

THE BAKER COMPANY

OPERATOR'S MANUAL

SterilGARD® III Advance^o Class II, Type A1 Biological Safety Cabinet

MODEL

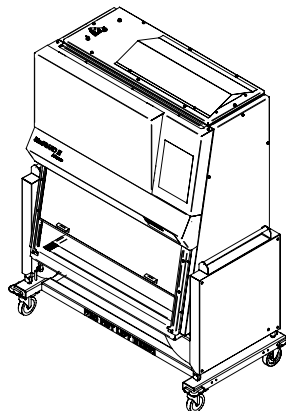
SG403A / SG603A with 12" SASH OPENING

CONFIGURATIONS

Animal Transfer Station (ATS)

Waste Disposal Unit (WDU)

Necropsy



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 biological safety cabinets. 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 SterilGARD®III Advance° cabinet includes many unique features which are included to give you superior performance, simpler maintenance and lower life cycle cost. Your SterilGARD®III Advance° cabinet is designed for both safety and value.

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 revolutionary ergonomic design will help prevent repetitive motion injury, reduce fatigue and lab accidents and enhance productivity.

Please note that all open-front containment cabinets, including this one, are for use with low to moderate risk agents only. Open-front cabinets do not provide absolute protection for the user. 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 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 SterilGARD®III Advance° 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,



Dennis Eagleson
President, CEO
The Baker Company, Inc.

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I - FUNCTION OF THE STERILGARD®III ADVANCE°

The SterilGARD®III Advance° is a Class II, Type A1 biological safety cabinet of original design. It features vertical laminar airflow and a front access opening. The unit is designed to protect not only the environment and the people using the cabinet, but also the product within from airborne contaminants.

Airflow Inside the Biological Safety Cabinet

Room air enters the front access opening of the cabinet then enters the front work surface perforation. Most of the HEPA filtered down flow air passes through a diffuser 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 HEPA filtered down flow air in the work area splits at the work surface. Some of the air enters the rear work area perforation while the remainder of the air enters the front work surface perforation. The air is pulled through the drain pan area, up the rear and side wall plenums, to the cabinet blower. The air is then pushed into the positive pressure plenum. At that point most of the air is pushed through the down flow HEPA filter while the remainder is exhausted out the exhaust HEPA filter and through a perforated filter protector at the top of the cabinet. [Reference Fig.1]

Unique features that contribute to airflow performance

The SterilGARD®III Advance° cabinet features a momentum air curtain. The stainless steel metal diffuser just below the supply HEPA filter creates a faster airflow behind the sash than over the work area. The faster airflow in front makes an effective air barrier.

Another feature of the unique Baker design is the high velocity return air slots, which maximize the cabinet's protective capability. It is generally accepted that maintaining containment and a particle free work area is most difficult in the area in which airflow turbulence is greatest — at the intersection of the side walls, the front access opening and the work surface. Turbulence caused by friction will also be found along a cabinet's side walls. In cabinets without high-velocity return air slots, this turbulence may also allow contaminants to escape from the work area, or it may make it possible for unfiltered room air to enter the work area.

The Baker high-velocity return air slots are located along the side walls of the work area opening. Air is drawn into the slots at very high speed, preventing the escape of particulates and ensuring that no unfiltered air enters the work area. Additional high-velocity return air slots are located at the top of the sliding window to prevent gases, vapors or particulates from coming up behind the window and escaping into the laboratory. In the same way, they prevent room air from migrating down behind the window and contaminating the work area.

The airfoil design at the bottom of the sash opening has been designed to maximize containment while allowing comfort when performing procedures in the cabinet. The need for the airfoil in effective biological safety cabinet design has been documented in research conducted by Baker and has continued this tradition with the SterilGARD®III Advance°.

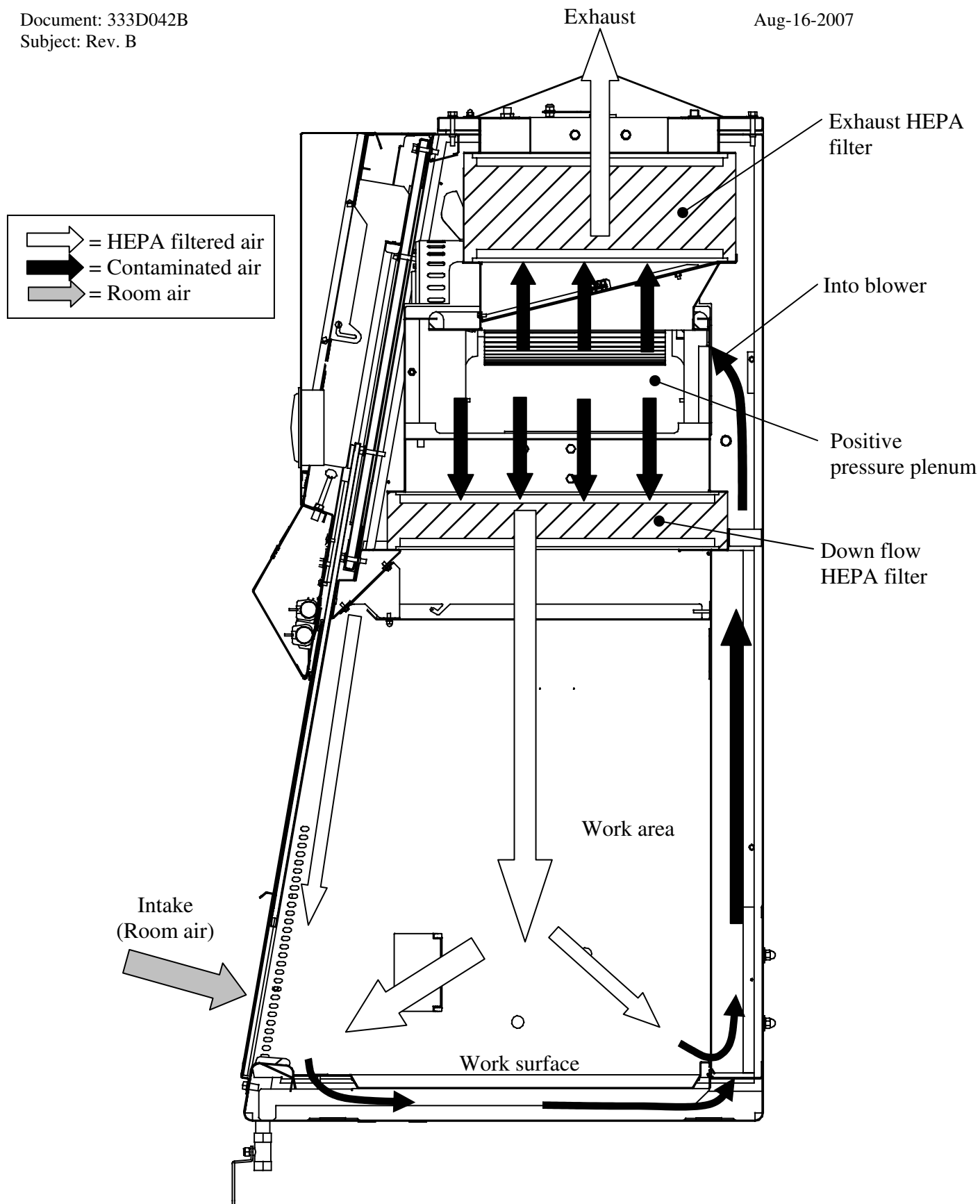
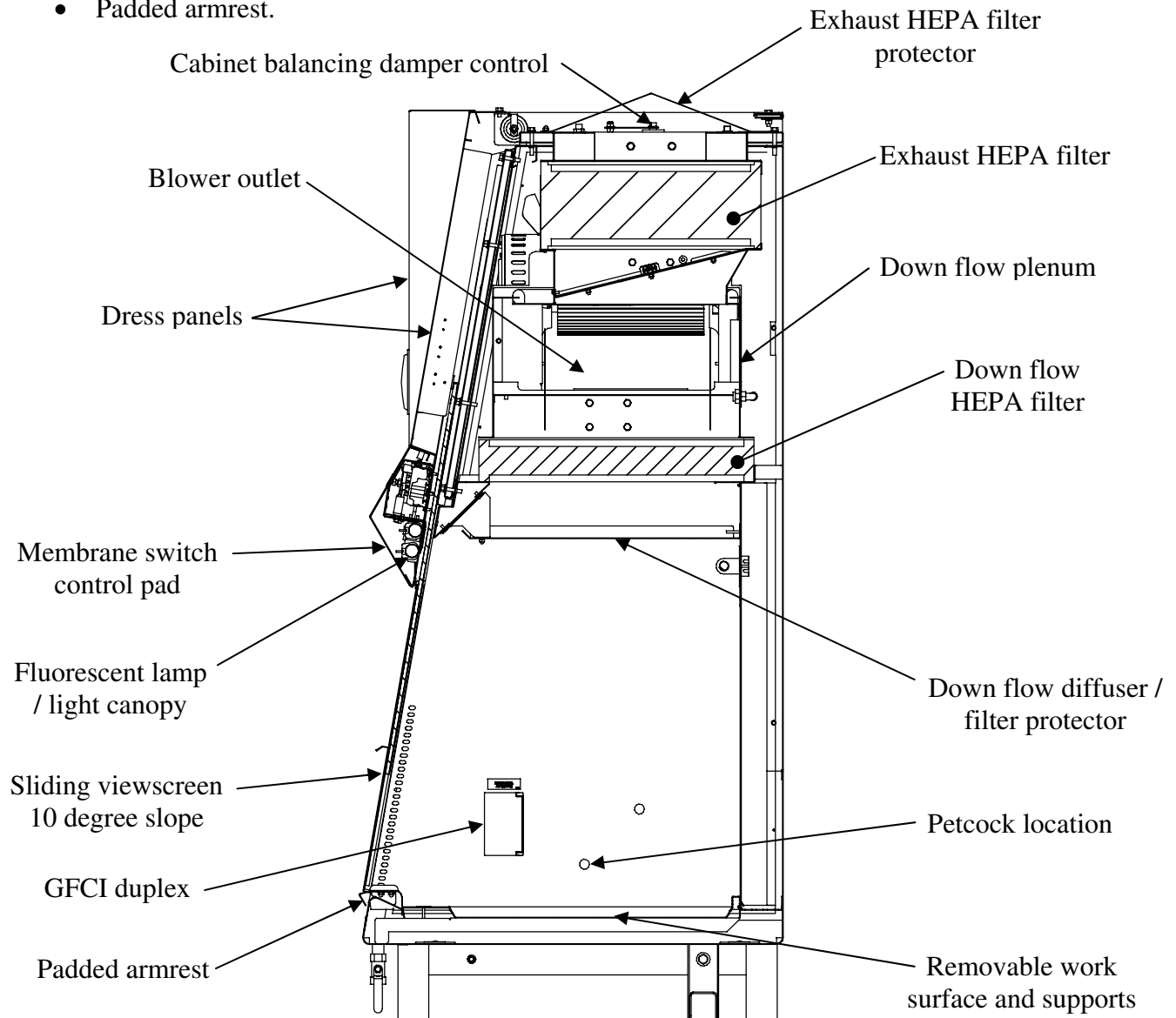


Fig. 1 Airflow Inside Cabinet

Base Features

- Performs to NSF 49 standard for Class II, Type A1 biosafety cabinet.
- HEPA filtration of air before it enters the work area.
- Front accessibility to electrical components, lamp, blower, and filters.
- Sliding viewscreen sloped 10 degrees for worker comfort.
- Removable work surface and supports for easy cleaning of the drain pan area.
- Adjustable heights stand with 5 inch diameter casters.
- Down flow filter diffuser / protector.
- Membrane switch control pad.
- GFCI protected duplex (2).
- Fluorescent lamp.
- Petcock on right hand wall.
- Padded armrest.



Cabinet Pressure Plenums

The cabinets work area is surrounded by negative pressure and all external seals are under negative pressure. All internal positive pressure plenum seals are surrounded by negative pressure plenums.

Design Details

Motor/ blower capacity

A motor/blower's capacity is measured by its ability to provide a nearly constant volume of air as resistance increases because of filter loading. Verification by a simulated filter-loading test has established that your SterilGARD®III cabinet is capable of automatically handling a 60% increase in pressure drop across the filter without reducing total air delivery more than 10%. With the use of the manual speed control, a 180% increase in the pressure drop across the filter can be handled. This results in extended filter life, which relates to significant cost savings over the life of the cabinet.

Air balance adjustments

Air balancing can be done by either of the following methods. However, only a technician with proper training and equipment should do it.

- The cabinet speed controller adjusts for build voltage differences and filter loading. It controls the total air volume being moved inside the cabinet.
- The internal cabinet balancing damper compensates for down flow and exhaust imbalances due to pressure drop differences between the filters when they are replaced.

Tested HEPA filters

All filters in the cabinet are scan-tested HEPA filters. They are 99.99% effective on particles of 0.3 micron size. Each filter is leak checked after installation to assure that there are no leaks greater than 0.01% of the upstream concentration.

