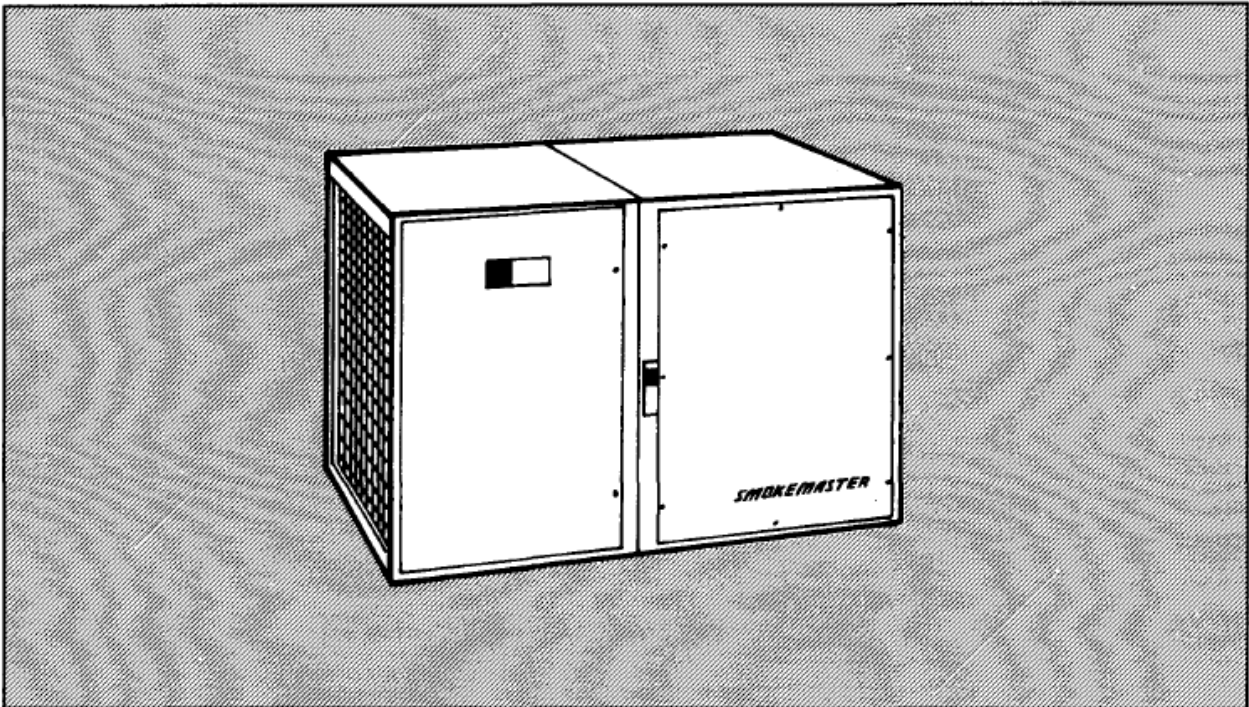


SMOKEMASTER[®]

F66R and F66L

INDUSTRIAL ELECTRONIC AIR CLEANER



THE F66R AND F66L INDUSTRIAL ELECTRONIC AIR CLEANERS CONTROL WELDING AND METAL WORKING FUMES IN WORK AREAS. THEY CLEAN THE AIR OF INDUSTRIAL SMOKE AND OIL MISTS. EITHER SOURCE CAPTURE TECHNIQUES OR AMBIENT AIR CLEANING CAN BE USED TO PROVIDE HEALTHIER WORKING CONDITIONS.

- Adjustable blower circulates up to 2600 cfm of air in single stage unit; 2500 cfm of air in a two stage unit.
- Models available with airflow from left to right and right to left.
- Single phase operating voltages include 120 Vac, 240 Vac and 208 Vac.
- Interlock switches prevent operation when cell access doors are open.
- Powered from a standard grounded outlet. All models equipped with a 10 foot power cord.
- Test button diagnostics give status of collector section.
- Solid state, self-regulating power supply output is not affected by moderate fluctuations in line voltage.
- System indicator lamp gives operational status of collection stages.
- Optional sump adapter drains collected liquids and mists from inside air cleaner.
- Optional plenum and hoses make source capture application easy.
- Prefilters and postfilters are interchangeable.
- Double pass air cleaners use independent power supplies for increased reliability.
- Permanently lubricated ball-bearing motor requires no maintenance.
- High voltage power supply uses voltage doubler to provide increased ionization voltage.

