

*****READ AND SAVE THESE INSTRUCTIONS*****



MAC 10[®] LEAC
Fan Filter Unit
Standard, RSR, & RSRE Models
INSTALLATION, OPERATION & MAINTENANCE MANUAL

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■ **Important Information**

To ensure ordering of the proper replacement parts or complete MAC 10 unit, record the information from the serial number label, located adjacent to the electrical box, in the fields below for easy future reference. If you cannot locate the Sales Order Number, please contact ENVIRCO for this information.



Serial No. Label

Company Purchased From _____

ENVIRCO Job Number _____

Order Number _____

Serial Number _____

Unit Part Number _____

Date _____

Airflows per Certification _____

■ **Contact Information**

ENVIRCO USA
101 McNeill Road
Sanford, NC 27330
Tel: (919) 775-2201
Tel: (800) 884-0002
Fax: (800) 458-2379
Email: info@envirco.com

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■ Critical Operation Conditions of the MAC 10 LEAC

1. Touching of the HEPA filter will damage it, voiding the warranty on the filter. The screen is only to protect against an accidental 'touch' of the filter. Never place a hand or tool on the filter. Never lie filter face flat down on a surface always have filter on its side or back to protect from damage.
2. Prior to powering the unit, verify that the unit has been plugged into the correct voltage. The serial number label on the top of the MAC 10 unit has the required voltage.
3. For reorder prepossess the MAC 10 part number and serial number should be recorded. This information is located on the serial number label, located adjacent to the electrical box. If you can't located the Sales Order Number please contact ENVIRCO for this information.

■ Warning

TO REDUCE THE RISK OF FIRE, ELECTRICAL SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

- A. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
- B. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
- C. If this unit is to be installed over an area using liquid, such as water or chemical cleaning solutions, it must be marked as appropriate for the application.
- D. Use this unit only in the manner intended by the manufacturer. If you have any questions, contact the manufacturer.
- E. Before servicing or cleaning the unit, switch power off at unit service panel and lock service panel to prevent power from being switched on accidentally.
- F. NOTE – The Mac 10 has not been investigated for use in fire resistance rated construction.
- G. To fulfill our obligations towards Article 33, in accordance to European REACH Regulation No 1907/2006 EC, we hereby inform you that this article contains the following Substances of Very High Concern mentioned on the Candidate list:
Cadmium/ 1,3,5-triglycidyl-s-triazinetrione

■ Part Numbers Covered by This Manual

11194-XXX	MAC 10 LEAC 2x4 (600x1210mm)	Standard Filter
11194-XXX	MAC 10 LEAC 2x4 (600x1210mm)	RSR/E Filter

Note: A "Z" in the part number indicates that the unit is special. This may indicate a size change from standard or a special filter. Please contact the factory for part numbers if this is the situation.

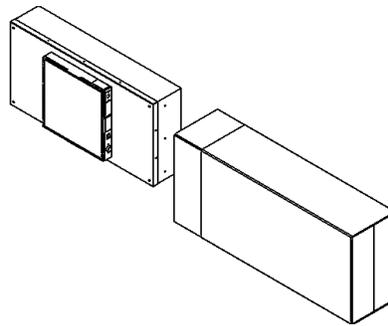
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■ **Installation**

Note: The MAC 10 LEAC Fan Filter Unit is completely assembled at the factory with the exception of the optional ¼" (0.64 cm)-20 eyebolts, which can be used when hanging the unit from an overhead structure.

Step 1. Carefully remove the unit from the shipping carton and inspect for any damage that may have occurred during transportation. (See Figure 1)

Figure 1: Unboxing



Step 2. Wipe down plastic bag and move unit into clean room. (Double bagging is available upon request.)

Step 3. If using rigidly supported grid (usually 2" (50 mm) or wider), raise unit through ceiling and lower onto the gasketed grid. If using a flexible grid (typically supported with wires) the unit must be secured to an overhead structure with eyebolts, s-hooks and chain or ¼-20 all thread. A roll of high-density gasket has been provided for use with ungasketed grids. Note: special size units are available to fit specific clean room grid systems.

