

## F50F Duct Mounted Electronic Air Cleaner

### INSTALLATION INSTRUCTIONS

#### APPLICATION

The high efficiency F50F Electronic Air Cleaner is mounted in the return air duct of a forced air heating, cooling, or ventilating system. It captures a significant amount of airborne particles 0.5 microns and larger from the air circulated through it. All models have an internal air flow switch to operate the F50F when the system blower is on.

#### PLANNING THE INSTALLATION

##### Review Installation Requirements

The air cleaner should be installed where all the air passing through the system circulates through it. The best location is in the return air duct next to the blower compartment so the air cleaner can help keep the blower motor and evaporator coils clean.

##### **IMPORTANT**

*Do not mount in the discharge air duct.*

For most efficient air cleaning, airflow must be spread evenly across the face of the air cleaner. If the duct is a different size than the air cleaner cabinet, gradual transitions are recommended. If the duct turns sharply just before the air cleaner, turning vanes are recommended.

##### Applications with Air Conditioning

The air cleaner should be installed upstream from the evaporator coil. The air cleaner will help keep the coil clean, reducing maintenance.

##### Applications with a Humidifier

An evaporative humidifier can be mounted upstream from the air cleaner. An atomizing humidifier should be mounted downstream from the air cleaner, even though hard water salts will be blown into the living space and deposited as dust. If an atomizing humidifier must be mounted upstream from the air cleaner:

1. Mount it as far upstream as possible from the air cleaner.
2. Install a standard disposable furnace filter between the humidifier and the air cleaner to trap water droplets and hard water salts.
3. Frequently clean the air cleaner to prevent a hard water salt buildup.

**NOTE:** The volume of water that passes through an atomizing humidifier can overload the air cleaner, resulting in hard water salts being deposited as dust in the living space.

##### Applications with an Activated Carbon Filter

An activated carbon (charcoal) filter can be used to remove odors or other gaseous contaminants (not particle-based) that are not removed by the air cleaner. Locate the carbon filter:

- Downstream from the air cleaner. This means that dust from the carbon filter will not be collected by the air cleaner and will be deposited in the living space.
- Outside the air cleaner cabinet.

##### **WARNING**

**Fire or Explosion Hazard.**

**Can cause property damage, severe injury or death.**

Some carbon filters are combustible and contact with high voltage could result in smoke or fire.

- Where carbon granules cannot fall into the electronic cell. If necessary, use a disposable furnace filter between the carbon filter and the electronic cell.
- With proper transitions, if the activated carbon filter requires a different size duct than the air cleaner. Allow 20 degrees expansion per side, per fitting.

**NOTE:** Honeywell does not offer carbon filters. Consult an activated carbon filter manufacturer for sizing and application.

##### Applications with Outdoor Air Intake

Return air temperature must be at least 40°F (4°C). Lower temperatures can cause ionizer wire failure. If outdoor air is used, warm it upstream from the air cleaner by:

- Making sure the outdoor intake is far enough upstream from the air cleaner so the return and outdoor air is thoroughly mixed. Stratified air can dump a stream of very cold air into one section of the air cleaner.
- Adding baffles upstream from the air cleaner to force thorough air mixing.
- Installing a preheater if large amounts of outdoor air are used. The preheater, which could be an electric strip heater or hot water coil, should be controlled by a thermostat. Hot water or steam coils should be protected by a freeze-up control.

##### Optional W8600F

The F50F terminal board is recessed slightly so it or the wires will not interfere with installation. The entire power supply box can be unplugged and removed to provide access to the



terminals. The W8600F air cleaner monitor can be mounted in the living area or in the furnace room. It should be located in a convenient location to observe the display.

NOTE: The W8600F is not available in Europe.

### Choose Location

Choose a location that is readily accessible for regular inspection and cleaning. Allow at least 13 in. (330 mm) in front of the access door for removing the prefilter and electronic cell. Allow enough room above the power supply so it can be serviced without removing pipes, ducts, or other heating system components.

The air cleaner *must* be installed where the temperature does not exceed 40°F to 125°F (4°C to 52°C).

### Choose Mounting Position

## ⚠ WARNING

### Heavy Equipment Hazard.

### Can cause injury or equipment damage.

Do not mount the air cleaner with the access door facing down. If the access door faces down, the latch may not hold, and the cell and prefilter can fall unexpectedly. Also, nothing holds the cell and prefilter in place when the access door is opened.

The air cleaner can be mounted in any position except with the access door facing down. Following is a list of air cleaner mounting positions for a variety of furnace installations.

NOTE: At least 13 in. (330 mm) clearance is required between the access door and any obstructions for cell and prefilter maintenance.

