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Engineering & Technology

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AirShield[™] Exterior Ducted APS for **AS2000EG, AS3500EG and AS5000EG**

Installation and Owners Manual Version 7.0



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1.0 INTRODUCTION

1.1 Thank you for purchasing the **AirShield™ AS2000EG, AS3500EG or AS5000EG** medical grade, interior ducted air purification system (APS). This unit is one of the finest air cleaning devices manufactured in the world today. To ensure optimizing the unit's effectiveness and safe use, please read this Owners Manual in its entirety before installing and operating these units.

2.0 AirShield™ EG Unit Specifications:

Height:	31"
Width:	29"
Length:	42"
Weight:	135 lbs. operating. 170 lbs. shipping
Plug & Safety Switch	Hard wired (<i>local disconnect not supplied</i>)
Weight:	170 lbs. no UV, 180 lbs with UV
Construction:	.062 aluminum welded walls .125 2" x 2" angle aluminum base Flanged ends
Electrical:	200-240 Volt/50-60 Hz/1-3 Phase, 2.8A max.
Air Flow:	2000, 3500 or 5000 CFM maximum; Variable to Lowest CFM (20% of max.)
dBA:	54 dBA on High (Ducted)
Control:	Off/On, High, Variable to Low

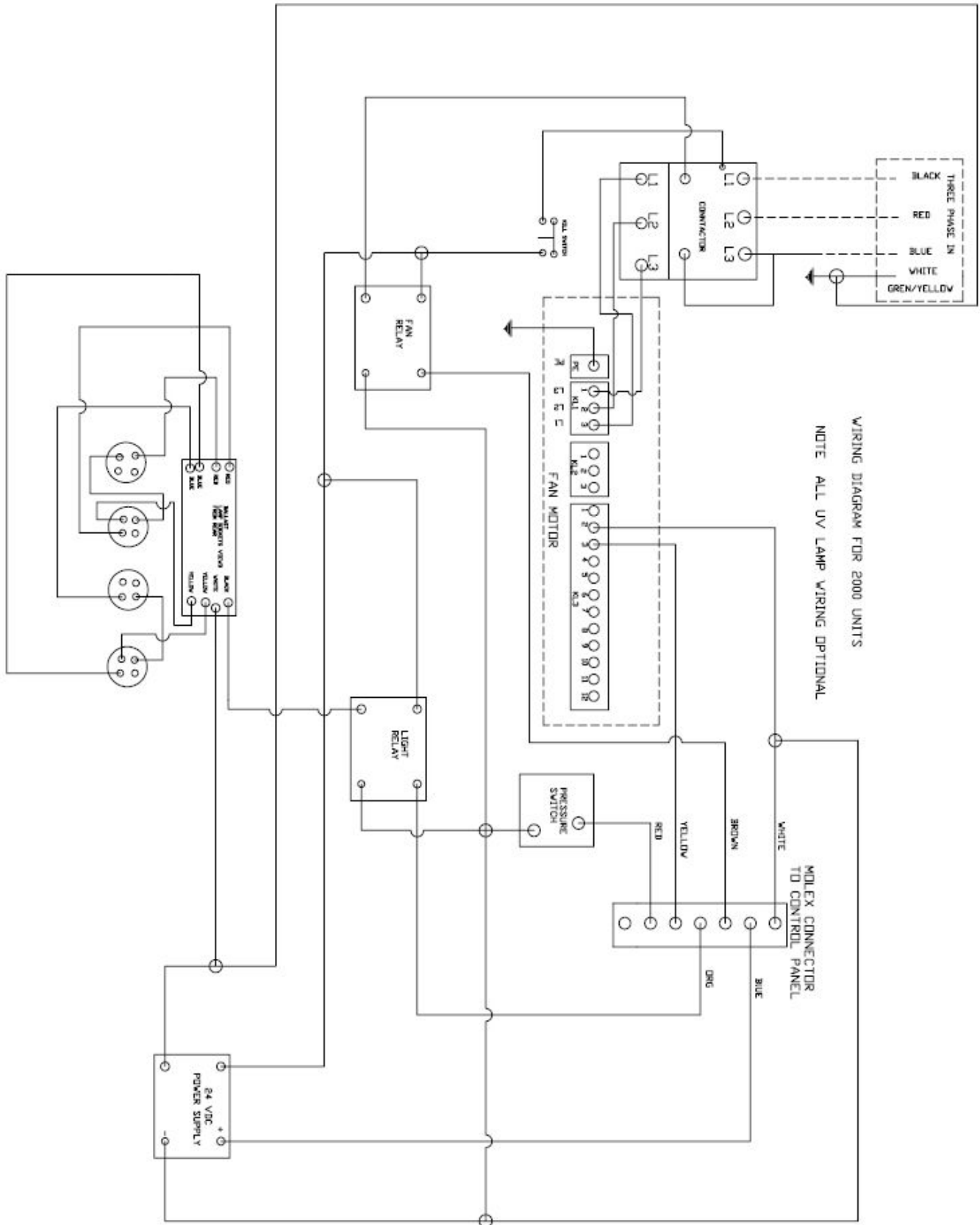
3.0 AS EG UNIT REPLACEMENT PARTS:

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
AS2000EGPF	24" x 24" x 4" Pleated Prefilter (30% ASHRAE or MERV 8 – Antimicrobial)	1
AS2000EGHF	24" x 24" x 11½" (12" with gasket) Certified 99.99% Super HEPA Filter with Galvanized Steel Frame	1
AS500DGUV	22" UV-C Lamp (Optional)	4



NOTE: All filters and UV lamps come factory installed and should not be removed until replacement is required.

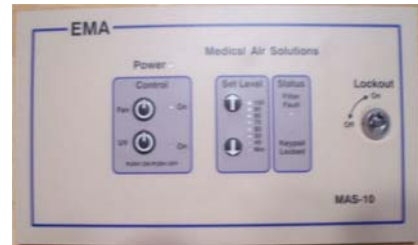
4.0 Wiring Diagram



5.0 EG UNIT INFORMATION

5.1 **MOTOR/BLOWER INFORMATION** – The blower is a direct drive, motorized, backward curved AC impeller type and is rated for continuous operation. The blower motor has sealed bearings. This is a 200-240 VAC electrical supply that is inverted to DC voltage. Maintenance is not required.

5.2 **CONTROL PANEL** – The keyed access Control Panel allows the operator to adjust the speed on the motor blower unit and to manually energize the UV-C lamps. There is also a pressure switch to monitor the differential pressure, to indicate when the HEPA filter needs replacement and run speed memory.



5.3 **24 VDC TRANSFORMER** – This transformer will supply low voltage to the pressure switch, relays and control panel. All control elements in this unit are low voltage.

5.4 **PRESSURE SWITCH** – The pressure switch receive 24 VDC and the contact closes and illuminated the “FILTER FAULT” LED when the filter needs changing.

5.5 **PREFILTER INFORMATION** – The life of the pleated antimicrobial prefilter will depend on the ambient conditions within the service area from which the air is being drawn. Average prefilter life is 1-3 months, depending on the length of use, the environment and the application.

5.6 **CERTIFIED HEPA FILTER INFORMATION** – The life of the 99.99% HEPA filter will depend on the ambient conditions within the room from which the air is being drawn. Average HEPA filter life is 2-5 years, depending on the environment and/or application. The internal differential pressure (dP) switch LED on the control panel will indicate when the HEPA filter should be changed.

5.6.1 HEPA filters should be changed when the “FILTER FAULT” LED is illuminated. Ensure that the prefilter is not loaded as this may give a false high dP reading.