For further information:
BERRIMAN ASSOCIATES
1-800-480-3630
www.berriman.com

TABLE OF CONTENTS

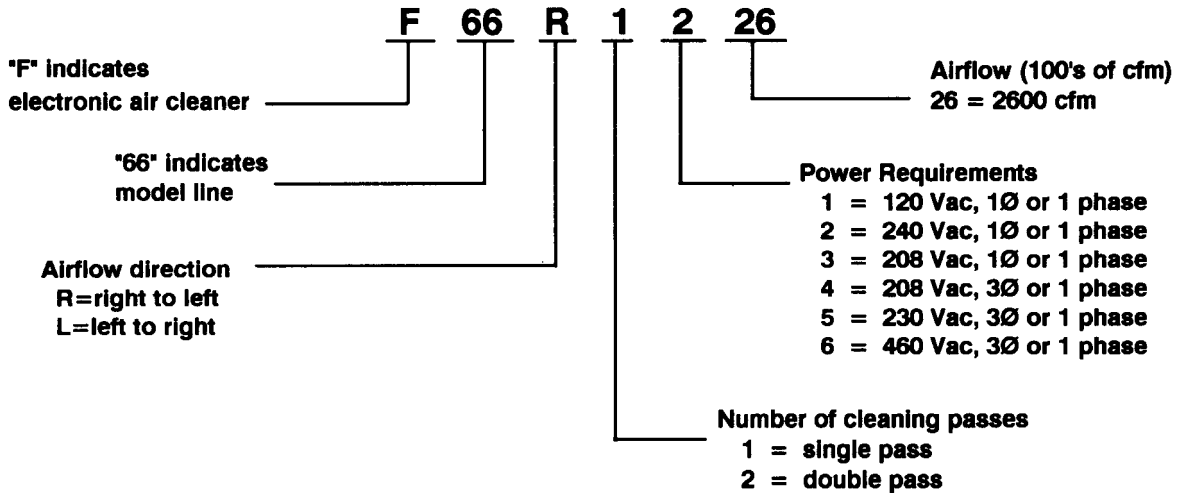
	PAGE
SPECIFICATIONS	3
PLANNING THE INSTALLATION	4
Introduction	4
Sizing	4
Ambient Cleaning	6
Source Capture Cleaning	6
INSTALLATION	9
When Installing This Product...	9
Unpacking	9
Stand Mounting	9
Overhead Mounting	9
Source Capture Plenum	10
Electrical Installation	11
OPERATION AND CHECKOUT	15
ADJUSTMENTS	15
SERVICE	16
Cleaning the Electronic Air Cleaner	16
Cleaning the Pre/Post Filters	16
The Alkaline Detergent Solution Cleaning Method	16
Staining	17
The Acid Detergent Method	16
Physical Force Methods	17
Contaminants and Cleaning Procedures	18
Replacing the Cells	18
Sump Pan Cleaning	19
TROUBLESHOOTING	19
Troubleshooting Procedure	19
Diagnostic Checks	20
Energize the Electronic Air Cleaner	20
Check Collector Output Voltage and Cells	20
Check High Voltage Output and Power Supply	20
Electronic Air Cleaner is Working Properly	20
Check Blower, Motor and Power Supply	20
Remove Cells, Energize Electronic Air Cleaner	20
Check Electronic Cells	21
Check Indicator Light and Line Voltage	21
Check Wiring and Power Source	21
Replacement of High Voltage Power Supply	21
EXPLODED VIEW OF F66 ELECTRONIC AIR CLEANER	22
PARTS LIST	23

SPECIFICATIONS

IMPORTANT

THE SPECIFICATIONS GIVEN IN THIS PUBLICATION DO NOT INCLUDE NORMAL MANUFACTURING TOLERANCES. THEREFORE, THIS UNIT MAY NOT MATCH THE LISTED SPECIFICATIONS EXACTLY. ALSO, THIS PRODUCT IS TESTED AND CALIBRATED UNDER CLOSELY CONTROLLED CONDITIONS, AND SOME MINOR DIFFERENCES IN PERFORMANCE CAN BE EXPECTED IF THOSE CONDITIONS ARE CHANGED.

MODEL NUMBER KEY



Model	F66L1126 F66R1126	F66L1226 F66R1226	F66L2125 F66R2125	F66L1526 F66R1526	F66L2625 F66R2625
No. of Electronic Cleaning Stages	1	1	2	1	2
Volts - Phase	120 Vac, 1Ø	240 Vac, 1Ø	120 Vac, 1Ø	230 Vac, 3Ø	460 Vac, 3Ø
Amps - Watts	13.2A, 1050W	6.6A, 950W	13.2A, 1050W	4.0A, 900W	2.0A, 900W
Airflow *	2600 cfm	2600 cfm	2500 cfm	2600 cfm	2500 cfm
Shipping Weight	325 lbs.	325 lbs.	457 lbs.	334 lbs.	466 lbs.
Installed Weight	278 lbs.	278 lbs.	410 lbs.	287 lbs.	419 lbs.
No. of 38003 Industrial Cells	2	2	4	2	4
Length Dimensions	41"	41"	60"	41"	60"

POWER SUPPLY: Self-regulating dual voltage, solid state, industrial rated

CELL WEIGHT: 32 lbs. each

CELL AREA: 218 sq. ft.