Note: Confirm fan dimensions to match T-grid dimensions. Special size units are available to fit specific cleanroom grid systems.

Step 4. Have an electrician wire the unit to the appropriate voltage (115V, 220V, 277VAC), according to the wiring diagram in section IX and local electric codes. If optional power cord was purchased, plug unit into a grounded receptacle. The optional power cord is not acceptable for plenum installations.

■ Cleaning the LEAC Prefilter (Standard Foam)

Tools Required: None.

Note: To keep the filter in top operating condition, washing the foam prefilter (if installed) is recommended every three to six months.

Step 1. To gain access to the prefilter, remove the ceiling panel next to the unit, if applicable.

Step 2. Switch the ON/OFF switch to the OFF position.

Step 3. Remove the prefilter from the snap-in frame. (See Figure 2, below.)

Step 4. Clean the prefilter by hand washing in water with a mild detergent or by using a vacuum cleaner. Allow prefilter to dry completely before replacing.

Step 5. Complete by reversing the above steps.

WARNING
 DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

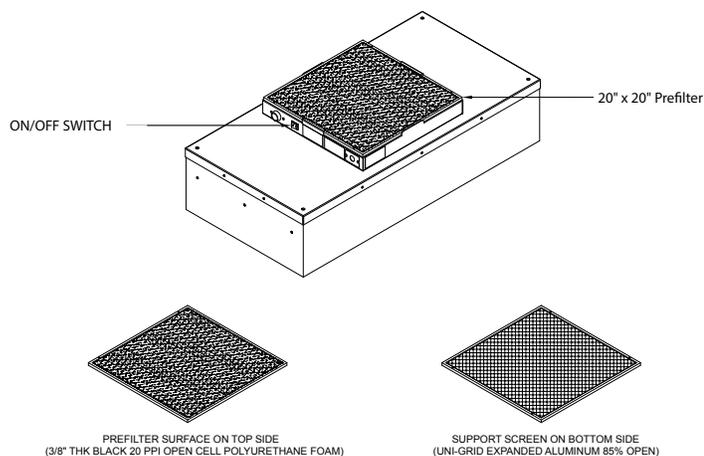


Figure 2: Foam Cleaning Prefilter

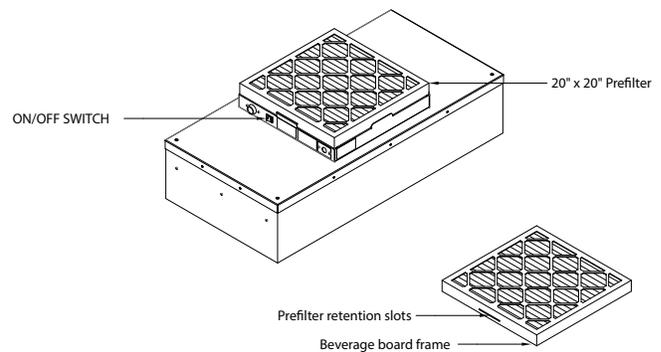


Figure 3: G4 Prefilter Placement

■ Changing the LEAC Prefilter (G4 Pleated)

Tools Required: None.

Note: To keep the filter in top operating condition, replacing the pleated prefilter is recommended every twelve months or sooner.

Step 1. To gain access to the prefilter, remove the ceiling panel next to the unit, if applicable.

Step 2. Switch the ON/OFF switch to the OFF position.

Step 3. Remove the prefilter from the snap-in frame. The beverage board frame has slots that have to be depressed to release the filter from the prefilter housing (See Figure 5, above.)

Step 4. After removing the new G4 pleated prefilter from the box, remove the die cut slots from the beverage board frame and install on prefilter bracket.

Step 5. Complete by reversing the above steps.

WARNING
 DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

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■ **Service: Removal and Replacement of Standard HEPA/ULPA Filters**

WARNING

DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

WARNING

THE STANDARD FILTER IS PROTECTED WITH AN EXPANDED METAL FACE SCREEN. THIS IS NEVER TO BE USED TO HANDLE THE FILTER. IT IS ONLY FOR PROTECTION AGAINST AN ACCIDENTAL TOUCH OF THE FILTER. ONLY HANDLE THE FILTER BY THE FRAME.

