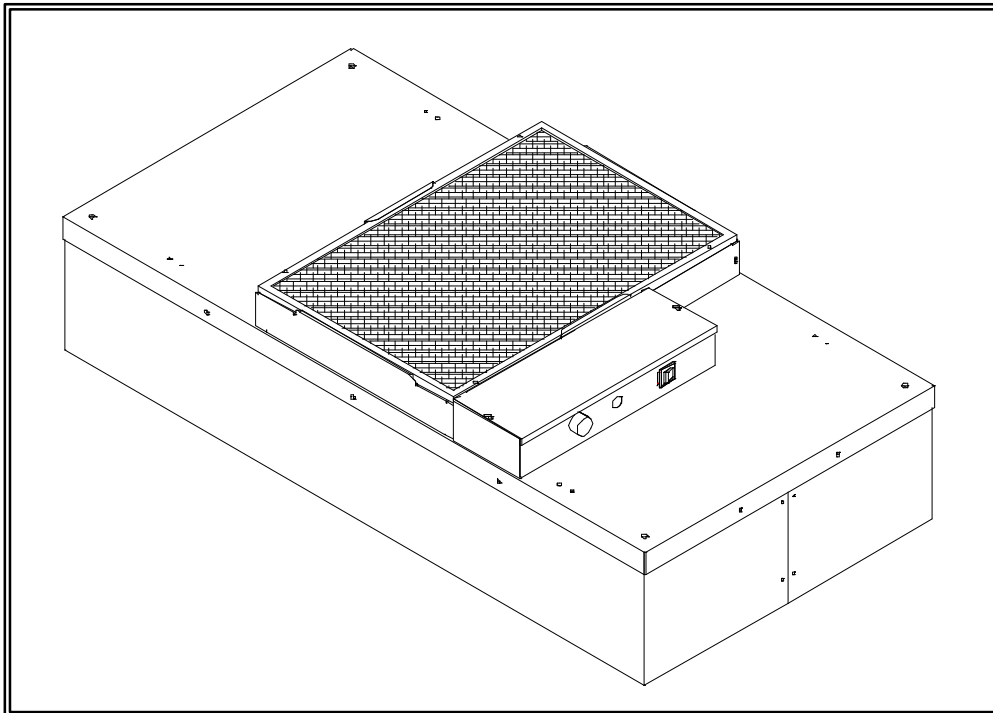


*** READ AND SAVE THESE INSTRUCTIONS ***

MAC 10^â *Original* VE5^â FAN FILTER MODULE INSTALLATION AND SERVICE MANUAL

STANDARD, RSR, RSRE MODELS



Mac 10^â and VE5^â are registered Trademarks of the
Enviroco Corporation, Albuquerque, New Mexico, U.S.A.

US Patents 4,560,395 and 5,470,363 Other patents issued and pending in foreign countries

Updated 7/05

READ AND SAVE THESE INSTRUCTIONS

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 a tub or shower, 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:

ENVIRCO CORPORATION

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5601 Balloon Fiesta Parkway N.E.
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Email: info@[envirco.com](mailto:info@envirco.com)

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DP Computers Building
128 Joo Seng Road #05-01
Singapore 368356
Tel : 65 286 0995
Fax : 65 286 0859
Email: info@Asia@fedders.com

- E. Before servicing or cleaning unit, switch power off at service panel and lock service panel to prevent power from being switched on accidentally.

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I. SERVICE: Cleaning the MAC 10 VE5 Prefilter

WARNING!

Disconnect the unit from the electrical power source before attempting any service.

Tools Required: None

Note: To keep the filter in top operating condition, washing the foam prefilter 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 1)
- 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.** Reassemble by reversing the above steps.

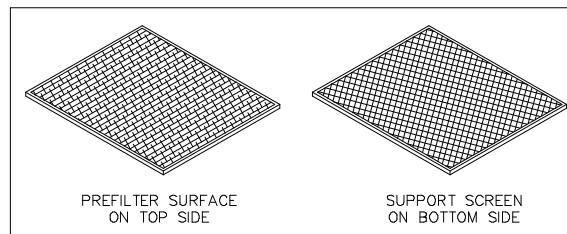
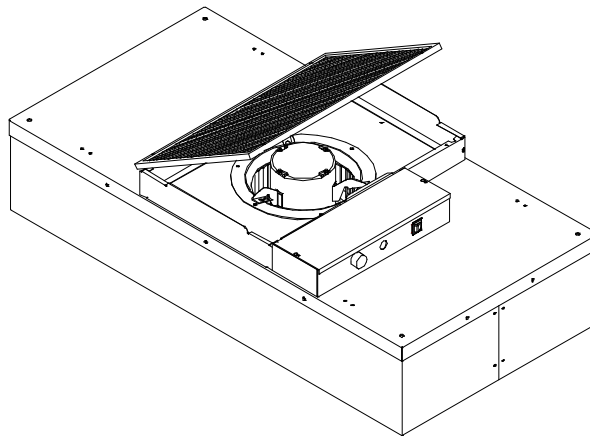


Figure 1

II. SERVICE: Removal and Replacement of the HEPA/ULPA Filter (Standard Unit)

WARNING!