Easy filter access

For convenience and ease of service, all filters are front accessible. The down flow and exhaust filters can be removed through an access panel located behind the dress panels in the front of the cabinet. Qualified technicians should only 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 7/16" [11.1mm] radius (rounded) 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.

Towel guard

The towel guards are located under the work surface at the bottom rear and sides of the return-air

plenums. Acting as a protective screen, integral to the interior walls, they help prevent wipes and other paper materials from being drawn into the blower system. They need to be kept clean at all times.

All-metal plenums

The plenums are constructed entirely of carbon and 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.

Drain pan

The drain pan is designed with 7/16" [11.1mm] radius in all four bottom corners to facilitate cleaning and disinfection. Drainage is provided by a 1/2" [12.7mm] diameter stainless steel ball valve located at the bottom of the drain pan.

Prefilters

Located under the workarea worksurface along the back wall and side walls for easy cleaning. These prefilters are made of Scottfoam material which trap dust and large particles, prolonging the cabinet's HEPA filters. These filters are a washable, reusable type.

Viewscreen

The cabinet's 1/4" [6.35mm] safety plate glass sliding viewscreen may be opened to 19 3/8" [492.1mm] for placing of large items in the work area, and maybe fully closed for system shutdown or UV light operation.

Work area lighting

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

Electronic ballast

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

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 also can be autoclaved.

UniPressure plenum

A telescoping all steel positive pressure plenum provides a more even clamping force on the HEPA filter frames and helps deliver the down flow air more uniformly. The plenum can be easily telescoped for quick

Motor / Blower assembly

The motor and blower are assembled on a slide plate. This allows the assembly to be easily removed from the positive pressure plenum for faster servicing or replacement.

Cable ports (Optional)

A cable port is located in the cabinet's left and right side walls. It 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 viewscreen access opening. A plug is provided for each port, when the port is not being used or the cabinet is being decontaminated.

Specifications

Weight

Model	CABINET WEIGHT	SHIPPING WEIGHT
SG403A-ATS	700 lbs [3114 N]	1,200 lbs [5338 N]
SG603A-ATS	900 lbs [4003 N]	1,400 lbs [6228 N]
SG403A-WDU	700 lbs [3114 N]	1,200 lbs [5338 N]
SG603A-WDU	900 lbs [4003 N]	1,400 lbs [6228 N]
SG603A-Necropsy		

Electrical Specifications

All electrical wiring should comply with the National Electrical Code and any applicable Local Electrical Codes at the site of installation.

A single 115V AC, 20A, 60 Hz, 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:

Model	Typical Current (Amps)	Hydraulic Lift Current (Amps)
SG403A-ATS	13.0	2.0
SG603A-ATS	15.0	2.0
SG403A-WDU	13.0	2.0
SG603A-WDU	15.0	2.0
SG603A-Necropsy	15.0	2.0

The unit is furnished with one 14' 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 to 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. For the SG403A the breaker allows 5A total on all outlets. For the SG603A the breaker allows 3A total on all outlets.

The cabinet is provided with an optional lift that requires 115V AC at 2 Amps intermittent duty. The lift duty cycle is 1 minute on, 9 minutes off.

The cabinet incorporates the Baker StediVOLT[®] blower motor speed control. This compensates for normal variations in incoming line voltage.

The cabinet may be provided with an optional UV lamp. The UV lamp and Fluorescent lamp are interlocked to prevent simultaneous operation.

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:

- Indoor use
- 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, Annex J
- 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.

Hydraulic Lift Stand

The hydraulic lift stand provides the following range of heights:

	Knee Space Height	Work Surface Height	Overall Height
Minimum Setting	19 ¹¹ / ₁₆ "	21 ¹¹ / ₁₆ "	81 ³ / ₄ "
Maximum Setting	39 ¹ / ₁₆ "	41 ¹ / ₁₆ "	100 ³ / ₄ "

The cabinets have an optional adjustable hydraulic lift stand to adjust the work surface height to accommodate the ergonomic requirements of any user, standing or sitting. It adjusts at the touch of a button, using a remote control attached to the unit. A separate adjustable ergonomic footrest is also available as an option.

Casters

The cabinets are equipped with 5" diameter casters with a locking mechanism. This allows for the unit to move easily from room to room when the lift is at its lowest setpoint.

Telescoping stand with adjustable feet. (optional)

The optional support stand provides the following range of heights:

Stand w/ adjustable feet	Knee Space Height	Work Surface Height	Overall Height
Minimum Setting	28 ¹ / ₈ "	30 ¹ / ₈ "	91 ¹ / ₄ "
Maximum Setting	36 ⁵ / ₈ "	38 ⁵ / ₈ "	99 ³ / ₄ "

The stand is also shipped disassembled, providing a smaller package for shipping, handling and installation. The stand is easily assembled and attached on site to support the cabinet. ***Instructions on assembling and installing the stand are packed in the cardboard box with the stand.***

Telescoping stand with castors. (optional)

The optional support stand with castors provides the following range of heights:

Stand w/castors	Knee Space Height	Work Surface Height	Overall Height
Minimum Setting	28"	30"	91 ¹ / ₈ "
Maximum Setting	34"	36"	97 ¹ / ₈ "

The stand is also shipped disassembled, providing a smaller package for shipping, handling and installation. The stand is easily assembled and attached on site to support the cabinet. ***Instructions on assembling and installing the stand are packed in the cardboard box with the stand.***

II - PREPARING THE STERILGARD®III ADVANCE⁰ FOR USE

Checking the Cabinet Upon Arrival

Upon receipt of your new SterilGARD®III cabinet, first inspect the exterior of the crate, box and/or skid. If there is any broken glass or other visible damage, that fact should be noted on the receiving slip and immediately reported to the delivering carrier.

Next, remove the packing material and inspect the cabinet itself. Remove the cabinet from the skid with a forklift or other available equipment. If any concealed damage is found it should be reported to the delivering carrier. A claim for restitution should be filed within 15 days.

The Uses of a Biological Safety Cabinet

The SterilGARD®III Advance⁰ 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. 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 accord 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

The ideal location for any laminar flow 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. [For more information, contact Baker]

If the cabinet exhausts air into the laboratory instead of venting to the outside, it is important that there is adequate space between the top of the cabinet and the ceiling. A solid ceiling located too close to the exhaust filter will restrict the air and limit the intake velocity. The cabinet exhaust opening should be no closer than 3" [76.2mm] from the ceiling, to enable proper airflow. Consult with our Customer Service Department for the implications of this, and for alternatives.

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 protective container from around the cabinet.
2. Remove the strapping that holds the cabinet to the pallet and the plastic covering, and remove the cabinet from the pallet.
3. Remove the tape that secures the front dress panel.
4. The viewscreen guide, light canopy and front 10° dress panel are shipped with locking bolts. Upon installation, remove these locking bolts and replace them with thumb screws which are packed in the workarea.

Please note if the cabinet is being exhausted to the outdoors, a flexible exhaust connection will be required to use the lift mechanism.

The SterilGARD®III cabinet can operate with filtered exhaust air entering directly into the room, or with filtered exhaust ducted to the outdoors.

Exhaust into the room

1. Never use the top of the cabinet or the work area for storage purposes.
2. Never use flammable, explosive or toxic vapors/gases, or substances which generate them, unless a qualified safety professional has evaluated the risk. The filters only remove particulates and not gases.
3. Keep the exhaust filter guard on the cabinet. It will help protect the filter from objects being dropped on it and keep the cabinet spaced from the ceiling or other objects so it can exhaust properly.

Ensure that the exhaust filter guard is properly installed over the filter opening. The filter guard will provide the following advantages:

- Provide adequate space between filter opening and ceiling for proper airflow.
- Prevent potentially damaging objects from being dropped onto the filter.
- Prevent objects from being placed over the exhaust opening and reducing the exhaust flow rate.

Model	Sash Opening	Exhaust Volume
SG403A-ATS	12" [304.8mm]	365 CFM (+/-5%) [172 L/sec]
SG603A-ATS	12" [304.8mm]	554 CFM (+/-5%) [261 L/sec]
SG403A-WDU	12" [304.8mm]	365 CFM (+/-5%) [172 L/sec]
SG603A-WDU	12" [304.8mm]	554 CFM (+/-5%) [261 L/sec]
SG603A-Necropsy	12" [304.8mm]	554 CFM (+/-5%) [261 L/sec]

Cabinet Exhausting into the Room

Connecting the Exhaust for Ducting Outdoors

To facilitate connections to an in-house exhaust system, use one of the following:

The optional CEC (canopy exhaust connection) and HEC (hard exhaust connection) both mount directly over the exhaust filter, include an access panel for leak checking the filter and terminate to a 10" [254mm] diameter vertical collar which can be directly connected to standard duct work. We recommend an airtight damper on the (HEC), and a decon box and decon seal plate for the CEC to aid in sealing the cabinet for decontamination.

Model	Sash Opening	Exhaust Flow Rate (Approximate - CFM)	* Suction Min/Max (Inches W.C.)
SG403A-ATS	12" [304.8mm]	438 / 614 [207 / 290 L/sec]	0.09 / 0.40 [22.4 / 99.6 Pa]
SG603A-ATS	12" [304.8mm]	665 / 1015 [314 / 479 L/sec]	0.20 / 0.50 [49.8 / 124.5 Pa]
SG403A-WDU	12" [304.8mm]	438 / 614 [207 / 290 L/sec]	0.09 / 0.40 [22.4 / 99.6 Pa]
SG603A-WDU	12" [304.8mm]	665 / 1015 [314 / 479 L/sec]	0.20 / 0.50 [49.8 / 124.5 Pa]
SG603A-Necropsy	12" [304.8mm]	665 / 1015 [314 / 479 L/sec]	0.20 / 0.50 [49.8 / 124.5 Pa]

Exhaust Requirement for a CEC

** Note: Water column suction is measured directly above the cabinet exhaust outlet before any dampers, elbows or other restrictions.*

Model	Sash Opening	Exhaust Flow Rate (Approximate - CFM)	* Suction Min/Max (Inches W.C.)
SG403A-ATS	12" [304.8mm]	365 [172 L/sec]	0.08 [19.9 Pa]
SG603A-ATS	12" [304.8mm]	554 [261 L/sec]	0.16 [39.8 Pa]
SG403A-WDU	12" [304.8mm]	365 [172 L/sec]	0.08 [19.9 Pa]
SG603A-WDU	12" [304.8mm]	554 [261 L/sec]	0.16 [39.8 Pa]
SG603A-Necropsy	12" [304.8mm]	554 [261 L/sec]	0.16 [39.8 Pa]

Exhaust Requirement for a HEC

** Note: Water column suction is measured directly above the cabinet exhaust outlet before any dampers, elbows or other restrictions.*

You may want to install an indicator light or some other safety device to give warning if the exhaust system fails. For more details, please contact The Baker Company.

While the cabinet contains an internal damper to adjust for variations in filter resistance and sash opening size, the building exhaust system should contain provisions to adjust the building system flow and pressure.

Whenever possible, the filtered exhaust should be connected to its own separate exhaust system. If it must be channeled into a ganged exhaust system, make sure that the system is not a recirculating one.

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. When present, petcocks are piped within the cabinet. The external connection uses 3/8" tubing compression fitting at the rear, top or bottom of the cabinet outer sidewall seal panel. Connection to plant utilities should be made per NFPA by qualified personnel with proper materials and technique. ***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 an 115 Volt AC, 60 Hz, 20 amps dedicated utility outlet.
3. Thoroughly clean the interior of the cabinet. Locate sash at correct access opening height of 12" [304.8mm].
4. Turn on the Blower. The indicator light will illuminate and the running blower will make an audible sound.
5. Turn on the Fluorescent Light. The indicator light will illuminate along with the interior work area. **(NOTE: The Fluorescent Light will not come on unless the blower switch is on. The Fluorescent Light and UV Light are interlocked so they cannot operate simultaneously.)**
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. The Fluorescent Light and UV Light are interlocked so they cannot operate simultaneously.)**

7. Cycle the lift stand up and down with the remote control, making sure the systems works smoothly.
Caution: When raising the cabinet, be careful not to damage the laboratory ceiling.
8. 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 unit, especially if it is connected to an exhaust system. A description of these tests can be found in Section 4, "On-site Checks and Maintenance."
9. It is also recommended that all personnel who will be using the cabinet study this Operator's Manual to learn how to use the cabinet most effectively. For additional start up and use procedures, please turn to Section 3, "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.