5.6.2 The manufacturer’s test dP reading is located on the certificate on the side of the HEPA filter.



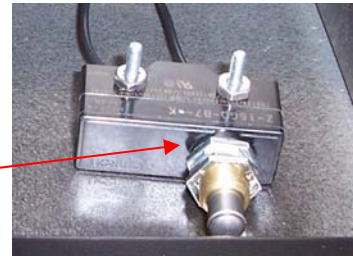
5.6.3 Manufacturer’s filter test certificate is located here.

5.6.4 **HEPA filter media is frangible and will puncture or tear very easily.** Care should be exercised that the media does not make contact with any foreign objects including installer's body parts.

5.7 **UV-C LAMP INFORMATION (if present)** – The four (4) UV-C (ultraviolet germicidal irradiation or UVGI) lamps, if this option is selected, illuminate the capture side of the 99.99% HEPA and will operate at maximum efficiency, on average, 8,000-9,000 hours. A UV indicator light and Off/On toggle switch is located in the control panel and will control and monitor the functioning of the UV-C lamps.

5.7.1 Upon initial installation, the indicator should shine green if the toggle switch is set to energize the lamps. If the UV-C lamps do not illuminate, the indicator light in the side access panel will not light and maintenance should be performed to correct the problem.

5.8 **SAFETY SWITCH** – A safety switch is located inside the access panel and will de-energize all electrical components of the EG unit when the circuit is broken.

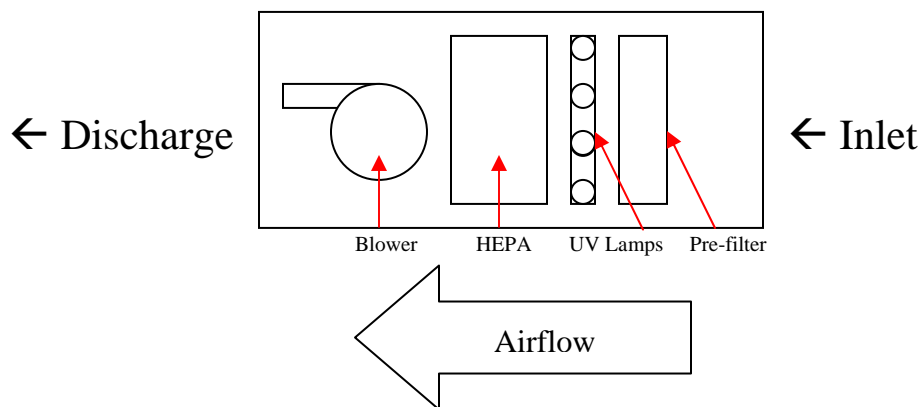


DO NOT MANUALLY ENERGIZE THE EG UNIT WHILE THE ACCESS PANEL IS OPEN!

5.8.1 If, during installation, an access panel is installed in the ducting on the inlet side if the unit, an additional safety switch is recommended to prevent accidental exposure to the UV lamps.

5.9 **Control Panel Keyed Access** – The Control Panel is only operable by the key provided in the “OFF” position.

6.0 EG UNIT INSTALLATION INFORMATION



6.1 **DELIVERED UNIT** – The EG unit is delivered with a blower, 99.99% HEPA filter, ASHRAE 30% antimicrobial pre-filter, UV-C lamps (optional), differential pressure switch, with a 24 VDC power supply

and weatherizing insulation installed. The legs and control panel shipped with the unit are packaged in separate boxes. This unit is designed to deliver 2000, 3500 or 5000 CFM at 1.1" total static pressure (1.1" S. P. is inherent in the unit).

This unit is minimally weatherized with R9 insulation. In extreme weather climates, additional insulation may be added to the outer casing of the unit.