Disconnect the unit from the electrical power source before attempting any service.

Tools Required: Phillips Head Driver

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 2). Discard the used filter as per requirements of the applicable regulations.

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

Step 5. Replace with the new HEPA/ULPA filter and assemble by reversing the above steps.

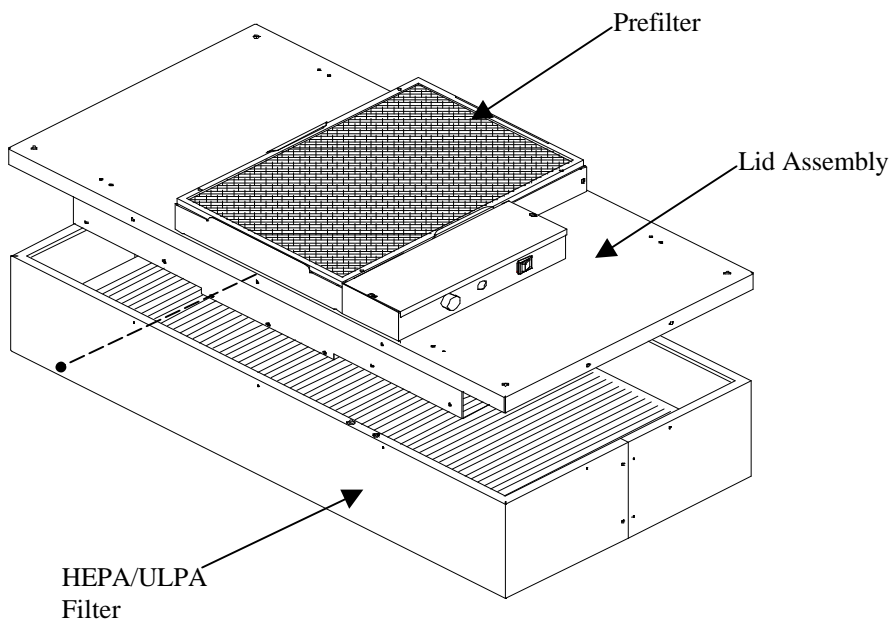


Figure 2

III. SERVICE: Removal and Installation of the Room Side Replaceable Filter (RSR/RSRE)

WARNING!

Disconnect the unit from the electrical power source before attempting any service.

Tools Required: 7/16" hex head wrench
4" x 4" x 3/8" filter support blocks

Manpower Required: 2

- Step 1.** Remove the diffuser screen by shifting it to one side and lowering it out of the housing.
- Step 2.** Install filter support blocks in all four corners of the unit. These blocks slide into place and support the filter during the removal process.
- Step 3.** Remove the six screws and clips, remove filter blocks and lower the filter as shown in Figure 3.
- Step 4.** Inspect filter for visible damage, if damaged set aside for replacement or repair.
- Step 5.** Place the filter against the filter-sealing surface of the RSR unit. Install the four filter support blocks as previously described.
- Step 6.** Install filter clips and screws, hand tight (until gasket compression begins) in the order shown in Figure 4. After all six clips are hand tight, tighten screws to create 50% compression (0.25") on the gasket, using the same order.
- Step 7.** Remove filter support blocks and reinstall screen.

Note: Tighten filter clip bolts as necessary to insure no bypass leakage. DO NOT over tighten.

