

OWNER AND SERVICE MANUAL



SMOKEMASTER[®] MODEL C-12

SELF-CONTAINED ELECTRONIC AIR CLEANER

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These air cleaners have not been tested for compliance to California Air Resource Board requirements and are not available for sale, resale or installation in California.

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PRINCIPLES OF OPERATION

HOW YOUR ELECTRONIC AIR CLEANER WORKS

A process called "Electrostatic Precipitation" traps airborne contaminants. The fan draws particulate laden air successively through the prefilter, the cell ionizing section and the cell collector section. The ionizing section imparts an electrical charge to the individual particles that are then drawn by electrostatic forces to the oppositely charged collector plates. Cleaned air is then discharged back into the room.

The electronic cells must be washed periodically to maintain efficient performance.

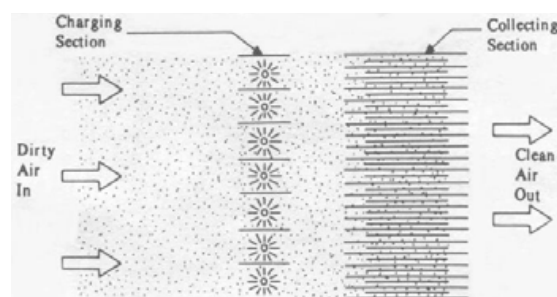


FIGURE 1: Conceptual Drawing of ESP Unit

INTRODUCTION

Your SMOKEMASTER® Electronic Air Cleaner is an advanced self-contained electronic air cleaner. The model C-12 unit offers a low cost, energy efficient air cleaning solution with minimal required maintenance. The SMOKEMASTER® model C-12 is designed to be installed in rooms with solid ceilings. Typical installations include conference rooms, lounges, offices, lunchrooms, etc.

Because it provides its own air circulation, your SMOKEMASTER® unit may be used in almost any application requiring the removal of airborne particulate contamination from an enclosed space.

Recommended quantities of clean outdoor ventilation air for various applications are described in Table 2 of the ASHRAE Standard 62-89, "Ventilation for Acceptable Indoor Air Quality." ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., Telephone #404-636-8400) notes that these recommended outdoor air quantities may be reduced by the use of clean, recirculated air if the IAQ Procedure 6.2 is used. Appendix E of ASHRAE 62-89 includes recommendations for the use of clean, recirculated air. However, in most cases, adequate control of carbon dioxide generally requires a minimum clean outdoor air quantity of no less than 15 cubic feet of air per minute per person.

Additional ventilation may be required for toxic contaminants. In any event, the air cleaner must be used only in areas that are ventilated for human occupancy in order to dissipate any incidental generation of ozone.

WARNING!

SMOKEMASTER® Electronic Air Cleaners are not explosion-proof. They must not be installed where there is danger of vapor, gas or dust explosion.

C-12 SPECIFICATIONS

DIMENSIONS: 25" x 25" x 11";
[635 mm x 635 mm x 279.5 mm]

WEIGHT: 79 Lbs. [36 Kg] shipping; 69 Lbs.
[31 Kg] installed, including electronic cells. Each cell weighs 9 ½ Lbs. [4.3 Kg].

ELECTRICAL RATINGS:

Voltage and Frequency: 120V, 60 Hz;
220/240V, 50 Hz

CURRENT AND POWER CONSUMPTION:

FAN SPEED	120V, 60 HZ		220/240V, 50 HZ	
	WATTS	AMPS	WATTS	AMPS
High	300	3.3	300	1.6
Med.	250	2.7	250	1.3
Low	220	2.4	220	1.2

AMBIENT TEMPERATURE RATING:

Shipping and Storage: -40°F to +150°F;
[-40°C to +66°C]

Particle Size Range	Efficiency
0.7-1.0	96.0
2.2-3.0	98.2
4.0-5.5	99.1
7.0-10.0	99.8

EFFICIENCY: Up to 99.8% efficiency (at 1000 CFM airflow) is delivered as measured according to the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2.

