OPERATOR'S MANUAL

Baker SterilGARD®III *Advance°*
Animal Transfer Station
Biological Safety Cabinet

MODEL
SG403ATS/ SG603ATS

THE BAKER COMPANY

NSF classification: Class II, Type A. (When the unit is vented to the outside, the classification is Class II, Type B3).

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

January 2002
Rev A

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° Animal Transfer Station cabinet includes many unique features which are included to give you superior performance, simpler maintenance and lower life cycle cost. Your SterilGARD®III Advance° ATS 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.

You will find your SterilGARD®III Advance° ATS cabinet suitable for use not only for research and clinical diagnostic work involving tissue culturing of possibly infectious samples, but also for I.V. drug preparations and other pharmaceuticals that could have adverse health effects on operators and other techniques requiring a contamination-free atmosphere.

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° ATS 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 AND DESCRIPTION OF THE STERILGARD®III ADVANCE° ATS

The SterilGARD®III Advance° is a Class II Type A/B3 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. (If this cabinet is vented outside, the NSF definition is Type B3).

Airflow Inside the Biological Safety Cabinet

The SterilGARD®III Advance° cabinet features The Baker Company's momentum air curtain. See Fig. 1. The stainless steel metal diffuser just below the supply HEPA filter creates a faster airflow behind the sash than over the work zone. The faster airflow in front makes an extremely 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, the pioneers in safety cabinet development. Baker has continued this tradition with the SterilGARD®III Advance°. The 10 degree sloped front feature has also been incorporated into the design to improve ergonomics - to allow the operator to use the cabinet properly without sacrificing comfort or safety.

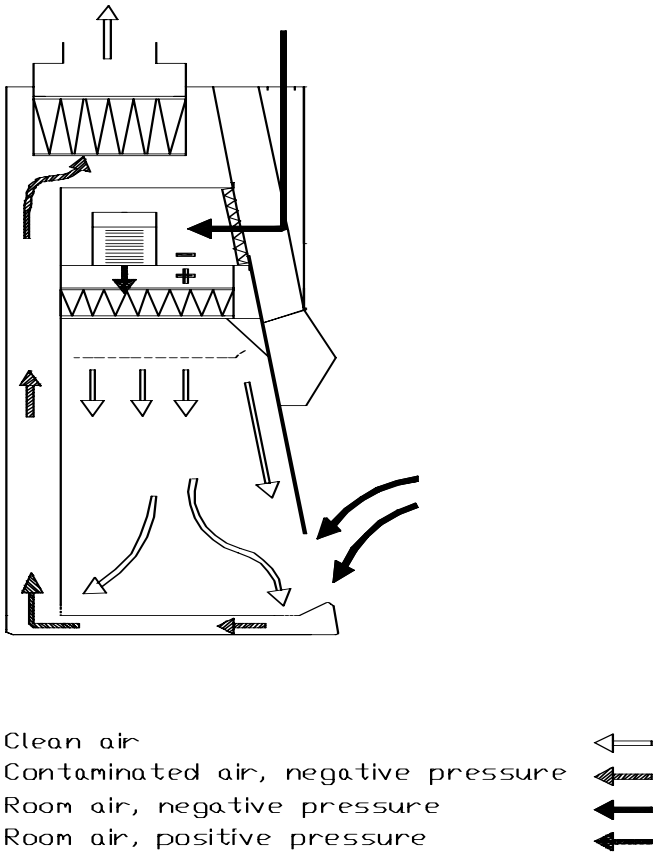


Fig. 1 Airflow Inside Cabinet

Positive and Negative Pressure Areas

One of the many features that sets the SterilGARD®III Advance° unit apart from other biological safety cabinets is the interaction of positive and negative pressure areas. The small positive pressure plenum is completely surrounded by a negative pressure area so that any particle passing through is bound to be drawn through the blower and trapped in a HEPA filter.

From the small positive pressure plenum, which is shown in Figure 1, a portion of the cabinet airflow is expelled through the exhaust HEPA filter. The remaining air is re-circulated through the supply HEPA filter where it re-enters the work area as better than Class 10 air. Because the cabinet must take in air to replace the air expelled through the exhaust filter, the same volume of room air enters the cabinet through the front access opening and the high velocity return air slots. This air, which does not reach the work area until passing through the supply HEPA filter, completes the air barrier at the front access opening.

All air is combined under the work surface. From here, the contaminated air is pulled, under negative pressure, through a plenum up the rear of the cabinet into the motor-blower, which blows it into a positive pressure plenum. Please note again that the positive pressure plenum is completely surrounded by negative pressure areas. If a leak should occur in a contaminated negative pressure plenum, such as the side wall or rear wall, the negative pressure will create suction and pull air in, not allowing it to escape into the operator's area. If there is a leak from the positive pressure plenum, the surrounding negative pressure area will recapture the contaminated air and recirculate it through a HEPA filter.

Access to the Work Area

For easy entry of apparatus into the work area, SterilGARD®III Advance° has a sliding viewscreen. Its ¼-inch safety plate glass allows excellent visibility, and it may be opened to a height of 18" to permit placement of items in the work area. The window will be set at a height of 12". An alarm is provided to remind the operator if the window is above the maximum position for using the cabinet. (Section 3 on "Proper Cabinet Use" explains how to use the viewscreen correctly while the cabinet is in use).

As with other Baker cabinets, the GFI protected electrical outlets inside the work area have a circuit breaker so that an electrical overload by ancillary equipment won't affect air handling. Overloading with electrical equipment should, of course, be avoided in any case. (See the "Ancillary Equipment" instructions in Section 3 on "Proper Cabinet Use").

Design Details

Performance assurance

Meticulous care in manufacturing is followed by more than 14 separate performance tests prior to shipment of your cabinet. In addition, a complete factory test report on the performance of your cabinet is included at the rear of this manual.

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 200% 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.

One-piece interior wall construction

The interior side and rear walls of your SterilGARD's work area are constructed from a single piece of 16-gauge stainless steel. The easy-to-clean 7/16-inch radiused (rounded) corners prevent buildup of contaminants and resist corrosion.

Protective screen

Located under the work surface at the bottom rear and sides of the return-air plenums, a protective screen, integral to the interior walls, is provided to prevent wipes and other paper materials from being drawn into the blower

system. This feature eliminates costly decontamination processes and downtime. The screen affords easy access to waste materials and should be kept clean at all times.

All-metal plenums

The plenums of your SterilGARD®III unit have been constructed entirely of metal in order to provide strength, durability, air-tightness and resistance to deterioration.

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 the radiused corners make for easy cleaning.

Cabinet exterior panels

External panel construction is of 16-gauge cold-rolled steel, or 16-guage stainless steel protected by a smooth white baked enamel finish.

Tested HEPA filters

Both the supply and exhaust filters in the SterilGARD®III Advance° are scan-tested HEPA filters. They are 99.99% effective on particles of 0.3 micron size. Each filter is scan-tested after installation to assure that there are no leaks >.01% of upstream concentration.

Viewscreen

The cabinet's ¼-inch safety plate glass sliding viewscreen may be opened to 18" for placement of large items in the work area, and may be fully closed for system shutdown or UV light operation.

Drain valve

A 3/8" diameter stainless steel ball valve in the SterilGARD®III unit is installed for safe and effective drainage of the drain pan.

Work area lighting

SterilGARD's lighting system produces 100 foot candles of illumination at the work surface area. The fluorescent light is externally mounted to minimize heat buildup. The unit uses two common F32T8-SP35 fluorescent bulbs.

Washable Reusable 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.

Drain Pan Cleanability

The drain pan is designed with 7/16" radius in all four bottom corners to facilitate cleaning. The worksurface supports have been designed to be removable for easy cleaning and to allow clear unobstructed access to the whole drain pan area during the cleaning procedure.

Air balance adjustments

Air balancing can be done by either of the following methods. However, it should be done only by a technician with proper training and equipment. (See Section 4, "On-Site Checks and Maintenance Procedures.")

- A speed controller adjusts for voltage differences and filter loading.
- An adjustable external damper compensates for supply and intake balance due to pressure resistance drop differences of supply and exhaust filters if they are changed at a later date.