MOTOR: TEFC, 1 Hp., ball bearing

AVAILABLE 60 HZ VOLTAGES AND PHASES: 120 Vac-1Ø, 240 Vac-1Ø, 208 Vac-1Ø, 208 Vac-3Ø, 230 Vac-3Ø, 460 Vac-3Ø, 50 Hz models also available.

CROSS SECTION DIMENSIONS: (all units) - 27 1/8" high x 26 1/4" wide (see length dimensions Page 4).

AMBIENT TEMPERATURE RATING: Shipping & Storage: -30°F to +150°F (-34°C to +66°C)

Operating: 40°F to 125°F (4°C to 52°C)

* Adjustable from 2100 cfm to 2600 cfm single stage, and 2000 cfm to 2500 cfm two stage.

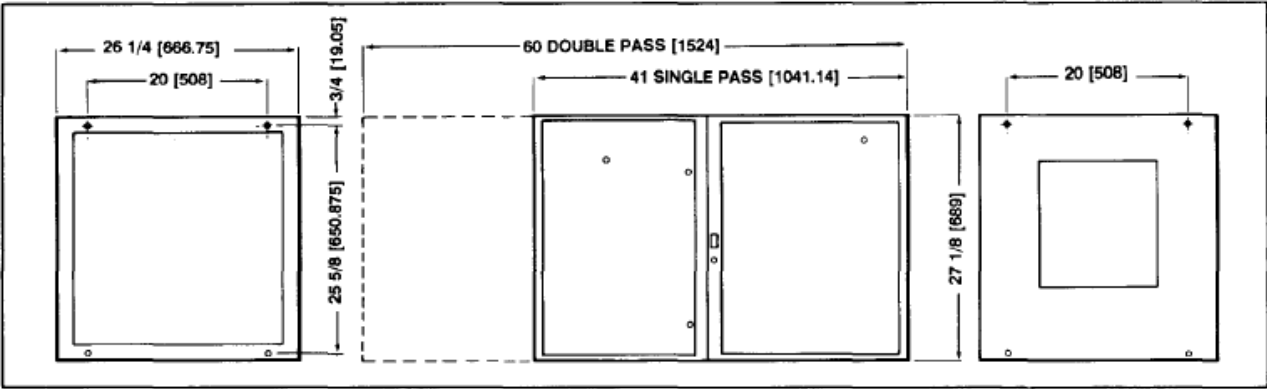


FIGURE 1 - F66 Dimensions in inches [mm shown in brackets]

PLANNING THE INSTALLATION

WARNING

The F66 Industrial Electronic Air Cleaner is not explosion proof. It must not be installed where there is danger of vapor, gas, or dust explosion.

INTRODUCTION

Clean air is the subject of numerous laws and regulations. Typical requirements in the United States are those put out by the Occupational Safety and Health Administration (OSHA). Private groups, such as the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), have also published numerous recommendations.

Normally, clean air is defined in regulations and recommendations as air having a limited amount of contaminant in it, commonly expressed as parts per million, or milligrams per cubic meter. Approved counteractions are intended to lower or eliminate the amount of contaminants in the air. One of the more common methods of achieving this goal is through the use of electronic air cleaners.

At no time should an electronic air cleaner be placed where there is a potential for explosion due to the presence of explosive dusts, gases or vapors.

SIZING

Sizing is that part of the installation which determines how many air cleaning units are required to maintain a desired level of air quality. The process of sizing an application involves roughly calculating the number of air cleaners needed and then modifying the calculation according to the specific characteristics of each application.

If air contaminants are generated from fixed stations where hoods and hoses can be acceptably installed, cleaning the air by capturing the contaminant at the source is strongly recommended. For source capture air cleaning, a hood

(not provided) is installed where the contaminants are generated and an attached hose feeds the contaminants to a source capture plenum. The plenum transfers the contaminants from up to 3 hoses directly into the electronic air cleaner (hose and plenum are ordered as accessories).

The actual number of contaminant sources which can be conducted into one air cleaner may vary from 1 to 3 depending on the nature of the contaminants. The composition, quantity, and rate of generation of the contaminants determines the air velocity needed to effectively capture these contaminants at the source. The required air velocity, in turn not only affects the hood design and hood location, but it also sets limits on how much hose can be used before the air pressure drop becomes too great for effective contaminant capture.