MODEL C-12	Low	Medium	High
CFM (60 Hz)	800	1050	1250
Noise Level	58 dB(A)	65 dB(A)	69 dB(A)

SAFETY PRECAUTIONS

Do not disassemble or modify. - Fire and/or electrical shock may occur as a result. For repair, contact your dealer or Air Quality Engineering, Inc.

Do not damage power cord or use unit with a damaged power cord. Fire, electrical shock, and/or damage may occur as a result.

Use the appropriate AC voltage, 120V or 220V, power source.

Do not allow the unit to intake flammable gases. Do not use where there is accumulation of such flammable gases. - Explosion and/or fire may occur.

Do not use with prefilter or main filter removed. - Malfunction may occur as a result.

C-12 COMPONENTS

COMPONENTS OF THE C-12 ELECTRONIC AIR CLEANER

Cabinet & Grille – Low profile design and finish options assure décor compatibility while also made of durable steel. Intake grille adds to the compatible appearance.

Removable Prefilters – Metal mesh prefilters catch larger particles before entering the electronic cells.

System Indicator Lamp, Power Pack and Three Speed Control – The system lamp monitors the electrical output, automatically indicating any systems malfunction. The power supply is located behind the bolted door with the system indicator light. The 3-speed control is accessible and is convenient to alter fan speed for varying concentrations of contaminants.

Electronic Cells – Heavy duty cells remove readily with attached grip handles. Lightweight and durable, each cell fits easily in the dishwasher or AQE washtub (PN 30182) to remove trapped particles accumulated from cleaning dirty air.

Hinged Access Door – Allows easy access to components for periodic cell and prefilter cleaning. Safety interlock discharges all power when the door is opened. Built-in test button assures collector performance.

Mounting – Mounts on wall brackets or with steel suspension rods. For mounting directly to a joist ceiling, lag screws are available.

Plug – Plugs into any regular 120 or 240 volt grounded outlet (depending on voltage ordered).

OPTIONAL CARBON FILTERS

The carbon filters are designed to install INSIDE the unit on all 4 outlet grills.

INSTALLING / REPLACING CARBON FILTERS

Replacing Carbon filters on the C-12 air cleaner

1. Turn off power to the air cleaner
2. Remove Electronic cells
3. Roll up one 41051 carbon filter and slide up around fan blade and up against outlet louver
4. The carbon filter will roll out by its self against outlet louvers
5. Repeat for other three outlet louvers

C-12 Parts List

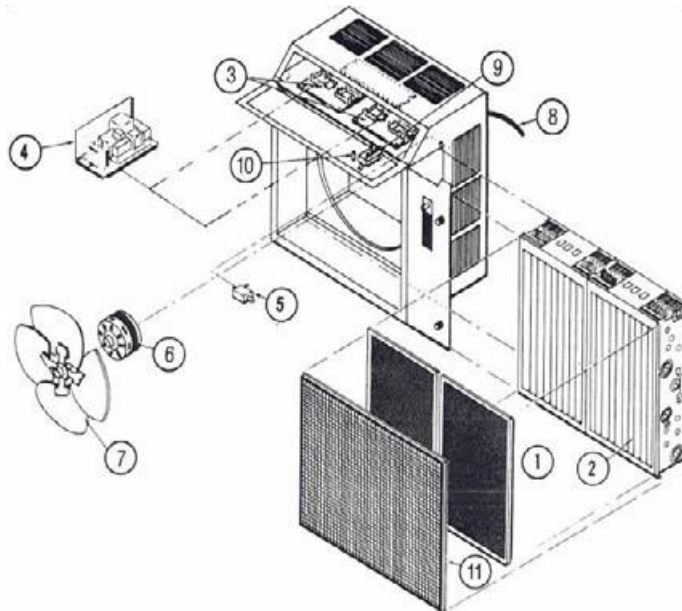


Figure 2: C-12 Parts Breakdown

No.	Description	Part Number	
		120V 60 Hz Models	220V 50 Hz Models
1	Prefilter	41009 (2)	41009 (2)
2	Electronic Cell	07316 (2)	38001 (2)
3	Contact Board Assembly	46113 (2)	46113 (2)
4	Power Supply	07071	07089
5	Door Interlock Switch	10106	10106
6	Motor Kit	05299	05014
7	Fan	37009	37009
8	Power Cord	42078	42027
9	Control Switch	10110	10110
10	Indicator Light	10097	10097
11	Intake Grille, Light	20025	20025
	Intake Grille, Black	20026	20026
NP	Ionizer Wire	38004 (18)	38004 (18)

C-12 INSTALLATION

IMPORTANT!