Easy filter access

For convenience and ease of service, the supply and exhaust HEPA filters are installed and removed through the front of the cabinet without entry into SterilGARD's work area. This is particularly helpful if the cabinet is connected to an exhaust duct. Filters should be replaced by qualified technicians only.

Hydraulic Lift Mechanism

The hydraulic lift mechanism provides the following range of heights:

	Knee Space Height	Work Surface Height	Overall Height
Minimum Setting	25 3/4″	21″	79 11/16″
Maximum Setting	37 1/2″	40 3/8″	99 1/16″

The ATS cabinets are provided with an adjustable hydraulic lift 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. The lift is rated at 115V/4 amps with a separate power cord and plug.

Casters

The SG403ATS/SG603ATS is 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.

Solid-state electronic ballast

The SterilGARD®III Advance° features solid-state electronic ballasts for fluorescent and (optional) UV light. These ballasts increase reliability, efficiency, service life and reduce heat.

UniPressure Preflow Plenum

The telescoping all steel supply plenum in the SterilGARD®III Advance° provides the user with a number of desirable features which enhance safety and reliability while reducing down time during servicing:

1. This unique plenum design directs air across then through the HEPA supply filter, improving downflow uniformity, extending filter life and reducing noise.
2. The two piece plenum serves as the filter sealing mechanism providing a continuous and evenly distributed clamping force around the complete perimeter of the filters. This approach eliminates potential filter frame damage as experienced with typical approaches, which utilize point forces. This method assures secure and sealed filters.
3. The filter plenum has a gasketed surface to the upstream side of the filter. The gasket on both upstream and downstream filter frames reduces the transmission of vibration through the unit from the motor blower assembly.
4. The motor blower assembly is mounted on a slide plate, which forms one wall of the plenum. This plate is removed by loosening one screw and disconnecting an electrical plug connector.
5. The two telescoping sections of the plenum are operated by turning two threaded rods in each section. These screw clamps exert a force on the all-metal plenums, which distributes the clamping force uniformly to the filter frames.

Specifications

Weight

The weight of the SterilGARD®III, Model SG403ATSATS cabinet is 700 pounds with a shipping weight of 1,200 pounds. The weight of the SG603ATSATS is 900 pounds with a shipping weight of 1,400 pounds.

Electrical Specifications

115V AC, 1 Phase, 60 Hz

The SterilGARD®III Advance° incorporates Baker's StediVOLT® motor speed controller for the blower motor. This compensates for variations in incoming line voltages.

The SterilGARD®III features two duplex GFI protected receptacles at a total of 5.0 amps/SG403ATS and 4.0 amps/SG603ATS, controlled by an internal self-resetting circuit breaker. The unit is furnished with one 14' power cord with 20-amp plug, type NEMA 5-20P. The power cord is the unit disconnect device.

The unit is protected with a 20 amp, 250 vac time delay fuse. A separate power cord is provided for the lift mechanism.

	SG403ATS	SG603ATS
Blower motor (1,625 RPM)	6.6	9.9 amps
Fluorescent Light (ballast)	0.8	0.8 amps
Duplex outlets (G.F.I.)	5.0	4.0 amps
Total running load	12.4	14.7 amps

Environmental Conditions

The SterilGARD®III Advance° is designed to be used under the following conditions:

- Indoor use
- Altitudes up to 2000 meters
- Temperature range from 5° C to 40° C
- Relative humidity up to 80%
- Main supply voltage fluctuations not to exceed ±10% of the nominal voltage

II - PREPARING THE STERILGARD®III ADVANCE° 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 Advance° 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). **Proper placement within the laboratory is essential.**

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 2¾" from the ceiling, to enable proper airflow. <u>At least 6' is required for exhaust filter leak checking.</u> 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 of other regulatory agencies having jurisdiction.

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 guild, light canopy and front 10° dress panel are shipping with locking bolts. Upon installation, remove these locking bolts and replace them with thumb screws which are packed in the workarea. (See Baker Co. drawing #333464 attached to the viewscreen for details)

Connecting the Exhaust

Please note if a B3 configuration is used, 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. Details of these alternatives are as follows:

Exhaust into the room -

Never use the top of the cabinet or the work area for storage purposes, and never use flammable, explosive or toxic vapors or gases, or substances which generate them, unless a qualified safety professional has evaluated the risk. The filter removes only particulates and not gases, thus causing the recirculation of these within the cabinet. <u>At least 6' is required for exhaust filter leak checking.</u>

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.

Exhaust to the outside -

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.

The exhaust requirements of SterilGARD®III Animal Transfer Station are as follows:

MODEL	Sash Opening	Exhaust Volume	Suction
SG403ATS	12"	364 CFM (+/- 5%)	0.1" w.c.
SG603ATS	12"	554 CFM (+/- 5%)	0.3" w.c.

Note: Water column suction is measured directly above the cabinet exhaust damper 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.

The optional exhaust transition and integral cabinet damper with remote control seals around the cabinet's exhaust filter opening, terminating to a 10" diameter studded flange. This design allows for direct connection to standard ductwork by 1) Hard Exhaust Connection (HEC) or 2) Canopy Exhaust Connection (CEC), using an air gap. The optional exhaust collar with airtight damper assembly (HEC) can be used to seal the cabinet exhaust for decontamination. See Figure -----.

While the cabinet with transition installed contains a damper to adjust for variation in filter resistance and sash opening sizes, the building exhaust system should contain provisions to adjust the building system flow and pressure.

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 SterilGARD®III. It should be plugged into an appropriate 115 Volt AC, 60 Hz, 20 amp dedicated utility outlet.
3. Thoroughly clean the interior of the cabinet. Locate sash at correct access opening height of 12".
4. Press the blower switch. The green indicator below the switch should light.
5. Turn on the fluorescent light and make sure the bulbs are lighted. These bulbs are locked into place with stop-lock fittings. The lights will not go on unless the blower switch is on.
6. If your cabinet has been purchased with the optional Ultraviolet (UV) Light, lower the viewscreen to its fully-closed position and turn the UV light on to make sure it is operational. The UV light option features an interlock which prohibits its operation unless the viewscreen is completely closed and the fluorescent light is turned off.
7. Plug the power cord for the hydraulic lift table into a separate outlet. Cycle the table 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. See "Setting Your Limit Switch" in Section xxxx.
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.

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.

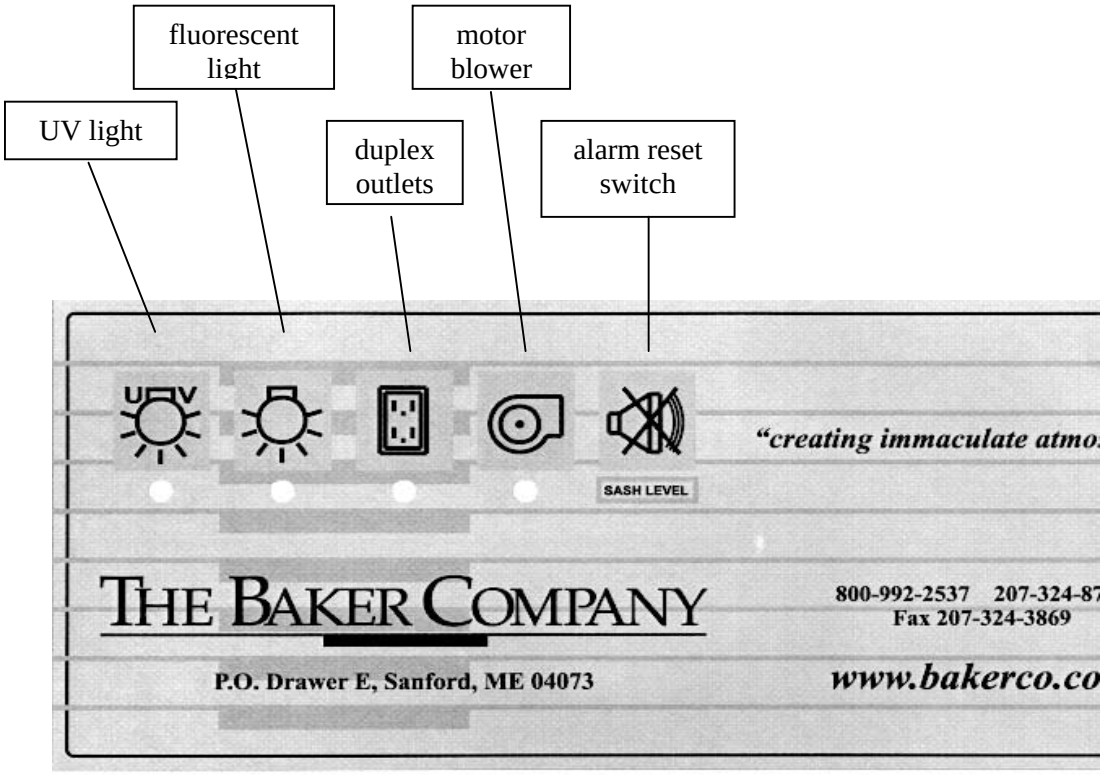
In order to keep the interior workspace clean and free of particulates, all Baker laminar flow cabinets are designed for continuous operation. If the blower is turned off, the unit becomes contaminated with room air. Therefore it is recommended that the blower is left on at all times.