- *Upflow "Highboy" furnace:* Side installation; air cleaner is mounted vertically where return enters side inlet of furnace. See Fig. 1A.
- *Downflow "Highboy" furnace:* Installation beneath furnace (air cleaner cabinet can easily support weight of furnace and air conditioner coil). Air cleaner is mounted horizontally where return enters from below. See Fig. 1B.
- *Upflow "Highboy" furnace:* Closet installation. Air cleaner is mounted vertically on furnace between furnace and louvered return air opening in closet door. See Fig. 1C.
- *"Lowboy" furnace:* Air cleaner is mounted horizontally in return plenum just above furnace, opposite supply plenum. See Fig. 1D.
- *Downflow "Counterflow" furnace:* Air cleaner is mounted horizontally in return duct or plenum just above furnace. See Fig. 1E.
- *High capacity system:* Two or more air cleaners can be used together. See Fig. 1F.
- *Electric furnace or heat pump:* Single cell air cleaner is mounted with access door on top. See Fig. 1G.
- *Horizontal furnace:* Air cleaner is mounted vertically where return enters. See Fig. 1H.

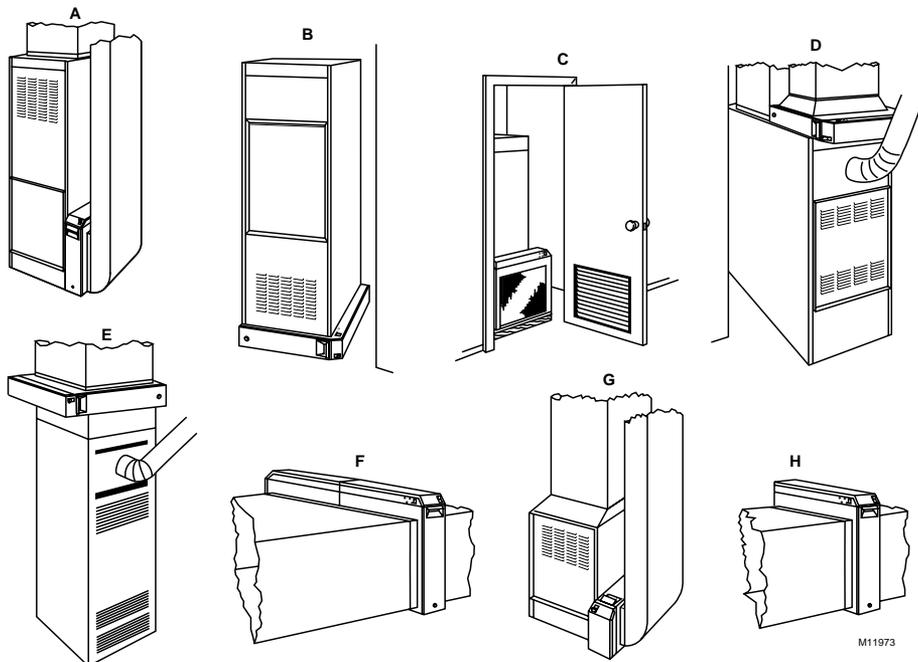


Fig. 1. Mounting positions with a variety of furnace installations.

### Determine Duct Design Requirements

The air cleaner is adaptable to all new or existing forced air heating, cooling and ventilating systems used in residential applications. Transitions, turning vanes, or offsets may be needed in some applications for effective operation.

#### Transitions

Transitions are needed when the duct is a different size than the air cleaner cabinet. Gradual transitions reduce air turbulence and increase efficiency. Limit expansion to no more than 20 degrees (about 4 in. per running foot [100 mm per 300 linear mm]) on each side of a transition fitting. See Fig. 2.

#### CHANGE DUCT SIZE GRADUALLY TO MINIMIZE TURBULENCE.

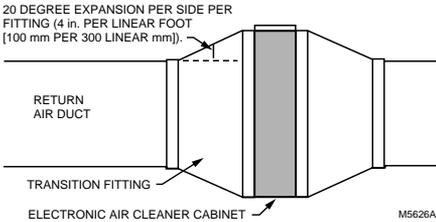


Fig. 2. Change duct size gradually to minimize turbulence.

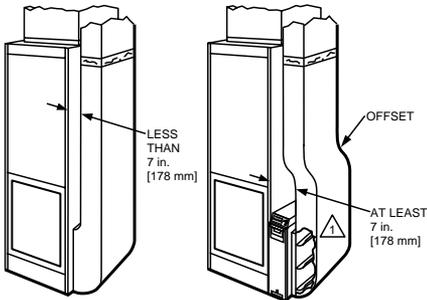
#### Turning Vanes

If the air cleaner is installed close to an elbow or angle fitting, install turning vanes inside the angle to distribute airflow more evenly across the face of the cell. See Fig. 3.

#### Offsets

If the duct connection to the furnace in a side installation allows less than 7 in. (178 mm) for mounting the air cleaner cabinet, add an offset to the elbow. See Fig. 3.

#### TYPICAL USE OF DUCT OFFSET TO ALLOW SPACE FOR ELECTRONIC AIR CLEANER.



⚠️ TURNING VANES HELP DISTRIBUTE AIRFLOW EVENLY.