Read these instructions carefully. A hazardous condition or damage to the product could result if instructions are not followed.

CAUTION!

1. Do not connect the power source until after the electronic air cleaner is mounted. Electrical shock and equipment damage may result.
2. Be sure to turn off the air cleaner prior to service or installation. The motor has an automatic thermal overload so it will stop when it is overheated. It will automatically start after a cooling period.
3. Avoid electrical shock by being careful when the air cleaner is turned on for an electrical check. Also, be careful when working near the air cleaner's moving parts.
4. Wear gloves when installing the air cleaner to protect your hands from cuts.

Location

The C-12 should be mounted on the ceiling near the center of the room. Air is drawn into the bottom of the C-12 and discharged in four directions. Divide larger rooms into sections and use a C-12 in the center of each section.

The C-12 should be installed at the ceiling in nearly all applications. This is especially important when the air cleaner is used for smoke control. Visible smoke contains very small particles – so small, in fact, that they are not noticeably affected by gravity. Smoke usually rises to the ceiling and hangs there.

If the C-12 must be installed some distance away from the ceiling, make sure it is at least 14 inches [355 mm] away from the ceiling. This measurement is necessary to reduce staining of the ceiling of lingering smoky air. When the air cleaner is right against the ceiling, the air at the ceiling is moving too fast to deposit dirt particles.

Over 14 inches [355 mm] from the ceiling, the effect is not a problem. But in the space between, slow moving, dirty air is drawn into the area of the discharge outlets and can stain a light colored ceiling.

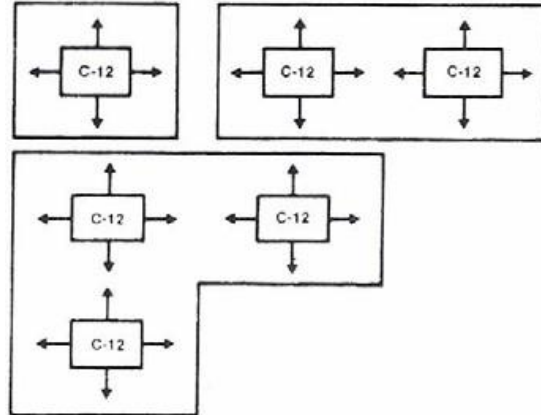


Figure 5 - C-12 Mounting Location

Check the existing air circulation in the room. The C-12 should be installed so that it aids the circulation already established. When airflow patterns are not immediately apparent, observe the smoke from a cigarette in various locations within the room.

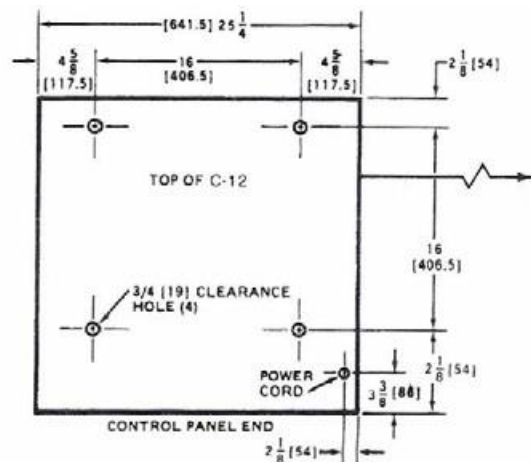


Figure 6 - C-12 Installation Dimensions

Ceiling Mounting

The C-12 is mounted by suspending it from the ceiling.

The mounting holes in the C-12 are spaced 16 inches [406.5 mm] between centers in

both directions. This makes it easy to fasten the air cleaner directly to the ceiling framework with 8 inch lag screws. Leave space for the power cord to run between the top of the C-12 and the ceiling. The power supply cord must not be concealed above ceilings or behind walls.

