

Designers and

Builders of

Laminar Flow

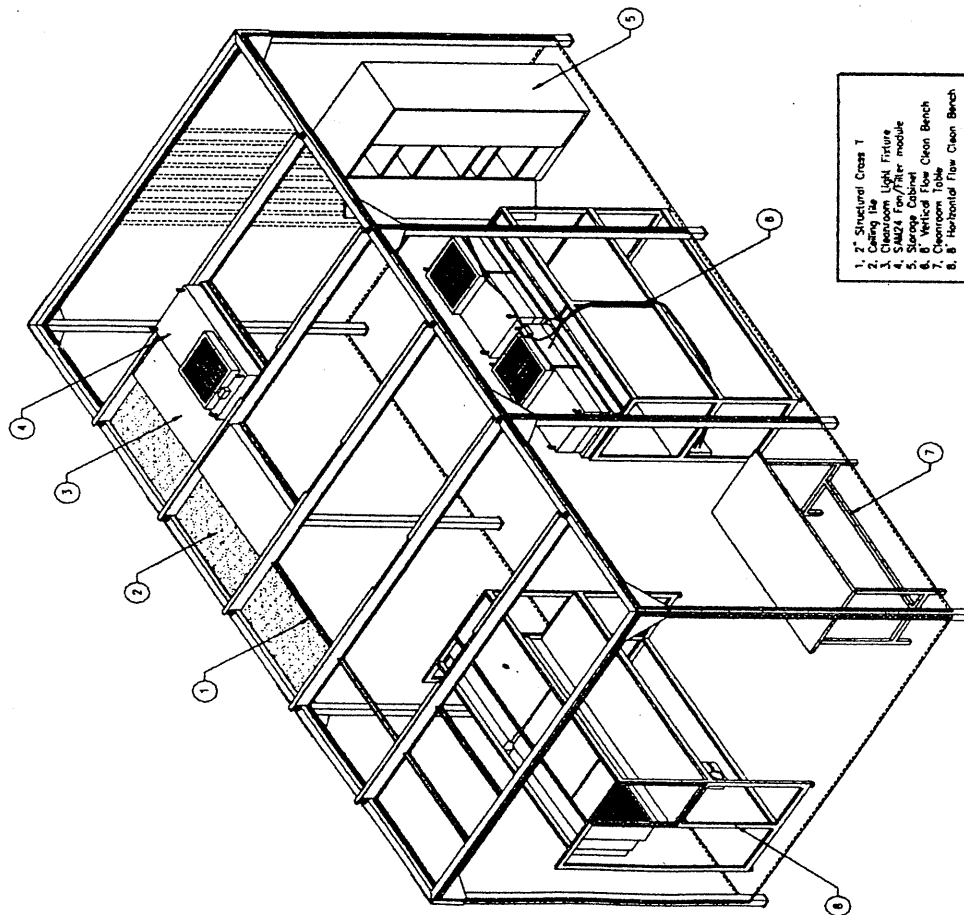
Systems and

Equipment for

Clean Rooms

OPERATION AND MAINTENANCE MANUAL

**FOR
SAM HEPA FAN/FILTER
MODULES**



- 1. Structural Cross T
- 2. Ceiling Light Fixture
- 3. Cleanroom Light Fixture
- 4. SAM24 Fan/Filter module
- 5. Storage Cabinet
- 6. Vertical Flow Clean Bench
- 7. Cleanroom Floor
- 8. Horizontal Flow Clean Bench

Typical Clean Rooms International Softwall Cleanroom with Clear curtain walls and Overlapping strip door entrance.

CLEAN ROOMS INTERNATIONAL, INC.

GRAND RAPIDS, MICHIGAN

616-452-8700 Phone

616-452-2372 Fax

E-mail: sales@cleanroomsint.com

Website: www.cleanroomsint.com

Table of Contents

SECTION 6: PRODUCT WARRANTY

GENERAL INFORMATION

Receiving and Unpacking
Information For Your Records
Principle of Operation
Method of Operation

INSTALLATION

Start Up Checklist
Wiring

MAINTENANCE

Preventive Maintenance
Changing The HEPA Filter

REPLACEMENT PARTS

TROUBLE SHOOTING

PRODUCT WARRANTY

The manufacturer warrants this equipment to be free from defects in material and workmanship for a period of one year from date of purchase.