- 6.2 **UNIT ORIENTATION** – The orientation of the unit will determine whether the unit will be utilized for ultra-pure air supply or exhaust. The unit is flanged on both ends to allow for creating a positive or negative pressure environment in the area that the unit is servicing. The unit may also be used as a recirculating device to provide HEPA filtered air changes to the area being serviced.
- 6.3 **UNIT MOUNTING** – The unit can be mounted directly to the roof or a slab by attaching the legs to the bottom of the unit. Simply remove the hex bolts from the weld nuts and attach the legs to the unit. The unit can also set mounted on a curb. Ensure that the unit is sufficiently elevated so that the unit will not see water above the curb or legs.
- 6.4 **NEGATIVE PRESSURE OPERATION** – The ducting to the unit should be attached to a transition on the flange at the inlet of the unit. The speed of the unit should be set so that the air exhausted by the unit to the outside is a minimum 200 CFM greater than the supply to the area being serviced.
 - 6.4.1 The ducting of the unit should be sized to reduce the static pressure as much as possible.
 - 6.4.2 A moisture shroud with bug/bird screen should be installed at the discharge to keep insects, birds and water from entering the unit.
- 6.5 **POSITIVE PRESSURE OPERATION** – The ducting from a supply air source should be attached to the unit on the flange at the inlet of the unit. The re-entry of the supply air in the area being serviced shall be with a duct from the discharge to the area being serviced. The speed of the unit should be set so that the air supplied by the unit is a minimum 200 CFM greater than the exhaust from the area being serviced.
 - 6.5.1 The ducting of the unit should be sized to reduce the static pressure as much as possible.
 - 6.5.2 The ducting to and from the unit should be insulated.
- 6.6 **SYSTEM BALANCING** – If this unit is exhausting or supplying air to multiple grilles or diffusers, then volumetric control dampers will need to be installed in the supply or exhaust ducting to balance air movement.

- 6.7 **USING WITH HVAC UNITS** – If a heating and/or cooling unit is to be used in conjunction with the **EG** unit, then a volumetric control damper will be required to maintain a static pressure sufficient to keep the fan on the HVAC unit or the **EG** unit to freewheel causing motor damage.
- 6.8 **USING WITH REHEATING OR COOLING COILS** – If a heating and/or cooling coil is to be installed in conjunction with the **EG** unit then the extra static pressure must be calculated to ensure the unit will provide the supply or exhaust air necessary.
- 6.9 **MAIN POWER TO THE UNIT** – The client or the installing contractor must provide a local disconnect which may be located on the unit or next to the unit. Ensure the local disconnect provided is capable of being “locked out” to power down for maintenance. The unit requires 230 VAC which will have 2 hot, 1 common and 1 ground electrical leads. The 208-240/60/1-3 power will connect to the blower motor and be inverted to 24 VDC.
- 6.9.1 If the local disconnect is installed on the **EG** unit, the box **MUST** be sealed to prevent moisture from entering the cabinet.
- 6.10 **CONTROL WIRING** – The Control Panel should be mounted inside the building, preferably in a penthouse, the area being serviced or other area. All control wiring in the unit is low voltage (24 VDC) and is numbered so that the wires in the “J” box on the unit will mate with the numbered wires at the Control Panel. Simply mate the wires from the Control Panel to the unit.

7.0 MAINTENANCE



WARNING: THE EG UNIT SHOULD BE DE-ENERGIZED AND WORKERS SHOULD FOLLOW THE FACILITY’S LOCKOUT/TAGOUT PROCEDURE!

- 7.1 **PREFILTER REPLACEMENT** – When changing filters, we recommend the use of gloves, goggles and a protective facemask, but, standard operating procedures for the facility should always be followed. Exhausted filters should be placed in plastic bags, sealed, and disposal performed based on your state, local and/or facility’s disposal procedures. To change the prefilter:
- 7.1.1 Remove the bolts and access door on the side of the unit.
- 7.1.2 Slide the prefilter out from the slot enclosure (disturb trapped dust as little as possible).
- 7.1.3 Dispose of the old prefilter as per state/local regulations or facility SOP.