III - PROPER CABINET USE

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

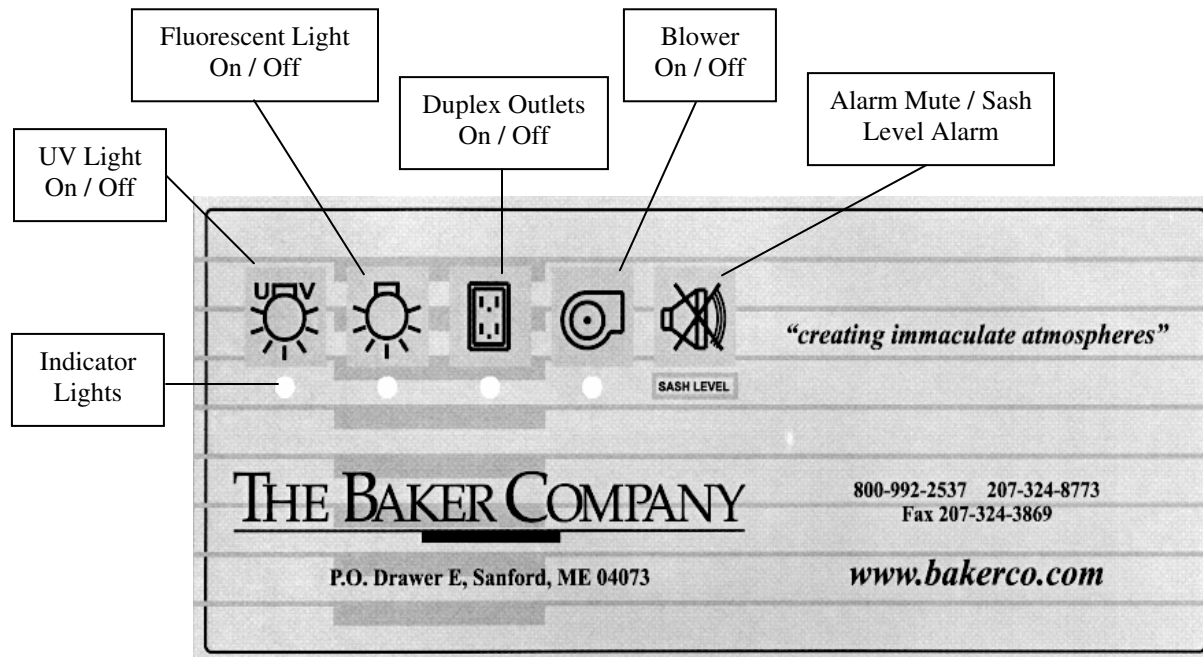
If the cabinet is not understood and operated correctly it will not provide an adequate protective barrier. To insure operator safety the cabinet must be installed and operated per the manufacturer's instructions.

All activities that are to be performed in your 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 see 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 electrical panel of the cabinet. A number of switches are arranged in a single membrane switch assembly. [Reference Fig. 2]



Note: See pg. 21 for Delay off Time Functions

Fig. 2, Operator Controls

- Ultraviolet (UV) Light On / Off [Optional] – A bulb, which produces light in the ultraviolet range, may be used to help disinfect the work area. 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.** The Fluorescent Light and the UV Light are interlocked. When the viewscreen is closed, turning the UV Light On will automatically turn the Fluorescent Light Off. Turning the Fluorescent Light On will automatically turn the UV Light Off. The UV light will also automatically shut off if the viewscreen is opened. A yellow indicator light located below the switch will illuminate when the switch is on.
- Fluorescent Light On / Off – This switch controls operation of the Fluorescent Light. **The cabinet blower must be on for the Fluorescent Light to operate.** The Fluorescent Light and the UV Light are interlocked. When the viewscreen is closed, turning the UV Light On will automatically turn the Fluorescent Light Off. Turning the Fluorescent Light On will automatically turn the UV Light Off. A Blue indicator light located below the switch will illuminate when the switch is on.
- Duplex Outlets On / Off – This switch controls the duplex outlets in the work area. A Blue indicator light located below 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 below 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 12” [304.8mm]. The sash alarm will be activated whenever the viewscreen is raised above or lowered below this level. To mute the audible alarm, press the alarm reset button. The indicator light located below the switch will continue to flash. After five minutes, if the conditions persist, 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.

Programmable Delay off Time Function

The following procedure can be used to program a Delay Off time for UV, outlets, or fluorescent lights:
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. (e.g. pressing the pushbutton 3 additional times would set the delay to 60 minutes, 15 min. 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. (e.g. 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. If the cabinet has not been left running continuously, turn on the blower. An indicator light located below the switch will illuminate when the switch is on. Listen for the sound of the cabinet blower running. Check the readings on the Magnehelic gauge, it should read a pressure consistent with the last time the cabinet was on.
2. Turn on the fluorescent light. The fluorescent light will not operate unless the Cabinet Blower is On.
3. Check to determine that the drain valve is in the closed position or the drain coupling is capped.
4. 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.**
5. 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.
6. After your equipment is in place inside the cabinet, adjust the sliding viewscreen so it is open to the correct opening height 12" [304.8mm]. An alarm will signal if you are not at the proper opening. This is important to maintain proper cabinet airflow.
7. You can begin working in the cabinet after it has run for at least three minutes with the viewscreen in the proper position.

Working in the Cabinet

1. 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.
2. Perform all work on the depressed area of the solid work surface. Work with a limited number of slow movements. Since all of the equipment you need is already in the cabinet, it will not be necessary to move your arms in and out through the air barrier.
3. 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.
4. Avoid using floor-type pipette discard canisters. It is important that your 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.
5. Because of the restricted access, pipetting within the cabinet will require the use of pipetting aids.
6. 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.
7. 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.
8. **Never operate your cabinet while the viewscreen alarm indicator is on.** The operating position of the sash provides an 12" [304.8mm] 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.
9. 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.
10. After you have removed all materials, 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.**

11. We recommend 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.

Ultraviolet Germicidal Lamp (optional)

Ultraviolet lamps lose their effectiveness over time and should be replaced when intensity drops below 40 microwatts per cm² at the work surface. Check regularly.

WARNING

- UV light is hazardous, Do not defeat 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.

Cable Ports (Optional)

A cable port is located in the cabinet's left and right side walls. It 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 viewscreen access opening. A plug is provided for each port, when the port is not being used or the cabinet is being deconed.

It is important not to overload the port with too many cables/tubing. Cables/tubing in the work area need to be suspended on cable hooks provided. The hooks are located along the interior rear wall. This keeps the cables/tubing from affecting the airflow in the work area and placing unwanted stress on the cable port gaskets. [Reference Cable Port Illustration in appendix]

Waste Disposal Unit

The waste disposal system utilizes a double bagging process. The inner bag is connected to a removable collar that is located at the cabinet's work surface. The outer bag is connected to a fixed collar located under the cabinet's drain pan. Bands can be used to hold the bags to the collars. Covers are provided at the work surface and under the drain pan to cap the waste disposal openings when not in use.

Waste Disposal Bag Removal process

Important: Before starting this process be sure to clean up the work area.

1. Lift the removable collar out of the work surface opening to expose the top of the inner bag's connection to the collar.
2. Remove the band that holds the inner bag to the collar.
3. Pull up slightly on the inner bag opening then tightly close it off. Push the bag back down into the outer bag.
4. Remove the band holding the outer bag to the cabinet's collar and slide the trash receptacle out from under the cabinet.
5. Close off the top of the outer bag and dispose of it according to lab protocol.

Waste Disposal Bag Insertion process

1. Place a disposal bag in the trash receptacle and slide it under the cabinet's waste disposal opening.
2. Attach the bag opening to the cabinet's fixed collar using a band.
3. Insert a disposal bag into the outer bag through the opening at the work surface.
4. Attach the removable collar to the inner bag opening using a band. Set the collar down into the waste disposal opening until it rests flat with the work surface.

Important: When the waste disposal is not in use the disposal opening should either be covered or the bags left in place so that there is no opening to the room by which contaminants could exit the cabinet.

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 NSF/ANSI Standard 49-2004 ANNEX G "Recommended Microbiological decontamination Procedure", NSF International, 789 North Dixboro Road, P.O. Box 130140, Ann Arbor, Michigan 48113-0140.

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 SG403A & SG603A cabinets are 49 and 78 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.

Decontamination procedure

WARNING

Only qualified technicians should perform this procedure.

1. Surface-disinfect the inside of the window and all other surfaces on the view screen assembly.
2. Multiply the total volume of the cabinet (49 or 78 ft³) by .3 gram/ft³ of space to determine the amount of paraformaldehyde required to decontaminate the cabinet. If the cabinet is vented to the outside you must consider the volume of the duct work in the paraformaldehyde calculation.
3. 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.**
4. The inside cabinet work space should be at room temperature with 60% to 85% relative humidity. If relative humidity is low (10 to 30%) add a pan of boiling water on the work surface. If it is (40% to 55%) add a pan of hot tap water on the work surface. Relative humidity above 85% will require extra clean up which will be covered in step 15. **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.**
5. Place a heating mantle with paraformaldehyde in the work space. The heating mantle must be able to reach 450 degrees F and must have a grounded plug that should be plugged in to an outlet outside the cabinet.
6. **This step is optional.** Place a second heating mantle in the cabinet with 10% more by weight of ammonium bicarbonate than paraformaldehyde. This will be used later in step 13 to neutralize the formaldehyde gas.
7. **This step is recommended.** Place spore strips inside the cabinet to confirm that the decontamination process has been successful.
8. If the cabinet is vented to the room, use a sheet of plastic and seal the front access and exhaust port openings. These openings should be sealed such that the exhaust airflow recirculates back to the

- front access opening. This will promote the even distribution of formaldehyde gas throughout the cabinet.
9. If the cabinet is vented to the outside, then the exhaust transition should have a means to recirculate the exhaust airflow back to the cabinet blower. This will promote the even distribution of formaldehyde gas through the exhaust filter. Seal the front access opening.
 10. Turn on the heating mantle containing the paraformaldehyde flakes.
 11. After 25% of the paraformaldehyde has depolymerized, turn on the cabinet blower for 10 to 15 seconds. Repeat after 50%, 75% and 100% of the paraformaldehyde has depolymerized.
 12. Allow the formaldehyde gas a minimum residence time of 12 hours, preferably over night.
 13. Turn on the heating mantle containing NH_4HCO_3 and the cabinet blower and allow the two gases to circulate for at least one hour. Then vent the cabinet to the outside.
 14. Aseptically remove spore strip and place in Trypticase-soy broth and incubate for 7 days. No growth will verify the decontamination process.
 15. 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.

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 will be 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 Filters

The High Efficiency Particulate Air (HEPA) filter is one of the essential components of a clean air cabinet. It is the shield, which stands between the product and the environment.

The HEPA filter consists of a continuous sheet of glass fibers pleated and mounted in a rigid frame. It is 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 for more information).

It must be pointed out that the HEPA filter is **not** intended to filter gasses or vapors, nor are they 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.

IV - ONSITE CHECKS AND MAINTENANCE PROCEDURES

We recommend 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. Our 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. Your copy of the test report, which you will find at the back of this manual, gives the factory test results for your own SterilGARD® III cabinet. Use it as your record of the original testing, and as your guide to testing in the future. To gain many years of satisfactory service, please be sure that your maintenance personnel come as close as possible to duplicating these original test figures.

Your test procedures should be identical to ours so that achieving similar test results and comparison of data will be possible. Please correspond directly with us to request detailed procedures for your particular cabinet model. Alternate testing procedures can be found in the NSF International Standard No. 49.

The Airflow Balance

WARNING

Only qualified technicians should perform this procedure.

The airflow balance, which is set at the factory, provides your 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. If the window is set above or below this height an alarm will sound.

2. Intake Velocity

Specific details for acquiring the intake velocity readings are illustrated on the cabinet instruction label affixed to the front of your cabinet. There are two methods that can be used to obtain the correct intake velocity readings on your SterilGARD III Cabinet. The "Primary Method" is the recommended method where a direct inflow measurement or "DIM" is sealed directly to the front access opening to acquire the cabinet airflow rate. If the Primary Method cannot be used due to the absence of a DIM or minimal space at the cabinet front, the "Secondary Method" must be used. This method is completed by lowering the window sash opening to three inches and using a thermal anemometer to take a set of readings across the reduced opening. The average of these readings is then used to calculate the actual intake velocity as shown in the example below. **(IMPORTANT: This is only an example. Please refer to the data plate affixed to your cabinet)**

$$\begin{array}{c}
 \begin{array}{cc}
 \text{3" Window Opening Area} & \text{Correction Factor} \\
 \downarrow & \downarrow \\
 \begin{array}{c} \text{(3" SASH)} \\ \text{Traverse Vel. X} \\ \text{Avg.} \end{array} & \frac{0.958 \text{ FT}^2(0.089\text{m})^2}{2.56 \text{ FT}^2(0.237\text{m})^2} + 10 \text{ FPM} \\
 & (0.05)\text{M/S} \\
 \uparrow & \\
 \text{8" Window Opening Area}
 \end{array}
 \end{array}$$

Example: SterilGARD 403A with 8" sash opening

3. Finally, a correction factor is added to this value which again is noted on the airflow data plate affixed to the front of your cabinet.
4. **Down flow Velocity**
NOTE: The IV bar and UV light bulb need to be removed before measuring downflow readings.
 Your cabinet was tested at the factory using a uniform grid pattern. Specific details of this pattern and values are illustrated on the cabinet data plate label affixed to the front of your cabinet. Refer to NSF /ANSI 49-2004 under "Annex F 2.3.1 Uniform Down Flow Cabinets" to obtain additional information.
5. Compare your results with those originally recorded at the factory.
6. Make adjustments to the blower speed controller and the damper as necessary. The speed controller is located inside the light canopy on the far left side. Turn the screw clockwise/ counterclockwise to increase/decrease flow. The damper is located inside the cabinet. An adjustment rod with indicator is positioned at the top of the cabinet on the left side. Using a proper wrench the damper can be opened or closed by turning the rod clockwise/counterclockwise to increase/ decrease flow. The chart below may aid with making the correct adjustment:

Condition		Adjustment	
Downflow	Inflow	Damper	Speed Controller
High	High		Decrease
Low	Low		Increase
Low	High	Close	
High	Low	Open	
OK	Low	Open	Increase
OK	High	Close	Decrease
Low	OK	Close	Increase
High	OK	Open	Decrease

NOTE: As the HEPA filters load up with particulates, airflow will be maintained automatically, at least until the filter resistance increases 50% or more. When airflow eventually diminishes, you will have to increase the blower speed in order to maintain the original volume of recirculating air. There is a speed control located in the light canopy. Turn it clockwise until you have the desired airflow. If

the airflow cannot be maintained, it will be necessary to replace the HEPA filters. (See "Procedure for HEPA Filter Replacement" later in this section).