No other warranty is herein expressed and none shall be implied.

If failure appears within one year from date of purchase, the buyer must notify the Company immediately. Defective product may be delivered freight prepaid to the nearest Company authorized location. Company shall, at its option, correct the defect, or supply a replacement. The liability of Company shall not in any case exceed either the cost of correcting defects in the product or supplying a replacement therefore, whichever shall be less, and upon the expiration of one (1) year from date of purchase of product by customer all such liability shall terminate. Documentary proof of length of service (which shall include date of purchase) must be furnished to Company if the date of manufacture was more than one (1) year prior to the date of alleged failure. Company is not responsible for damage to product due to abuse, improper installation, use other than for which originally sold, or through operation above rated load, either intentionally or otherwise of any product or party.

Under no circumstances will manufacturer be responsible for any freight (in or out), installation, or removal costs.

The foregoing warranty is in lieu of all other warranties, express or implied, with respect to the product, including any implied or statutory warranty of merchantability or fitness for purpose. Company shall not be liable by virtue of this warranty, or otherwise, for any consequential, incidental or special loss or damage resulting from the use or loss of use of the product.

SECTION 5: TROUBLE SHOOTING GUIDE

Problem

Blower does not run

Possible Solution

- Make sure the unit is properly connected to the power source.
- Make sure switch is turned on.
- Make sure the speed control is turned on.
- Verify power to the outlet.
- Tighten or replace fuse.
- Check capacitor for loose connection.
- Make sure the blower is running clockwise as viewed thru the prefilter frame and blower opening.
- Prefilter needs to be replaced.
- HEPA filter needs to be replaced.
- Rotate lamp slightly to verify proper contact.
- Try different lamp.
- Replace ballast.

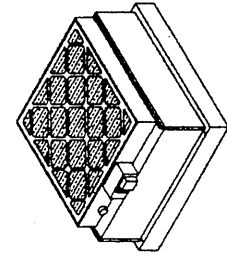
Lamps not lit but blower runs

Magnetohelic Gage needle does not move.

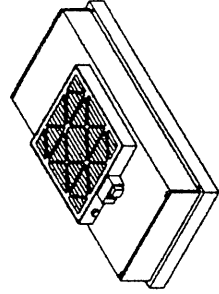
Make sure the blower is running.

If additional information is needed please contact:

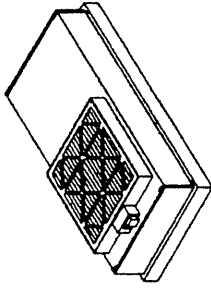
Clean Rooms International, Inc.
Phone: (616) 452-8700
Fax: (616) 452-2372