Note: All filters should be visually inspected for freight damage before installation. It is necessary to use two workers when removing the filter and for installation to avoid twisting or separation of the media seals. Handle the filter only by the frame and never place anything on the upstream filter side of the filter. Additionally, it is important to keep the filter level to prevent any shearing force on the media itself.

For Standard Filters:

Tools Required: Phillips head screwdriver, rivet hand tool, Ø5/32 aluminum rivet grip range .126-.187

Step 1. Remove unit from ceiling.

Step 2. Remove the 10 screws holding the HEPA/ULPA filter to the lid assembly.

Step 3. Lift the lid assembly off the HEPA/ULPA filter. (See Figure 4.) Discard the used filter as per requirements of the applicable regulations. Carefully install the filter deflectors into the new filter using the 5/32 rivets. Do not touch or place the filter deflectors on the HEPA/ULPA media pack. This could cause tears in the filter pack.

Note: Before replacing with a new HEPA/ULPA filter, carefully inspect the new filter for any visual damage. Also, inspect the gasket in the “tee” bar to ensure a tight seal. Replace as necessary.

Step 4. Replace with the new HEPA/ULPA filter and complete by reversing the above steps.

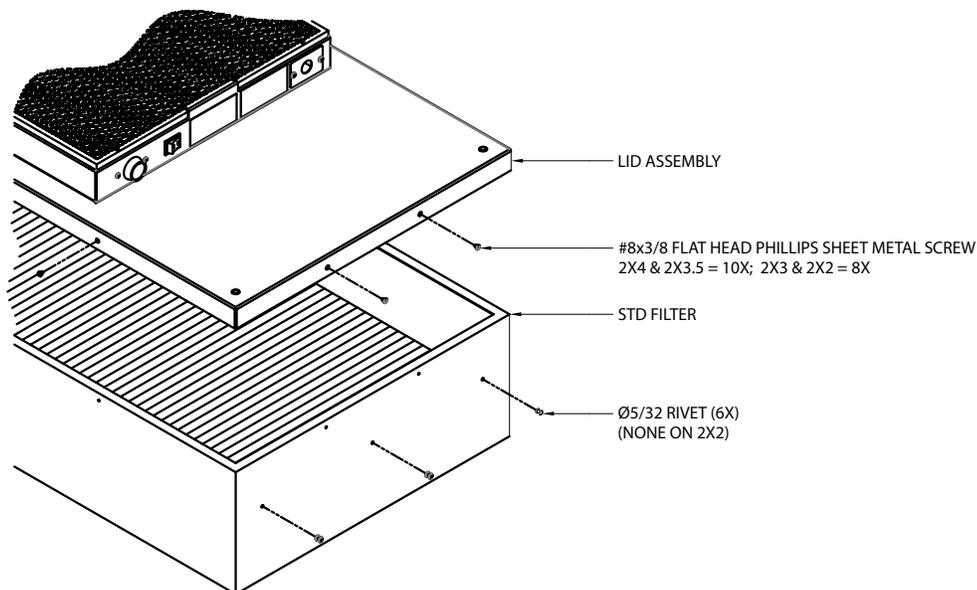


Figure 4: Standard Filter Replacement

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■ Service: Removal and Replacement of RSR/E Gel Seal Filters

WARNING

DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

WARNING

THE RSR/E FILTERS ARE PROTECTED WITH AN EXPANDED METAL FACE SCREEN. THIS IS NEVER TO BE USED TO HANDLE THE FILTER. IT IS ONLY FOR PROTECTION AGAINST AN ACCIDENTAL TOUCH OF THE FILTER. ONLY HANDLE THE FILTER BY THE FRAME.

Note: All filters should be visually inspected for freight damage before installation. It is necessary to use two workers when removing the filter and for installation to avoid twisting or separation of the media seals. Handle the filter only by the frame and never place anything on the upstream filter side of the filter. Additionally, it is important to keep the filter level to prevent any shearing force on the media itself.