Filter Leak & Smoke Testing

The filters in your cabinet were tested at our factory before shipment to ensure that the media, gasket, and frame were not exceeding NSF International Standard 49 allowable leak rates. Since filters may become damaged in transport, we recommend that the filters be re-tested by qualified technicians 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 International details the steps for performing the filter leak test in their Standard 49.

Filter leak test procedure – Down flow filter

1. Turn on cabinet blower.
2. Raise the viewscreen to the full open position.
3. Remove diffuser under down flow filter to access filter media and frame by removing two cap nuts at the front, lowering the front and sliding the diffuser forward off rear wall mounting studs.
4. The port for measuring upstream concentration is located on the top rear left hand side of the cabinet.

WARNING

If the cabinet has been in use then it must be decontaminated before removing the plug.

5. Introduce the aerosol challenge to the cabinet blower at the front work surface perforation.
6. Perform filter leak test per NSF 49.
7. Repair any discovered leaks.

Filter leak test procedure – Exhaust filter

1. Turn on cabinet blower.
2. If the cabinet has a CEC or HEC, remove the access panel for leak scanning the exhaust filter. If the cabinet is exhausting to the room, remove the exhaust filter protector.
3. The port for measuring upstream concentration is located on the top rear left hand side of the

cabinet.

WARNING

If the cabinet has been in use then it must be decontaminated before removing the plug.

4. Introduce the aerosol challenge to the cabinet blower at the front work surface perforation.
5. Perform filter leak test per NSF 49.
6. Repair any discovered leaks.

Airflow Smoke Pattern Test

We recommend that qualified technicians 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 International details the steps for performing the airflow smoke pattern test in their Standard 49.

Maintenance Notes

Cleaning the Work Area

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

To wash the drain pan under the work surface, lift up and surface decontaminate the solid work surface, the perforated grille, and remove the 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 the way you approach the task. Make sure you close the drain valve when you are finished cleaning the drain pan.

Ultraviolet Germicidal Lamp (optional)

As reported in other sections of this manual, 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 your cabinet has a germicidal lamp, frequently measure its intensity at the geometric center of the work surface with an ultraviolet light meter. The appearance does not indicate UV effectiveness.

Checking the Magnehelic Gauge or Optional Air Flow Monitor (AFM)

Changes in areas surrounding the laboratory may produce unexpected dust or other conditions which affect the filters. To maintain filter integrity and good cabinet operation, check the Magnehelic gauge and AFM periodically.

Replacing the HEPA Filters

When the certifier can no longer set the cabinet air flows to within $\pm 5\%$ FPM of the nominal set point by adjusting the speed control and/or balancing damper then it may mean the filters are loaded with particles and must be replaced. If the filters are damaged, they will also need to be replaced.

Before any seal panels are removed, the cabinet should be decontaminated. The filters are sure to have collected microorganisms and other potentially harmful particles generated in the work area during their lifetime, and maintenance personnel should not allow themselves to be exposed. It should also be remembered that a specific gaseous decontamination might work against microorganisms, but not against chemical agents. Where chemicals are present, consult an industrial hygienist or other qualified person.

A chemically contaminated filter must be handled with caution. Clothing and/or breathing apparatus should be used to protect personnel as necessary to reduce the hazard. It is advisable to seal the contaminated side of the filter by taping a plastic sheet or cardboard over the face before removal. This should minimize the number of particles shaken loose from the filter. Once removed, the filter should immediately be sealed in a chemical hazard bag and then disposed of safely in accordance with 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. The cleaning materials, along with the protective gear and clothing should be properly disposed.

HEPA filters are very easily damaged, and you will want to use great care in handling so as to avoid injury to the filter media and gasket surfaces. When installing the new filters, it is a good idea to tape a piece of cardboard over the filter media to give protection against dropped wrenches or misdirected fingers. Of course, you'll need to make sure that the cardboard is removed before the access panels are re-installed. Inspect the filters carefully before and after installation. A broken or damaged filter is worthless.

For detailed instructions on changing the filters, see the following two sections.

Accessing the down flow and exhaust filters

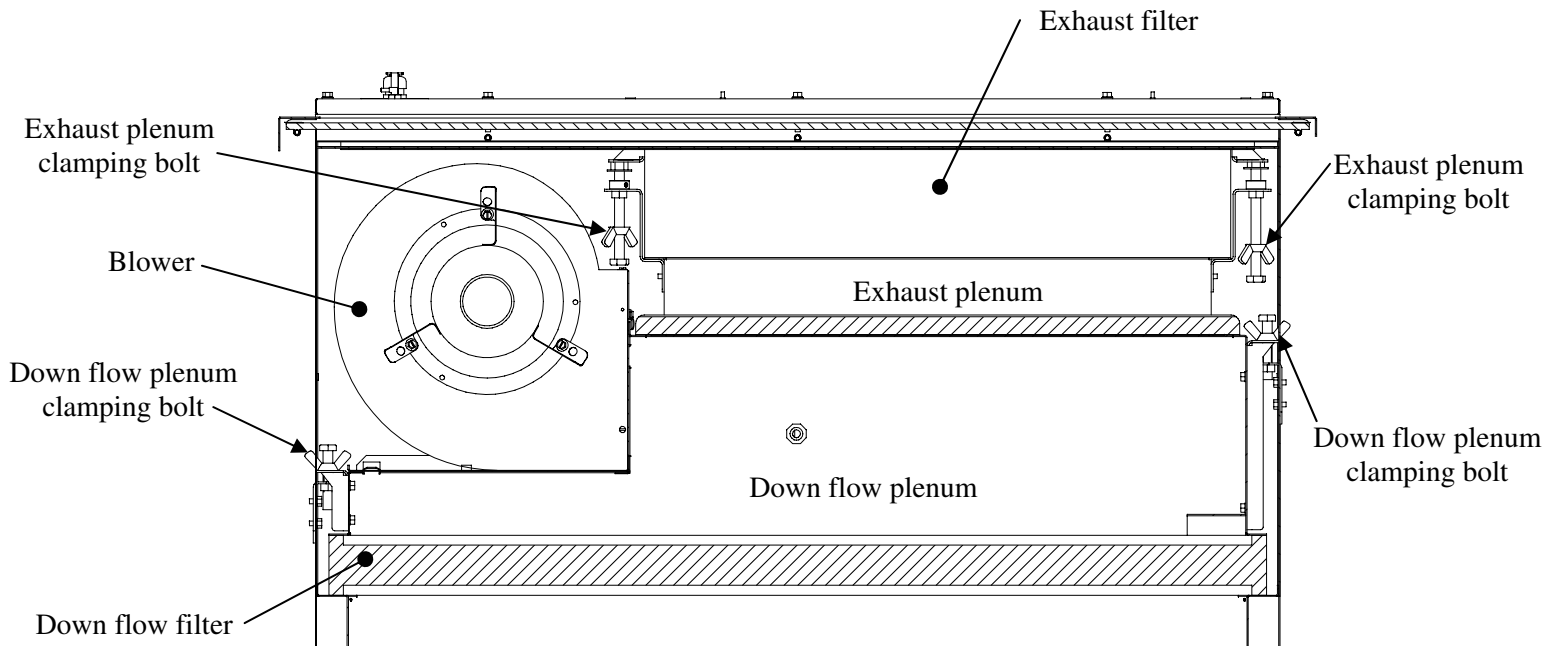
WARNING

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

1. Decontaminate the cabinet and disconnect power.
2. Close the viewscreen.
3. 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 it. Unplug tygon tube from the back of the magnehelic gauge. Firmly grip the bottom edge of the vertical dress panel with both hands, slide the panel to the right and lift the panel off the cabinet.
4. Remove the light canopy locking fasteners inside the sloped dress panel and lower the canopy. Make sure the canopy support cables on each end are secured.
5. Remove the two screws at the top and loosen the two lower lock nuts holding the sloped dress panel. Lift the panel off the cabinet.
6. Loosen the four lock nuts holding the electrical mounting board and carefully lift the board off. Lay it

face down inside the light canopy. (No electrical connections should need to be disconnected)

7. Loosen each of eight (10) 3/8" hex head bolts holding the front access panel. Be careful not to damage or loose the seal washer on each bolt when removing them. Remove the access panel. Be careful not to damage the panel gasket.
8. You now have direct access to change the down flow and exhaust filters.



Interior view of positive pressure plenum with blower and filters

Changing the down flow filter

1. Loosen the two (2) ½” hex head down flow plenum clamping bolts located on either side of the down flow plenum, alternating two or three revolutions at a time until the plenum is raised about ¼” [6.4mm]. This will allow the down flow filter to slide out the front towards you. If the filter gasket sticks to the cabinet, use a putty knife to break it free.
2. Slide the filter out the front towards you. Be careful not to contact the filter media.

WARNING

Once removed, the filter should immediately be sealed in a chemical hazard bag appropriately marked for the type of hazard and then disposed of safely in accordance with environmental regulations.

If you also need to change the exhaust filter, go directly to “Changing the exhaust filter” steps now.

3. Slide the new down flow filter all the way in until it stops against the rear filter stop, gasket side facing down. Be careful not to contact the filter media with your fingers. Position the filter so its frame is aligned with the cabinet frame.
4. Tighten the two (2) ½” hex head down flow plenum clamping bolts, alternating two or three revolutions at a time until the filter gasket is compressed approximately 1/8” [3.2mm].
5. Reassemble the cabinet following the previous instructions in reverse order.

IMPORTANT

When reinstalling the front seal panel, first tighten each ¼-20 hex cap screw until the bolt seal washer is engaged with the panel. **Next turn each bolt 1 ¼ to 2 ½ revolutions until the panel gasket is evenly compressed approximately half way. Do not over tighten. Use caution if using a power driven tool.**

6. Reconnect power.
7. Check the filter and gasket for leaks.

Changing the exhaust filter

If only the exhaust filter is to be replaced, the down flow plenum clamping bolts (lower) should be loosened four or more revolutions before loosening the exhaust plenum clamp bolts (upper).

1. Loosen the two (2) ½” hex head exhaust plenum clamping bolts located on either side of the exhaust plenum, alternating two or three revolutions at a time. This will lower the plenum and allow the exhaust filter to drop down and slide out towards you. If the filter gasket sticks to the cabinet, use a putty knife to break it free.
2. Slide the filter out towards you, making sure not to contact the filter media.

WARNING

Once removed, the filter should immediately be sealed in a chemical hazard bag appropriately marked for the type of hazard and then disposed of safely in accordance with environmental regulations.

3. Slide the new exhaust filter in 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 over the exhaust plenum.
4. Tighten the two (2) ½” hex head exhaust plenum clamping bolts, alternating two or three revolutions at a time until the filter gasket is compressed approximately 1/8” [3.2mm].
5. Tighten the two (2) ½” hex head down flow plenum clamping bolts, alternating two or three revolutions at a time until the filter gasket is compressed approximately 1/8” [3.2mm].
6. Reassemble the cabinet following the previous instructions in reverse order.

IMPORTANT

When reinstalling the front seal panel, first tighten each ¼-20 hex cap screw until the bolt seal washer is engaged with the panel. **Next turn each bolt 1 ¼ to 2 ½ revolutions until the panel gasket is evenly compressed approximately half way. Do not over tighten. Use caution if using a power driven tool.**

7. Reconnect power.
8. Check the filter and gasket for leaks.

Troubleshooting

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

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

1. Make sure that the building exhaust connection is operating at the proper static pressure and exhaust flow.
2. Verify that cabinet down flow is within specification.
3. Check to see if anything is blocking part of the intake or rear wall perforated.
4. Check for room cross drafts caused by vents, open windows, and high traffic through doorways. Eliminate the source of the cross draft.
5. The exhaust filter maybe loaded with particulate if the cabinet has been in service for some time. Decontaminate the cabinet and replace the filter.