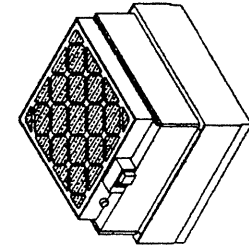
SAM22



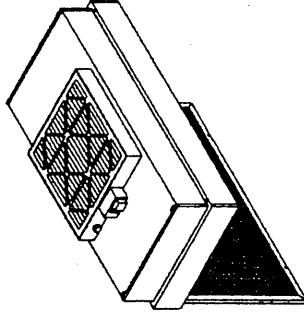
SAM24 MicroSound



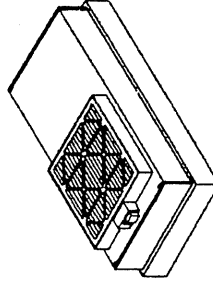
SAM24 LC



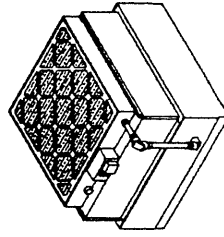
SAM22 CRF



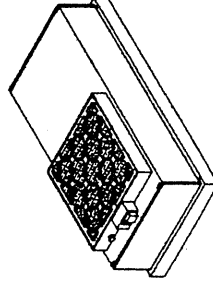
SAM24 MicroSound CRF



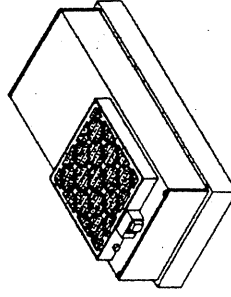
SAM24 LC CRF



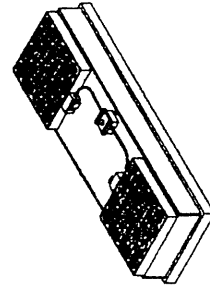
SAM22 CRF/LI



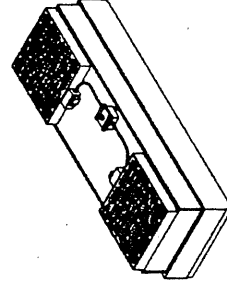
SAM24 H.O.



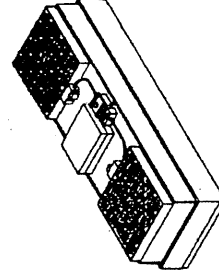
SAM24 H.O. CRF



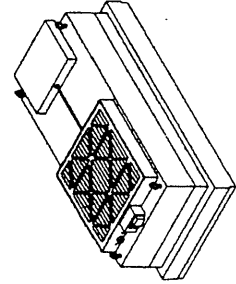
SAM26



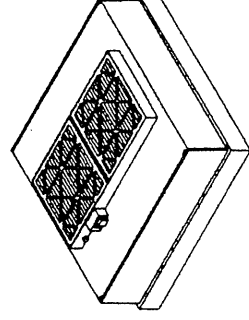
SAM26 CRF



SAM26 CRF/LI



SAM24 CRF/LI



SAM44 CRF

Clean Rooms International offers a larger variety of filter modules than any of our competitors

SECTION 1 : GENERAL INFORMATION

Receiving and Unpacking

Clean Rooms International, Inc. inspects each product before packaging. CRI does not take responsibility for damages caused by the freight company.

All shipments are "FOB Ship Point". This means once goods are picked up and signed for by the driver, they are the responsibility of the freight company. When the shipment is delivered and signed for by your receiving personnel the ownership and responsibility is transferred to the consignee.

Inspect the incoming shipment with the freight carrier driver present. Note any damage to the carton on the receiving papers including the driver's copy. Immediately inspect the damaged carton(s) and file a freight claim with the transportation company.

If the damage is discovered after the carton is opened, it is the buyer's responsibility to file a freight damage claim. Keep all incoming cartons and the product for inspection.

Information for your records:

Fill in the following information while unpacking the SAM modules. This information will be needed when ordering replacement filters or other parts.

Model: _____

Serial Number(s): _____

Bought From: _____

Date: _____

Installation Date: _____

Principle of Operation

The SAM Fan/Filter modules are self-contained low profile fan powered HEPA filter modules. SAM's can be used in many applications where clean air is needed. This is accomplished by maintaining a flow of HEPA filtered air to remove airborne particles within a controlled, closed loop room or chamber and by maintaining a positive pressure within an environment with air changes sufficient to meet the various Federal Standard 209 classifications. Because of unique sizes offered, the SAM's can be incorporated in many different areas such as Softwall Cleanrooms, new clean room design, facility upgrading, over conveyors or free standing machinery. The SAM's can be utilized in either a horizontal or vertical flow position.

Because of installation methods and uses beyond our control the user understands that Clean Rooms International, Inc. makes no warranties, express or implied as to the products suitability for any particular use or

MOTOR/BLOWER/PREFILTER FRAME ASSEMBLIES

NOTE: When ordering a M/B/P/F, use suffix -22 for SAM22, -24 for SAM24 and -26 for SAM26

All models with #221750 Lau blower assembly including SAM24 LC, CRI, CRI/LL and old style SAM22, 24 & 26 series.

115V, 60 hz, 1075 RPM, Magnetek	19910
208-230V, 50/60 hz, 1075 RPM, Magnetek	19911
277V, 60 hz, 1075 RPM, Magnetek	19912
208-230V, 50/60 hz, 1625 RPM, GE Motor	19913

All models with Revcor wheel and inlet ring including all SAM24 MicroSound series and new style SAM22 series built after 6/98.