7.1.4 To install a new prefilter, simply slide it into the slot enclosure.

7.1.5 When complete, replace access door and bolts ensuring the door has engaged the safety switch.

7.2 **UV LAMP REPLACEMENT** – The Off/On Toggle switch energizes or de-energizes the UVGI lamps. UV-C lamps **must** be changed after no more than 9,000 hours of use. While they may still illuminate, the UV-C at 253.7 nm wavelength will be significantly reduced. To change out lamps:



WARNING: AVOID DIRECT EXPOSURE TO UV-C LAMPS. REPEATED AND/OR PROLONGED EXPOSURE CAN BE HAZAROUS TO SKIN AND EYE HEALTH!

7.2.1 Do not handle new UV-C lamps with bare hands, use gloves. The oil deposited on the lamp can reduce UV-C output considerably.

7.2.2 Remove the bolts and access door on the side of the unit.

7.2.3 Carefully remove the UV-C lamp from its holder by pushing the lamp gently toward non-pin end through the grommet.

7.2.4 Gently pull the 4 pin end out of the socket then pull the lamp out of the grommet at the other end.

7.2.5 Repeat procedure for the other three (3) lamps.

7.2.6 Dispose of used UV-C lamps as per your state/local or your facility's disposal procedures.

7.2.7 Don cloth or surgical gloves. When installing UV-C lamps take care not to touch the glass tube with bare hands as skin oils will block UV output, rendering them less effective.

7.2.8 Installing the new lamps is performed by reversing the removal process. Insert the non-pin end of the lamp through the grommet then gently insert the 4-pin end into the fixture.

7.2.9 Repeat procedure for the other three (3) lamps.

7.2.10 When complete, replace access door and bolts ensuring the door has engaged the safety switch.

7.3 **HEPA FILTER REPLACEMENT** – When changing the 99.99% HEPA filter, we recommend the use of gloves, goggles and a protective facemask, but standard operating procedures for the facility should always be followed. It is recommended that this task be performed by two persons. The HEPA filter is replaced when the starting dP is double the starting dP.

- 7.3.1 Remove the access door bolts on the side of the unit.
- 7.3.2 Loosen the four (4) thumbscrews so that the HEPA filter can be removed by hand.
- 7.3.3 The HEPA filter is held in place in a slot enclosure.

Pre-filter UVGI Lamps HEPA Filter

- 7.3.4 Carefully pull the used HEPA filter from the slot enclosure.
- 7.3.5 Exhausted filter should be placed in a plastic bag, sealed, with disposal performed based on your state/local regulations and/or facility's disposal procedures.
- 7.3.6 All surfaces should be cleaned with an approved biocide. Dispose cleaning materials based on your state/local regulations and/or facility's disposal procedures.



- 7.3.7 Carefully slide the replacement HEPA filter into the slot enclosure.
- 7.3.8 Tighten thumbscrews to allow gasket to seal the HEPA filter. **DO NOT OVERTIGHTEN.**



NOTE: HEPA filter media is frangible. **DO NOT TOUCH THE HEPA FILTER MEDIA AS IT IS VERY FRAGILE AND WILL TEAR OR PUNCTURE VERY EASILY!**

- 7.3.9 Replace access door bolts ensuring the door has engaged the safety switch.

8.0 Operation

- 8.1 Provide power to the unit by closing the circuit breaker on the local disconnect on the unit to the "ON" position. The green "POWER" LED on the control panel should be illuminated. To set the unit for operation, perform the following:
 - 8.1.1 At the keyed control panel, press the "FAN" button. The green "ON" LED should be illuminated.
 - 8.1.2 At the keyed control panel, press the "UV" button. The green "ON" LED should be illuminated.
 - 8.1.3 At the keyed control panel, press the "SET LEVEL" "UP" arrow. This will start the unit at the minimum speed on initial start-up or return to the "memorized" speed if the unit was restarted after a power loss or momentary power interruption. Initially the operator must set the fan speed to the required level.