Operator Controls

The operator controls and indicators are arranged on the front panel of the unit. See Fig. 2 below. A number of switches are arranged in a single membrane switch assembly.

1 - Alarm Reset Switch/ Sash Level Alarm -

For normal operation, the viewscreen must be placed to allow an opening of 12". The sash alarm will be activated whenever the sash is raised above this level. To mute the audible alarm, press the alarm reset button. The indicator will continue to flash. After five minutes, the alarm will sound again to remind you to lower the viewscreen. You may press the alarm reset switch again to mute the alarm for another five minutes. ***The alarm will sound again if the viewscreen is not in the proper position at or below the 12" mark.***



2 - Blower On/Off Switch -

Fig. 2 Operator Controls

This switch controls the power to the blower for the cabinet. When the switch is turned on, the green indicator light below the switch will light.

3 - Outlet On/Off -

This switch controls the two outlets on both sides of the work area. When the outlets are turned on, the blue indicator light below the switch will light.

4 - Light On/Off Switch -

This switch controls operation of the fluorescent light. **The blower must be turned on for the fluorescent light to operate.**

The blue indicator light below the switch will light when the fluorescent light is turned on.

5 - Ultraviolet Light (optional) On/Off Switch

A bulb, which produces light in the ultraviolet (UV) range, may be used to help disinfect the work area. This switch controls the UV light inside the work area if the UV light is purchased and installed in the cabinet. **Before the UV light may be turned on, the viewscreen must be fully closed, and the fluorescent light must be turned off.** The UV light will shut off if the viewscreen is opened.

The yellow indicator light below the switch will light when the UV light is turned on. The viewscreen should be completely closed when operating the UV light.

Ground Fault Interrupter

The outlets on this unit are protected by a ground fault interrupter (GFI). The GFI is designed to protect the operator from a possible electrical hazard. If the GFI detects a hazardous condition, it will cut off electricity to all of the outlets. The button in the center of the left hand outlet will pop out. To reset the GFI, correct the cause of the problem, then press the reset button on the GFI.

Start-up Procedure

1. If the unit has not been left running continuously, press the blower on/off switch. The green indicator light below the switch will light. Make sure that you have cabinet airflow by listening for blower sound. Check the reading on the mag gauge, it should be consistent with the last time the unit was on.
2. Turn on the fluorescent light. The fluorescent light will not operate unless the ultraviolet light is turned off. Never leave the ultraviolet light on while there is anyone in the room, unless viewscreen is fully closed.
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 a surface disinfectant.

   Note: Some disinfectants, such as bleach or iodine, may corrode or stain the steel surfaces. If this happens, thoroughly clean the surfaces 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 worksurface. **Disinfect the exterior of these materials prior to placing them on the worksurface.**

   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 no higher than the factory-set 12". An alarm will signal if you have exceeded the design opening. This is important to maintain proper airflow.

7. After the cabinet has run for at least three minutes with the window in the proper position, you are ready to begin.

Working in the Cabinet Work Space

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.

   Because of the restricted access, pipetting within the cabinet will require the use of pipetting aids.
5. 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.
6. ***Never operate your cabinet while the viewscreen alarm indicator is on.*** The operating position of the sash provides a 12" high 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 which may be adjusted for height. Additionally, the unit itself may also be adjusted using the hydraulic lift mechanism.
7. After a procedure has been completed, all equipment which 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.
8. 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 which might support bacterial growth. **Never use the cabinet to store supplies or laboratory equipment.**
9. 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.

Reacting to Spills

Consult your safety professional for proper procedures and treatment of the specific agents you plan to use.

Ultraviolet Germicidal Lamp (optional)

The SterilGARD®III Advance[o] is available with an ultraviolet light. The light is controlled by an on/off switch on the front panel. See Fig. 2. **The UV light will not operate unless the viewscreen is completely down and the fluorescent light is off.**

> ***Warning!***
>
> - ***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.***

Ultraviolet lamps lose their effectiveness over time and should be replaced when intensity drops below the optimum level. Check regularly.

Decontamination

Whenever maintenance, service or repairs are needed in a contaminated area of your cabinet, the cabinet must first be decontaminated by 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 "Formaldehyde Decontamination of Laminar Flow Biological Safety Cabinets" (pamphlet and/or slide cassette program), National Cancer Institute, U.S. Department of Health, Education and Welfare: National Institutes of Health. Available through Chief of Sales Branch, National Audiovisual Center, Washington, DC 20409. Additional information can be found in the National Sanitation Foundation's (1992) standard #49, Annex G, Decon Procedure.

Whatever gas you choose, have the proper safety equipment (gas masks, protective clothing, etc.) within easy reach. 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 volume of the SG403ATS & SG603ATS 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!***
>
> ***This procedure should be performed by qualified technicians only.***

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 ft^3 feet) by .3 gram/ft^3 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 boiling water in the work space. If it is (40% to 55%) add a pan of hot tap water in the work space. Relatively 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 which should be plugged in to an outlet outside the cabinet.
6. Place a second heating mantle in the cabinet with 10% more by weight of ammonium bicarbonate than paraformaldehyde (NH_4HCO_3). This will be used later in step 13 to neutralize the formaldehyde gas.
7. This step is optional. Place spore strips inside the cabinet to confirm 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 4 to 6 hours, preferably over night.
13. Turn on the heating mantle containing NH4HCO3 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

> ***Caution***
>
> ***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***
>
> ***Disinfection and cleaning should always be followed by rinsing in clean hot water and wiping the surface completely dry.***

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 biohazard 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 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 biological safety cabinet. It is the shield, which stands between the operator and environment and the experimental agent.

The HEPA filter consists of a continuous sheet of glass fibers pleated over aluminum separators 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 is 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. Consider the filters' inefficiency when performing a risk assessment. Since this cabinet is partially recirculating, there will be gaseous buildup to the point of equilibrium if these agents are used.

The life of a filter is determined by the cabinet/motor/blower system design and how it is used and how often. Under normal laboratory conditions, you can expect at least five years of use. However, misuse or a heavy dust load within the cabinet will shorten any filter's lifetime. Bunsen burners and misuse of chemicals will also shorten the useful life.

Hydraulic Lift Table – Reference attached section

Operating procedures

After many years of seeing our equipment used and misused, we have made up this list of suggestions:

- Store equipment and supplies outside of the cabinet.
- Always leave the blower on.
- Set the view screen at the proper height.
- When possible, use pipetting aids.
- Avoid use of an open flame within the cabinet unless the use has been specifically approved by a safety professional.
- Always keep the air intake grilles clear and unobstructed.
- Only use toxic, explosive or flammable substances if a safety professional has approved them for work in your cabinet.
- The control system will adjust automatically for small changes in the load on the blower. Adjustments for larger changes should only be made by a qualified technician. Don't change the cabinet or blower speed unless the change is required by a decrease in measured air velocity.
- Work only with agents assigned to biosafety levels 1, 2, or 3 in this cabinet.
- Always close the drain valve after each use.
- If the unit presents a warning signal, don't operate the unit until the warning ceases.

If the operators are well trained and use good common sense when operating your cabinet, you should have very few problems.

IV - ON-SITE 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!
This procedure should be performed by qualified technicians only.