Fig. 3. Typical use of duct offset to allow space for electronic air cleaner.

## INSTALLATION

### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. If the air cleaner is to be functionally checked before installation, be extremely careful to avoid electrical shock. Ensure power is disconnected before installation.
4. Installer must be a trained, experienced service technician.
5. Installation and wiring must conform to current regulations. In Europe, a qualified electrician must supervise wiring.
6. In Europe, the air cleaner must be supplied via a double pole isolating switch with a contact separation of at least 3mm in each pole.
7. After installation is complete, check out air cleaner operation as provided in these instructions.
8. **WARNING!** This air cleaner must be earthed (grounded).



### WARNING

**Electric Shock Hazard.**  
Can cause electrical shock or equipment damage.

Air Cleaner must be earthed (grounded).  
Do *not* connect to power before installation is complete.

### Unpack Electronic Air Cleaner

- Check that all components are included. The electronic air cleaner is shipped assembled. The unit consists of a galvanized steel cabinet, power supply with on-off switch and neon light, one or two electronic cells and prefilters, access door with test button, and homeowner literature package.
- W8600F (optional), mounting hardware and installation literature must be ordered separately.

### Clean Blower Compartment

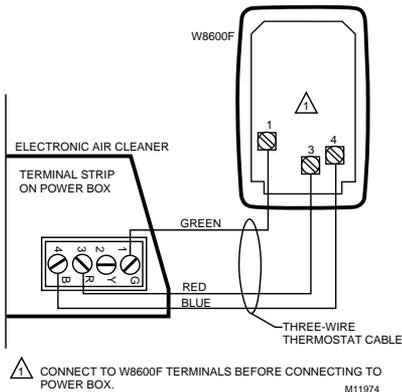
- Remove and discard the existing furnace filter.
- Thoroughly clean the blower compartment.
- If possible, power vacuum the ductwork to remove accumulated dust in an existing home, or construction dirt in a new home. The electronic air cleaner cannot remove dust that has settled in the blower compartment and distribution ducts.
- Check the edges of the furnace fan blades for dirt buildup and clean as necessary. The fan will not deliver the rated cfm if the blades are dirty.

### Fasten Cabinet to Furnace

NOTE: This procedure shows a side installation on a typical highboy furnace. You may need to alter the procedure to fit your application.

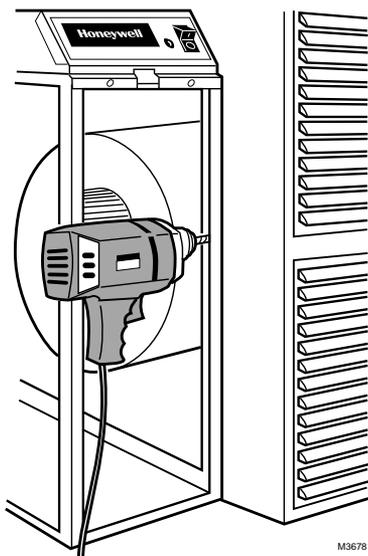
- Remove and set aside the access door, electronic cell(s) and prefilter(s).
- Align the cabinet with the return air opening.
- Create opening in furnace to match air cleaner cabinet opening.

- Install a transition if the furnace and air cleaner openings are different sizes. See Fig. 2.
- Place blocks under the cabinet so the unit is firmly supported and level. The 5/8 in. (16 mm) mounting foot on the cabinet hinge plate provides the minimum clearance required for the access door hinge.
- If a W8600F is used, first attach the wires to the air cleaner power box terminal board. See Fig. 4 and the W8600F installation literature, form 69-1200.



**Fig. 4. Schematic for wiring W8600F to F50F.**

- Attach the cabinet securely to the furnace. The unit can be attached directly, as shown, or a starting collar can first be fitted in the furnace opening. Either drill holes and fasten with sheet metal screws or rivets, or use slip joints. If drilling holes, use locking pliers to help hold the unit in place during drilling. See Fig. 5.



**Fig. 5. Fasten cabinet to furnace.**

### Install Turning Vanes

- Mount turning vanes inside the elbow or angle fitting that is directly against the air cleaner cabinet.

### Fasten Cabinet to Ductwork

- Install a transition if the opening in the air cleaner cabinet and the duct are different sizes. See Fig. 2.
- Fasten the other side of the cabinet to the elbow using sheet metal screws, rivets, or slip joints as appropriate.

### Install Optional W8600F Air Cleaner Monitor

Choose a location for the W8600F if it is part of the installation. The W8600F is designed to mount next to your thermostat, or in any convenient visible area (such as utility room) where it can be seen as it monitors the air cleaner performance. It shares no electrical connections with the thermostat. To install the W8600F, see Fig. 4 and refer to the Installations Instructions, form 69-1200, included with the air cleaner monitor.