For RSRE Filters:

Tools Required: Phillips head screwdriver, 3/16" ball driver hex head wrench

Step 1. Remove the diffuser screen by removing the six 10-32x1/2 screws.

Step 2. Loosen the six 1/4x20 socket cap head screws far enough to rotate the filter clip 90°. The filter will not drop during this operation. Slowly pull the filter away from the knife-edge seal, taking care not to touch the filter face during this operation. It is important to pull the filter slowly and evenly away from the seal so that the gel remains in the filter gel track.

Step 3. Inspect filter for visual damage. If damaged, set aside for replacement or repair.

Step 4. Inspect the gel seal if reinstalling the removed filter. Determine if the gel has lost its ability to seal. If so, have a certified professional replace the missing, dried out, and/or severely damaged gel.

Step 5. Place the filter evenly against the filter plenum housing of the RSR/E unit. Install filter clips and screws. The clips can be rotated and angled into place. Using the clips as a lever, the filter can be seated. It is recommended to work either clockwise or counter-clockwise around the filter and raise the filter into the gel.

Step 6. Reinstall screen. Reinstall and hand-tighten diffuser screen screws. Avoid overtightening the screen hardware.

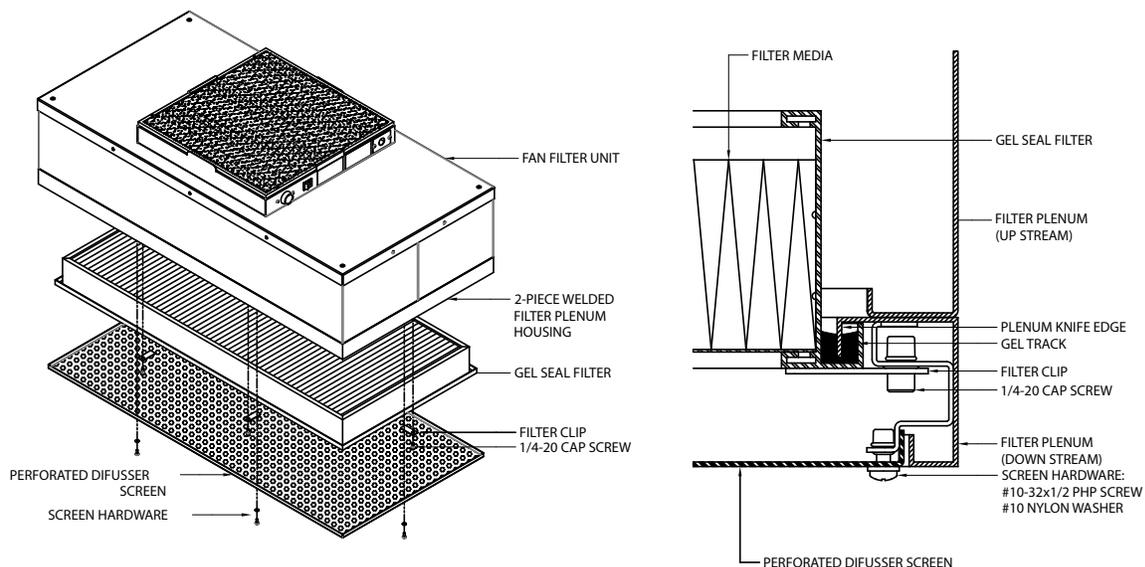


Figure 5: RSRE Filter Replacement

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■ **Service: Standard and RSR Motor Removal and Installation**

WARNING

DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

WARNING

ELECTRICAL SERVICE SHOULD ONLY BE PERFORMED BY LICENSED ELECTRICIANS OR AUTHORIZED ENVIRCO SERVICE TECHNICIANS.

Tools Required: Phillips head screwdriver, 3/8" (10 mm) Hex Head wrench, pliers, 5/32" (0.40 cm) Allen wrench

Step 1. To gain access to the motor, remove the ceiling panel next to the unit, if applicable.