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 this height an alarm will sound.
2. Perform inflow velocity test per NSF 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 downflow readings.
3. Perform downflow velocity test per NSF 49. Specific details are on the cabinet instruction label and in the factory test report.
4. The SG603ATS cabinet with a 10" sash, UV light & IV bar installed has a uniform downflow. The overall average, using the conventional downflow velocity grid, are: 60-70 fpm.
5. Compare your results with those originally recorded at the factory.

Warning!
When the light canopy is lowered, some electrical parts are exposed. Do not perform any work inside the canopy unless you are a trained electrician or electronic technician.

6. Make adjustments to the blower speed controller and the damper as necessary. The speed controller is located inside the light canopy. Turn the screw clockwise/ counterclockwise to increase/decrease flow. The damper is located on top of the cabinet. Slide the damper open/closed to increase/ decrease intake flow. The chart on the following page 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 Test

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 procedures:

1. Remove diffuser under supply filter and external damper over the exhaust filter to access filter media and frame.
2. Perform calculations/measurements for upstream concentration of aerosol challenge.

Warning!

Decontaminate the unit before measuring the upstream concentration of aerosol in a contaminated plenum.

3. Perform filter leak test per NSF 49.
4. Repair leaks as required.

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.

Cabinet Integrity Test

The sealing integrity of your cabinet was tested at our factory before shipment to ensure that the welds, gasketed seams, and hardware were free of detectable leaks. Since these items may become damaged in transport, we recommend that they be re-tested, by qualified technicians, before the cabinet is used. The cabinet integrity test should also be performed at installation, relocation and at prescribed intervals as specified by an industrial hygienist, safety officer or other qualified person. NSF International details the steps for performing the cabinet integrity test in their Standard 49.

Cabinet Integrity Test Procedure:

1. Decontaminate the cabinet if it has been used.
2. Disconnect cabinet from electrical source.
3. Shut off all gas, air, and/or vacuum ports.
4. Seal off the exhaust opening by taping around the external damper and the slot, or by taping a piece of cardboard or plastic over the opening. If the cabinet is connected to an external exhaust, close the gas tight damper or remove ductwork to allow sealing.
5. Remove the front dress panels, light canopy, the electrical panel, the window tracks and the viewscreen.

6. Seal the front window opening by taping a piece of heavy gauge plastic around the perimeter of the opening.

Warning!
Decontaminate the unit before pressurizing, if it has contaminated plenums.

7. Perform cabinet integrity test per NSF 49.
8. Repair leaks, as necessary.
9. Restore the cabinet to operating status. Be sure to remove the sealing material, clean the cabinet, and reassemble all components.

Electrical Safety Tests

The electrical leakage, ground circuit resistance, and polarity were tested at our factory before shipment to ensure that there is no risk of electrical shock present in your cabinet. Since electrical components may become damaged in transport, we recommend qualified technicians retest them, before the cabinet is used. The electrical safety tests should also be performed at prescribed intervals as specified by an industrial hygienist, safety officer or other qualified person. NSF International details the steps for performing these tests in their Standard 49.

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.

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 x 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.

Check the HEPA Filters Regularly

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 airflow monitor periodically. If the unit consistently operates near either end of the normal range, check the filters carefully.

Replacing the HEPA Filters

If the control system presents an alarm, or if your periodic checks of total airflow show a drop of ten percent or more from the original settings, the filters may be loading with particulates. As explained earlier in this section, the blower speed can be manually increased to compensate for filter loading. However, when the airflow can no longer be maintained or when the filters are damaged, they need to be replaced.

Before any seal panels are removed, the cabinet should be decontaminated. Please see pages 11-12 for specifics on decontamination. 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 may 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. 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.

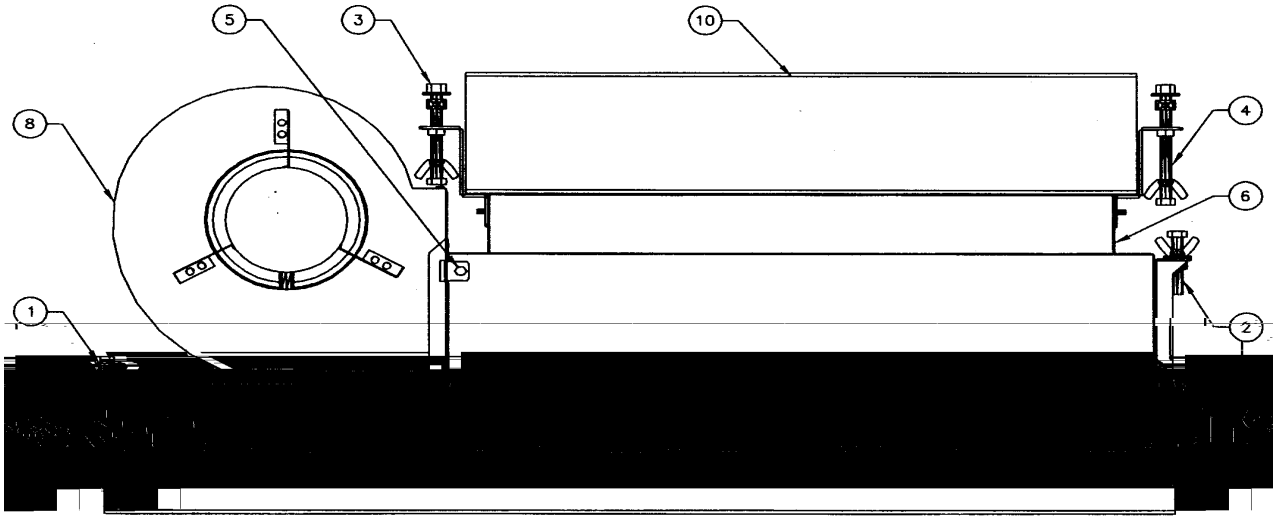
Changing Filters

> ***Warning!***
> ***Decontaminate the unit before changing filters.***

1. Lower the sash to the fully closed position.
2. Disconnect the tygon tube from the back of the magnehelic gauge and lift off the outer closure panel.
3. Remove the canopy locking fasteners inside the inner closure panel and then lower the canopy.
4. Remove the inner closure panel by disconnecting the sash limit switch wire and removing the two bolts at the top and loosening the two bolts at the bottom.
5. Loosen each of the ten 3/8" hex head bolts on the front seal panel. Be sure not to damage or lose the seal washers on each bolt.
6. Remove the front seal panel making sure that you do not damage the gasket. The filters are now exposed.
7. Loosen the ½ - 13-plenum clamp bolts, located on each side of the supply plenum, approximately 3 ½ revolutions or until the supply plenum is raised about ¼ inch above the filter. See Figure 3.
8. Loosen the filter gasket seal from the metal plenum. A putty knife works fine to break the gasket seal if necessary. Align the supply filter with the notches in the frame of the plenum and remove the filter by sliding it towards you.

   NOTE: Once removed, the filters 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 are not removing the exhaust filter, proceed to step number 11. If only the exhaust filter is to be changed, the supply plenum clamp bolts (lower) should be loosened four or more revolutions before loosening the exhaust plenum clamp bolts (upper).

9. Alternately loosen the ½ - 13-plenum clamp bolt, located on each side of the exhaust plenum, approximately 3 ½ revolutions or until the exhaust plenum is lowered enough to allow the top of the filter to clear the top of the cabinet. See Figure 3.



10	EXHAUST FILTER
9	SUPPLY FILTER
8	MOTOR BLOWER ASSEMBLY
7	SUPPLY PLENUM
6	EXHAUST PLENUM
5	MOTOR BLOWER ASSEMBLY CLAMPING BOLT
4	EXHAUST PLENUM ADJUSTING BOLT
3	EXHAUST PLENUM ADJUSTING BOLT
2	SUPPLY PLENUM ADJUSTING BOLT
1	SUPPLY PLENUM ADJUSTING BOLT
FIG NO._____	DWG NO. 333166

10. Loosen the exhaust filter gasket seal from the metal plenum. Remove the exhaust filter by sliding it out towards you.