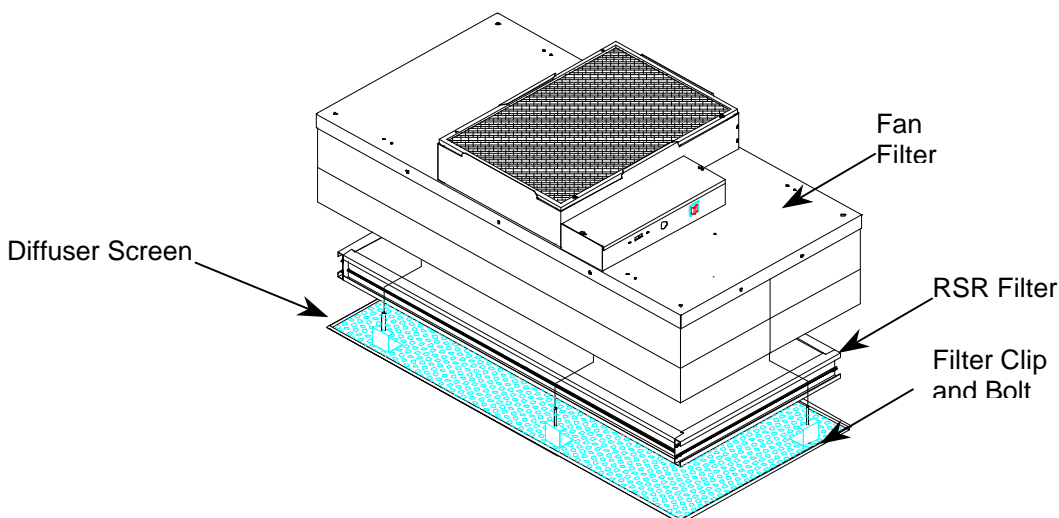


Figure 3

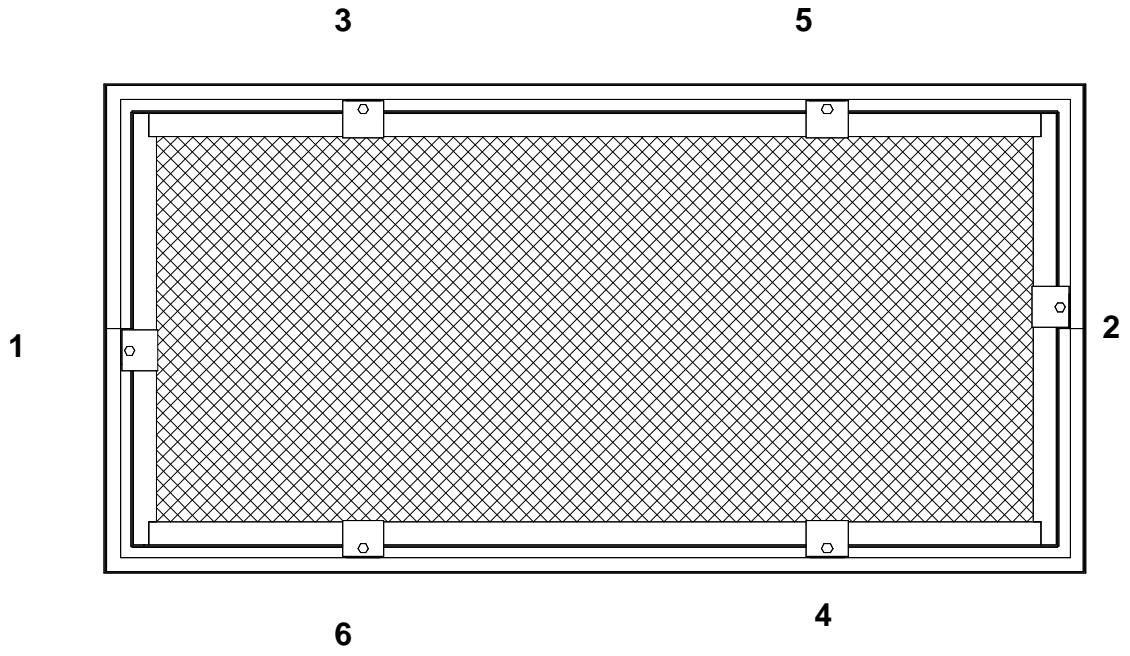


Figure 4

IV. SERVICE: Removal and Installation of the Motor (Standard and RSR models)

WARNING!

Disconnect the unit from the electrical power source before attempting any service.

WARNING!

Electrical service should be performed by licensed electricians or authorized ENVIRCO service technicians.

Tools Required: **Phillips Head Driver**
 3/8" (10mm) 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.(see Section II)
- Step 4.** Loosen the electrical box cover screws (2), and slide/lift off cover.
- Step 5.** Make note of all wire locations for reinstallation later.
- Step 6.** Disconnect the two brown wires from the capacitor, using a pair of pliers.
- Step 7.** Disconnect the motor wiring from the rotary switch and rocker switch or speed control and rocker switch and remove the grommet from the motor leads. Save this grommet for reinstallation.
- Step 8.** Remove the six screws to free the venturi ring and remove the motor/blower assembly from the lid assembly. If using a power drivers, set the unit to a low torque setting to avoid stripping the sheet metal screws.(see Figure 5)
- Step 9.** Using a 5/32"(0.40 cm) Allen wrench remove the blower wheel from the motor shaft. Remove motor from the venturi ring using a hex wrench.
- Step 10.** Replace with the new motor and reassemble by reversing the above steps. Set the spacing between the venturi ring and the blower wheel at 0.06"(0.15 cm) clearance.