Step 2. Switch the ON/OFF switch to the OFF position.

Step 3. Remove the prefilter off the prefilter frame.

Step 4. Loosen the electrical cover screws (two), and slide/lift off cover. (See Figure 6.)

Step 5. Make note of all wire locations for reinstallation later.

Step 6. Disconnect 5-pin and 16-pin wire harnesses from the electrical box housing.

Step 7. Remove the eight screws to free the motor/blower assembly from the lid assembly. If using power drivers, set the unit to a low torque setting to avoid stripping the sheet metal screws (See Figure 6.)

Step 8. Using an adjustable wrench, loosen the two set screws that attach the blower wheel to the motor shaft.

Step 9. Mark the location of the motor support bracket (belly band), then loosen the bolt just enough to allow the motor support bracket to slide off the motor.

Step 10. Using the removed motor, mark the new motor with the location of the motor support bracket.

Step 11. Replace with the new motor and reassemble by reversing the above steps 1-8. Set the spacing at 0.25" (6.35 mm) clearance between the blower and the upper motor plate/prefilter frame. This will give a 0.11" overlap between the venturi ring and the blower.

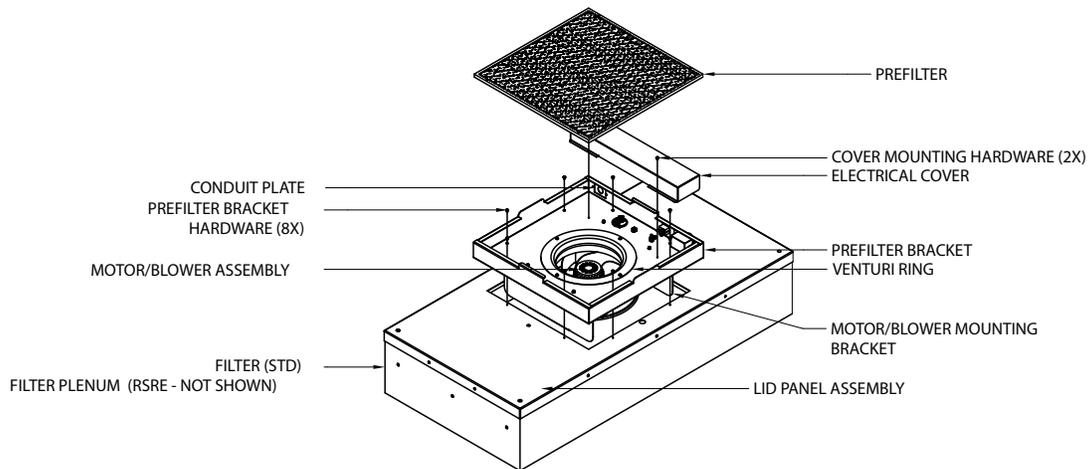


Figure 6: Standard/RSR Motor Replacement

■ Service: RSRE Motor Removal and Installation

WARNING

DISCONNECT THE UNIT FROM THE ELECTRICAL POWER SOURCE BEFORE ATTEMPTING ANY SERVICE.

WARNING

ELECTRICAL SERVICE SHOULD ONLY BE PERFORMED BY LICENSED ELECTRICIANS OR AUTHORIZED ENVIRCO SERVICE TECHNICIANS.

Tools Required: 3/16 hex head wrench, Phillips head screwdriver

Note: It is highly recommended to also change the motor capacitor when changing the motor.

Step 1. To gain access to the motor, remove the gel seal HEPA/ULPA filter.

Step 2. Prior to removing motor/blower assembly, remove blower wheel to expose motor connectors on motor. Using an adjustable wrench loosen the two set screws that attach the blower wheel to the motor shaft. Disconnect the five and sixteen pin connectors from the motor.

Step 3. While supporting the motor blower assembly from below, remove the six screws on the underside of the venturi ring and lower the assembly. (See Figure 7). Note the baffle does not have to be removed to remove the motor/blower assembly.

Step 4. Before removal of the motor mount bracket, measure the precise location of the bracket on the motor. Remove the bracket.