Fig. 3 – Supply Plenum

11. Replace the filter(s) by simply aligning them with the notches in the frame of the plenum and sliding them back against stops in rear, ensuring that the gasket remains attached on both sides.
12. The exhaust plenum clamps should be tightened first, alternately two to three revolutions at a time until the filter gasket is compressed to approximately $^1/_8$ inch.
13. The supply plenum clamps can now be tightened, alternately two the three revolutions until the gasket is compressed to approximately $^1/_8$ inch**.**
14. Reinstall the front seal panel by first tightening each ¼ - 20 hex cap screw until the bolt seal washer is engaged with the panel. **Next turn each bolt 1¼ to 2½ revolutions until the panel gasket is evenly compressed to ⅛-inch thickness. Do not overtighten. (Do not use a power drive socket for this procedure)**.

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 exhaust damper is adjusted to its factory-marked position and that no other objects are blocking the airflow.
2. Make sure that the stainless steel supply diffuser is installed in the work area under the supply HEPA filter.
3. If your cabinet is connected to an in-house exhaust, make sure that there is adequate exhaust suction and the system is not producing back pressure. Also, be sure the dampers are open. Re-balance the exhaust system to handle an adequate volume of air and static pressure (suction). Consult with building maintenance people.
4. The exhaust filter may be loaded with dirt if the unit has been in service for some time. Decontaminate, and replace all HEPA filters.
5. There may be high cross-drafts in the room which are causing the outflow of smoke. Check the airflow balance, following the procedure recommended in an earlier section of this Section. Eliminate the source of the cross draft.

When there is low airflow 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. Although this should be corrected in the building's electrical system, you may be able to compensate by adjusting the blower speed control clockwise until proper velocity is reached. The control is located on the left side of the light canopy.
2. Check the filters for damage. Decontaminate the unit and replace the filters, if necessary.

If there is no air flow within the work area -

1. Check to make sure the blower switch is turned on. The green indicator below the button should be lighted.
2. Check to make sure the unit is plugged into a dedicated electrical outlet (grounded 20 amp, 115 Volt AC, 60 Hz).
3. Check to make sure the wiring connections inside the left end of the light canopy are pushed together properly.
4. Check to see if the lights are working. If they are, then turn the blower switch off and let the cabinet set for ten minutes. This allows the motor time to reset itself, if it has been overheated.

   Note: If the motor restarts and there is a whining sound, the motor bearings may be causing the motor to overheat.
5. 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, 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. Check to make sure the outlet switch is in the on position. The blue indicator below the switch should be on.
2. Check the reset button on the Ground Fault Interrupter outlet. If the GFI has tripped out, press the reset button.
3. 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 light does not work -

1. Ensure that the window is completely closed and the fluorescent light is off.
2. Check for proper electrical connections between the ultraviolet bulb and lamp sockets.
3. Check the ultraviolet light bulb; replace if necessary.
4. 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 is effective, the ballast may need replacing.

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

NOTE: It may be necessary to decontaminate the cabinet.

1. Check the speed controller.
2. Lower the light canopy from the unit and check the multi-pin connectors at the left end of the electrical panel to be sure they are securely engaged.
3. Check the blower wheel for contact with the blower housing.
4. Check the blower for loose objects.

When the window open alarm is sounding -

1. Check to ensure the window is at the correct position. The alarm should be silent when the window is at the proper design opening. The indicator below the alarm-reset button will flash. You may cancel the audible alarm for five minutes by pressing the alarm-reset button. The indicator will continue to flash until the window is set in the correct position. After 5 minutes, the alarm will sound again. You may press the alarm-reset button again.

If the fluorescent light does not work -

1. The blower switch should be turned on, and the blue indicator below the fluorescent light switch should be lit.
2. Lower the light canopy from the unit and check the multi-pin connectors at the left end of the electrical panel to be sure they are securely engaged. If the lamp flickers and can be corrected by vigorous rubbing of the bulb, there is probably an improper ground. The wiring can be traced to the source of a break.

If the air magnehelic gauge has high or low readings –

A higher reading than normal could be an indication of the following:

1. Blocked or partially obstructed perforated grilles (front and/or rear).
2. Towels or wipes have blocked the towel guard on either the back or sides of the unit.
3. The viewscreen is in the closed position and the in-house exhaust fan is still pulling air though the cabinet.
4. Incorrect air flows
5. Loaded prefilters

For any of the above conditions, always check for proper air flows first.

A lower reading than normal could be an indication of the following:

1. Partially or totally blocked filters.
2. Incorrect air flows.
3. Perforated grilles or worksurface has been removed.
4. No prefilter installed

For any of the above conditions, always check for proper air flows first.

SG403ATS/SG603ATS DISASSEMBLY INSTRUCTIONS

NOTES: Refer to diagram on Page 19 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 (4) 1/4" Spin Wrench (5) 5/16" Spin Wrench

DISASSEMBLY:

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 light canopy down on its restraint cables and disconnect the sash alarm limit switch wires from the switch.
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 bolts 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. Loosen the window track retaining bolts and remove the tracks.
14. Remove the window by lifting up and out. Store in a safe place.
15. Using a 3/8" drive socket and drill, remove ten retaining bolts from the front access panel. Remove the center top bolt last.
16. Blower/motor removal - remove one bolt 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. Remove the side panels - Remove the 3/4" brass nuts from each petcock plumbing connection and the (7) retaining bolts per side.
25. 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.
26. Repeat the process on the other side. (**Note:** The left side panel wiring will have to be disconnected when removed.)
27. Lift out the front perforated grill at the worksurface.
28. Lift out the worksurface pan and worksurface supports.

REASSEMBLY:

Use the disassembly instructions in reverse order.

Environmental Conditions Addendum

- Maximum relative humidity 80 percent for temperatures up to 31°C decreasing linearly to 50 percent relative humidity at 40°C.

- Transient overvoltages according to Installation Categories (OVERVOLTAGE CATAGORIES) I, II AND III (see Annex J). For mains supply the minimum and normal category is II.

- POLLUTION DEGREE 1 OR 2

REPLACEMENT PARTS LIST
STERILGARD®III ADVANCE^{O}, MODEL SG403ATS & SG603ATS
VERTICAL LAMINAR FLOW CABINET

Part Name	*Part No. SG403*	*Part No. SG603*
Capacitor	11557	11558
Circuit Breaker – 4A & 5A	34331	34337
Exhaust HEPA Filter	37868	38594
Fluorescent Ballast	34160	34160
Fluorescent Lamp	17927	17927
Front Panel	333068	336155
Ground Fault Interrupter Outlet with Indicator Light	34921	34921
Lamp Holder, "Butt-On" Type	34465	34465
Limit Switch	16651	16651
Mag Gauge	20774	20774
Membrane Switch Controller	34699A	34699A
Motor/Blower Controller	304227	304227
Relay, Solid State	1855167	1855167
Sash Balance	38014	38172, 38173
Side Panel, LH	333152	333152
Side Panel, RH	333153	333153
Standard Outlet	18231	18231
Supply Blower	11429	11432
Supply Diffuser	333079	336079
Supply HEPA Filter	37865	37866
Supply Motor	31676	31679
Switch, Touch-Type	37919	37919
Transformer	34327	34327
Ultraviolet Lamp	18023	18025
Ultraviolet Lamp Ballast	34160	34165
Ultraviolet Lamp Socket	18088	20281, 20283
Viewscreen Assembly	333066	336066
Viewscreen Frame Assembly	333081	336081
Back Wall Prefilter	38526	38524
Side Wall Prefilter	38525	38525

HYDRAULIC LIFT TABLE

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

LIFT TABLE OPERATION

The hydraulic lift table system operates on 115v/4 amps electrical power with a separate power cord and plug.

The lift table 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 worksurface height or moving unit from room to room, depress the up or down arrows on the remote control.

Depending on the ceiling height, the upper limit switch on the lift table may be adjusted to prevent cabinet from damaging the ceiling. See XX for instructions on setting the switch.

The minimum distance between the top of the cabinet and the ceiling is 6".

TROUBLE SHOOTING THE HYDRAULIC SYSTEM

For the warranty to be valid after a repair, the following must be adhered to:

- only original spare parts are to be used.
- no internal repair is allowed in the pump, cylinder, motor, transformer or circuit board other than by authorized personal.
- repairs are to be made according to included instructions.
- the systems may, also continually, only be used accorded to specified data.