Note in Figures 7 and 8 that the C-12 is not suspended from the top but rather from the venturi plate, which is heavier metal and designed to support the entire device.

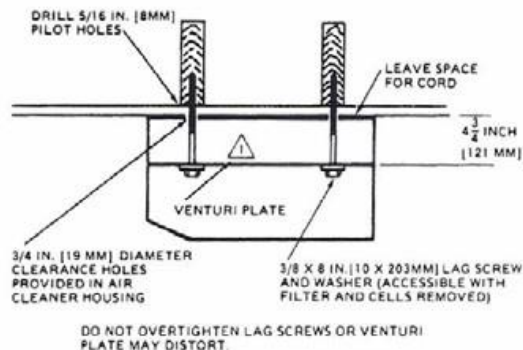


Figure 7 – C-12 Lag Screw Placement

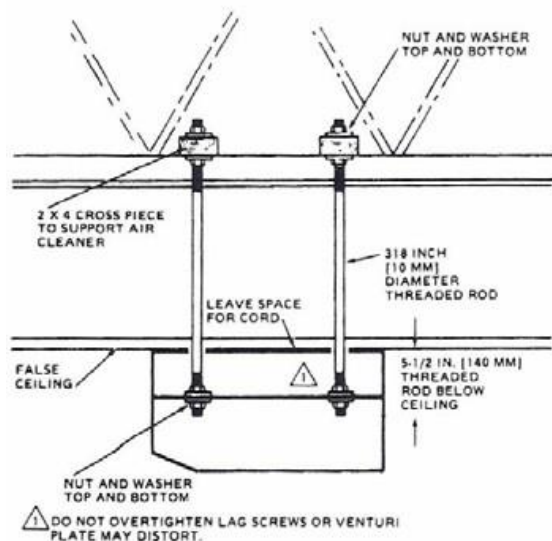


Figure 8 – C-12 Threaded Rod Placement

Be sure that you select a strong structural part of the ceiling. Do not fasten it to a false ceiling or to plaster or plaster-board. In some cases, it may be necessary to construct some type of framing strong enough to support the weight of the C-12.

The C-12 may also be mounted using 3/8 in. [10 mm] diameter threaded steel rods available in many hardware stores. Four steel rods will be required.

WALL MOUNTING

Two wall mounting brackets are used to support the C-12. They are included in an accessory package along with a blank plate to block off the outlet louvers on the side of the air cleaner which will be against the wall.

The two brackets must be mounted on the wall 16 inches [406.5 mm] between centers so that the long bolts will line up with the air cleaner mounting holes. The brackets should be securely fastened to the wall studs with lag screws. On masonry walls, use appropriate screw anchors.

Use the blank metal plate to block off the louvered outlet on the side of the air cleaner that will face the wall. Use the 2 screws with nuts and washers to fasten this plate to the louvers.

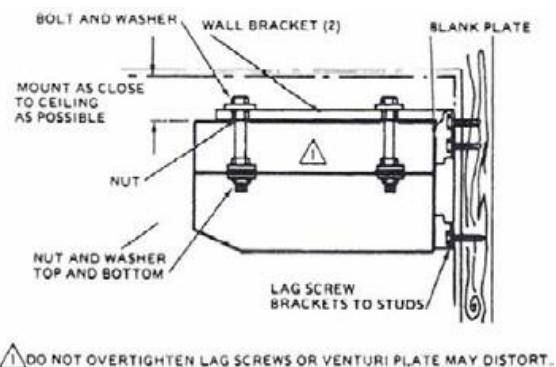


Figure 9 – Wall Mounting the C-12

C-12 ELECTRICAL INSTALLATION

CAUTION!

Only persons qualified to install electrical wiring should attempt this procedure. All wiring must comply with applicable codes and ordinances.

WIRING

The 120V, 60 Hz C-12 has a standard 3-prong plug on a 10 foot [3 m] power cord. It requires only a standard grounded outlet for electrical power.

Route the power cord so that it will be out of the way of the building's occupants.