When there is low down flow within the work area and through the exhaust filter-

1. Check the incoming line voltage. Low voltage may cause the blower to operate at a slower-than-designed speed. You may be able to compensate by adjusting the blower speed control clockwise until proper velocity is reached. The control is located inside the light canopy on the left side.
2. The filters maybe loaded with particulate if the cabinet has been in service for some time. If the blower speed control is turned up to maximum voltage and the airflow is still low, decontaminate the cabinet and replace the filters.

If there is no down flow within the work area-

1. Make sure the cabinet is plugged in and the blower switch is turned on. The Green indicator below the button should be lighted.
2. Check the wiring connections between the electrical panel and the cabinet to see if they are connected properly.
3. See if the light is working. If it is, then turn the blower switch off and let the cabinet set for ten minutes. This allows the motor time to reset itself, if it had overheated. *NOTE: If the motor restarts and there is a whining sound, the motor bearing maybe causing the motor to overheat.*
4. If these solutions do not correct the problem, or if the blower failed to start after the rest period, then the speed control, blower motor, relay, control board, switch, or capacitor is defective. A qualified electrician, using the wiring diagram in the Appendix of this manual, can by-pass the speed control to determine if it is defective.

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 below the button should be lighted.
2. Check the reset button on the Ground Fault Circuit Interrupter outlet. If the GFCI has tripped out, press the reset button. The outlets are also protected by a self-resetting thermal circuit breaker. A

qualified electrician, using the wiring diagram in the Appendix of this manual, can check this breaker.

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

1. Make sure the window is completely closed.
2. The Yellow indicator below the switch should be On and the Fluorescent Light should turn Off automatically.
3. Check for proper installation of the bulb in the lamp sockets.
4. Inspect the UV bulb; replace if necessary.
5. Have a qualified electrician check the power supply to the UV Lamp ballast.
6. If none of the above corrects the problem, the ballast may need replacing.

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

1. Open the electrical panel and check the multi-pin connectors to be sure they are securely engaged.
2. Check the speed controller for proper input power and output voltage consistent with the Test Report.
3. Remove the blower access panel and inspect the blower wheel for contact with the blower housing.
CAUTION: It maybe necessary to decontaminate the cabinet before removing the panel.
4. Check the blower for loose objects.

When the Viewscreen Sash Alarm is sounding-

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

1. Make sure the window is at the correct position. The alarm should be silent when the window is at the proper design opening or fully closed. You can silence the audible alarm for five (5) minutes by pressing the Alarm-Mute button. The indicator will continue to flash until the window is set in the correct position. After five (5) minutes, the alarm will sound again. You may press the Alarm-Mute button again.
2. Open the electrical panel and check to see if the proximity sensor cables are connected.

If the Fluorescent Light doesn't work-

1. The blower switch needs to be turned on, and the Blue indicator below the Fluorescent Light switch should be lit.
2. Open the electrical panel and check that the bulb is properly installed in the lamp sockets. If the lamp flickers and can be corrected by vigorous rubbing of the bulb, there is probably an improper ground.
3. Have a qualified electrician check the wiring and ballast for continuity. The wiring can be traced to the source of a break. If none of the above corrects the problem, the ballast may need replacing.

If the magnehelic gauge has high or low readings-

NOTE: Always check for correct airflow balance first.

A higher reading than what was originally recorded on the cabinets test report could be an indication of the following:

1. Blocked or partially obstructed work surface perforation (front and/or rear).

2. Towels or wipes are blocked the towel guards in the drain pan area.
3. The viewscreen is in the closed position and the in-house exhaust fan is still pulling air through the cabinet.
4. Incorrect airflow balancing.

A lower reading than what was originally recorded on the cabinets test report could be an indication of the following:

1. Blocked or partially obstructed filters.
2. Work surface has been removed.
3. Incorrect airflow balancing.

SG403A/SG603A DISASSEMBLY INSTRUCTIONS

NOTES: *Refer to diagram on Page 28 for blower, filter and plenum configuration.*

For Motor/Blower removal, follow steps 1-18.

For filter removal, follow steps 1-15 & 21-23

TOOLS REQUIRED: (1) 3/8" Spin Wrench (2) 3/8" Socket and Drill (3) 3/4" Wrench and (4) 1/4" Spin Wrench

DISASSEMBLY:

Disconnect Power Source!

1. Remove front cover.
 - A. Lift out at the bottom enough to disconnect the magnehelic gauge hose.
 - B. Lift out at the bottom and carefully lift up and away from the unit.
2. Remove the thumb screws that retain the face frame to the canopy (located inside of the front cover frame).

NOTE: Lower the sash to the closed position.
3. Drop the canopy down on its restraint cables and disconnect the limit switch wires.
4. Disconnect the canopy wires from the circuit board on the right hand side of the canopy.
5. Remove cable from relay.
6. Disconnect the restraint cables from the face of the unit and lift off the canopy at the bottom.
7. Remove the two retaining bolts at the top of the unit that secure the "information center" panel.
8. Loosen the four retaining nuts on the outer edges of the breadboard panel that houses the electrical components.
9. Disconnect the cord assembly at the top of the unit that goes up from the breadboard assembly.
10. Disconnect plug on left side.
11. Lift off the whole breadboard assembly with the cord assembly attached, and store in a safe place.
12. Remove "information center" panel.
13. Remove the window by lifting up and out. Store in a safe place.
14. Using a 3/8" drive socket and drill, remove ten retaining bolts from the front access panel. Remove the center top bolt last.
15. Loosen the track retaining bolts and remove the tracks by sliding out horizontally.
16. Blower/motor removal - remove one bolt, lock-washer and clip at the forward edge of the supply plenum.
17. Disconnect the motor leads by pulling apart at each connection.
18. Remove the blower by sliding it out the front.
19. Raise the lower supply plenum approximately 1/4" so that the filter can slide out.
20. Remove the supply HEPA filter by sliding out of the front.
21. Loosen the exhaust filter plenum by adjusting the two wing nut retaining bolt assemblies.

NOTE: Pull towards you on the L.H. retaining bolt and away from you on the R. H. retaining bolt.
22. Lower the exhaust filter until it clears the front top edge of the unit.

NOTE: Break the exhaust HEPA seal by lifting up gently at both front corners.
23. Pull exhaust filter straight out towards you.
24. Loosen the bolts on the inside of the exhaust plenum enough to allow the clamping hardware to angle out away from the slotted retaining brackets.
25. Remove the side panels - (7) retaining bolts per side.

26. Remove the 3/4" brass nuts from each petcock plumbing connection.
27. Repeat the process on the other side, if plumbing exits.
28. Lift out the worksurface using the pull tabs near unit sidewalls.

REASSEMBLY:

Use the disassembly instructions in reverse order.

Appendix

REPLACEMENT PARTS LIST

* = Note: Both GE and Baldor motors are qualified for this product. Please determine which brand you have prior to ordering replacement parts

<i>Part Name</i>	<i>Part No. SG403A</i>	<i>Part No. SG603A</i>
*Capacitor	*11558	*40816
Circuit Breaker – 3A & 5A	34331	34340
Exhaust HEPA Filter	40661	40662
Fluorescent Ballast	34160	40457
Fluorescent Lamp	17927	17927
Front Panel	333X604	336X604
Ground Fault Interrupter Outlet with Indicator Light	34921	34921
Lamp Holder, "Butt-On" Type	34465	34465
Proximity Switch lower/upper	40647/40671	40647/40671
Mag Gauge	20773	20773
Membrane Switch Controller (MSC Board)	40702	40702
Motor/Blower Controller	39658	39658
Relay, Solid State	1855167	1855167
Sash Balance	38014	38172, 38173
Side Panel, LH (POBM) Plumbing out the bottom	333X650	333X650
Side Panel, RH (POBM) Plumbing out the bottom	333X651	333X651
Standard Outlet	18231	18231
Supply Blower	11429	11418
Supply Diffuser	333P709	336P709
Supply HEPA Filter	40141	40142
*Supply Motor	*40931	*40814
Switch, Touch-Type/Overlay	42301	42301
Transformer	34327	34327
Ultraviolet Lamp	18024	18025
Ultraviolet Lamp Ballast	40899	40899
Ultraviolet Lamp Socket	20281/20283	20281, 20283
Viewscreen Assembly	333A310	336A310
Viewscreen Frame Assembly	333A311	336A311
Back Wall Prefilter	40628	40638
Side Wall Prefilter	40627	40627

HYDRAULIC LIFT STAND OPERATION

The hydraulic lift stand provides the following range of heights:

	Knee Space Height	Work Surface Height	Overall Height
Minimum Setting	19 ¹¹ / ₁₆ "	21 ¹¹ / ₁₆ "	81 ³ / ₄ "
Maximum Setting	39 ¹ / ₁₆ "	41 ¹ / ₁₆ "	100 ³ / ₄ "

Things to remember when using your SterilGARD III w/ Hydraulic Lift Stand:

Your SterilGARD III lift stand is designed for mobility in and between rooms. It comes with 5" diameter casters that have brakes. When attempting to move the cabinet, be sure to check that the brakes are "off". When moving the cabinet between two rooms check that it is unplugged. Roll up the power cord & position it where it will not cause problems during the move (If the cabinet has a retractable reel, ensure the power cord is retracted inside its reel). Also make sure that the cabinet is in its lowest position when going through doorways.

IMPORTANT

When ordering cabinet or hydraulic lift stand replacement parts, please provide the cabinet model and serial number as well as the model and date code on the hydraulic lift system.

The hydraulic lift stand system operates on 115v/2 amps electrical power.

The lift stand system is controlled by a remote control, which attaches to the cabinet exterior by a magnetic strip when not in use. To raise or lower the cabinet work surface height, or if you must move the unit from room to room, depress the up or down arrows on the remote control.

Note: the minimum distance required between the top of the cabinet and the ceiling is 2 3/4" for normal operation. There should be a minimum of 6" of clearance for proper maintenance of the cabinet.

Lowering the Hydraulic Lift Stand to the lowest position (ATS & Necropsy)

The lift stand comes with factory set limits which controls a range of heights that can be obtained thru normal operation of the lift stand. These limits help to protect the pump from over travel when the lift stand is in the full up, or full down positions. There will be times when you will need to lower the unit to the full down position in order to move your cabinet to a different location in your lab, or if you need to move the cabinet from room to room. Please follow the steps below should you have to lower your cabinet to this lowest position.

1. Press the down arrow on the remote control until the cabinet stops at the lowest preset limit and then release the button.
2. Once the cabinet has reached the lowest possible position the lift stroke will stop.

You can now move the cabinet to its new desired location. Note: Please verify heights of any door ways, or other obstructions prior to moving the cabinet around your lab to prevent damage to your cabinet or

facility. Once you have moved your cabinet into its desired location, press and hold the up arrow until the cabinet reaches a comfortable working height. (Note: Again, please check for any obstructions above the cabinet that may damage the unit while being raised to the upper position.) Your cabinet is now ready to use.

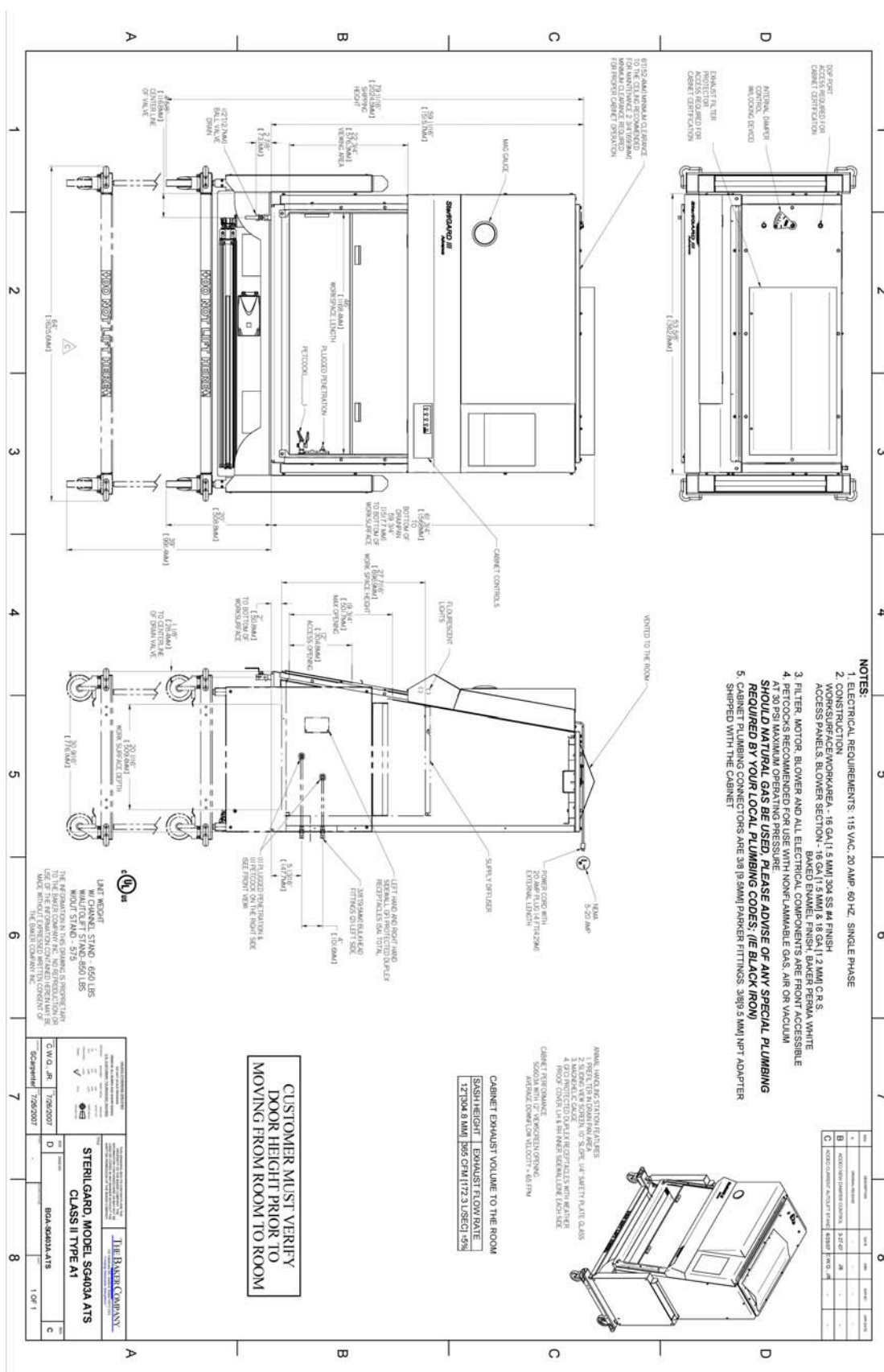
Lowering the Hydraulic Lift Stand to the lowest position (Waste Disposal Unit)