The motor can be heard, but the system doesn't move

Cause	Measure
Safety pin broken	See instruction "Exchange of safety pin on the motor unit"
Pump broken	See instruction "Exchange of pump"
Worm-gear in motor broken	See instruction "Exchange of motor"

The motor can't be heard (no power to circuit board)

Cause	Measure
Transformer overloaded	See instruction "Exchange of fuse in transformer"
Bad contact in circuit board connections	Pull out the electric plug from the wall socket, remove the cover from the motor unit and check all connections and cables. Assemble everything again and test the system.

The motor can't be heard (no power to electric motor)

Cause	Measure
Circuit board broken	See instruction "Exchange of circuit board"
Short-circuit on circuit board	See instruction "Exchange of fuse on circuit board"
Bad contact	See under "Bad contact in circuit board…" above

The system can be run down but not up

Cause	Measure
Up-relay on circuit board broken	See instruction “Exchange of circuit board relay”

Leakage in the cylinder or pump

Cause	Measure
Connection of 1 – 2 tubings loose	See instruction “Oil refill for 1 – 2 cylinders…” and tighten all tubing connection.
Connection of all tubings loose	See instruction “Complete system oil refill” and tighten all tubing connections
Cylinder broken	See instruction “Exchange of cylinder”
Pump broken	See instruction “Exchange of pump”

Tubing broken

Cause	Measure
Damage to tubing	Read enclosed paper concerning oil handling, get the oil dried up, then see instruction “Exchanging of hydraulic tubing”.

NOTE! When repairing the system it must be, at all times, unloaded and without electric power. When unloading the lift system/blocking up the safety cabinet, the cabinet weights are 700 lbs for the SG403ATS and 1200 lbs for the SG603ATS.

Exchange of security pin on a motor unit

As a first step, pull the electric plug out of the wall socket so that the motor unit is without power. Then the system must be unloaded through lifting up the entire cabinet, placing it on some sort of support, removing all weight from the lift system.

1. If the system is easy to reach from service point of view, only the pump has to be removed as described in the following points. Otherwise unscrew the pump-motor unit from its three (3) fastening points and jump over point 5 in the description. NOTE! Be careful so that the tubing won't be damaged, minimum bending radius is 30mm.
2. Start with unscrewing the four (4) screws holding the motor unit cover, then remove the cover.
3. Disconnect the limit switches through gently pulling out the 6-pin plug from the circuit board and remove the adhesive tape that holds the cable to the bracket.
4. Unscrew the two (2) screws holding the pump and the motor unit together.
5. Unscrew the fastening screw holding the back end of the pump to the table.
6. Pull the pump straight out from the motor unit.
7. Pull the coupler of the pump shaft. If it's impossible to pull the coupler straight out, try turning the coupler counter-clockwise and pull outwards at the same time.
8. Take a mandrel with 02.5 mm and knock out the broken security pin from the coupler and from the pump.
9. Remove burrs from the pump shaft using a file or abrasive paper.
10. Put the coupler onto the shaft of the new pump and press it all the way in. Don't forget the white plastic spacer between the coupler and the pump.
11. Take a new security pin 03 x 30 mm and drive it all the way into the coupler.
12. Turn the coupler on the motor so that it fits in with the coupler on the pump. Don't forget the plastic cross and reassemble the pump and the motor unit with each other. If it's an SO-pump, don't forget the two (2) spacers between the pump and the bracket.
13. Assemble the two (2) screws with nuts through the bracket and the pump and tighten. NOTE! The limit switch cable may not lay between the pump and the bracket when tightening.
14. Reassemble the rest of the parts in reverse order, fasten the pump in the back end, connect the limit switches and fasten the cover. Make sure that no cables get jammed or damaged.
15. Connect the power again and test run the system under load. Run carefully the first couple of revs and check that you are running the system in the right direction so that the security pin doesn't break.
16. Put the pump and motor unit in place again.

The system is now ready for use.

Exchange of pump on a motor unit

As a first step, pull the electric plug out of the wall socket so that the motor unit is without power. Then the system must be unloaded through lifting up the entire cabinet, placing it on some sort of support, removing all weight from the lift system.

1. If it's possible, run the pump (UNLOADED) until all cylinders protrude a minimum of 30 mm, then follow point 17 (skip point 18), otherwise skip point 17 and follow point 18.
2. If the system is easy to reach from service point of view, only the pump has to be removed as described in the following points. Otherwise, unscrew the pump-motor unit from its three (3) fastening points and jump over point 6 in the description. NOTE! Be careful so that the tubing won't be damaged, minimum bending radius is 30 mm.
3. Start with unscrewing the four (4) screws holding the motor unit cover, then remove the cover.
4. Disconnect the limit switches through gently pulling out the 6-pin plug from the circuit board and remove the adhesive tape that holds the cable to the bracket.
5. Unscrew the two (2) screws holding the pump and the motor unit together.
6. Unscrew the fastening screw holding the back end of the pump to the table.
7. Pull the pump straight out from the motor unit.
8. Take a mandrel with 02.5 mm and knock out the security pin from the coupler on the pump.
9. Pull the coupler of the pump shaft. If it's impossible to pull the coupler straight out, try turning the coupler counter-clockwise and pull outwards at the same time.
10. Pull off the white plastic spacer from the pump shaft and put It on the pump shaft of the new pump. Put the coupler onto the shaft of the new pump and press it all the way in.
11. Drill a hole in the pump shaft through the old hole in the coupler, using a 03.0 mm drill.
12. Take a new security pin 0.3 x 30 mm and drive it all the way into the coupler.
13. Place the new pump vertical with the tubing connections upwards.
14. Unscrew and remove all pressure nuts from the pump connection holes and remove the steel balls situated in all connection holes.
15. Turn the coupler clockwise (approximately ½ turn) or until ooil is visible in all connection holes.
16. Unscrew the first cylinder's tubing connection from the old pump.
17. **If the pump was running and the cylinders protrude more than 30 mm, this point is to be followed!**
    - 17.1 Hold the cylinder vertical with the tubing connection upwards (if necessary, remove the cylinder from the table leg or similar).
    - 17.2 Put the loose tubing end into a bottle filled with our special hydraulic oil. Press the piston rod all the way into the cylinder, watching so that no air bubbles come out from the tubing at the end of the compression. The best way to see this is to keep the tubing end under the oil level in the bottle.

Exchange of pump on a motor unit (con't)

18. If the pump wasn't running, this point is to be followed!

18.1 Put the loose tubing end into a bottle filled with our special hydraulic oil and slowly pull out the cylinder piston rod. Oil will be sucked into the cylinder through the created vacuum. Hold the piston rod in this outer piston for approximately 1 – 1 ½ minutes.

18.2 Hold the cylinder vertical with the tubing connection upwards (if necessary, remove the cylinder from the table leg or similar).

18.3 Press the piston rod all the way into the cylinder. Watch so that no air bubbles come out from tubing at the end of the compression. The best way to see this is to keep the tubing end under the oil level in the bottle.

19. A protrusion of 12mm is standard on the C02 – C04 cylinder piston rod. On the C01 cylinder, the piston rod goes even with the housing.
20. Connect the cylinder to one of the pump connections and tighten with 10 Nm torque, then reassemble the cylinder to the table leg or similar.
21. Repeat point 15 – 19 on all cylinders.
22. Turn the coupler on the motor so that it fits in with the coupler on the pump. Don't forget the plastic cross. Reassemble the pump and the motor unit with each other. If it's a S0-pump, don't forget the two (2) spacers between the pump and the bracket.
23. Assemble the two (2) screws with nuts through the bracket and the pump and tighten. NOTE! The limit switch cable may not lay between the pump and the bracket when tightening.
24. Reassemble the rest of the parts in reverse order. Fasten the pump in the back end. Connect the limit switches and fasten the cover. Make sure that no cables get jammed or damaged.
25. Connect the power again and test run the system under load. Run carefully the first couple of revs and check that you are running the system in the right direction so that the security pin doesn't break.
26. Crank/run the system about halfway upwards and check that the cylinders start to move at the same time, that they move smoothly and that they all protrude the same length. Furthermore, check that the cylinders don't feel "soft". If necessary, follow instruction "Oil refill…" until the system works all right again.
27. Run a whole stroke (up and down) to check that the limit switches are working all right.
28. Put the pup and motor unit in place again.

The system is now ready for use.

Exchange of electric motor

As a first step, pull the electric plug out of the wall socket so that the motor unit is without power. Then the system must be unloaded through lifting up the entire cabinet, placing it on some sort of support, removing all weight from the lift system.