115V, 60 hz, 1075 RPM, Magnetek, Revcor Blower	19914
208-230V, 50/60 hz, 1075 RPM, Magnetek, Revcor Blower	19915
277V, 60 hz, 1075 RPM, Magnetek, Revcor Blower	19916

Fluorescent lamp 6 ft (includes 703933 UV shield)	SAM26CRF/LI	703885-1
Fluorescent lamp 6 ft, F72/T12, High Output	SAM26CRF/LI	703885
Lamp Bracket for 2 ft and 4 ft models	SAM 22 & 24	805011
Lamp Bracket, for 6 ft models	SAM 28	805013
Lamp Bracket, for 6 ft models with spring loaded receptacles	SAM 28	805012
Lamp Receptacle, H.O., spring loaded	SAM26CRF/LI	703874
Lamp Receptacle, H.O., stationary for 6 ft models	SAM26CRF/LI	703875
Lamp Receptacle, Med BI Pin for 2 ft & 4 ft models	All Models	703871
Magnehelic Gage, 2"	All Models	804010
UV Shield, yellow, 6 ft models	SAM 28	703933
UV Shield, yellow, for 2 ft and 4 ft models	SAM 22 & 24	703932
ELECTRICAL PARTS		
Capacitor Boot	All Models	703788
Capacitor Mounting Strap	All Models	703790
Capacitor, 5MFD/370 VAC for 208-230V	All Models	703784
Capacitor, 7.5MFD/370 VAC for 115V	All Models	703786
Fuse, T 3.2 for use with 208-230V	All Models	703842
Fuse, T6 1/4 for 115V	All Models	703846
Power Cord Switch, 208-230V	All Models	703898
Power Cord, 8 ft, 110V	All Models	703902
Power Cord, 8 ft, 208-230V, no plug, use with 703898	All Models	703896
Speed Control, 10A, 115V	SAM 28	703916
Speed Control, 5A, 115V	SAM 22 & 24	703910
Speed Control, 5A 208-230/277V	SAM 22 & 24	703912
BLOWER ASSEMBLIES		
For SAM LC & other models built before 4/98 w/Lau Blower		221750
Revcor blower inlet ring		221748
Revcor blower wheel		221749
MOTORS		
208-230/277V, 50/60 hz Magnetek 1/3 HP		221888
115V, 60 hz, Magnetek 1/3 HP		221889
50/60 hz, 208-230V, 1625 RPM, 1/3 HP (3995 G.E.)		221890
50/60 hz, 208-230V, 1075 RPM, 1/3 HP (3986 G.E.)		221891
Explosion Proof, 208-230V, 1/3 HP		221892
Motor Bracket	SAM LC	221900
Motor Isolator	SAM MicroSound	603670
Motor Bushings	SAM MicroSound	603671
MOTOR/BLOWER ASSEMBLIES		
All models with #221750 Lau blower assembly including SAM24 LC, CRF CRF/LI, and old style SAM22, 24 & 26 series.		19901
115V, 60 hz, 1075 RPM Magnetek		19902
208-230V, 50/60 hz, 1075 RPM, Magnetek		19903
277V, 60 hz, 1075 RPM, Magnetek		19904
208-230V, 50/60 hz, 1625 RPM, GE Motor		
All models with Revcor wheel and inlet ring including all SAM24 MicroSound series and new style SAM22 series built after 6/98.		
115V, 60 hz, 1075 RPM, Magnetek, Revcor Blower		19905
208-230V, 50/60 hz, 1075 RPM, Magnetek, Revcor Blower		19906
277V, 60 hz, 1075 RPM, Magnetek, Revcor Blower		19907

application. Furthermore, Clean Rooms International, Inc. will not be held liable whatsoever by any individual or group, entity or representative of an individual, group or entity by use or application of any Clean Rooms International, Inc. fan powered module. The company also disclaims any liability for any perverse conditions or difficulty resulting from inadvertent errors or from misinterpretation of the materials enclosed.

Every effort has been taken to develop a concise, clear and informative manual for the SAM Modules. Standard installation instructions are enclosed along with a preventive maintenance program and replacement parts list. Due to continual product improvement at Clean Rooms International, Inc., information in this manual is subject to change without notice.