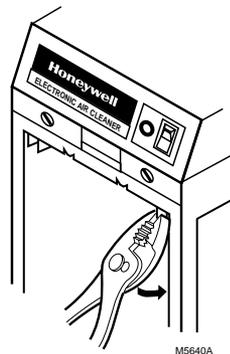
NOTE: The W8600F is not available in Europe.

### Seal Joints

- Seal all joints in the return air system between the air cleaner and the furnace to prevent dust from entering the clean airstream.

### Disable Unused Prefilter Guide

- Crimp the end of the downstream (closest to the furnace) prefilter guide to prevent incorrect prefilter installation following cleaning. See Fig. 6.



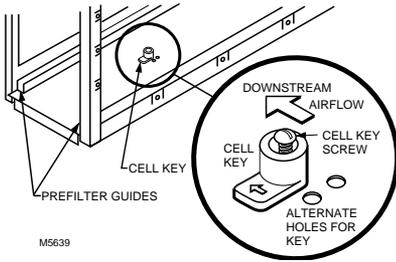
**Fig. 6. Crimping the prefilter guide.**

### Position Cell Key

The electronic cell must always be installed so the ionizer section is on the upstream side. A factory-installed cell key on the bottom of the cabinet allows the cell to be inserted in only one direction. As long as the arrow molded into the plastic key points in the same direction as the airflow, the ionizer will always be on the upstream side.

If the position of the key must be reversed, proceed as follows:

1. Remove electronic cell.
2. Remove the screw holding the cell key in place. See Fig. 7.



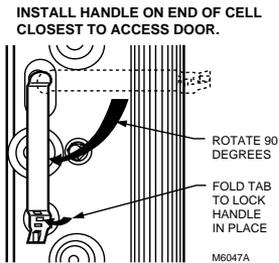
**Fig. 7. Position of cell key determines orientation of cell (arrow on key must point downstream).**

3. Turn the key around and place it over the opposite holes. The tab on the bottom fits into the larger hole, and the screw into the smaller hole. Make sure the arrow on the key points in the direction of the air flow (downstream).
4. Tighten the screw into the new hole.
5. Insert the electronic cell. The ionizer section will now be on the air-entering (upstream) side of the cabinet.

### Attach Cell Handles

The cell handles are packed in the installers bag assembly. They must be installed on the end of the cell closest to the access door. To install:

1. Orient the cell as it will be when installed. The gray contact board must be up and the airflow arrow stamped into the cell must point downstream.
2. Hold the handle sideways and insert the solid tab on the back of the handle into the slot in the cell. Turn the handle 90 degrees clockwise to align the divided tab with the square hole. See Fig. 8.



**Fig. 8. Install handle on end of cell closest to access door.**

3. Insert the divided tab into the square hole.
4. Fold up the wedge and insert it into the divided tab to lock the handle in place. If necessary, press with the end of a pliers, or other blunt instrument.

### Reassemble Air Cleaner

- Insert the electronic cell with the gray contact board up and the airflow arrow pointing downstream. If the cell does not slide easily into the cabinet, check the orientation of the cell key.
- Insert the prefilter on the upstream side of the cabinet in the guide provided.
- Replace the access door. Insert the tab on the bottom of the door into the slot in the cabinet, then swing it closed and press into place. The door must be firmly in place or the air cleaner will not operate.

### WIRING



### WARNING

**Electric Shock Hazard.**  
**Can cause personal injury.**  
 Do *not* use an extension cord.

All wiring must comply with local codes and ordinances.

The line voltage power source must match the voltage and frequency printed on the label inside the access door.

For air cleaners installed within European countries, see Figs. 11 and 12 for internal schematics.

For air cleaners installed outside European countries including the U.S.:

- Plug the F50F directly into the correct voltage and frequency outlet. See Figs. 9 and 10 for internal schematics. The F50F will operate properly at any fan speed on a multispeed or modulated speed system wired with conduit or plugged in.

**NOTE:** To reduce the risk of electric shock, this product has a grounding type plug that has a third (grounding) pin. This plug will only fit into a grounding type power outlet. If the plug does not fit into the outlet, contact a qualified electrician to install the proper outlet. Do *not* change the plug in any way.

- Alternatively, the F50F can be wired with conduit.
  1. Open access door.
  2. Remove and retain the (2) screws from the front of the power box and the (2) screws from the sides of the power box. See Fig. 13.
  3. In the power box, remove and retain (2) wire nuts that connect the line cord leads to the power box wiring.
  4. Remove the green lead from the green grounding screw on the wiring compartment barrier.
  5. Remove the power cord and the strain relief.
  6. Install plug (provided in bag assembly) in the hole left by the power cord.
  7. Attach conduit through a power box side knockout.
  8. Wire the air cleaner directly to line voltage using wire nuts. See Fig. 14. Secure ground connection to the green ground screw on the wiring compartment barrier.
  9. Replace power supply cover and access door.