1. If the system is easy to reach from service point of view, only the pump has to be removed as described in the following points. Otherwise, unscrew the pump-motor unit from its three (3) fastening points and jump over point 5 in the description. NOTE! Be careful to that the tubing won't be damaged, minimum bending radius is 30 mm.
2. Start with unscrewing the four (4) screws holding the motor unit cover, then remove the cover.
3. Disconnect the limit switches through gently pulling out the 6-pin plug from the circuit board and remove the adhesive tape that holds the cable to the bracket.
4. Unscrew the two (2) screws holding the pump and the motor unit together.
5. Unscrew the fastening point, holding the back end of the pump to the table.
6. Pull the pump straight out from the motor unit.
7. Turn the coupler on the motor shaft until the fastening screw on the side of the coupler is reachable, then loosen the screw approximately two (2) turns.
8. With the help of a big screwdriver, carefully pry the coupler loose from the motor shaft.
9. Gently disconnect the motor connections from the circuit-board, then unscrew the three (3) screws holding the motor to the bracket and remove the motor.
10. Put the new motor in place, fasten and tighten the three (3) screws. Connect the motor cables to the circuit board again, black cable to J6 and red cable to J5.
11. Fit in the wedge-shaped groove to the wedge on the motor shaft, then press the coupler onto the shaft until it gets in contact with the washer on the shaft and tighten the screw in the coupler again.
12. Turn the coupler on the motor so that it fits in with the coupler on the pump. Don't forget the plastic cress. Reassemble the pump and the motor unit with each other. Assemble the two (2) screws with nuts and tighten. NOTE! The limit switch cable may not lay between the pump and the bracket when tightening.
13. Reassemble the rest of the parts in reverse order. Fasten the pump in the back end. Connect the limit switches and fasten the cover. Make sure that no cables get jammed or damaged.
14. Put the pump and motor unit in place again.
15. Connect the power again and test-run the system under load. Run carefully the first couple revs and check that you are running the system in the right direction so that the security pin doesn't break.

The system is now ready for use.

Exchange of transformer

As a first step, run the system to the bottom position and pull the electric plug out of the wall socket so that the motor unit is without power.

1. Unscrew the four (4) screws holding the transformer to the table or similar.
2. Unscrew the two (2) screws holding the lid in place on the transformer and remove the lid.
3. Unscrew the cable pull-securing socket from the 24-volt cable (the cable that runs from the transformer to the motor unit) and unscrew the cable from the terminal connection.
4. Fasten and tighten the cable in the terminal connection of the new transformer and tighten the cable pull-securing socket. NOTE! Make sure that the cable is fastened and that it isn't damaged, because if uninsulated parts of the cables come in contact with each other, there will be a short circuit.
5. Replace the lid and tighten the screws.
6. Fasten the transformer under the table.
7. Connect the electric plug to the wall socket and test-run the system.

The system is now ready for use.

Exchange of fuse in transformer

As a first step, run the system to the bottom position and pull the electric plug out of the wall socket so that the motor unit is without power.

1. Unscrew the two (2) screws that hold the lid in place on the transformer and remove the lid.
2. Gently remove the broken fuse and replace it with a new delay action fuse (2.0 ampere glass tube fuse 0.5 x 20mm).
3. Reassemble the lid and tighten the screws.
4. Connect the electric plug to the wall socket and test-run the system.

The system is now ready for use.

Exchange of circuit board

As a first step, run the system to the bottom position and pull the electric plug out of the wall socket so that the motor unit is without power.

1. If the system is easy to reach from service point of view, it won't have to be removed from the table or similar. Otherwise, unscrew the pump-motor unit from its three (3) fastening points. NOTE! Be careful so that the tubing won't be damaged, minimum bending radius is 30 mm.
2. Start with unscrewing the four (4) screws holding the motor unit cover, then remove the cover.
3. Gently disconnect all contact from the circuit board.
4. Undo the screw that holds the circuit board and remove it. Replace it with the new circuit board and tighten the screw.
5. NOTE! If the old circuit board is of rev. EGM100-A and it's exchanged with a rev EGM100-C board, then the limit switches and the plastic rail they are fastened to has to be exchanged as well.
6. Connect all contacts again according to the enclosed drawing no. 30053.
7. Reassemble and fasten the cover. Make sure that no cables get jammed or damaged.
8. If necessary, put the system in place again.
9. Connect the power again and test run the system under load. Run carefully the first couple of revs and check that you are running the system in the right direction so that the security pin doesn't break.

The system is now ready for use.

Exchange of circuit board fuse

As a first step, run the system to the bottom position and pull the electric plug out of the wall socket so that the motor unit is without power.

1. If the system is easy to reach from service point of view, it won't have to be removed from the table or similar. Otherwise, unscrew the pump-motor unit from its three (3) fastening points. NOTE! Be careful so that the tubing won't be damaged, minimum bending radius is 30 mm.
2. Start with unscrewing the four (4) screws holding the motor unit cover, then remove the cover.
3. Gently remove the broken fuse and replace it with a new fuse (0.5 ampere glass tube fuse 0.5 x 20mm).
4. Reassemble and fasten the cover. Make sure that no cables get jammed or damaged.
5. If necessary, put the system in place again.
6. Connect the power again and test run the system under load.

The system is now ready for use.

Exchange of circuit-board relay:

As a first step run the system to bottom position and pull the electric plug out of the wall socket so that the motor unit is without power.

1. If the system is easy to reach from service point of view it won't have to be removed from the table or similar, otherwise unscrew the pump-motor unit from it's 3 fastening points. NOTE! Be careful so that the tubing won't be damaged, minimum bending radius is 30 mm.
2. Start with unscrewing the 4 screws holding the motor unit cover, then remove the cover.
3. Release the clamp from the socket assembled relay and gently take the relay out of he socket.
4. Put the new relay in place and reassemble the clamp.
5. Reassemble and fasten the cover. Make sure that no cables gets jammed or damaged.
6. If necessary put the system in place again.
7. Connect the power again and test run the system under load, run carefully the first couple of reeves and check that you are running the system in the right direction so that the security pin doesn't break.

The system is now ready for use.

Oil refill for 1-2 cylinders on a system:

As a first step the system must always be unloaded through i.e. lifting up the entire cabinet, placing it on some sort of support removing all the weight from the lift system.

1. If possible unscrew the pump (with motor unit) and place it vertical with the tubing connections upwards, otherwise place it so that the pump end with the tubing connections is higher than the crank / motor end of the pump.
2. Crank / run the system (**UNLOADED**) until the defect cylinder has come out 30 – 40 mm.
3. Unscrew the defect cylinders tubing connection from the pump.
4. Put the loose tubing end in to a bottle filled with our special hydraulic oil and slowly pull out the cylinder piston rod, oil will be sucked into the cylinder through the created vacuum, hold the piston rod in this outer position for approximately 1 – 1,5 minutes.
5. Place the cylinder vertical with the tubing connection upwards, if necessary unscrew the cylinder from its fastening points, and press the piston rod into the cylinder until no more air bubbles comes out from the tubing. The best way to see this is to keep the tubing end under the oil level in the bottle.
6. Repeat the 2 points above until this cylinder protrudes approximately 50 mm. More then the functioning cylinders do.
7. Crank / run the system another 1 / 2 turns upward or until oil can be seen coming up in the pump connection hole.
8. Connect the tubing on the pump.
9. Crank / run the system backwards to bottom position and at the same time press in the piston rod on the refilled cylinder. Then press in the piston rod on the rest of the cylinders.
10. With the pump in its lowest position, the piston rod on the refilled cylinder should now protrude more then the piston rods on the other cylinders.
11. Unscrew the concerned tubing connection from the pump again and empty redundant oil in to the oil bottle by:

    (For crank driven systems) pressing the piston rod all the way into the cylinder. A protrusion of 12 mm is standard on the C02-04 cylinder piston rod, on the C01 cylinder the piston rod goes even with the housing.

    (For motor driven systems) press in the piston rod until it protrudes as much as on the other cylinders (place the piston rod according to sketch when pressing our the oil).
12. Connect the tubing to the pump again and tighten it to 10 Nm.
13. Crank / run the system about halfway upwards and check that the cylinders starts to move at the same time, that they move smoothly and that they all protrude the same length. Further more check that the refilled cylinder doesn't feel "soft". If necessary repeat all points until the system works all right.
14. Put the pump and the cylinder in place again and fasten up loose hanging tubing.