PERMANENT WIRING

To permanently wire the C-12 follow these instructions exactly. All wiring must comply with applicable codes and ordinances. Wire the C-12 using the built-in junction box as indicated in Figure 12.

It is recommended that No. 14 or heavier wire be used to complete the wiring from the junction box to the external power source. However, be sure to comply with local codes.

1. Open C-12 junction box cover (Figure 12).
2. Disconnect and discard the power cord, the solderless connectors and strain relief. Plug the power cord hole with the plug provided.
3. Run conduit from the power supply to the junction box through the appropriate knockout. Fish wires to junction box.

4. Connect lead wires with solderless connectors including ground (green) wires. Proper grounding of this device is mandatory for correct operation and safety.
5. Insert hole plug in the hole where power cord was removed.

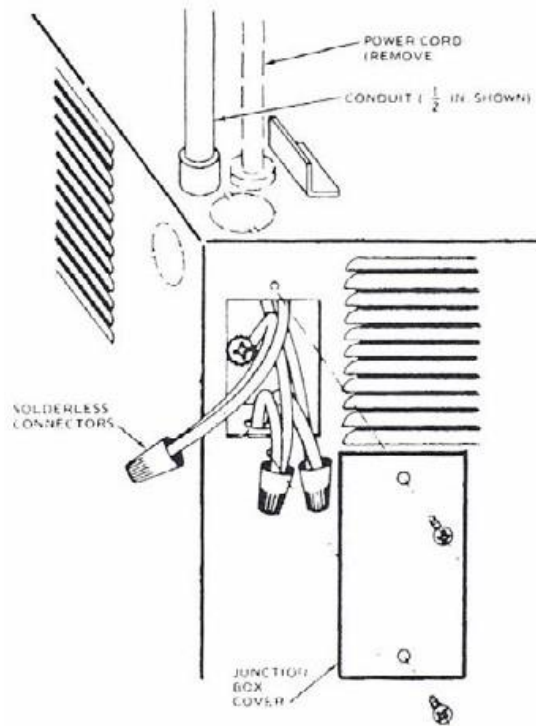


Figure 12 – C-12 Power Input

CHECKOUT

1. Make sure the air cleaner is securely fastened to the true ceiling.
2. Replace the power module (X-11Q only) and reconnect the electronic plugs.
3. Check to make sure the electronic cells are oriented for correct airflow--arrows on side of cell should point up. The contact board on the cell should align with the contact board on the power module.
4. Make sure the intake grille opens easily and the electronic cells and the prefilter are secure in the unit.
5. Turn the electrical power back on.
6. Make sure the fan runs on all three-speed settings. The system light should be on when the fan is running.
7. Press the test button. An audible snap indicates the collection section of the cell is functioning.
8. Opening the intake grille stops the fan and turns out the system light.
9. Clean up surfaces of the air cleaner and the installation area.

NOTE: If the air cleaner does not appear to work right, refer to the Electrical Troubleshooting section.

OPERATING INSTRUCTIONS

SAFETY INTERLOCK SYSTEM - In order for all air cleaner functions to receive operating power, the grille must be securely in position. This actuates the safety interlock switch. The air cleaner will not function without the grille in place.

FAN SWITCH - Your electronic air cleaner has an Off-Low-Med-Hi switch. The electronic collection system and built-in fan are designed to run simultaneously. Turn off the air cleaner before opening the access door to remove the electronic cells for cleaning.

SYSTEM LIGHT - Your electronic air cleaner is equipped to tell you simply and quickly that it is working properly. The amber system light tells you at a glance the status of the power supply. The system light should be on when the unit is on.

TEST BUTTON - Pushing the white button labeled "push to test" generates a snapping noise that indicates proper function of the collector cells.

MAINTENANCE

CAUTION!