Step 5. Replace with the new motor and reassemble by reversing the above steps. Set the location of the motor mount bracket as measured (see above Step 6). Set the spacing at 0.25" (6.35 mm) clearance between the blower and the upper motor plate/prefilter frame creating a 0.11" (2.80 mm) overlap between the wheel and the venturi ring. When reinstalling the assembly, align the plate to insure that the leads will reach the electrical box.

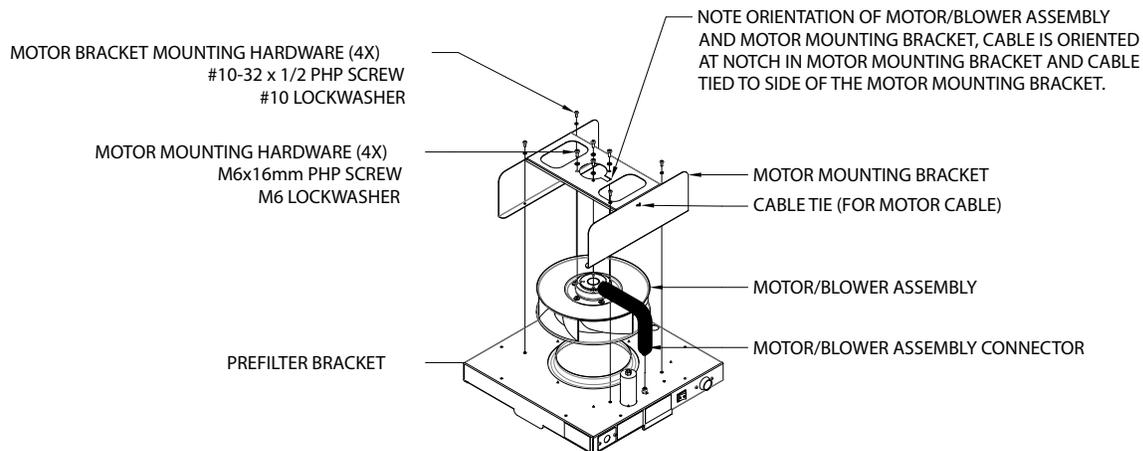


Figure 7: RSRE Motor Replacement

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■ **Unit Control Box**

ON/OFF Switch - Speed/Airflow Adjustment

All MAC 10 units are equipped with a three-position rotary switch, which is located on the side of the electrical box. (See Figure 8.)

Recommended fan speed during initial start-up and operation is the “LOW” speed. As airflow eventually decreases due to filter loading, fan speed may be increased by moving the rocker switch to the top or “MEDIUM” position, and finally to the “HIGH” position. Periodic airflow velocity readings (Per I.E.S. T. Specifications) should be conducted to determine the filter condition and appropriate fan speed setting.

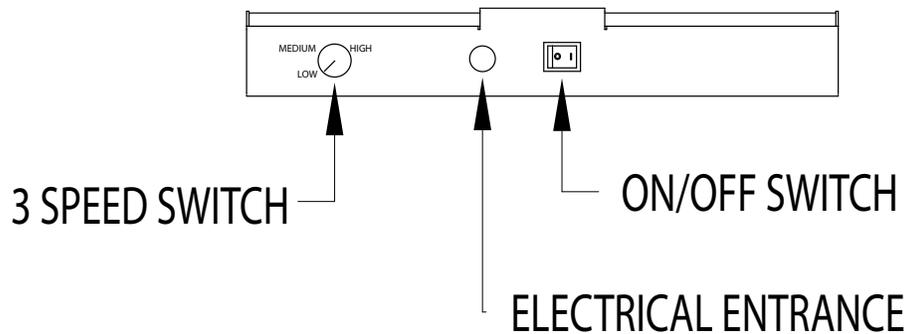


Figure 8: 3 Speed Switch Adjustment

■ Troubleshooting

UNIT IS NOT ADJUSTABLE

Verify that rotation of the knob on the visual speed control does not change the RPM or Flow Index display on the unit. If rotating does nothing, remove the electrical box cover and remove the 4-pin connector from the Visual Speed control and install in 180 degrees rotated. Again adjust the knob. The 4 pin connector is on the 18" (31.8 mm) white conductor.