The system is now ready for use again.

Complete system oil refill:

As a first step the system must always be unloaded through i.e. lifting up the entire cabinet, placing it on some sort of support; removing all the weight from the lift system.

1. Unscrew the pump (with motor unit) and place it vertical with the tubing connections upwards.
2. Unscrew all tubing connections from the pump.
3. Crank / run the system backwards to bottom position.
4. To fill up pump use a syringe with a maximum needle diameter of 2.5 mm to or take an oil bottle, make a hole in the bottle cap and connect a piece of our hydraulic tubing to it, then press in a small piece of metal or plastic tube with a maximum outer 0 of 2,5 mm in to the hydraulic tubing.
5. Take the syringe or the bottle and stick the needle or the small tube though the small 0- holes in the bottom of the pump connections, fill up until oil starts to climb up in the connection and until no air bubbles can be seen in the bottom of the holes.
6. To fill up the cylinders put the loose tubing ends in to a bottle filled with our special hydraulic oil and slowly pull out the cylinder piston rods, oil will be sucked into cylinders through the created vacuum, hold the piston rods in this outer position for approximately 1-1,5 minutes.
7. Place the cylinders vertical with the tubing connection upwards, if necessary unscrew the cylinders from its fastening points, and press the piston rods all the way into the cylinders, watch so that no air bubbles comes out from the tubing at the end of the compression. The best way to see this is to keep the tubing end under the oil level in bottle.
8. If air does come out at the end of the compression repeat the 2 points above until it's OK.
9. Crank / run the system ½ turns upwards or until oil can be seen coming up in the pump connection holes.
10. Connect the tubing to the pump and tighten them to 10 Nm.
11. Crank / run the system abut halfway upwards and check that the cylinders starts to move at the same time, that they move smoothly and that they all protrude the same length. Further more check that the cylinders don't feel "soft" under load. If necessary repeat all points until the system works all right again.
12. Put the pump and the cylinders in place again and fasten up loose hanging tubing.

The system is now ready for use again.

Exchange of cylinder:

As a first step the system must always be unloaded through i.e. lifting up the entire cabinet by placing it on some sort of support, removing all the weight from the lift system.

1. If possible unscrew the pump (with motor unit) and place it so that the pump end with the tubing connections is higher than the crank / motor end of the pump.
2. Crank / run the system (**UNLOADED**) until the defect cylinder has come out 30-40 mm.
3. Unscrew the defect cylinder from its fastening points, and then unscrew the tubing connection from the cylinder.
4. Take the new cylinder, unscrew the pressure nut and remove the steel ball from the connection hole.
5. Connect the tubing to the new cylinder and tighten it with 10 Nm torque. NOTE the cylinder may not be fastened in cylinder tubing or piston rod during tightening of pressure nut.
6. Unscrew the defect cylinders tubing connection from the pump.
7. Put the loose tubing end in to a bottle filled with our special hydraulic oil and slowly pull out the cylinder piston rod, oil will be sucked into the cylinder through the created vacuum, hold piston rod in this outer position for approximately 1-1,5 minutes.
8. Place the cylinder vertical with the tubing connection upwards and press the piston rod into the cylinder until no more air bubbles comes out from the tubing. The best way to see this is to keep the tubing end under the oil level in the bottle.
9. Repeat the 2 points above until this cylinder protrudes approximately 50 mm more than the functioning cylinders do.
10. Crank / run the system another ½ turn or until oil can be seen coming up in the pump connection hole.
11. Connect the tubing to the pump and tighten.
12. Crank / run the system backwards to bottom position and at the same time press in the piston rod on the new cylinder. Then press in the piston rods on the rest of the cylinders.
13. With the pump in its lowest position, the piston rod on the new cylinder should now protrude more than the piston rods on the other cylinders.
14. Unscrew the concerned tubing connection from the pump again and empty redundant oil in to the oil bottle by:

    (For crank driven systems) pressing the piston rod all the way into the cylinder. A protrusion of 12 mm is standard on the C02-04 cylinder piston rod, on the C01 cylinder the piston rod goes even with the housing.

    (For motor driven systems) press in the piston rod until it protrudes as much as on the other cylinders (place the piston rod according to sketch when pressing our the oil).
15. Connect the tubing to the pump again and tighten it to 10 Nm.
16. Crank / run the system about halfway upwards and check that the cylinders starts to move at the same time, that they move smoothly and that they all protrude the same length. Further more check that the refilled cylinder doesn't feel "soft". If necessary repeat all points until the system works all right.
17. Put the pump and the cylinder in place again and fasten up loose hanging tubing. **The system is now ready for use again.**

Exchange of hydraulic tubing:

At Crankdriven systems:

As a first step rung the system to bottom position, then the system must always be unloaded through i.e. lifting up the entire cabinet, placing it on some sort of support removing all the weight from the lift system.

At motor driven systems:

As a first step run the system to bottom position, then unscrew the cover from the motor unit and remove it. Disconnect the limit switches trough gently pulling out the 6-pin plug from the circuit board (see enclosed drawing 30043). The run the system all the way to the bottom. Through quick taps on the control box switch until the coupler in the motor unit doesn't move anymore.

NOTE: Be real careful when tapping the switch otherwise there is a risk that the security pin in the coupler will break and have to be replaced.

Assemble the limit switch plug and the cover again.

The system must always be unloaded through i.e. lifting the entire table on some sort of support or knocking the table over on the side.

1. Unscrew the pump (with motor unit) and place it vertical with the tubing connections upwards.
2. Unscrew all tubing connections that are to be exchanged from the pump.
3. Unscrew the cylinders from their fastening points and unscrew the tubing connections from them too.
4. Take the new hydraulic tubing and cut it to desired lengths using i.e. a so-called carpet knife to get a clean cut, check so that the cut is perpendicular.
5. Take a pressure nut and a ferrule, put it on the new tubing and connect it to the cylinder, tighten with 10Nm. NOTE: the cylinder may not be fastened in cylinder tubing or piston rod during tightening of pressure nut.
6. Follow instruction "Complete system oil refill" from point 4 to point 11.

The system is now ready for use.

HYDRAULIC LIFT TABLE PARTS LIST

DESCRIPTION	PART #
Hydraulic pump	39556
Motor / Circuit Board	39555
Hydraulic Cylinder	39557
Security Pin	39558
Input Power Transformer	39559
Hydraulic Cylinder Tubing	39560
Hand Held Remote Control with Cord	39561
Wiring for Reed Switches	39562
Castor Assembly with Brake	38470
Castor Assembly without Brake	38471

The Baker Company

Upper Limit Switch Adjustment Instructions For Hydraulic Lift Assembly

The hydraulic lift comes with two limit switches. The limit switches are used to protect the pump from over travel when the lift is in the full down or up position.

The limit switches use magnets to sense the position of the pumps travel. The switches are located on the pump inside a plastic electrical raceway. The lower limit switch is located nearest the motor. The upper limit switch is located on the opposite end, away from the motor. The switches are held inside the raceway by plastic clips.

The switches are preset at the factory to provide maximum travel for the lift assembly. You should never need to relocate the lower limit switch unless the shear pin is being sheared when the pump travels to the full down position.

Relocating the Upper Limit Switch: (*Reference Figure 1*)

The hydraulic lift is located under the cabinet. **If the electrical raceway happens to be between the pump and lift frame it will be necessary to disconnect the pump and motor assembly from the frame. (It is held to the frame in three places)**

1. Have the cabinet in the full down position.
2. Remove electrical raceway cover on pump.
3. Mark the current position of the upper limit switch on the raceway.
4. Remove upper limit switch and move it down closer to the lower limit switch. **The closer you are to the lower switch, the less travel the lift will have**. The existing plastic clip that holds the switch is glued to the raceway. A replacement clip is provided.
5. With the limit switch in the new location, run the lift up to verify the maximum elevation. **(Be careful not to run the top of the cabinet into a low ceiling)**
6. Repeat step five until the desired maximum elevation is achieved.
7. Replace the raceway cover. (Reconnect pump and motor assembly to frame if removed)