1. **BE EXTREMELY CAREFUL WHEN WORKING WITH THE ELECTRONIC CELLS AND FILTERS.** The edges of the cells and filter, and the collection plates and ionizing wires of the cell may be sharp.
2. **When cleaning the cells and filters, be sure to wear appropriate protective gear, especially goggles and gloves. Skin contact with alkaline detergent solution should be avoided. See warning label on detergent.**

WASHING THE ELECTRONIC CELLS AND PREFILTER - To maintain peak efficiency, the electronic cells and prefilter in your electronic air cleaner must be washed regularly with special cell cleaning detergent concentrate. Washing is necessary to remove dirt particles collected from the air. The intake grille may be removed from the machine for periodic washing. A wash kit and detergent is available from Pure n Natural Systems.

1. Fill wash tub with cell cleaning detergent and hot water per detergent manufacturer's instructions.
2. Immerse cells in the cleaner solution and remove immediately (see Figure 17).



Figure 17: Cell Washing Tub

3. Set cells aside for five minutes to allow the cleaner to penetrate.
4. Thoroughly rinse cells with very hot water. Make certain no residue remains.
5. Inspect collector plates for cleanliness. Repeat wash procedure, if necessary.
6. **OPTIONAL** - Using Cell Coat (PN 45023) will allow better release of contaminant when washing.
7. Check the electronic cells for broken wires and bent collector plates. The cells may be installed in the air cleaner and energized. The indicator light may remain off during the normal two hour drying time. However, if annoying arcing occurs during this period, the cell may be removed to dry.
8. **CELL CLEANER IS REUSABLE. SAVE FOR REPEATED USE.** Replace cleaning solution when cells are no longer being effectively cleaned.
9. Remove lint from prefilter with vacuum cleaner or wash with mild detergent solution.

SERVICE

WARNING!

The following instructions are intended for qualified service personnel only. Dangerous line voltage circuits are exposed during this procedure. Disconnect the power at the fuse before servicing the unit.

MOTOR MAINTENANCE PROCEDURE

The manufacturer of the motor used in the air cleaner recommends oiling the motor at least once a year. The following procedure can be followed:

1. De-energize the unit.
2. Remove the prefilter and cells from the cabinet.
3. Remove the fan blade from the motor shaft.
4. Unscrew the four screws holding the motor mounting plate and lower the motor. THE WIRING NEED NOT BE DISCONNECTED.
5. There are two oil holes on the motor:
 - a. Near the motor shaft.
 - b. On the end opposite the motor shaft near the bearing plate.

Five drops of SAE 20 weight non detergent oil or electric oil in each hole is adequate. Wipe off the excess oil that misses or runs out of the oil holes. Replace the motor fan blade, cells and prefilters in the unit. Re-energize the unit and check it out to ensure proper operation.

MOTOR REPLACEMENT PROCEDURE

1. Disconnect the power at the fuse or circuit breaker.
2. Open the intake grille. Remove the cells to provide access to the motor.
3. Remove the fan blade from the motor.
4. Disconnect the fan motor leads at the plastic connector near the fan motor.

5. Remove the screws holding the motor to the unit to remove the motor.
6. Install the new motor, connect the electrical lines and replace the fan, cells, prefilter and grille.
7. Connect the power and check the new motor operation.

C-12 POWER SUPPLY REPLACEMENT PROCEDURE

1. Disconnect power from the unit.
2. Disconnect quick connect terminals from power supply. Unplug power supply wire harness.
3. Remove 4 screws holding power supply in place (on earlier units, remove nuts and washers from inside of cabinets).
4. Install new power supply.
5. Connect line voltage wires to power supply with plugs. **Wires with similar colors go together.** Next, connect the pink high voltage wires to the outside terminals on the contact board which are marked I. Attach the grey high voltage wires to the inside terminals marked C. Be certain that all wires are connected properly.
6. Reconnect power and test power supply with test button to be sure unit is operating properly.

IONIZING WIRE REPLACEMENT

The ionizing wires in the charging section of the electronic cell may break or become damaged. Inspect the cell from the upstream side after washing to make sure that none of the wires are broken or out of position. During operation, a broken or deformed wire generally causes a short to ground, possibly with visible arcing or sparking. This condition, or any other short in the ionizing section of the cell, will cause the indicator light to go out.

Broken wires must be replaced for the air cleaner to function effectively without arcing. Remove all parts of the broken wire. If necessary, the cell may be temporarily used with one wire missing.