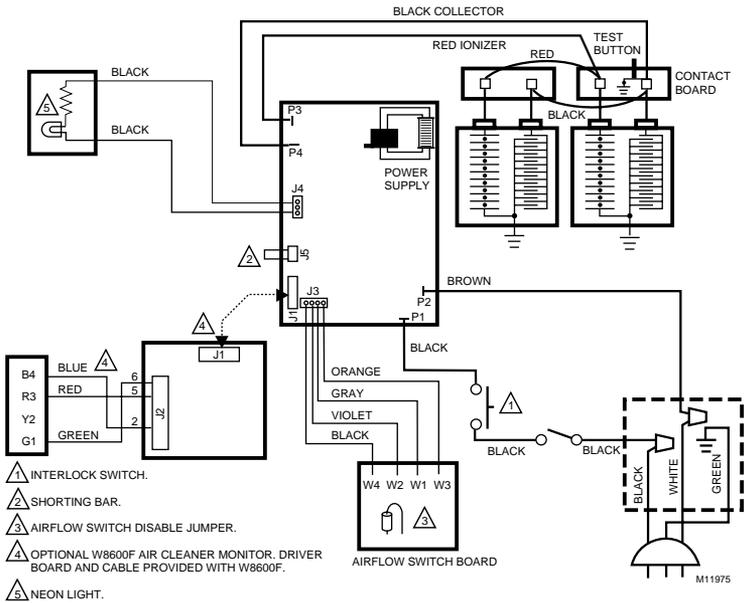


Fig. 9. Internal schematic for 120V F50F Models with Optional W8600F.

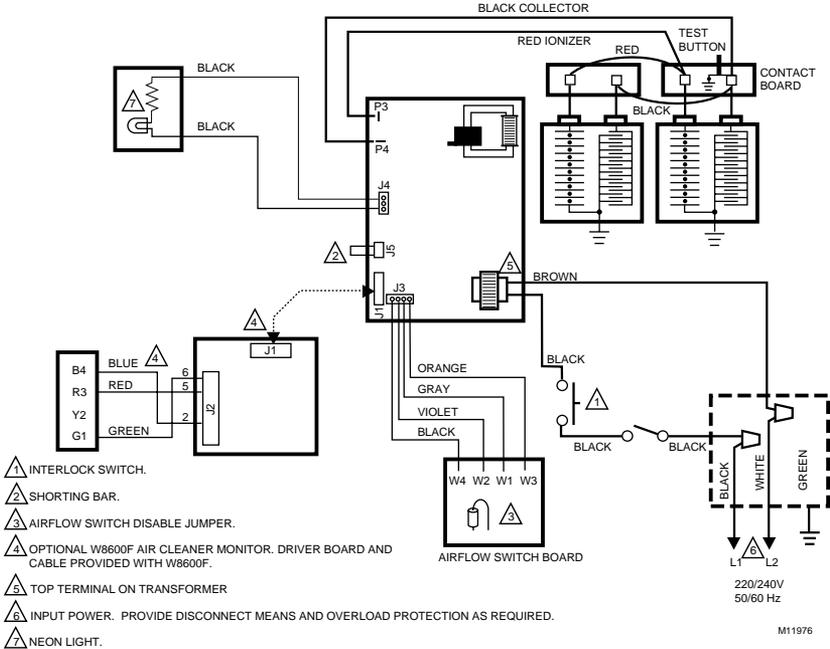


Fig. 10. Internal schematic for 220–240V F50F models with W8600F.

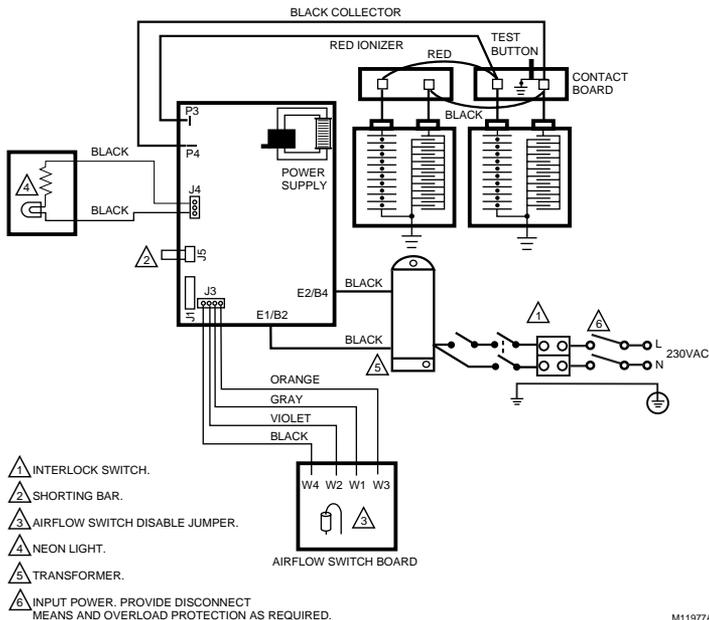


Fig. 11. Internal schematic for CE compliant 230V, 2 cell F50F models.