It is the intention of Clean Rooms International, Inc. to deliver a safe and reliable product that will give years of trouble free service. To ensure optimum performance and maximize product life it is imperative that a preventative maintenance program be established and adhered to by the responsible maintenance personnel.

Method of Operation

Air circulation is maintained by using one (1) direct drive forward curve centrifugal fan. The fan is driven by a 1/3 hp permanent split capacitor motor with thermal overload and fuse protection. The SAM26 series uses (2) motor blower assemblies.

The speed of the fan can be adjusted by means of a factory installed variable speed control mounted on the housing. The speed control is an option on the LC series.

Removal of the prefilter on top of the unit allows access to the fan assembly. The instructions for removing the motor/blower are on a following page.

An optional Magnehelic pressure gage can be supplied to give a visual reading of the pressure drop across the prefilter or HEPA filter. The gage can be supplied separately for a remote location with factory installed ports or installed as an integral component of the filter module.

Safety

As with any piece of equipment which contains electrical components, the potential for personal injury and property damage exists if the unit is not properly installed or maintained. The following list of safety issues pertain only to the SAM Fan/Filter Module and does not attempt to cover installation or operational concerns.

SECTION 4: REPLACEMENT PARTS

1. Read the user manual prior to installation and operation. Retain manual for future reference.
2. Units are available which will operate on either 120 volt or 208-230 volts. Check the label on the front of the unit for voltage required prior to connecting the unit to the power source. Verify available capacity of wiring circuit to avoid overloading and the potential of fire.
3. Unit must never be exposed to rain or excessive moisture.
4. If the module is equipped with a power cord do not handle with wet hands.
5. Do not use this product near water as in near a bathtub, washbowl, whirlpool etc.
6. Do not place anything on the top of the unit.
7. Do not use any type of electrical adapter which will allow the unit to be plugged into an outlet which is not grounded.
8. Do not plug the unit into an outlet that is controlled by an on/off wall switch or by a facility house lighting control switch.
9. Power supply cords should be routed so as not to cross a doorway or hallway where personal traffic may be injured or cause damage to the cord.
10. Disconnect or unplug module prior to any maintenance procedures.
11. After any service or repairs, the unit should be thoroughly inspected by a qualified technician to insure that the unit is still performing at maximum efficiency.
12. Replacement parts and components should be ordered through your local Clean Rooms International, Inc. representative or distributor to insure that parts are compatible and perform as originally designed. Any replacement parts not supplied by Clean Rooms International, Inc. and used in the SAM Module could void any or all warranty issues.