1. Use care to avoid damage to the spring connector or other parts of the cell during the installation.
2. Hook one end of the ionizing wire over the spring connector at one end of the cell.

3. Hold the opposite eyelet with a needle-nose pliers and stretch the wire the length of the cell. Depress the opposite spring connector and hook the eyelet over it (see Figure 18 for a reference).

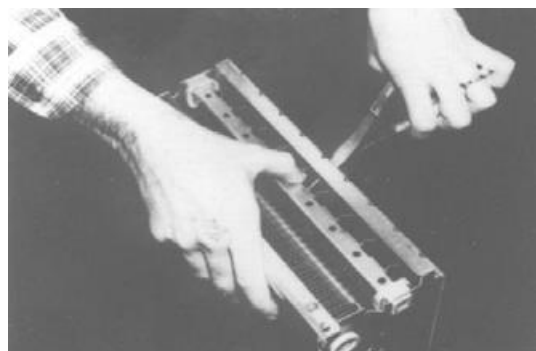
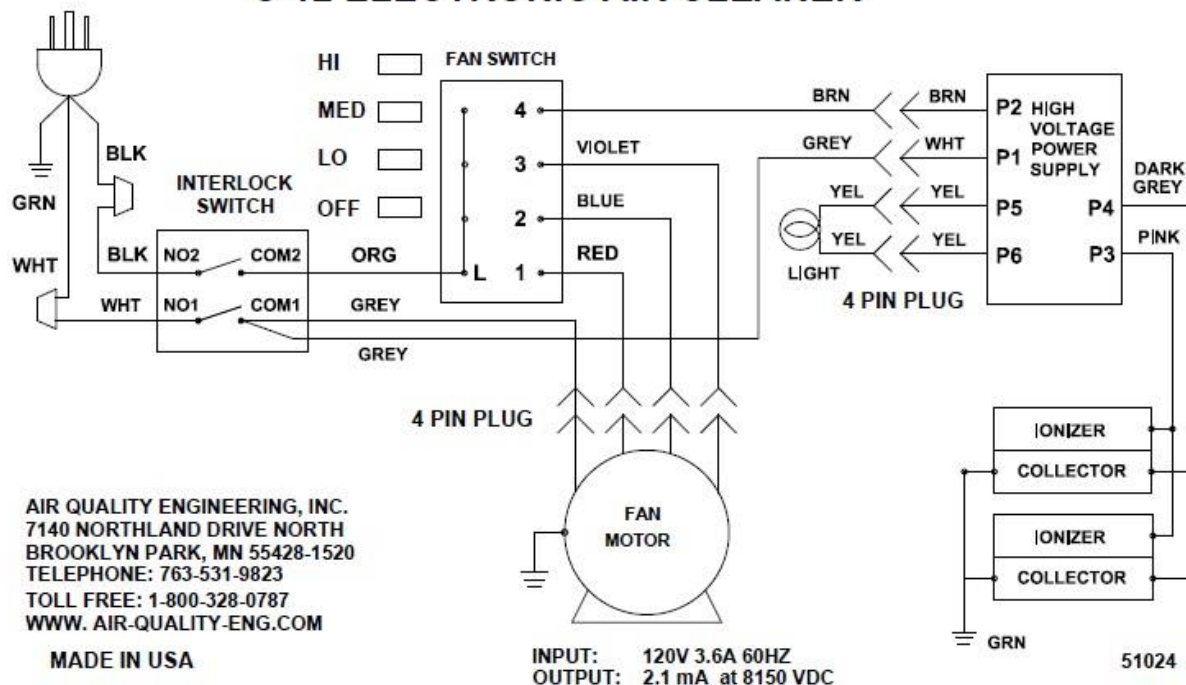


Figure 18: Ionizer Wire Replacement

C-12 ELECTRICAL SCHEMATIC

SMOKEMASTER® C-12 ELECTRONIC AIR CLEANER



ELECTRICAL TROUBLESHOOTING

WARNING!

The following instructions are intended for qualified service personnel only. Dangerous line voltage circuits are exposed during this procedure. Disconnect the power before servicing the unit.