Therefore, when sizing an application for source capture air cleaning, it is necessary to keep in mind how the specific contaminants, the hood, and the needed velocity all combine to affect the number of stations which can be attached to a single unit and the number of units which will be needed for a particular application.

When the installation of hoods and hoses is physically infeasible or unacceptable, the electronic air cleaners are strategically placed overhead, or on stands, to provide background air cleaning.

For background air cleaning, the number of electronic air cleaners needed can be estimated by the relationship of air volume to the needed air changes per hour. In these cases the following formula is helpful:

Electronic Air Cleaners=

$$\frac{\text{Air Volume} \times \text{Air Changes/Hour}}{\text{Clean Air Rating} \times 60}$$

Clean Air Rating =

$$\text{Airflow} \times \text{Efficiency}$$

Two-cell model =

$$2500 \text{ cfm} \times 0.9 = 2250 \text{ cfm}$$

$$[4250 \text{ M}^3/\text{hr.} \times 0.9 = 3825 \text{ M}^3/\text{hr.}]$$

The air volume in a space is sometimes reduced to account for high ceilings and large equipment in the space. For example, in an application where the ceiling is higher than 30 ft. [9.1 m], the air volume above 30 ft. [9.1 m] may be subtracted if it does not significantly affect contaminant dispersal either by how the contaminants are circulated from their sources or how the heating, cooling or ventilating equipment affects the dispersment of the contaminants. Also, if equipment takes up a great deal of space in relation to the total air space, its volume may be deducted from the total air volume.

A method for calculating the needed air changes per hour is to measure the generation rate of the contaminants and the suggested allowable level of contamination. To use this method of calculation, consult your representative.

Regardless of the method used to calculate the number of units needed to produce clean air, the physical conditions of the space to be cleaned may either limit this number or demand that more units be installed. For background air cleaning it is important to establish a uniform airflow pattern throughout the entire space. Limitations to the calculated sizing may be a lack of space for mounting areas or the number of units may interrupt normal building operation; that is, a unit cannot be mounted where an overhead crane will smash into it or where stand mountings seriously interrupt building traffic patterns. The number of units required by air volume and air changes per hour might need to be increased when the shape of a structure is such that effective capturing and air distribution is not possible according to the sizing calculations.