- 8.1.3.1 On initial power-up or reapplying power after a power interruption, the unit **MUST** be manually restarted at the control panel.
- 8.1.3.2 On power-up, the control panel will initiate a self-diagnostic to ensure all elements of the control panel are working properly. This self-diagnostic can take up to 10 seconds.
- 8.1.3.3 While the self-diagnostic is in progress after a power loss, **DO NOT** press the “Up” or “Down” arrow keys to increase/decrease speed. This will cause the memory to be cleared and will **NOT** return to the previous setting.
- 8.1.3.4 **NOTE:** Whenever the speed setting is changed during normal operation, the existing speed setting resident in memory will be cleared and the new setting will be saved each time an “Up” or “Down” arrow is pressed.
- 8.1.4 Check the status of the “FILTER FAULT” LED. The red LED should not be illuminated.
 - 8.1.4.1 If the “FILTER FAULT” LED illuminates, shut down the system then restart to perform a “hard” reset of the pressure switch. If the “FILTER FAULT” LED is still illuminated, then;
 - 8.1.4.2 Shut down the system and check the pre-filter for loading. If necessary, replace the pre-filter. If the “FILTER FAULT” LED is still illuminated, then;
 - 8.1.4.3 Check the HEPA filter for loading. If necessary, replace the HEPA.
 - 8.1.4.4 If none of these remedies resolve the issue then call MAS Engineering at (770) 377-3884.
- 8.1.5 Turn the key at the key station to the “LOCKOUT” position and secure the key. No changes will be accepted from the keypad when the key station is in the “LOCKOUT” position.
- 8.2 If used for exhaust, the unit should be vented to the outside whenever possible. (Some States and local codes require exhaust to the outside)
- 8.3 The system balancing should be checked once per year.

Manufactured exclusively for Medical Air Solutions by:
GAP Partners, Inc.
Rabun Gap, GA
USA

Limited Liability Warranty

All products are warranted by Medical Air Solutions (hereafter called **MAS**) to be free from defects in materials and workmanship for a period of five (5) years after shipment from its factory, provided the buyer demonstrates to the satisfaction of **MAS** that the product was properly installed and maintained in accordance with **MAS**'s instructions and recommendations and that it was used under normal intended operating conditions.

This warranty is limited to the replacing and/or repairing by **MAS** of any part or parts which have been returned to **MAS**, with **MAS**'s written authorization and in which **MAS**'s opinion are defective. Parts not manufactured by **MAS** but installed by **MAS** in equipment sold to the buyer shall carry the original manufacturer's warranty only. The buyer shall pay for all transportation charges, any and all sales and use taxes, duties, imports, or excises for such part or parts. **MAS** shall have the sole right to determine whether defective parts shall be repaired or replaced.

This warranty does not cover any customer labor charges for replacement of parts, adjustments or repairs, or any other work unless such charges shall be assumed or authorized in advance, in writing, by **MAS**.

This warranty does not cover any replaceable items such as filters or lamps, or any products which in the judgment of **MAS**, has been the subject to misuse or negligence, improper handling or which has been repaired or altered outside **MAS**'s factory in any way, which may have impaired its safety, operation or efficiency, or any product, which has been subject to accident.

This warranty shall be null and void if any part not manufactured or supplied by **MAS** for use in any of its products shall have been substituted and used in place of a part manufactured or supplied by **MAS** for such use, without authorization in advance, in writing by **MAS**.

There are no warranties, other than those appearing on the acknowledgement form including no warranty of merchantability or fitness for a particular purpose, given in connection with the sale of the goods sold hereunder. The buyer agrees that his sole and exclusive remedy, and the limit of **MAS**'s liability for loss from any cause whatsoever, shall be the purchase price of the goods sold hereunder for which a claim is formally made.

No warranty or affirmation of fact, expressed or implied, other than as stated in "LIMITED LIABILITY WARRANTY" above is made or authorized by **MAS**.