Check circuit fuse or breaker. Correct if fuse is blown or breaker is tripped.

Be sure the electronic cells are in place, the intake grille is closed and the unit is turned on.

ARCING

From time to time, you may hear a snapping noise coming from the electronic air cleaner. This arcing occurs when the air cleaner collects an unusually large particle or when the cells are wet, extra-ordinarily dirty or damaged.

If an unusual amount of arcing persists, check first to determine if the electronic cells need washing. Look also for any sign of bent collector plates or broken ionizer wires.

If arcing still occurs when the cell is clean and dry, consult your Air Quality Engineering, Inc., representative or dealer for repair.

PROBLEM 1

FAN OFF
LAMP OFF

1. Make sure the supply cord is plugged into a standard receptacle.
2. Make sure there is voltage to the receptacle by using any other electric device.
3. Make sure the top access cover is properly in place in order to actuate the interlock switch.

PROBLEM 2

FAN ON
LAMP OFF

1. If the fan is on and the light is out, the problem is with the electronic cell or high voltage power supply.
2. To determine which component is faulty...
 - Remove the electronic cell, and operate the air cleaner. If the light does not come on, then the high voltage power supply will have to be replaced.
3. If the indicator light does come on, the problem is with the electronic cell. Check the cell for:
 - a. Bent collector plates. Straighten and space the plates using a needle nose pliers.
 - b. Check for missing ionizer wires. Replace the missing wires.
 - c. Check for dirty buildup on the collector plates and the insulators. Wash the cell thoroughly.

PROBLEM 3

FAN OFF
LAMP ON

1. Check the motor on all three speeds. Be certain that the control buttons are pushed in all the way.
2. If the light is on and the fan is off. The motor will have to be replaced.

CERTIFICATE OF WARRANTY

ONE - YEAR LIMITED WARRANTY

Air Quality Engineering, Inc., warrants to the original purchaser, subject to the conditions below, that should the product covered by this warranty ("product") fail to perform by reason of improper workmanship or material, Air Quality Engineering, Inc., (AQE) will, during the period of one (1) year from the date of original purchase either (i) replace the Product or (ii) provide all necessary parts to repair the Product, without charge. The decision to replace the Product or the necessary parts shall rest solely with AQE. This one-year limited warranty does not apply to main filter elements. Air Quality Engineering, Inc., will replace without charge the main filter elements during the period of thirty (30) days from the date of original purchase if the main filter elements fail to perform by reason of improper workmanship or material. This warranty is valid only under the following conditions:

CONDITIONS

1. **AUTHORIZATION:** Purchaser will contact Air Quality Engineering, Inc., 800-328-0787, for authorization, returned goods authorization number (RGA) and shipping address. AQE will direct purchaser to either return the necessary parts or the Product at AQE's option.
2. **PROPER DELIVERY:** The shipping, freight prepaid, or delivery of the parts or the Product to Air Quality Engineering, Inc., in either its original carton or in a carton assuring similar protection of the Product with returned goods number (RGA) clearly displayed on the outside of the carton.
3. **UNAUTHORIZED REPAIR:** A showing by the original purchaser that the Product has not been altered, repaired or serviced by anyone other than an authorized service technician using genuine AQE parts.
4. **UNAUTHORIZED PARTS:** A showing by the original purchaser that the Product has had only genuine Air Quality Engineering, Inc., parts and filters used in its operation and maintenance.
5. **SERIAL NUMBER INTACT:** A showing by the original purchaser that the Serial Number has not been altered or removed.
6. **MISUSE:** A showing by the original purchaser that the Product has not been involved in an accident, freight damaged, misused, abused or operated contrary to the instructions contained in the Owner's Manual.

Air Quality Engineering, Inc.'s, sole responsibility shall be to repair or replace the Product within the terms stated above. AQE shall not be liable for any consequential damages resulting from and breach of warranty, express or implied, applicable to the Product. Some states do not allow the exclusion or limitation of consequential damages so this limitation may not apply to you.

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This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

MANUFACTURER & WORLDWIDE DISTRIBUTOR OF SMOKEMASTER® AIR CLEANING SYSTEMS

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