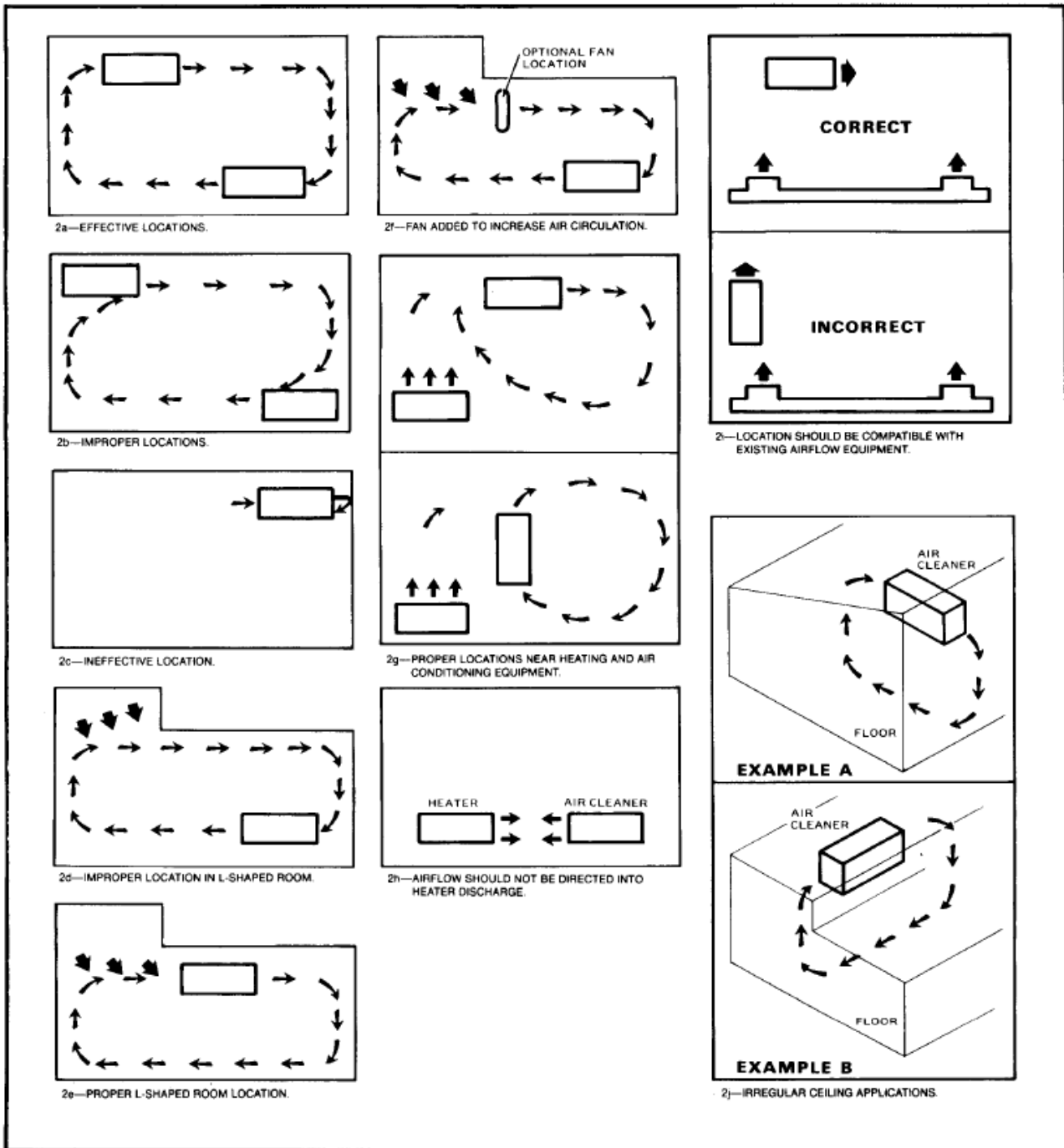


FIGURE 2 - Guidelines for locating the F66 when ambient cleaning

AMBIENT CLEANING

Whether an air cleaner is ceiling hung or placed on a stand, the first important consideration is that the inlet of the unit be located as close as is reasonably possible to the greatest concentration of air contaminants. Second, since the air cleaner draws contaminated air from approximately 10 ft. [3.0 m] around the outlet and exhausts the cleaned air from 50 to 75 ft. [15.2 m to 22.8 m] from the outlet, the inlet of the unit should be placed 25 percent of the distance along the wall of a room. See Figure 3.

DO NOT locate an air cleaner inlet too close to the corners of a room. Contaminated air will be able to bypass the unit and not be cleaned. DO NOT locate an air cleaner outlet too close to a corner or wall. See Figure 2 (2c). The cleaned air will recirculate directly back to the air cleaner inlet.

DO NOT locate an air cleaner in an L-shaped room so that exhausted air enters directly into the small portion of the room as shown in Figure 2 (2d). This can produce a self-contained circular air pattern in the small part of the room which decreases the air cleaner's effectiveness. Locate an air cleaner in an L-shaped room as indicated in Figure 2 (2e).

The shape of a room and location restrictions may require the installation of a fan as in Figure 2 (2f) to promote proper air circulation. Also, the size of a room may require the use of fans to bring contaminants to an air cleaner inlet.

In rooms with irregular ceilings, install the air cleaner close to the ceiling on the highest wall, as example A indicates in Figure 2 (2j). When one section of the ceiling is at least 12 in. [3-4.8 mm] higher than another, locate the air cleaner in the area with the higher ceiling, as shown in example B of Figure 2 (2j).

When selecting locations for numerous units, position the air cleaners to create uniform movement of air and provide maximum access to the sources of contamination. The outlets of the air cleaners should not be located so that they generate opposing air currents or that the outlet from one air cleaner is less than 30 ft. [9.1] from the inlet of another air cleaner.

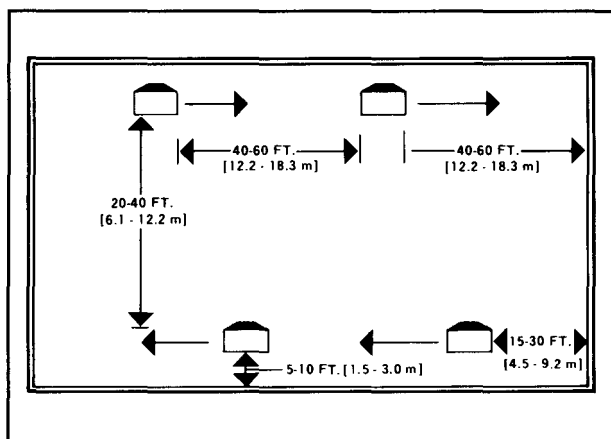


FIGURE 3 - Location guide for background cleaning

SOURCE CAPTURE CLEANING

When selecting a location for an electronic air cleaner that uses a hood and hose to capture the contaminants at the source, note the available stand or ceiling mounting areas which will provide satisfactory air distribution for the air cleaner outlet. Choose the location which will keep the air pressure drop, caused by the length of the hose, within an acceptable range. Do not mount the outlet of the air cleaner so close to a wall that it inhibits the airflow. Also, the outlet of an air cleaner should not be located such that it interferes with the source capture process of another air cleaner hood.