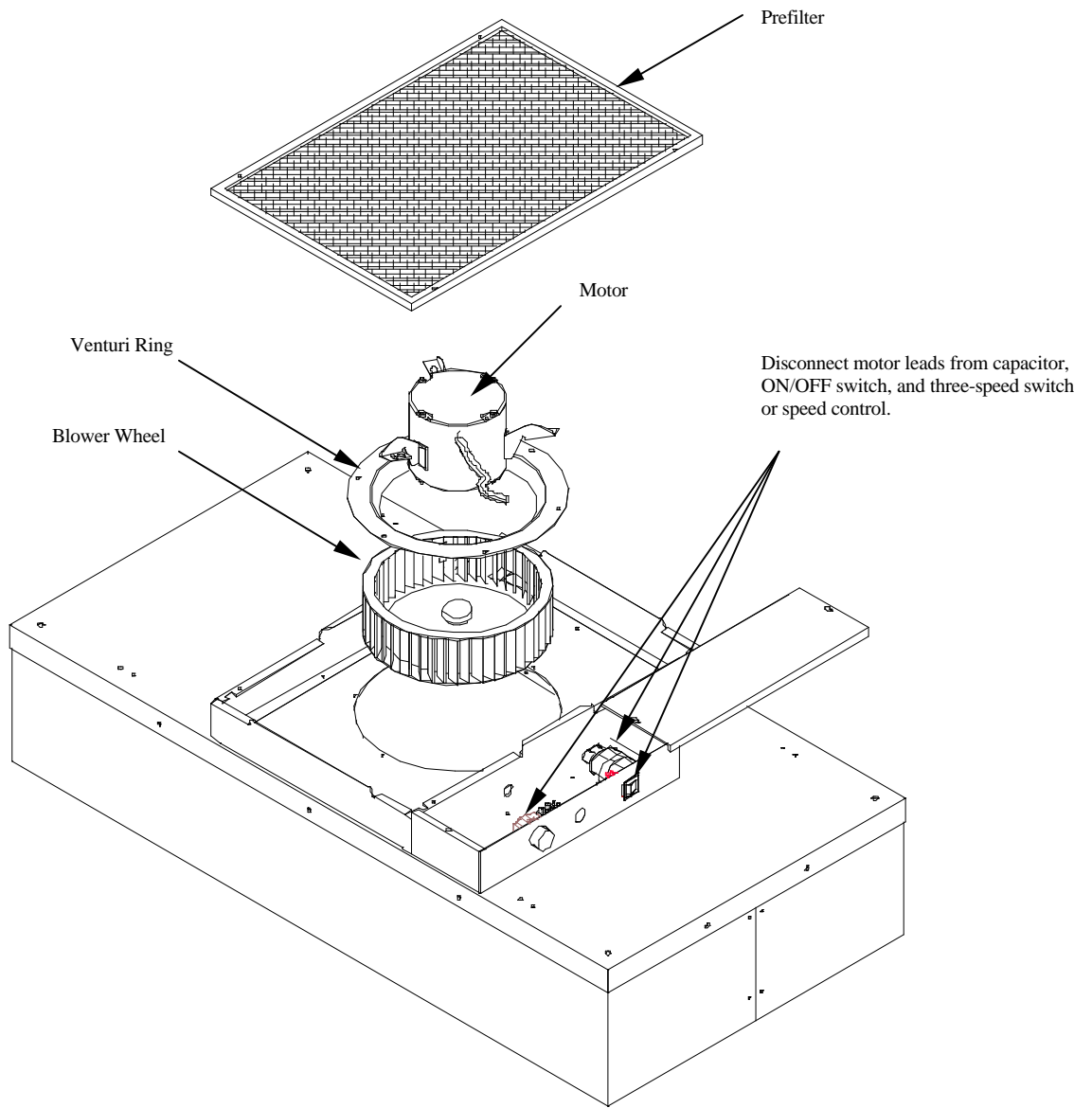


Figure 5

v. **SERVICE: Removal and Installation of the RSRE Motor**

WARNING!

Disconnect the unit from the electrical power source before attempting any service.

WARNING!

Electrical service should be performed by licensed electricians or authorized ENVIRCO service technicians.