The lift stand comes with factory set limits which controls a range of heights that can be obtained thru normal operation of the lift stand. These limits help to protect the pump from over travel when the lift stand is in the full up, or mid down positions. There will be times when you will need to lower the unit to the complete bottom position in order to move your cabinet to a different location in your lab, or if you need to move the cabinet from room to room. Please follow the steps below should you have to lower your cabinet to this lowest position.

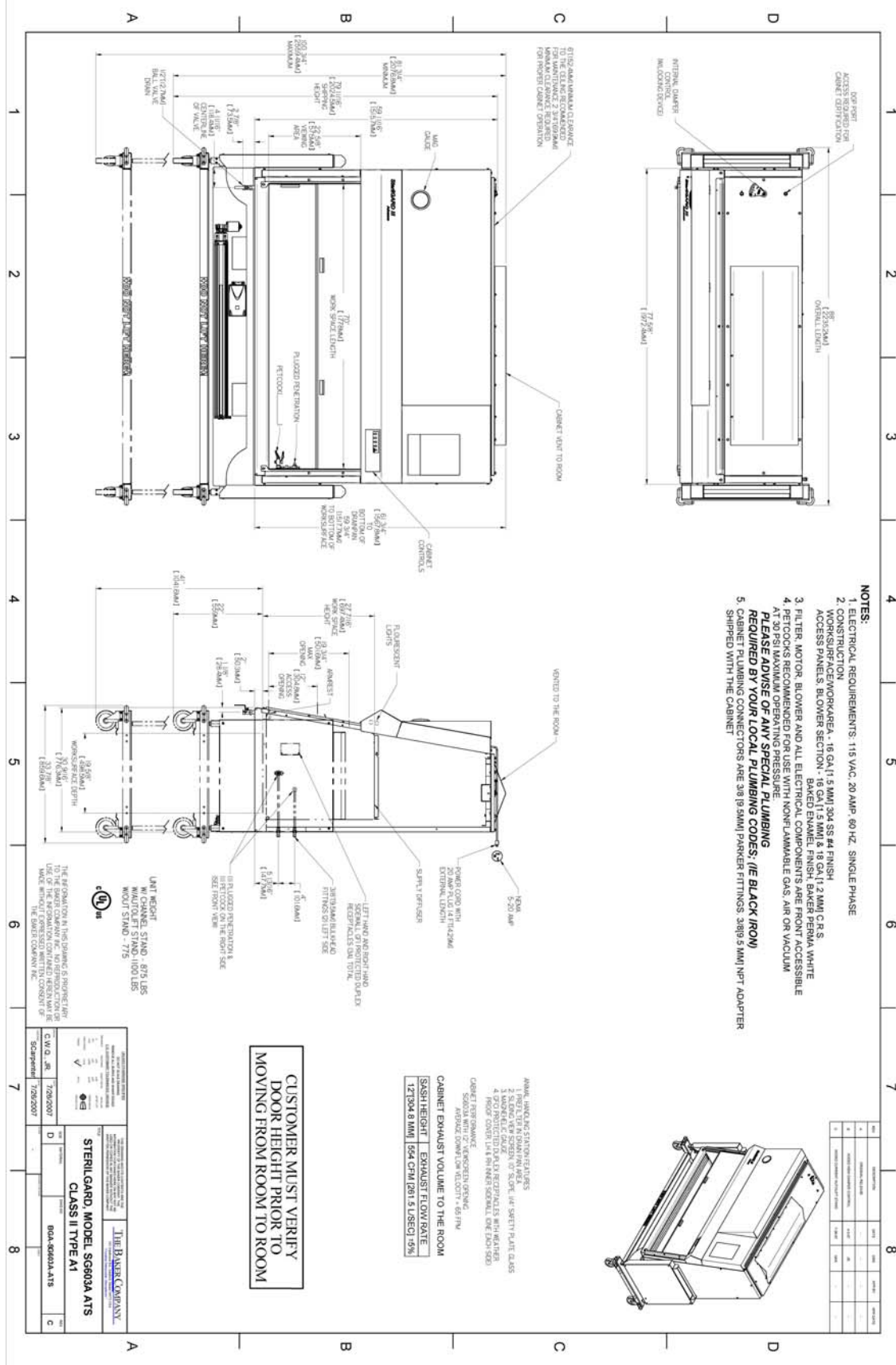
1. Remove the waste barrel that is under the unit so it will not be damaged while lowering the cabinet.
2. Press the down arrow on the remote control until the cabinet stops at the lower preset limit and then release the button.
3. Press and hold the down arrow again for approx. 7 seconds, and the cabinet will slowly start to lower. (Please note: It is very important to hold the down arrow throughout this step. If you release the down arrow while the cabinet is being lowered, the cabinet will not go down any further and you will need to raise the cabinet up until it goes past the lower pre-set stop and start this procedure again.)
4. Once the cabinet has reached the lowest possible position the lift stroke will stop.

You can now move the cabinet to its new desired location. Note: Please verify heights of any door ways, or other obstructions prior to moving the cabinet around your lab to prevent damage to your cabinet or facility. Once you have moved your cabinet into its desired location, press and hold the up arrow until the cabinet reaches a point above the lowest factory preset position. This will re-set the factory lower limit which will protect your pump. (Note: Again, please check for any obstructions above the cabinet that may damage the unit while being raised to the upper position.) Once you have raised the cabinet to this position you are now able to adjust it to a comfortable working height. Your cabinet is now ready to use.

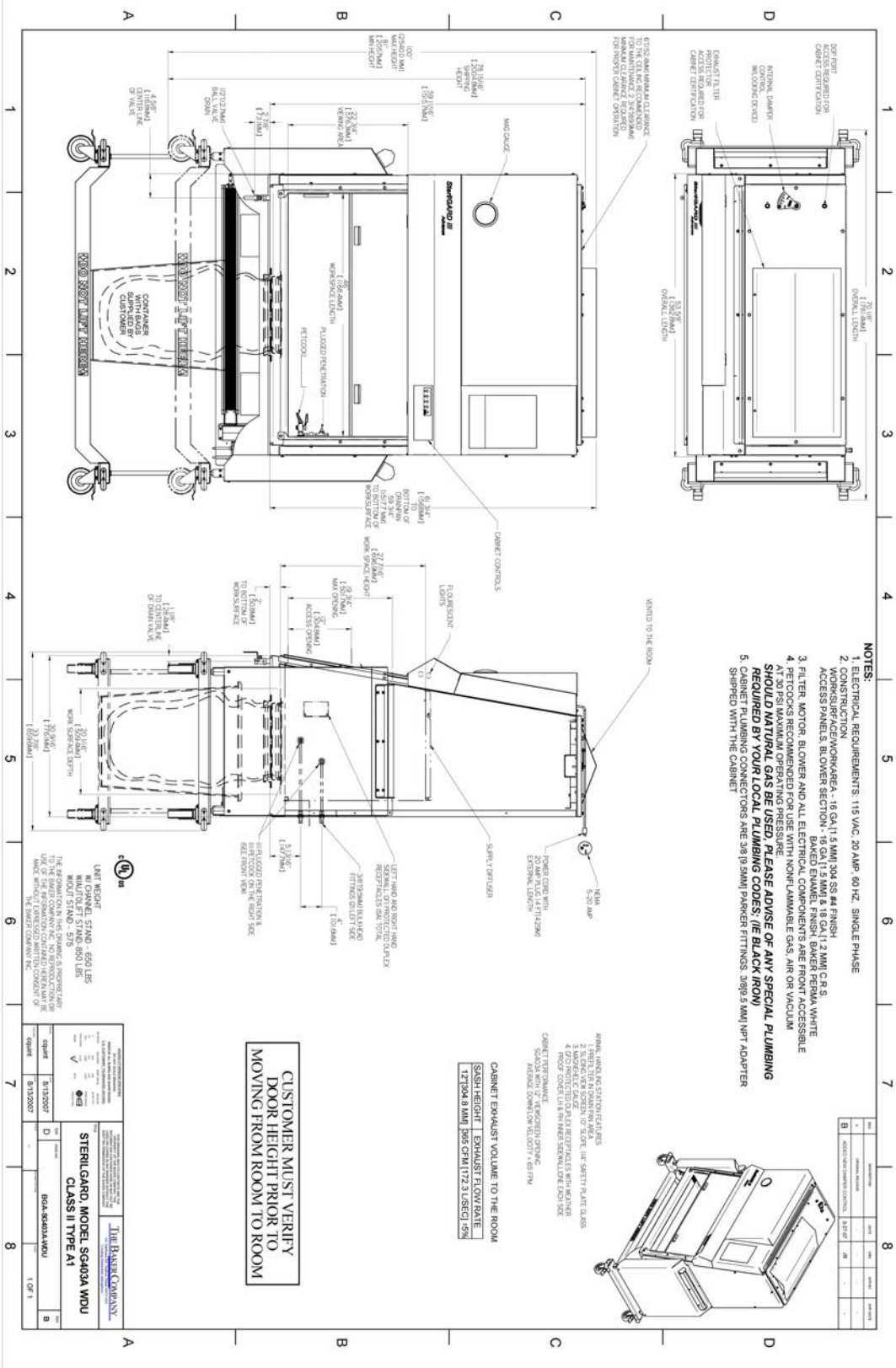
Dimensional Drawing – Standard Configuration [SG403A-ATS]