LOW AIR VELOCITY

Step 1. Check prefilter media; replace or clean as necessary.

Step 2. Adjust visual speed control for higher blower output.

Step 3. Check power supply for proper voltage, amperage and distribution frequency.

Step 4. Replace HEPA filter if the air velocity remains low.

HIGH AIR VELOCITY

Adjust visual speed control for lower blower output.

NON-LAMINAR FLOW AND/OR EXCESSIVE CONTAMINATION

Step 1. Ensure that no large obstructions are upstream of airflow pattern.

Step 2. Determine that no other air-moving devices are operating in or around cleanroom which disrupt room's airflow pattern.

Step 3. Check air velocity and, if low, conduct the "Low Air Velocity" procedure outlined above.

Step 4. Conduct smoke and photometer test on HEPA filter. Seal or replace HEPA filter as necessary.

Contact Technical Support at:

ENVIRCO

101 McNeill Road

Sanford, NC 27330, USA

Tel: (800) 884-0002

Fax: (800) 458-2379

Email: info@envirco.com

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■ **MAC 10 LEAC Wiring Diagram**

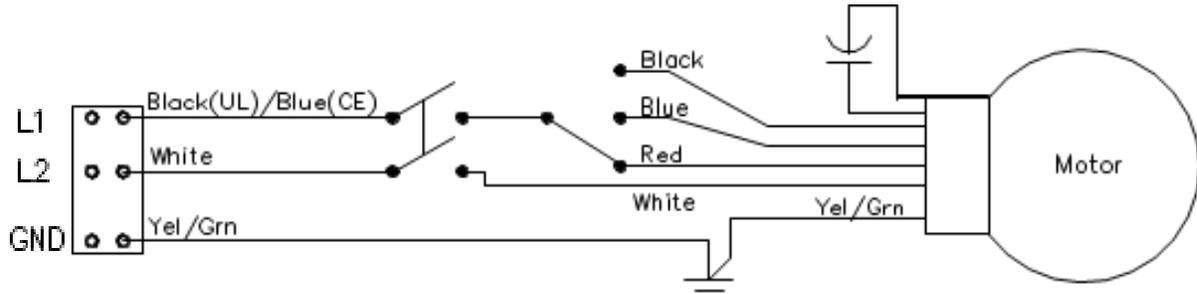


Figure 9: Wiring Diagram

■ MAC 10 LEAC Replacement Parts List

ACLE PARTS	PART #
Grommet	63271
Motor 120V	63764-001
Motor 220V	63764-002
Motor 277V	63764-003
Motor Mount Clip	38511-001
Venturi Ring	64115
Blower Wheel	64015
Motor/Blower Assy	
120V	24511-001
220V	24511-002
277V	24511-003
Capacitor	61485
Capacitor Boot	60126
Rocker Switch	63739-002
3 Spd Switch	63775
Foam Pre-filter (20x20)	62981-038
30/30 Pre-filter (20x20)	64125-001

All filter part numbers are based on the standard MAC 10 sizes (2x4 – 23.63x47.63).

If the unit in question is not this size or the part number includes a “Z”, contact the factory for replacement filter information.

STANDARD FILTERS PART NUMBERS

- 69600S-001HAPXX FILTER - HEPA 2X4 9” FRAME
- 69600S-001UAPXX FILTER - ULPA 2X4 9” FRAME

WELDED RSR GEL SEAL

- 69601-001H FILTER - HEPA 21X45X3.5 GEL SEAL
- 69601-001U FILTER - ULPA 21X45X3.5 GEL SEAL

Optional Accessories:

- Fluorescent lighting
- Ionizing bar
- ULPA Filter (Standard and RSR)
- A/C intake collar: 20x20 (10” /254mm)
- 20x20 (12” /304.8mm)
- 20x20 (14” /355.6mm)