Description	Model	Part No.
HEPA FILTERS (99.99% @ 0.3 micron)		
2x2 CRF/CAFM (20 5/8x 20 5/8 x 3)	SAM22CRF & CRFLI	302020
2x4 CRF/CAFM (20 5/8x 44 5/8 x 3)	SAM24CRF & CRFLI	302030
2x2 NCR (23 5/8x 23 5/8 x 3)	SAM22	302070
2x4 NCR (23 5/8x 47 5/8 x 3)	SAM24 MicroSound, LC & NCR	302090
2x6 NCR (23 5/8x 71 5/8 x 3)	SAM26	302120
2x6 CRF (20 5/8x 68 5/8 x 3)	SAM26CRF & CRFLI	302130
ULPA FILTERS (99.999% @ 0.12 micron)		
2x2 CRF/CAFM (20 5/8x 20 5/8 x 3)	SAM22CRF & CRFLI	302021
2x4 CRF/CAFM (20 5/8x 44 5/8 x 3)	SAM24CRF & CRFLI	302040
2x2 NCR (23 5/8x 23 5/8 x 3)	SAM22	302071
2x4 NCR (23 5/8x 47 5/8 x 3)	SAM24 MicroSound, LC & NCR	302100
2x6 NCR (23 5/8x 71 5/8 x 3)	SAM26NCR	302125
2x6 CRF/CAFM (20 5/8x 68 5/8 x 3)	SAM26CRF & CRFLI	302131
PREFILTERS		
Prefilter 20 x 20 x 1"	All Models	302190
Prefilter Charcoal 20 x 20 x 1"	All Models	302193
MISCELLANEOUS		
Eyebolt nut, 3/8"	All Models	211584
Eyebolt, 3/8" (use with #211584 nut)	All Models	211546
Filter Clamp, CRF/CAFM Style (4 per model)	All CRF Models	603552
Motor to blower mounting bracket	LC & Models built before 4/1/98	221900
Socket head, 10-24 x 1 for filter clamp (4 per model)	CRF & CRFLI	211615
GRILLE PARTS		
2 x 6 Acrylic eggcrate w/alum frame and hinges	SAM26CRFLI	402440-6
Grille Frame mounting clips (Tinnerman) (4 per model)	CRF & CRFLI	211594
Grille Frame mounting screws (2 per model)	CRF & CRFLI	211656
Grille, 2 x 4 acrylic eggcrate	SAM24CRFLI	402440
Grille, 2 x 4 acrylic eggcrate w/alum frame and hinges	SAM24CRFLI	402440-1
Grille, 2 x 4 polystyrene eggcrate	SAM24CRF	402450
Grille, 2 x 4 polystyrene eggcrate w/alum frame and hinges	SAM24CRF	402450-1
LIGHTING		
Ballast, 4 ft, 120V, 60hz, 2-lamp, rapid start	SAM24CRFLI 60 hz	703750
Ballast, 4 ft, 230/250V, 50hz, 2-lamp, rapid start	SAM24CRF 50 hz	703760
Ballast, 6 ft, 120V, 60hz, 2-lamp, H.O. rapid start	SAM26CRFLI 60 hz	703756
Ballast, 6 ft, 230/250V, 50hz, 2-lamp, H.O., rapid start	SAM26CRF 50 hz	703761
Fluorescent lamp 2 ft.	SAM22CRFLI	703883-1
(includes 703932 UV shield)	SAM22CRFLI	703883
Fluorescent lamp 2 ft, F20/T12	SAM22CRFLI	
Fluorescent lamp 4 ft	SAM24CRFLI	703884-1
(includes 703932 UV shield)	SAM24CRFLI	
Fluorescent lamp 4 ft, F40 40W or 34W, T12	SAM24CRFLI	703884

SECTION 2: INSTALLATION

SAM MicroSound

Step 1: Remove M/B/P Assembly from Plenum

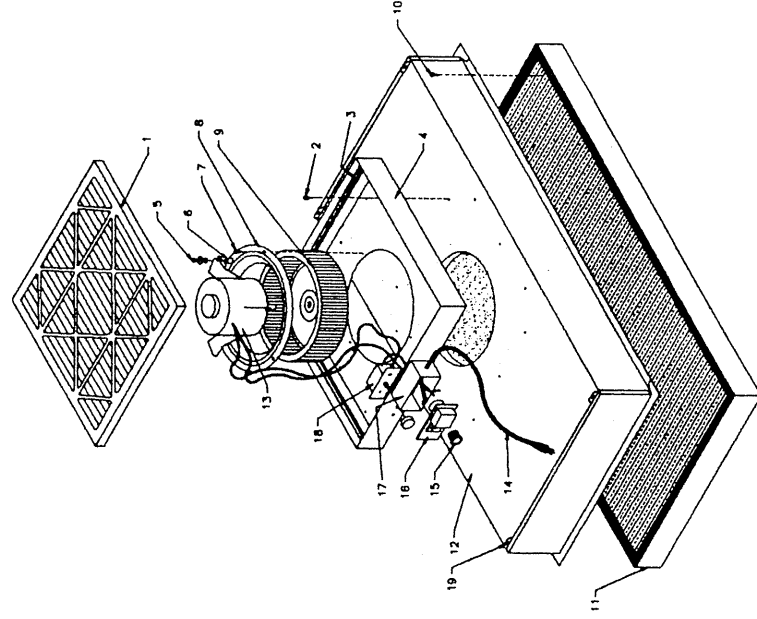
- A. Remove module from ceiling.

CAUTION: Do not touch surface of the HEPA Filter while removing module from ceiling.

- B. Remove prefilter. (1)
- C. Loosen prefilter frame (2) from plenum by removing twelve #8 sheet metal screws (3) around outer edge of prefilter frame.
- D. Remove motor blower/prefilter frame assembly from plenum.
- E. Reverse this process to reassemble.