- Step 1.** To gain access to the motor, remove the gel seal filter (see Section III).
- Step 2.** While supporting the baffle assembly from below, remove the four corner screws on the baffle assembly and lower the assembly.(see Figure 6)
- Step 3.** Prior to removing motor/blower assembly, remove electrical box cover (located underneath the lid panel) to expose motor connectors. Disconnect the power.
- Step 4.** While supporting the motor/blower assembly from below, remove the eight screws on the motor plate and lower the motor/blower assembly.(see Figure 7)

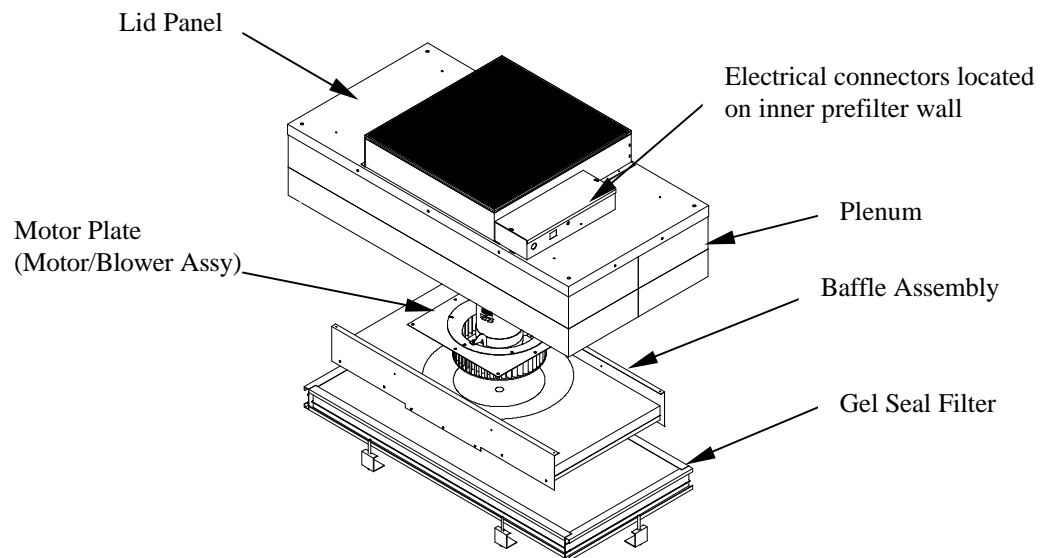


Figure 6

- Step 4.** Remove the six screws to free the venturi ring and remove the motor/blower assembly from the motor plate.(see Figure 9)
- Step 5.** Using a 5/32”(0.40 cm) Allen wrench remove the blower wheel from the motor shaft. Remove motor from the venturi ring by remove the three # 10 bolts.
- Step 6.** Before removal of the motor mount bracket, measure the precise location of the bracket on the motor. Remove the bracket.
- Step 7.** 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 between the venturi ring and the blower wheel at 0.06”(0.15 cm) clearance. When reinstalling the motor plate, align the plate to insure that the leads will reach the electrical box.

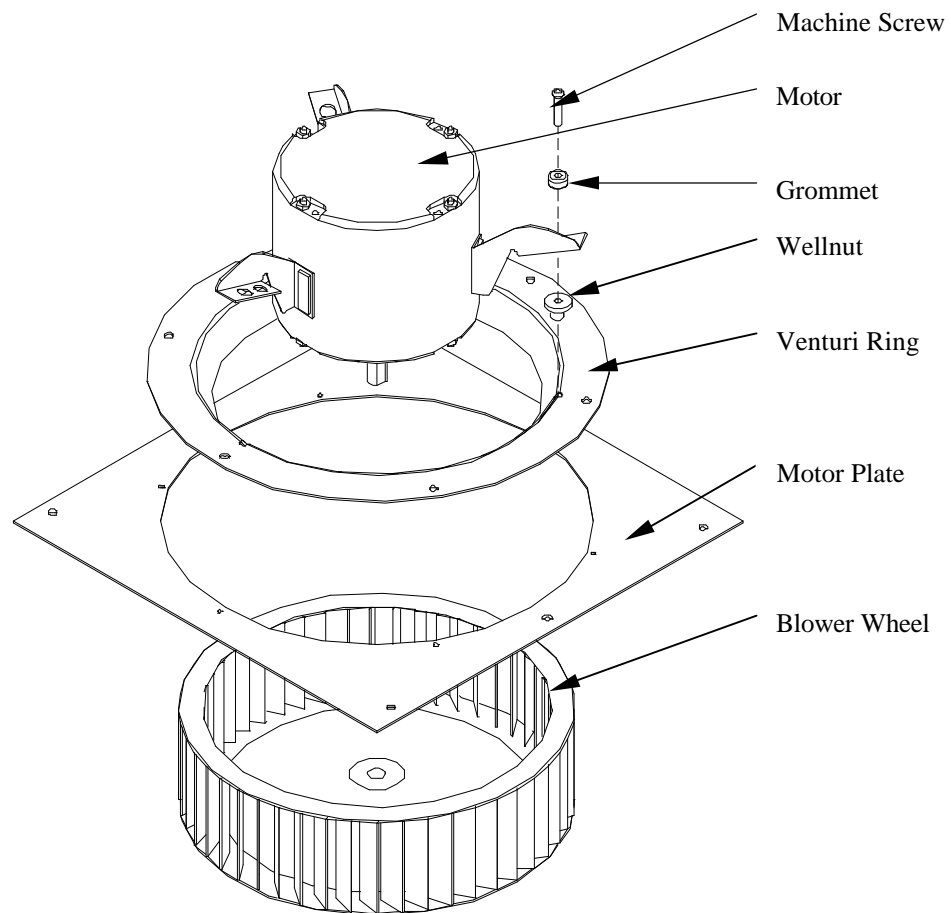


Figure 7

VI. 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. Specifications) should be conducted to determine the filter condition and appropriate fan speed setting.