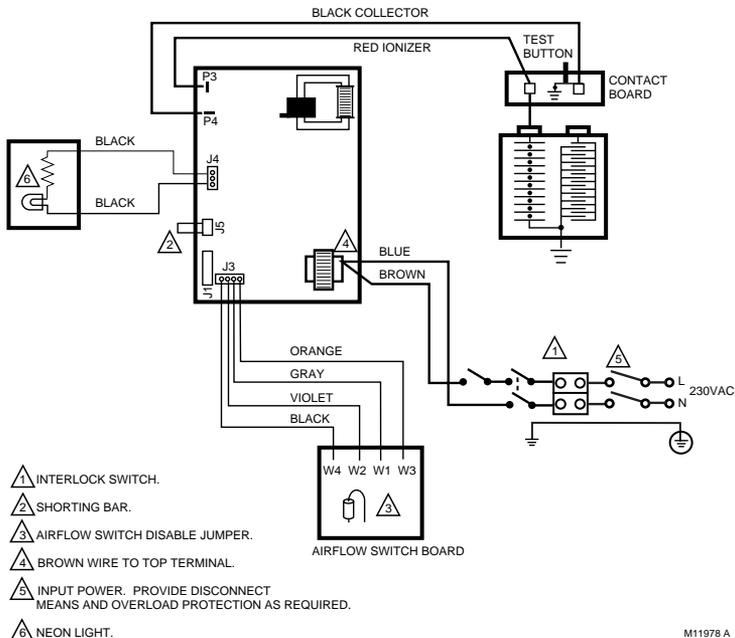


Fig. 12. Internal schematic for CE compliant 230V, 1 cell F50F models.

REMOVING COVER FROM POWER BOX.

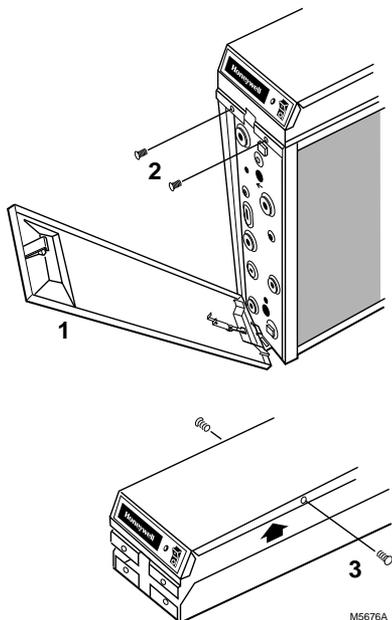
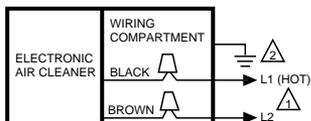


Fig. 13. Removing cover from power box.



- ⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- ⚠ THE AIR CLEANER CAN BE COMPLETELY ISOLATED FROM THE ELECTRICAL CIRCUIT OF THE HVAC SYSTEM UNLESS REQUIRED BY LOCAL CODE TO USE SAME CIRCUIT. ANY CONVENIENT HOUSE CIRCUIT CAN POWER AIR CLEANER, REGARDLESS OF ELECTRICAL RATING OF HVAC SYSTEM.

M5707

Fig. 14. Conduit connection for F50F (Not applicable in European countries).

OPERATION

Large particles (lint, hair) are caught by the prefilter. As the dirty air passes through the intense high voltage electric field surrounding the ionizer wires, all particles are given an electrical charge. The air then moves through the collector part of the cell where alternate parallel plates are charged positively and negatively, creating a uniform electrostatic field. The charged particles are attracted to and collect on the plates having the opposite electrical charge. The air leaving the air cleaner has fewer particles. Each time the air circulates through the F50F, more particles are removed.

CHECKOUT

Inspect Installation

- Make sure:
- Turning vanes and transitions, as needed, are properly installed.
  - Sheet metal joints between air cleaner and furnace are sealed.
  - All sheet metal connections are complete.
  - Original furnace filter has been removed and the blower compartment cleaned.
  - If an atomizing humidifier is installed upstream from the air cleaner, a disposable furnace filter is installed between the humidifier and the air cleaner.
  - Outside air, if used, is mixed with return air or heated, as necessary, before it can reach the air cleaner.
  - The airflow arrows on the electronic cell point downstream.
  - The prefilter is on the upstream side of the cell.
  - The cell handle faces outward.
  - The electronic cell and prefilter are clean and dry.
  - Wiring connections to the W8600F (optional) are properly made.