Step 2: Remove Motor from M/B/P Assembly

- A. Note how the unit is wired. During re-assembly make sure all wiring is returned to original and the replacement motor is wired the same.



CAUTION:

HEPA filter media is fragile and can be damaged easily. Special precautions must be taken during installation of SAM HEPA Fan/Filter Modules. To avoid damage to the filter media, touch only the frame and **DO NOT PLACE HANDS OR ANY OTHER OBJECTS ON THE FILTER SURFACE.**

Most ceiling T-Bar systems are not designed to support the weight of any fan powered filter module. For this reason it is imperative that the unit be suspended independent from the ceiling. Each SAM is equipped with a method of suspension to make the installation hanging process easy.

Modules may be supported with either flexible or rigid hangers. Because of the weight of the unit, use at least 12 gage hang wire, light chain or cable to support the module.

Start Up Check List

1. Check the voltage on the CRI label. Verify that the power supply is the same voltage as the SAM module.
2. Remove the prefilter and determine if wheel of blower is free to rotate and has not been subject to misalignment in shipping or installation. Check nuts, bolts, screws for tightness.
3. Apply power and check that the wheel is rotating in the correct direction. Looking through the prefilter frame, the fan must be rotating in a clockwise direction.

Wiring

Motor leads are terminated to a junction box mounted on the module. Call the factory if you need a wiring diagram. The power to the modules manufactured before April 1, 1998 (except the LC modules) is controlled by an ON/OFF toggle switch. Older LC modules do not come with the switch or fuse protection and must be wired directly to the power supply.

If an additional safety switch is needed to meet code, the electrician should wire it between the fuse and power source.

NOTE: All units must be electrically grounded in accordance with the National Electric Code and ANSI-CI-1971.

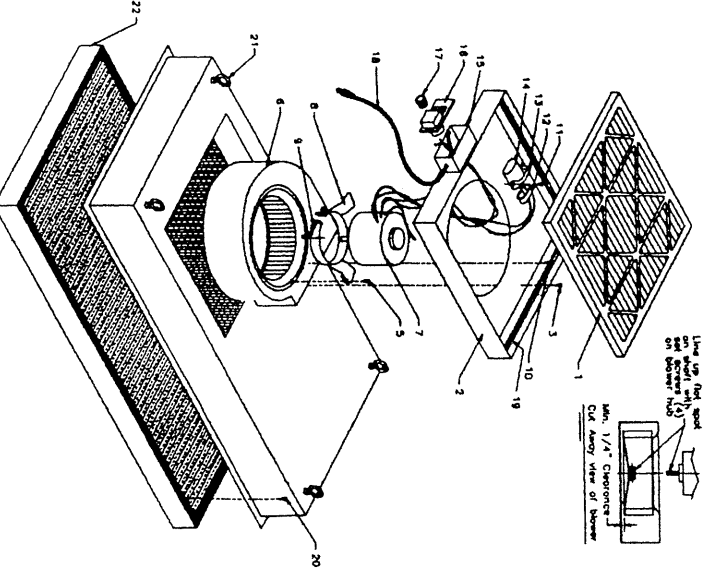
Power Requirement

<u>Model</u>	<u>HP</u>	<u>Voltage</u>	<u>Rated Amps</u>	<u>Max Amps</u>
SAM22 Series	1/3	115	4.9	6.4
	1/3	208-230	2.6	3.1
SAM24 Series	1/3	115	4.9	6.4
	1/3	208-230	2.6	3.1
SAM26 Series	(2) 1/3	115	9.8	12.8
	1/3	208-230	5.2	6.2

E. Reverse this process to reassemble.

Step 2:

- Remove Motor from M/B/P Assembly
- A. Note how the unit is wired. During re-assembly make sure all wiring is returned to original and the replacement motor is wired the same.
 - B. Use a long 1/8 hex allen wrench to loosen allen set screw (4) holding the motor shaft to the blower assembly. (H.O. SAM blower and motor mount slightly different from illustration). Go thru the fan blades with the allen wrench to get at the set screw.
 - C. Remove motor (7) and motor bracket (8) as a unit from blower assembly (6) by removing the screws (5) and lifting straight up.
 - D. Remove motor bracket (8) from motor by loosening belly band screw (9).
 - E. Remove blower assembly (6) from prefilter frame (2) by loosening seven #8 sheet metal screws (10).
 - F. **IMPORTANT MOTOR REASSEMBLY NOTE:**
To position the allen set screw correctly, line up flat spot on the motor shaft with set screw on blower hub. Reverse this process to re-install motor in blower assembly.