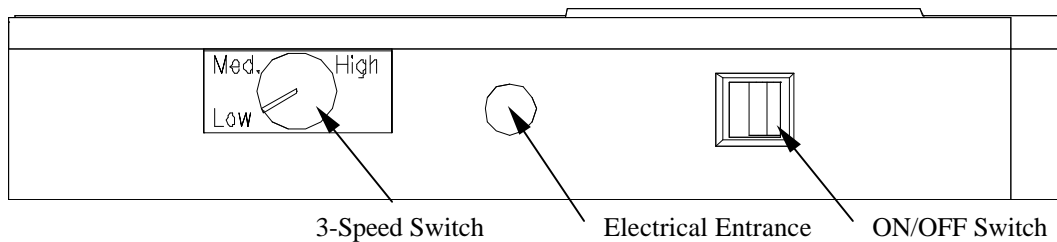


Figure 8

Optional Speed Control

Units furnished with the optional speed control (the speed control is standard with 2x2 and 2x3 units) enable adjustment of airflow at any setting within the recommended performance range. The speed control knob is located on the side of the electrical box, adjacent to the on/off switch.

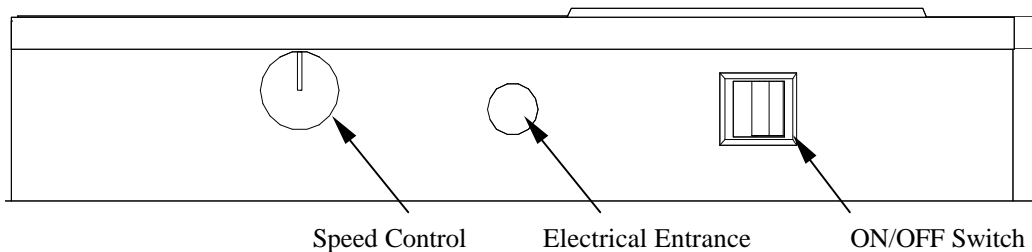


Figure 9

Airflow/speed is adjusted by rotating the knob (see Figure 9):

Clockwise → Lowers the speed

Counter-Clockwise → Increases the speed

Fully rotating the speed control knob to the left or counter-clockwise will turn the unit off.

Note : When turning the unit “ON” from the “OFF” position of the speed control, the fan is at the highest speed. Turning the speed control knob clockwise will lower the airflow.

VII. Trouble Shooting:

Low Air Velocity

- Step 1.** Check prefilter media; replace or clean as necessary.
- Step 2.** Flip switch from “Low” to “Medium” or “Medium” to “High” on units with 3-speed switch.
- Step 3.** Adjust variable speed control (only units with *optional* Speed Control) for higher blower output.
- Step 4.** Check power supply for proper voltage, amperage and distribution frequency.
- Step 5.** Replace HEPA/ULPA filter if the air velocity remains low.

High Air Velocity

- Step 1.** Flip switch from “HIGH” to “MEDUIM” to “LOW” on units with 3-speed switch.
- Step 2.** Adjust variable speed control (only units with *optional* Speed Control) for lower blower output.

Non-Laminar Flow and/or Excessive Contamination

- Step 1.** Insure that no large obstructions are upstream of airflow pattern.
- Step 2.** Determine that no other air-moving devices are operating in or around clean room 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.