To effectively control atmospheric contamination at its source, proper hood design is necessary. Minimum airflow and power consumption are also important factors in designing an effective local exhaust system to control contamination.

Capturing air contaminants at their source requires the creation of sufficient airflow past the contaminant source to remove the contaminated air and draw it into an exhaust hood. Fine airborne dust particles, mists, vapors, gases, and fumes follow air currents. Airflow, alone, is sufficient to capture these contaminants.

Larger dust particles tend to have a trajectory, or throw, in air. Capturing these heavier particles calls for barriers and proper hood placement to direct the particles into the hood before they fall out of the airstream. This placement should also prevent particle scattering.

Basic knowledge of the contaminated airflow to be controlled is necessary before an effective hood or enclosure can be designed. The more complete and effective the design, the more economical and efficient the installation will be.

A complete enclosure is often the best way to start. Once a source is ideally enclosed, provide access and working openings as required. This concept can be used to develop booths, side- or down-draft hoods, and side shields.

The access and working openings must be kept to a minimum. Whenever possible, they must also be kept away from the contaminated airflow. Any inspection and maintenance openings should be provided with tight doors whenever possible.

A hood that is open and does not enclose or confine the contaminant should be avoided. Open hoods can be used, but exhaust volumes must be large and cross drafts nearby can easily upset draft control.

Canopy hoods are effective in controlling operations that may suddenly release surges of gases and vapors. Hot processes are an example.

However, canopies should not be used where people may be working in the airflow between contaminant source and canopy, because exhaust airflow can actually increase the worker's exposure to the contaminant. Plating tanks and cementing tables typically have this problem with canopy type hoods.

The duct takeoff in the exhaust hood should be located in the normal line of contaminant travel. Arrange the duct openings to distribute the exhaust airflow throughout the hood. This is especially important with large shallow hoods, where air movement tends to concentrate close to the duct opening. The airflow can be spread around the hood by using multiple duct takeoffs, interior baffles, or filter banks.

Air intake from areas not needing airflow, or without contaminants, can be controlled with flanges. Flanges minimize airflow from areas outside the desired air collection area. Usually the flange width is equal to the hood diameter, but not exceeding 6 inches [152.4 mm]. Flanges may increase the effectiveness of the hood, allowing a reduction in hood airflow requirements by up to 25 percent.

Exhaust airflow requirements are calculated after the hood design is determined. The airflow volume is calculated using the enclosure's known open area and the airflow velocity needed to collect the contaminants. The collected airflow must be sufficient to prevent the escape of any contaminated air. Table 1 shows airflow capture velocities for various types of processes.

Where enclosing the process is impractical, the hood should be located as close to the source as possible. The airflow must be adequate to maintain the capture velocity required to carry the contaminants to the hood opening. See Figure 4.

TABLE 1 - CONTAMINANT CAPTURE VELOCITIES^a

CONTAMINANT DISPERSAL CONDITION	EXAMPLES	CAPTURE VELOCITY	
		fpm	m ³ /hr.
Released with practically no velocity into quiet air.	Evaporation from tanks; degreasing, etc.	50 - 100	914 - 1829
Released at low velocity into moderately still air.	Spray booths; intermittent container filling; low speed conveyor transfers; welding; plating; pickling.	100 - 200	1829 - 3658
Active generation into zone of rapid air motion.	Spray painting in shallow booths; barrel filling; conveyor loading; crushers.	200 - 500	3658 - 9144
Released at high initial velocity into zone of very rapid air motion.	Grinding; abrasive blasting; tumbling.	500 - 2000	9144 - 36576

In each category above, a range of capture velocity is shown. The proper choice of values depends on several factors.

Lower End of Range

1. Room air currents minimal or favorable to capture.
2. Contaminants of low toxicity or of nuisance value only.
3. Large hood-large air mass in motion.

Upper End of Range

1. Disturbing room air currents.
2. Contaminants of high toxicity.
3. High production, heavy use.
4. Small hood-local control only.

^aFrom INDUSTRIAL VENTILATION MANUAL by American Conference of Governmental Industrial Hygienists.

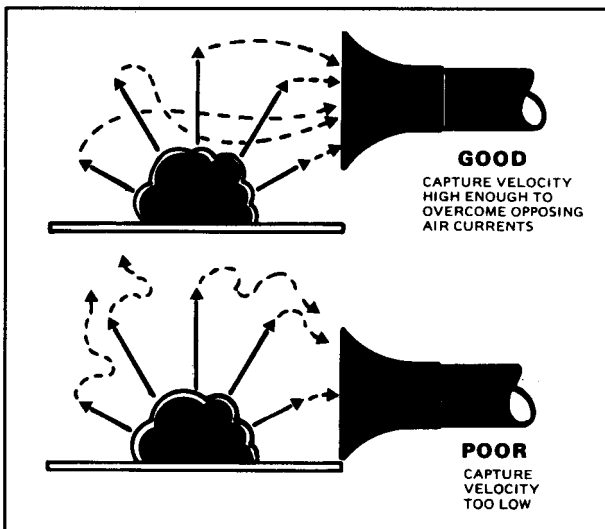


FIGURE 4 - Capture velocity

Collecting contaminants is accomplished by eliminating or minimizing natural air currents at the contaminant site, and by pulling the air into the exhaust hood. The airflow velocity must be high enough to overcome any opposing air currents and maintain the capture velocity. See Figure 4.