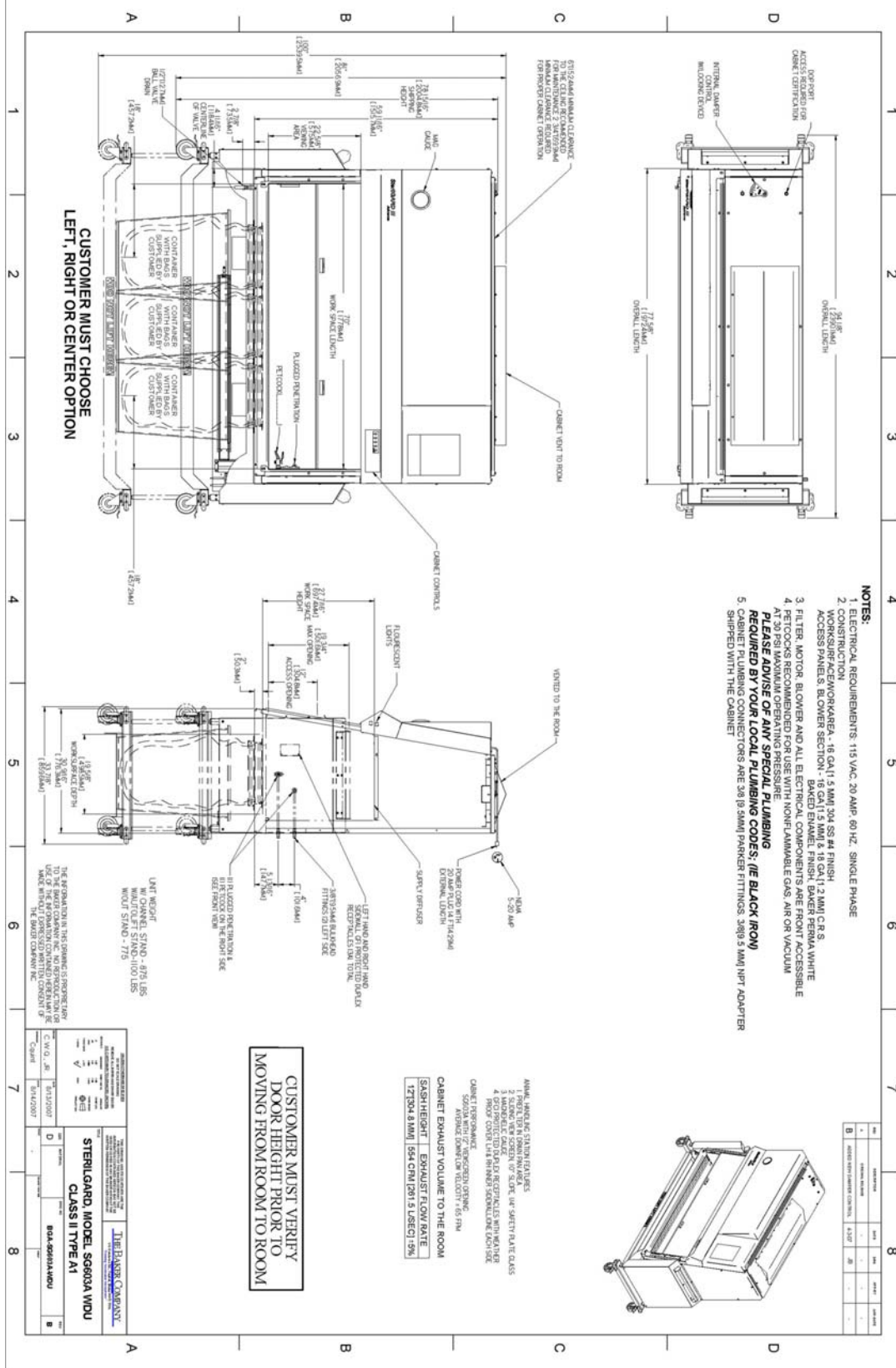
Dimensional Drawing – Standard Configuration [SG603A-ATS]



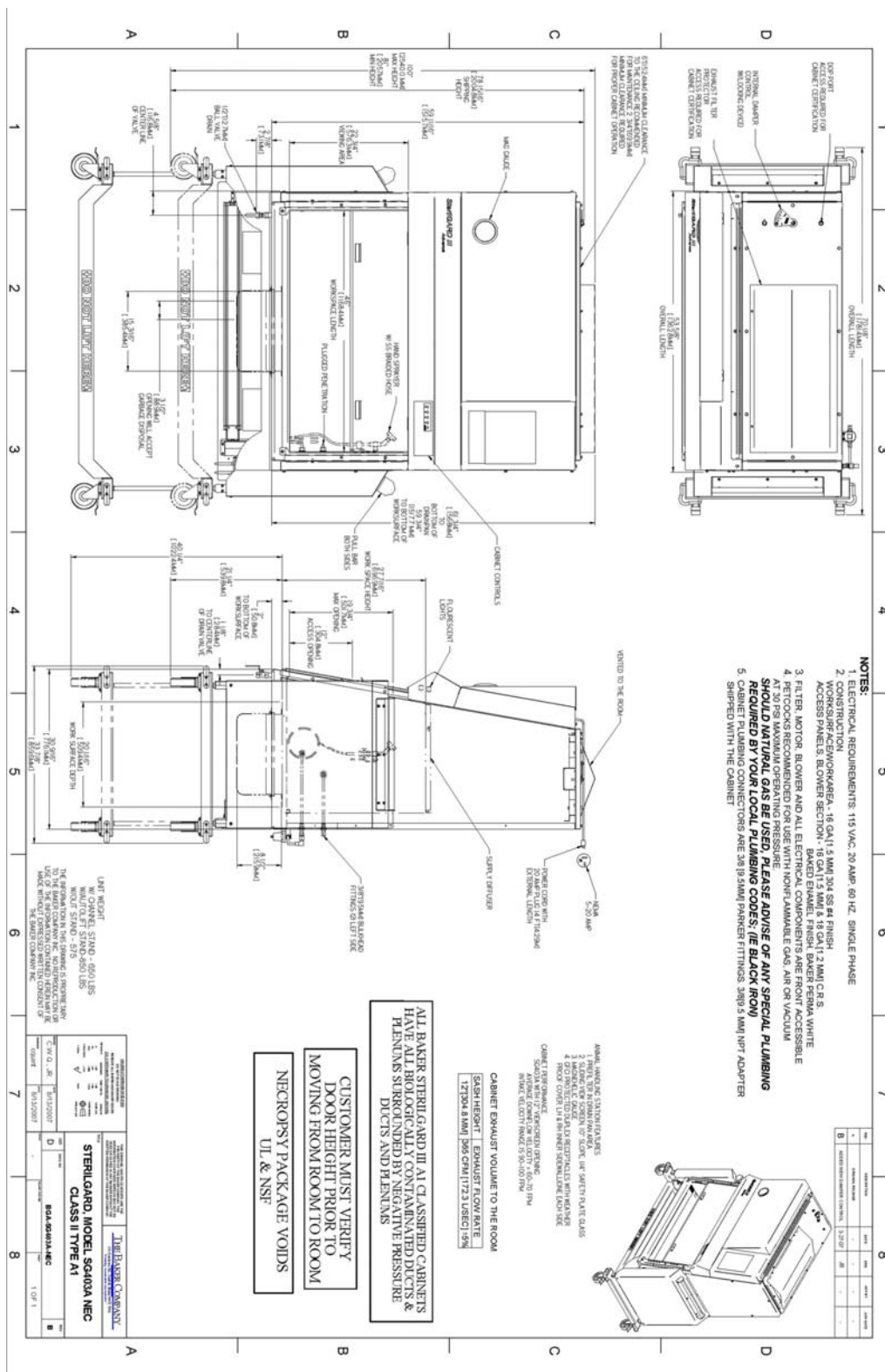
Dimensional Drawing – Waste Disposal Configuration [SG403A-WDU]



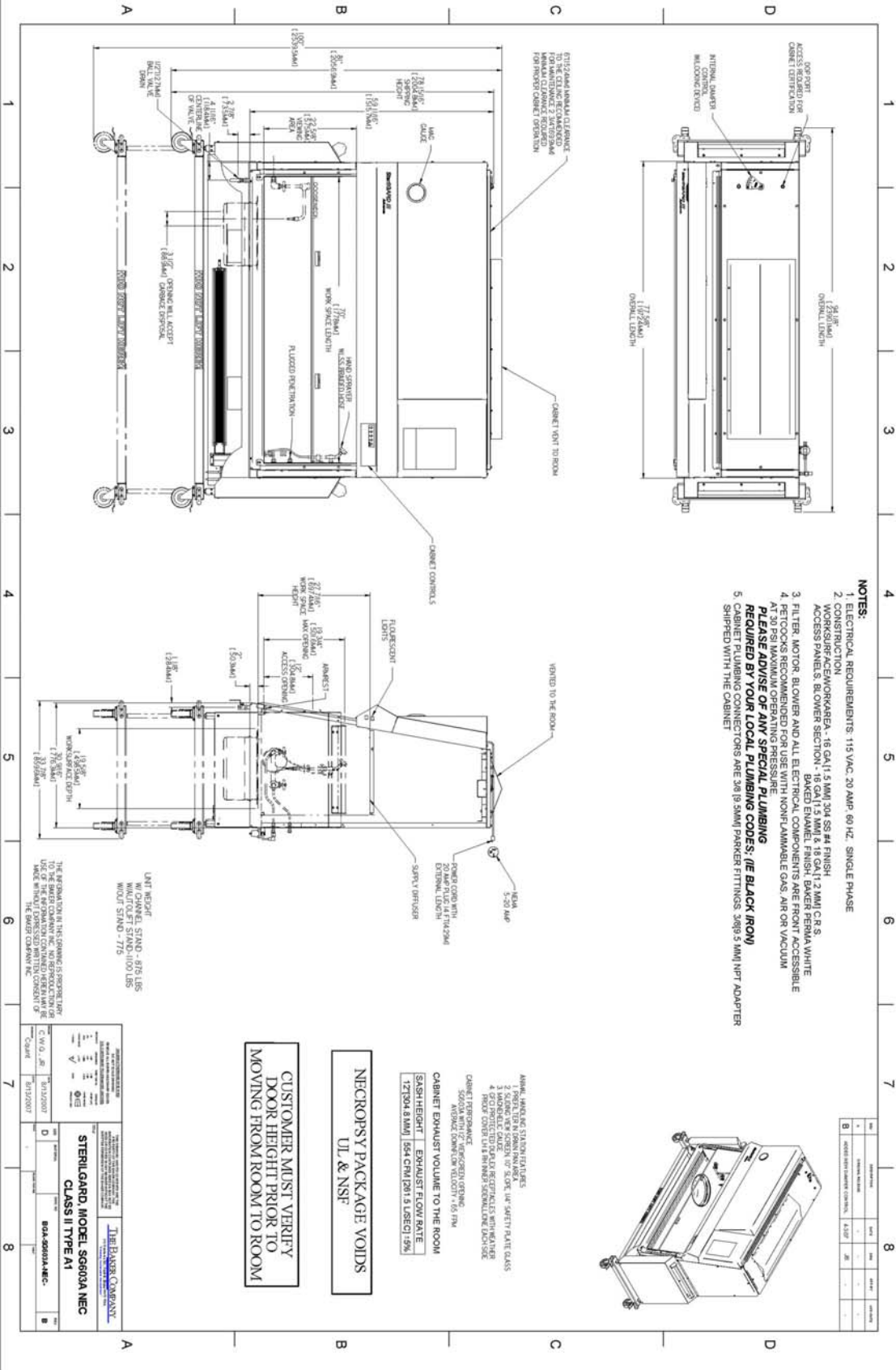
Dimensional Drawing – Waste Disposal Configuration [SG603A-WDU]



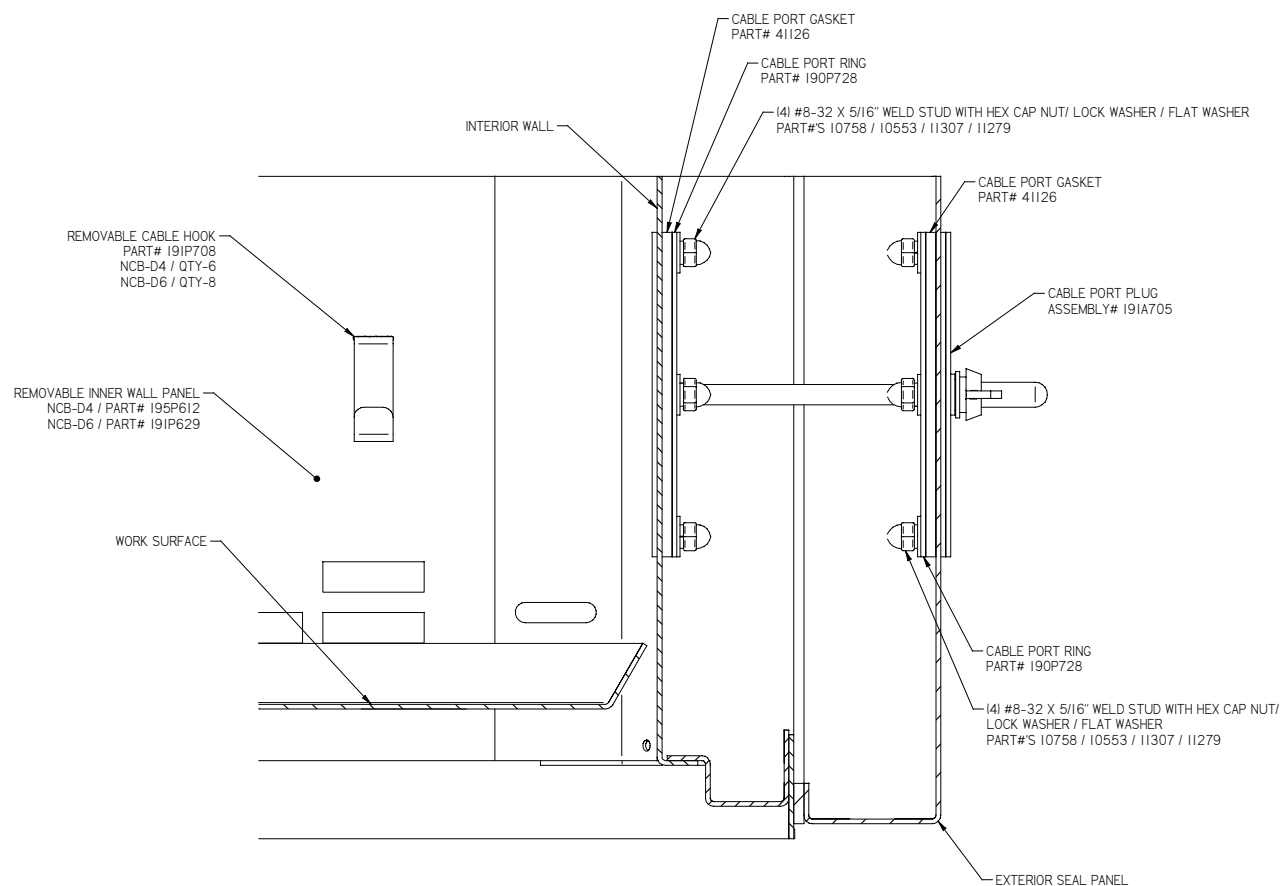
Dimensional Drawing – Necropsy Configuration [SG403A-NEC]