VIII. MAC 10 VE5 Wiring Diagrams

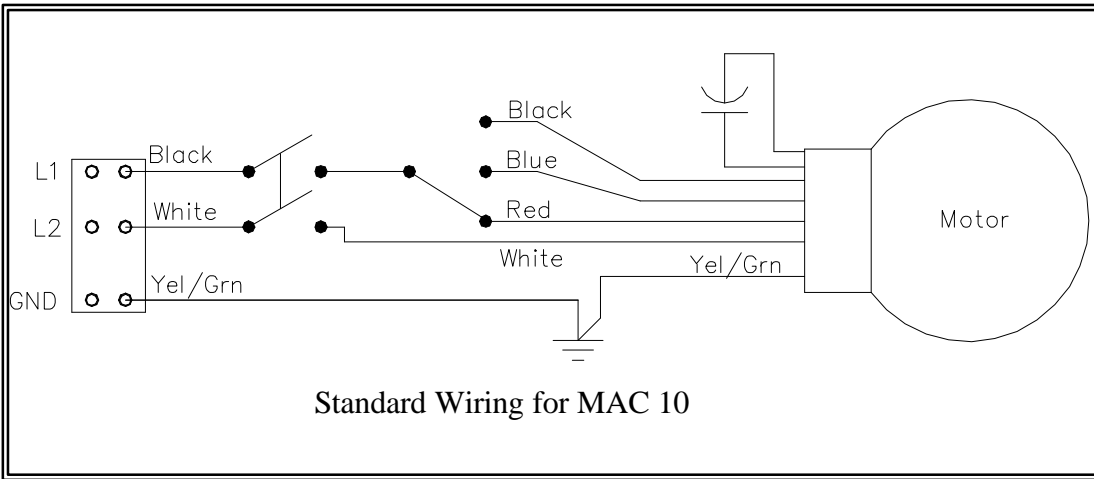


Figure 10

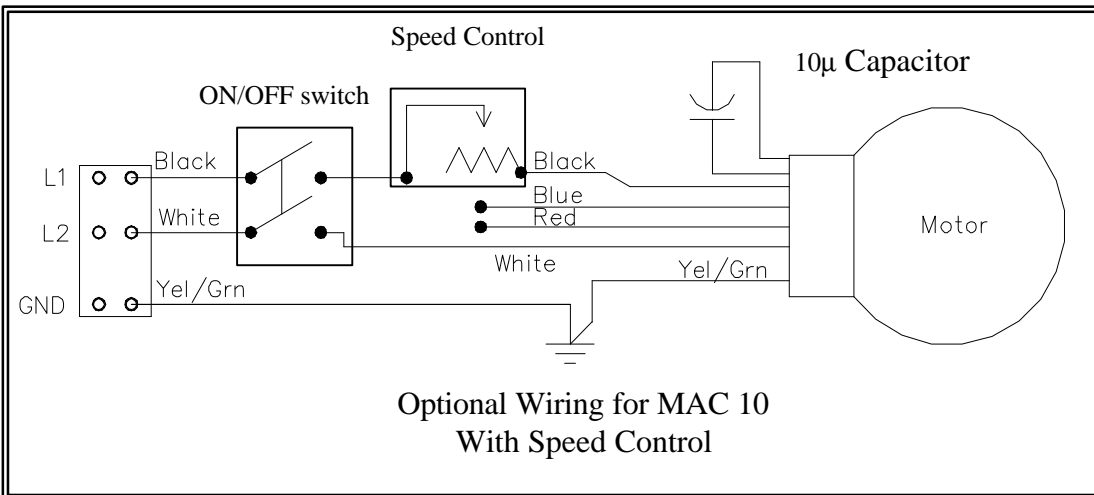


Figure 11

IX. MAC 10 VE5 Replacement Parts List:

Description	Quantity per unit	ENVIRCO Part Number		
		115V	220V	277V
		60 Hz	50 - 60 Hz	60 Hz
Prefilter	1	62981-001	62981-001	62981-001
Motor	1	63764-001	63764-002	63764-003
Capacitor	1	61485	61485	61485
ON/OFF Switch	1	63739	63739	63739
Speed Control (Optional) (CE Marked)	1	63011	63015 63742	63016
Pressure Switch (Optional)		63415	63415	63415
Transformer (Optional)		63667	63666	63665
Current Sensor (Optional)		24235-001	24235-001	24235-001
Power cord (Optional)		63042-001	63042-004	63042-013
Standard Filter:		HEPA	ULPA (Optional)	
2' x 2'	1	69514-004	69514-018	
2' x 3'	1	69514-019	69514-012	
2' x 3.5'	1	69514-020	69514-021	
2' x 4'	1	69514-006	69514-007	
HEPA Filter (RSR):				
2' x 2'	1	69391-005	69391-006	
2' x 3'	1	69391-012	69391-013	
2' x 3.5'	1	69391-010	69391-011	
2' x 4'	1	69391-001	69391-002	

Optional Accessories:

Fluorescent lighting

Ionizing bar

Solid state speed control on 2x4, and 2x3¹/₂ units - (standard on all other sizes)

12"(30.48 cm) diameter A/C intake collar

Gel Seal Filter (RSR unit only)

ULPA Filter (Standard and RSR)

Replacement parts are available through your authorized ENVIRCO representative. If you cannot locate a representative in your area, contact our Parts Department at:

ENVIRCO CORPORATION

5601 Balloon Fiesta Parkway NE

Albuquerque, NM 87113, U.S.A.