Source of air motion to either minimize or use to advantage in hood design -

- Thermal air currents from heat generating operations.
- Machinery motion (conveyer belts, grinders, etc.).
- Material motion (dumping or container filling).
- Operator movements.
- Room air currents (generally 50 fpm [85 m³/hr] minimum; could be much higher).
- Spot heating, cooling or ventilation equipment near area.

See Figure 5.

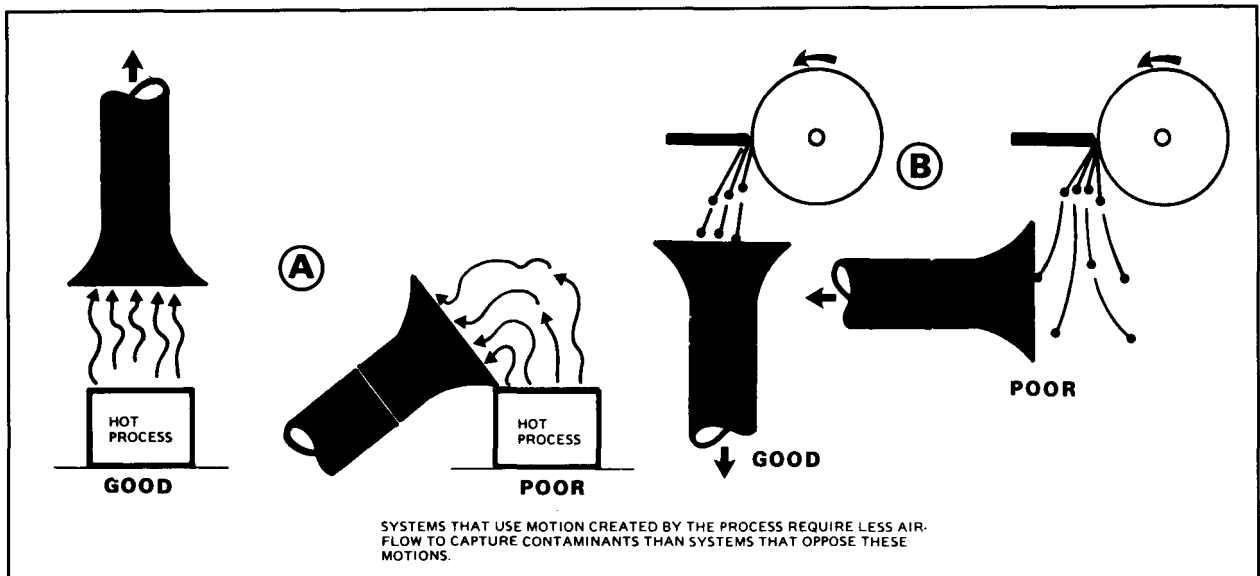


FIGURE 5 - Utilizing process motion

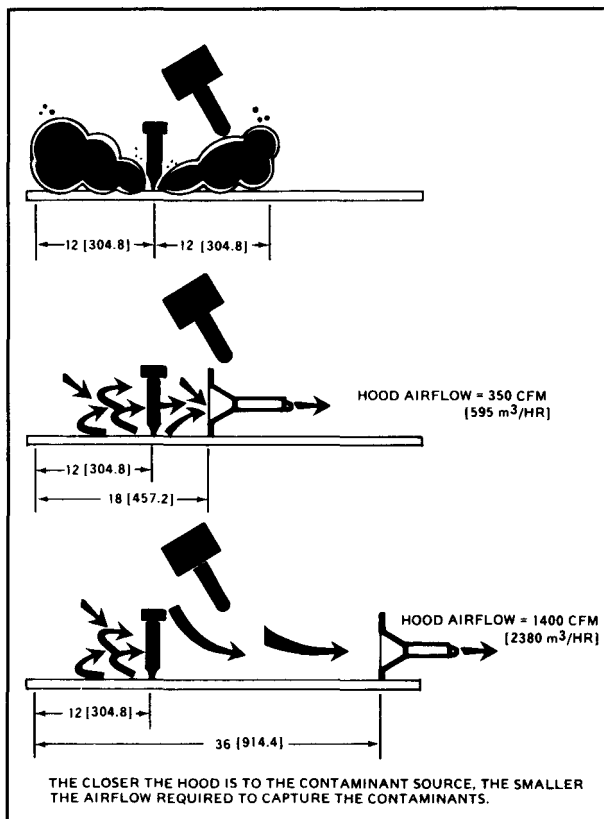


FIGURE 6 - Hood location; airflow needed increases with distance from work

Airflow needed in a hood design is affected by hood shape, size and location. The hood should be as close as possible, and enclose the operation as much as possible.