Check Air Cleaner Operation

With all components in place, turn on the air cleaner switch and energize the system blower. Check the following points of operation:

1. The neon light next to the on-off switch is on. If a W8600F is part of the installation, also check the wall panel and make sure ON is indicated. The W8600F FAULT will come on if there is a problem with the high voltage power supply.
2. Turn off the system blower. The neon light should go off after a few seconds. The neon light shows that the air cleaner is energized and the high voltage power supply is working properly.
3. Turn on the system blower. With the air cleaner energized, push the test button. A snapping sound indicates that the collector voltage is present on the cell. On air cleaner with a W8600F, the FAULT indicator will come on when the test button is held down.
4. With a multispeed blower, repeat steps 1-3 for each fan speed.
5. If operation is not as described, refer to the Troubleshooting and Service section.

TROUBLESHOOTING AND SERVICE

**⚠ WARNING**

**Electric Shock Hazard.**  
Can cause personal injury or equipment damage.

The following procedures expose hazardous live parts. Disconnect from power between checks and proceed carefully. The instructions are for use by qualified personnel only.

## Tools and Equipment

Troubleshooting the electronic air cleaner requires:

- Needlenose pliers for stringing ionizer wires and inserting edge connectors.
- Test meter.

The electronic air cleaner troubleshooting charts show how to quickly isolate a problem in the air cleaner. Although a meter is needed for some steps, the primary diagnostic tools are the *neon light* and the *test button*. See Fig 15.

## Neon Light (On Power Box)

The neon light is powered through the power supply and is on when the power supply output voltage is normal.

## Test Button

When pushed, the *test button* shorts from collector voltage to ground. The resulting arcing sound indicates that high voltage is being supplied to the collector. The solid state power supply controls current flow to the collector. On air cleaners with a W8600F, the FAULT indicator will activate when the *test button* is held down.

## FAULT Indicator (Air Cleaners with W8600F)

The FAULT indicator is on the W8600F. It indicates the following problems: excessive dirt loading, partial shorting of the collector, continuous ionizer or collector arcing, power supply failure, excessive ionizer current, or any condition causing a major reduction in high voltage.

## Power Box

### WARNING

**Electric Shock Hazard.**

**Can cause personal injury.**

Always turn off power and remove access door before removing power supply or its cover.

The solid state power supply within the power supply box can be replaced. If troubleshooting indicates a power supply problem, replace the entire power box or replace the power supply within the box. See form 69-1136. See Fig. 16 for power box removal.

## Modification to Reduce Ozone Odor

### WARNING

**Electric Shock Hazard.**

**Can cause personal injury.**

Always disconnect power and open the access door before opening the power supply cover.

The electronic air cleaner generates a small amount of ozone in normal operation. During the first week or two of operation, the amount may be higher because of sharp edges on some of the new high voltage metal parts. Normal use dulls these edges in a short time.

The average person can detect the odor of ozone in concentrations as low as 0.003 to 0.010 parts per million (ppm). The electronic air cleaner contributes 0.005 to 0.010 ppm of ozone to the indoor air. The U.S. Food and Drug Administration and Health and Welfare Canada recommend that indoor ozone concentration should not exceed 0.050 ppm. As a comparison, the *outdoor* ozone level in major cities is sometimes as high 0.100 ppm.

However, if desired, the ozone generated by the air cleaner can be reduced in one of two ways:

1. Install an activated carbon filter downstream from the air cleaner. Make sure particles from the air filter cannot fall into the air cleaner.

### WARNING

**Electric Shock Hazard.**

**Can cause personal injury.**

Only a trained service technician should perform the following procedure.

2. Move J5 shorting bar. This will reduce ozone production about 20-25 percent and reduce efficiency about 7-10 percent depending on actual airflow delivered by the furnace blower.
  - a. Unplug or disconnect power to the air cleaner.
  - b. Open the access door.
  - c. Remove the power box cover. See Fig. 16.
  - d. Locate J5 shorting bar on the power supply. See Fig. 17. Remove the shorting bar and reinstall so it is on only one pin.

NOTE: The ozone will be reduced, but the shorting bar is available for reinstallation if needed.

- e. Replace the power supply cover and access door. Turn on the power.
- f. Repeat the checkout procedure before leaving the job.