Tel: (505) 798-4412

Tel: (800) 545-6598

Fax: (505) 345-8875

VII. LIMITED WARRANTY

ENVIRCO CORPORATION (“ENVIRCO”) warrants the equipment will be free of defects in materials and workmanship under normal use for a period of three (3) years. The HEPA filter shall only be warranted against loading for a period of two (2) years when operated in cleanroom conditions. ENVIRCO’s sole obligation under this warranty is to repair or replace any parts of the equipment which are defective for a period of three (3) years from the invoice date, provided that the repair or replacement is actually performed within the three(3) year period from the invoice date. The buyer agrees to assume any incidental expenses including but not limited to the cost of transporting the defective equipment to ENVIRCO’s repair facility. The buyer’s sole remedy under this limited warranty is the repair or replacement of any defective part of the equipment. ENVIRCO DISCLAIMS ANY IMPLIED WARRANTIES INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. In no event shall ENVIRCO be liable for punitive, incidental, or consequential damages arising out of this sale, including, but not limited to damage to persons or property, loss of use, loss of time, inconvenience, equipment rental, loss of earnings or profit or any other commercial loss. This warranty excludes certain expendable items such as light tubes, prefilters, etc. ENVIRCO expressly disclaims and excludes from this warranty any responsibility for equipment failures and/or defects attributable to improper maintenance, abuse, accident or modification of the equipment (such as application of an adjustable frequency drive).

X. TESTING

Each MAC 10 VE5 filter unit is thoroughly tested at the factory before shipment. However, because of the “rigors” of shipping, ENVIRCO encourages its re-test after installation.

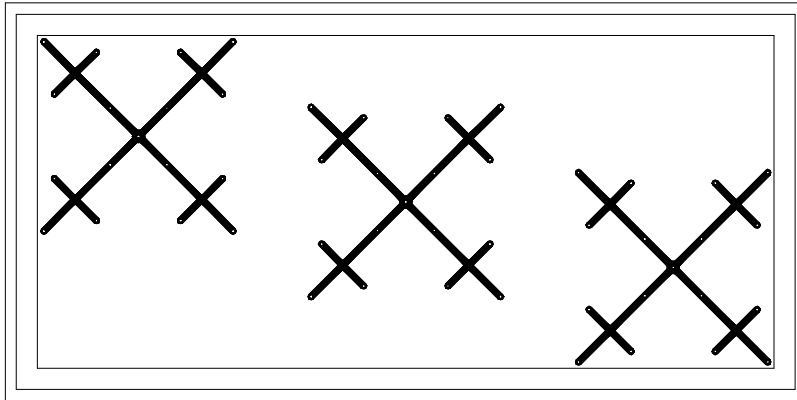
ENVIRCO recommends that the customer contact an independent organization, with technicians trained and experienced in performance evaluation and maintenance of clean air equipment.

Some of the testing procedures performed on the MAC 10 VE5 include PS challenge of HEPA filters to assure specified performance, along with air velocity measurement and adjustment tests.

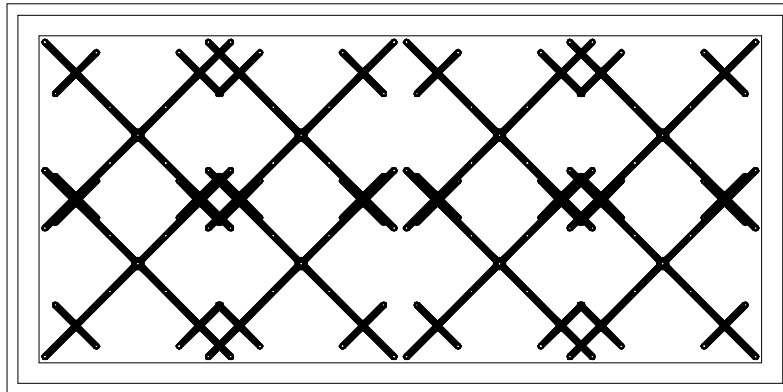
Recommended Testing

All units that are airflow tested at Envirco are tested using a Shortridge *Airdata Multimeter 800 series* with a Velgrid head. The recommended method of reading is to place one corner of the Velgrid head 1-1/4” from the corner of the filter face and then take four reading evenly spaced along the four foot side, then repeat these reads for the other long side. This gives a total of eight reading to test the unit. All advertised data is based on using the Velgrid with 8 readings (128 velocity points). Envirco recognized the using 8 reading during a

cleanroom start-up may be time consuming and recommends using 3 Velgrid readings taken on a diagonal, as shown below.



Factory Approved Testing – 3 readings with a Velgrid



Recommended Testing – 8 readings with a Velgrid