Dimensional Drawing – Necropsy Configuration [SG603A-NEC]



Cable Port Illustration





Interior View

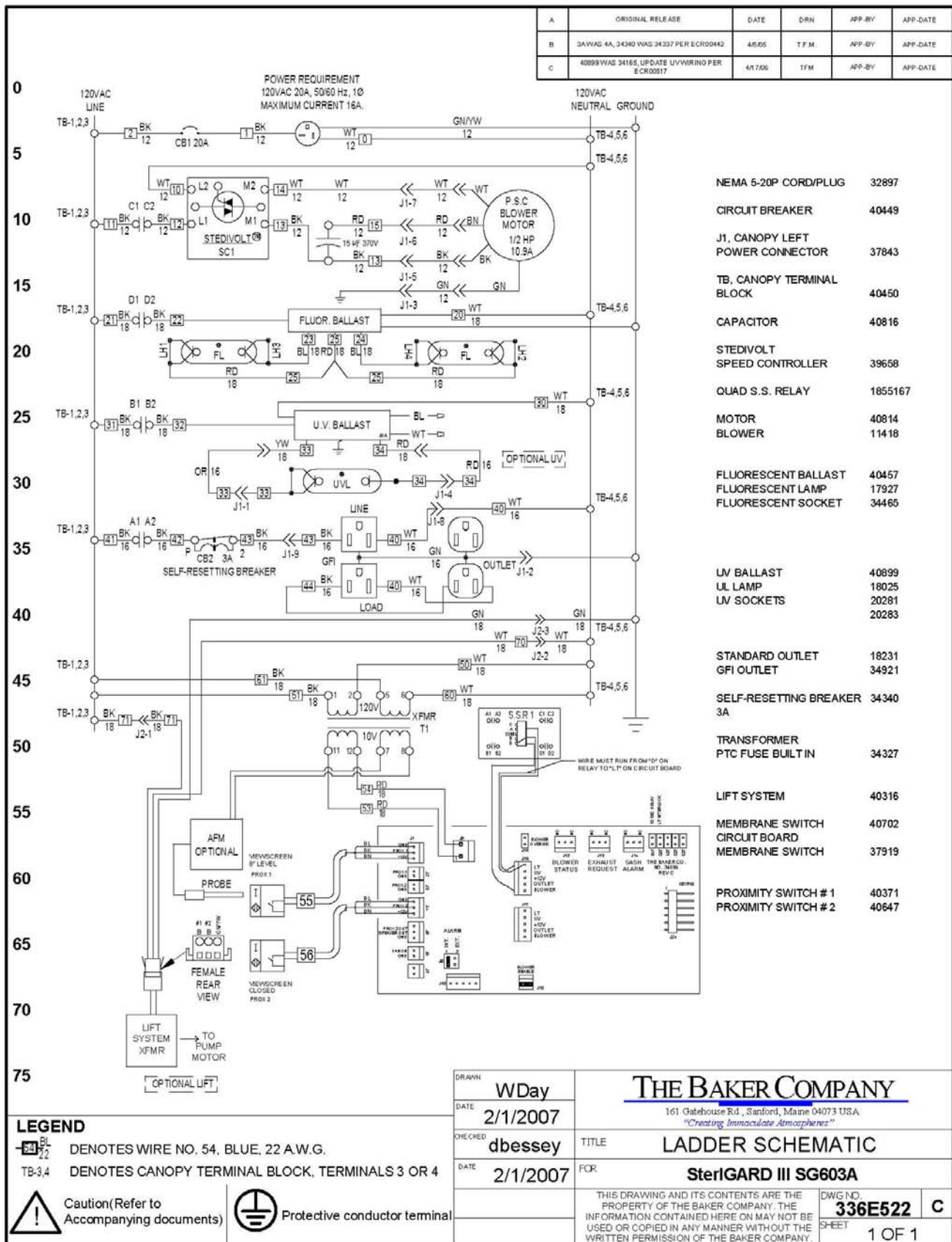


Exterior View

[Cable port plug not shown]



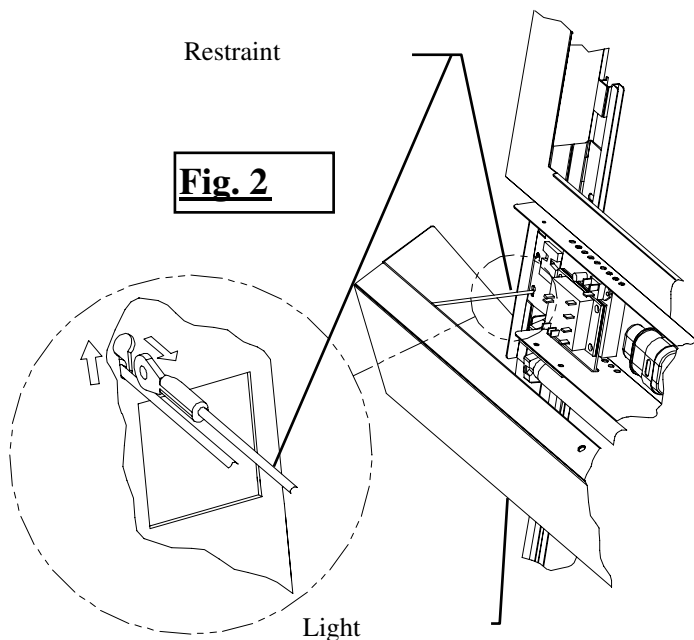
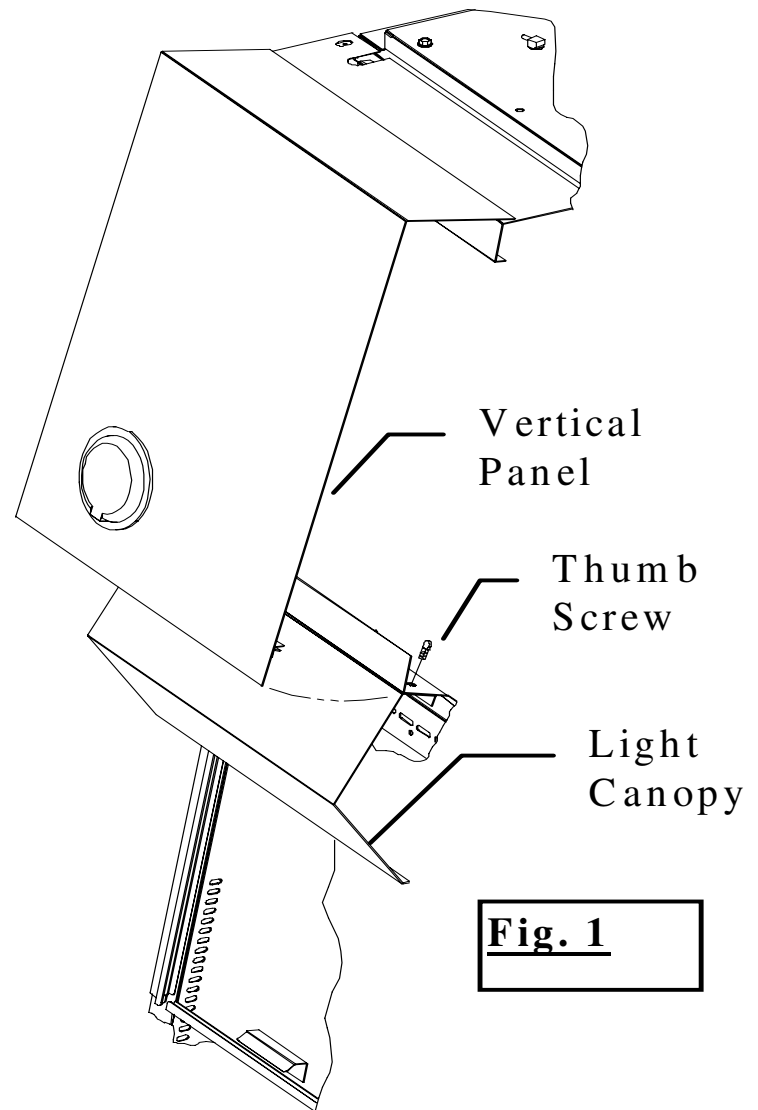
Ladder Schematic: SG603A



Replacing Fluorescent and Ultraviolet Lamps

Fluorescent Lamp Replacement

- 1) Turn the fluorescent lamps off by depressing the light on/off switch locating on the right side of the light canopy.
- 2) Pull the vertical panel out enough at the bottom so that the thumbscrews can be accessed. (Fig.1) Hinge the dress panel standoff (located on the left side of the sloped dress panel) down and lower the vertical panel on it. While removing the thumbscrews, support the light canopy with the other hand. Lower the canopy until the restraint cables hold it in place.
- 3) Disconnect the restraint cables from the face of the electrical mounting board at both ends of the light canopy. (Fig. 2) Gently hinge the canopy down until it rests on the front of the unit.



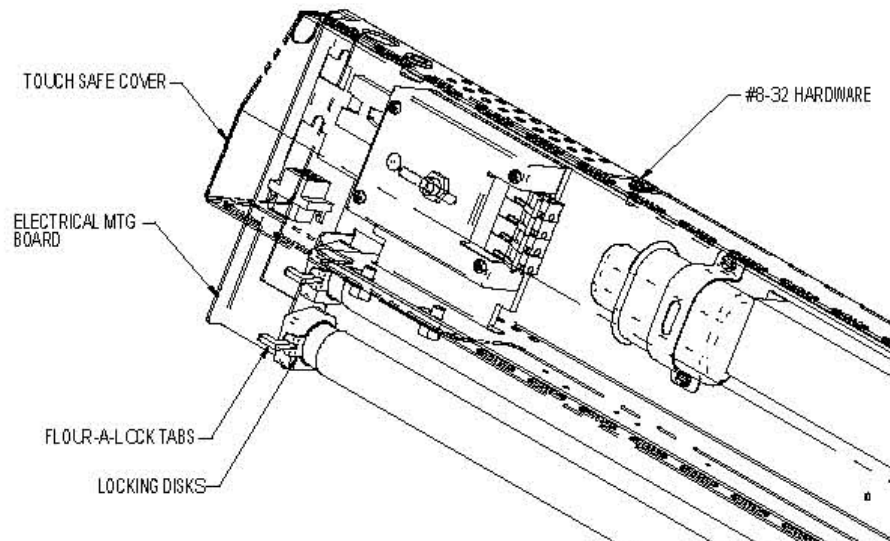


Fig. 3

- 4) Remove *FLUOR-A-LOCK* tabs (2) from the lamp sockets located on the left side of the fluorescent lamps. (Fig. 3) Using both hands, grasp the lamp carefully near each end and rotate it approx $\frac{1}{4}$ turn until the lamp is no longer seated in the lamp sockets. Slide each end out of the sockets. Repeat the process for removing the second lamp and dispose of them properly.
- 5) Install new lamps by following step 4 in reverse order. Make sure that the locking disks are installed on one end of each lamp and that the *FLUOR-A-LOCK* tabs are inserted properly. (Fig. 3)
- 6) Hinge light canopy up temporarily and press the light on/off switch to verify that both lamps are working.
- 7) Lower canopy halfway and re-insert restraint cables on either end of electrical mounting board. Close the canopy and install the thumbscrews finger tight.
- 8) While lifting the vertical dress panel up slightly, hinge the dress panel standoff up against the sloped dress panel. Gently lower the vertical dress panel down until it rests against the cabinet.

Ultraviolet Lamp Replacement

As reported in other sections of this manual, 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 position. The audible alarm should activate and the indicator on the light canopy will flash. To mute this audible alarm while the UV lamp is being replaced, press the alarm reset button located on the light canopy. After five minutes the alarm will sound again and you may press the reset button if more time is needed for lamp replacement.
- 2) Using both hands, grasp the UV lamp carefully near each end and move it approximately ½" [13mm] 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 – O.S.H.A. Federal Regulation

The following is an excerpt from the O.S.H.A. 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. The biohazard symbol shall be designed and proportioned as illustrated in figure J-9.”

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.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE UNLESS OTHERWISE AGREED IN WRITING SIGNED BY THE BAKER COMPANY. THE BAKER COMPANY SHALL NOT BE RESPONSIBLE FOR ANY IMPROPER USE, INSTALLATION, SERVICE OR TESTING OF GOODS

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