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■ Limited Warranty

LIMITED WARRANTY: Unless otherwise expressly stated in ENVIRCO's published specifications for the Goods, ENVIRCO warrants that Goods are free from defects in material and workmanship, except for services which are warranted to be performed in a competent and diligent manner in accordance with any mutually agreed specifications. The foregoing warranty shall apply for eighteen (18) months from the date of shipment from ENVIRCO's facility, except for services for which the warranty shall apply for ninety (90) days from the date of performance (the "Warranty Period"). Provided Buyer informs ENVIRCO in writing of any breach of warranty prior to the expiration of the applicable Warranty Period, ENVIRCO shall, as its sole obligation and Buyer's sole and exclusive remedy for any breach of this warranty, repair or replace/re-perform the Goods which gave rise to the breach or, at ENVIRCO' option, refund the amounts paid by Buyer for the Goods which gave rise to the breach. Any repair, replacement or re-performance by ENVIRCO hereunder shall not extend the applicable Warranty Period. The parties shall mutually agree on the specifications of any test to determine the presence of a defect. Unless otherwise agreed upon by ENVIRCO in writing, Buyer shall bear the costs of access, de-installation, re-installation and transportation of Goods to ENVIRCO and back to Buyer. These warranties and remedies are conditioned upon (a) the proper storage, installation, operation, and maintenance of the Goods and conformance with the proper operation instruction manuals provided by ENVIRCO or its suppliers or subcontractors, (b) Buyer keeping proper records of operation and maintenance during the applicable Warranty Period and providing ENVIRCO access to those records, and (c) modification or repair of the Goods only as authorized by ENVIRCO. ENVIRCO does not warrant the Goods or any repaired or replacement parts against normal wear and tear or damage caused by misuse, accident, or use against the instructions of ENVIRCO. Any modification or repair of any of the Goods not authorized by ENVIRCO shall render the warranty null and void. EXCEPT AS EXPRESSLY SET FORTH HEREIN, ENVIRCO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY DISCLAIMED TO THE EXTENT PERMITTED BY APPLICABLE LAW.

■ Testing

Each MAC 10 LEAC filter unit is thoroughly tested at the factory before shipment. However, because of the "rigors" of shipping, ENVIRCO encourages its re-test after installation. Additional, for large installations it is recommended to bench test 5% of the units prior to installation.

ENVIRCO recommends that the customer contact an independent organization, with technicians trained and experienced in performance evaluation and maintenance of clean air equipment.

Some of the testing procedures performed on the MAC 10 LEAC include PSL challenge of HEPA/ULPA filters to assure specified performance, along with air velocity measurement and adjustment tests. No DOP is used on MAC 10 Filters, unless requested.

Clean air solutions built for you.

MORE INFORMATION AVAILABLE AT WWW.ENVIRCO.COM

Industrial

Cleanroom Products

- » MAC 10[®] Original
- » MAC 10[®] IQ™
- » MAC 10[®] IQ™ LAF
- » MAC 10[®] LEAC™
- » MAC 10[®] LEAC2™
- » MAC 10[®] LEDC™
- » Ducted Ceiling Module:
DCM & RSR
- » AC or DC Control Systems
- » MAC-T Ceiling Grid System

Hospital & Healthcare

Hospital & Healthcare

- » IsoClean[®] and IsoClean
with Ultraviolet Light
 - » AirCeil[®]
 - » Hospi-Gard[®] Room
Pressure Monitor
- ### Enviramedic Products
- » HOR Horizontal Flow
Enclosure
 - » HCF Horizontal Flow
Surgery Room
 - » VOR Vertical Flow Surgery
Isolator

Pharmaceutical

Pharmaceutical & Medical Device

- » Unimodule M2 Vertical
Laminar Flow Workstation
- » METD 100% Exhausted
Vertical Flow Workstation
- » Laminar Downflow Module

Laboratory & Research

Laboratory & Research

- » 100-Plus Horizontal or
Vertical Flow Clean Bench
- » Unidirectional Flow
Horizontal Flow Bench (LF)
- » TT Table Top Horizontal
Flow Clean Bench
- » EnviraLab Sterility Module:
ESM