SECTION 3: MAINTENANCE

Preventive Maintenance

A program of preventive maintenance will greatly increase fan and motor life. Inspect the fan wheel, motor, and filter after the first three (3) months of operation. Based on the findings, schedule periodic inspections and maintenance for:

1. Changing prefilters.
2. Cleaning fan wheel as required to insure smooth quiet operation. Periodic cleaning of all fan equipment is strongly recommended because dirt accumulation on the impeller can cause vibration which greatly increases stress and load on motor bearings.
3. Lubricate the motor every 12 months with #20 non-detergent oil.
4. Changing the HEPA filter.

When to Change the HEPA Filter?

Static pressure can be measured with a Magnehelic gage or manometer.

It is time to change the HEPA filter when the pressure drop across the filter reaches two (2) times the original resistance or a maximum of 1.1" WG. The blower is capable of overcoming static pressure beyond 1.1" WG. However, the total CFM of filtered air diminishes sharply.

How to Change the HEPA Filter

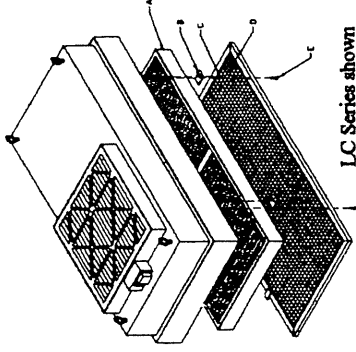
CAUTION: Do not touch the surface of the HEPA filter while installing or removing the filter from ceiling.

1. MicroSound & LC Series
 - A. Remove SAM Module from ceiling.
 - B. Remove twelve Tek screws (A) located on plenum flange.
 - C. Clean plenum flange surface.
 - D. Set plenum on top of replacement filters.

NOTE: Gasketed surface of filter should mate with plenum.

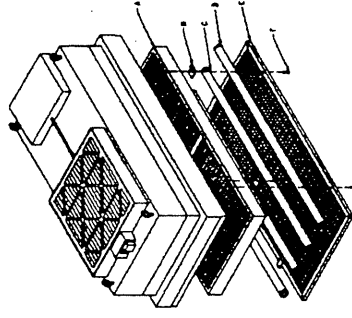
CAUTION: Do not touch either side of the filter during installation.

- E. With plenum centered over filter, install all screws.



2. CRF Series except Dominator
 - A. Removal of Module from ceiling grid is not required.
 - B. Remove (2) phillips screws (E) from the grille frame and lower grille to vertical position.
 - C. Remove (4) filter clips (B) from frame and pull down on the HEPA filter to break the seal, then lower the filter straight down through the light housing.
 - D. Replace with new HEPA filter and repeat each of the above steps in reverse order.

CAUTION: Do not touch either side of the filter during installation.



3. CRF/LI Series
 - A. Removal of Module from ceiling grid is not required.
 - B. Remove (2) phillips screws (F) from the grille frame and lower grille to vertical position.
 - C. Remove lamps (D) from lamp brackets.
 - D. Remove (4) filter clamp screws (C) and clamps (B) from frame and pull down on the HEPA filter to break the seal, then lower the filter straight down through the light housing.
 - E. Replace with new HEPA filter and repeat each of the above steps in reverse order.
- CAUTION:** Do not touch either side of the filter during installation.

Instructions For Removing Motor/Blower/Prefilter Frame Assembly.

LC, old style NCR & CRF Series built before April 1, 1998

Step 1: Remove M/B/P Assembly from Plenum

- A. Remove module from ceiling.

CAUTION: Do not touch surface of the HEPA Filter while removing module from ceiling.
- B. Remove prefilter. (1)
- C. Loosen prefilter frame (2) from plenum by removing twelve #8 sheet metal screws (3) around outer edge of prefilter frame.
- D. Remove motor blower/prefilter frame assembly from plenum.