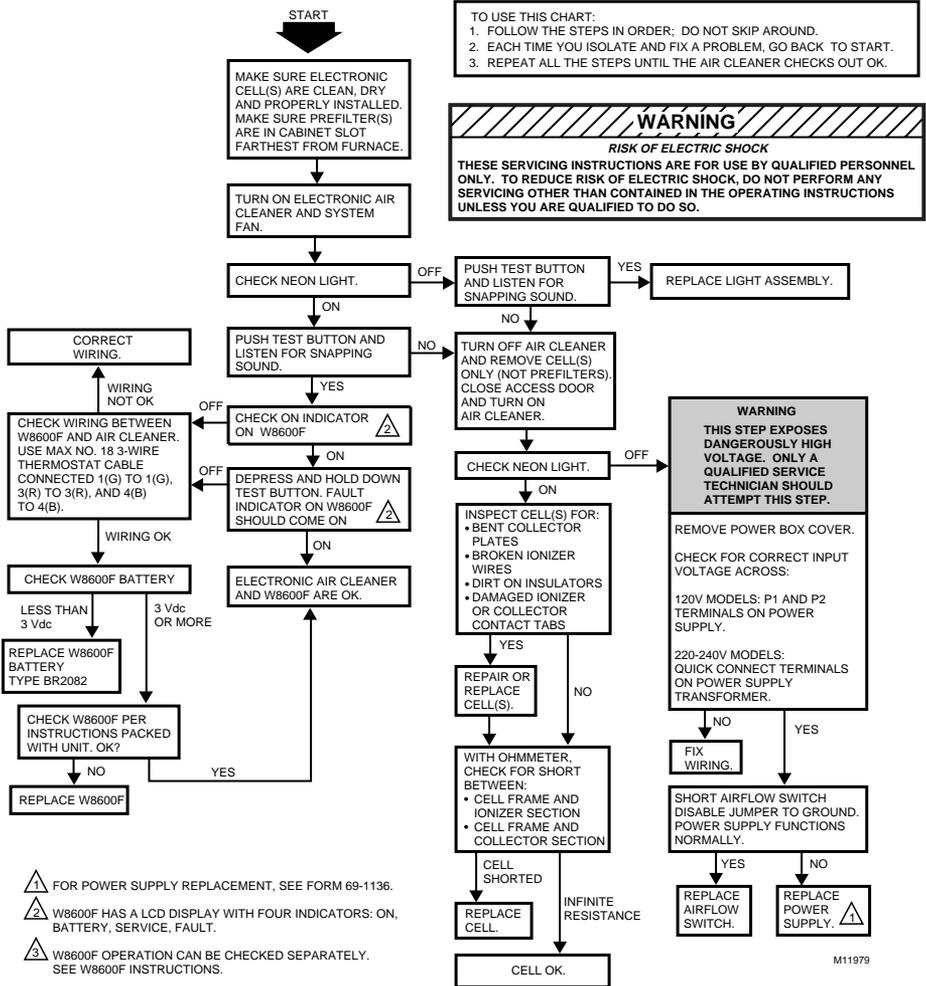
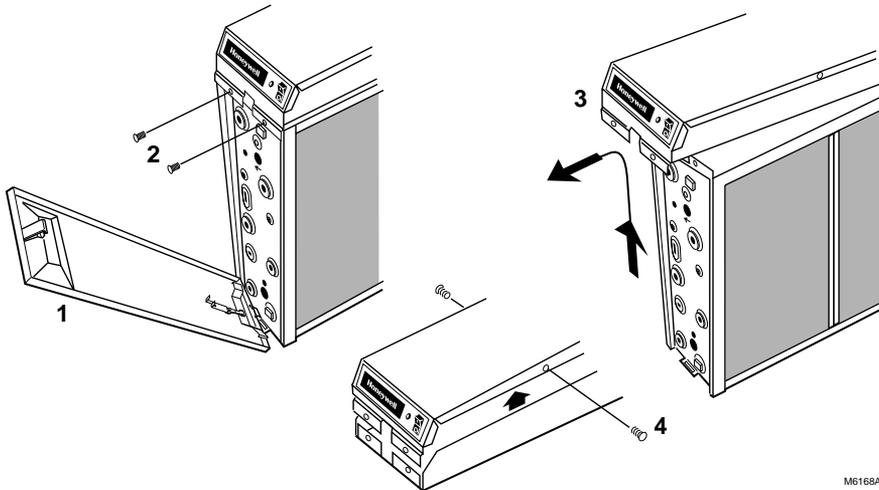


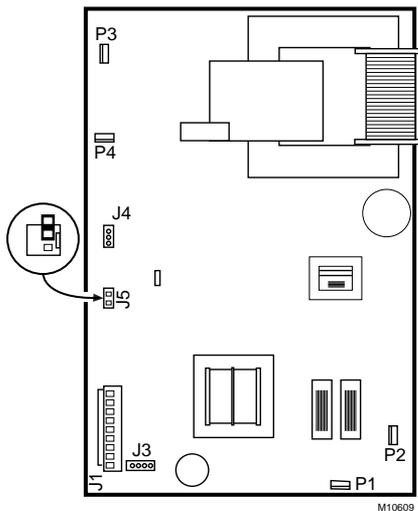
Fig. 15. Troubleshooting electronic air cleaners.

REMOVE POWER BOX FROM AIR CLEANER AND REMOVE THE COVER.



M6168A

Fig. 16. Removing the power box.



M10609

Fig. 17. Move J5 shorting bar to reduce ozone production about 20-25 percent.

**Honeywell**

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**Home and Building Control**  
Honeywell Inc.  
Honeywell Plaza  
P.O. Box 524  
Minneapolis, MN 55408-0524

**Home and Building Control**  
Honeywell Limited-Honeywell Limitée  
155 Gordon Baker Road  
North York, Ontario  
M2H 3N7



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