Suction in a duct opening will draw in air equally from all directions. As distance from the inlet opening increases, the decrease in airflow velocity occurs more quickly. The velocity in feet per minute (fpm) equals the cubic feet per minute (cfm) from Figure 10 divided by inlet area in feet (0.35 for 8 inch hose).

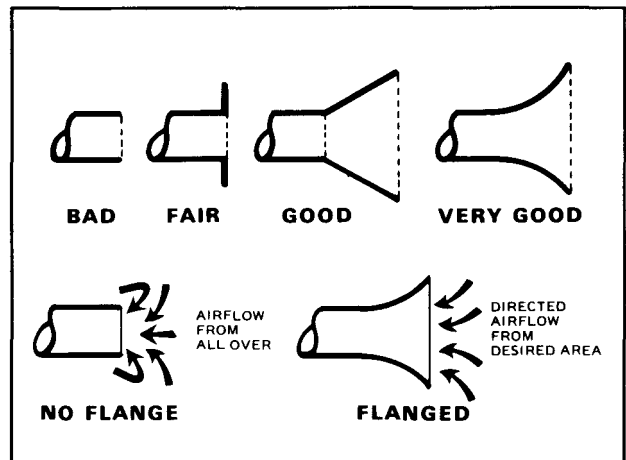


FIGURE 7 - Hood flanges

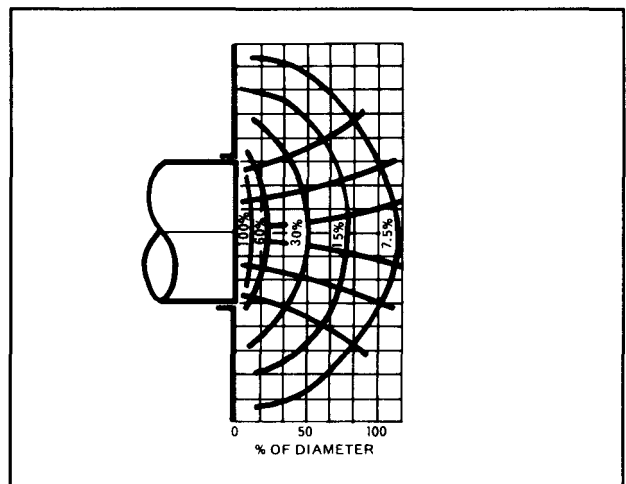


FIGURE 8 - Velocity contour (in percentage of opening velocity) for flanged circular opening

When utilizing thermal airflow occurring in a process, exhaust airflow should be greater than the process airflow. This will minimize air spillage at the rim of the hood.

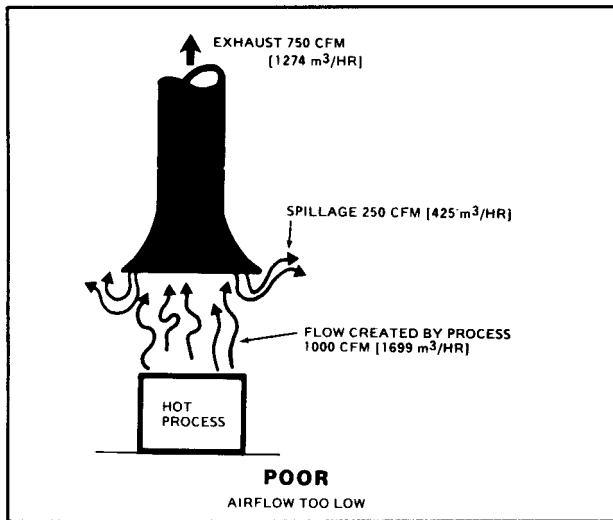


FIGURE 9 - Maintain adequate airflow

For further information on ventilation and hood design, refer to a more complete source, such as:

INDUSTRIAL VENTILATION, by American Conference of Governmental Industrial Hygienists, published by Committee on Industrial Ventilation, Lansing, Michigan, 48106

HANDBOOK OF VENTILATION FOR CONTAMINANT CONTROL, by Henry J. McDermott, published by Ann Arbor Science, Box 1425, Ann Arbor, Michigan, 48106

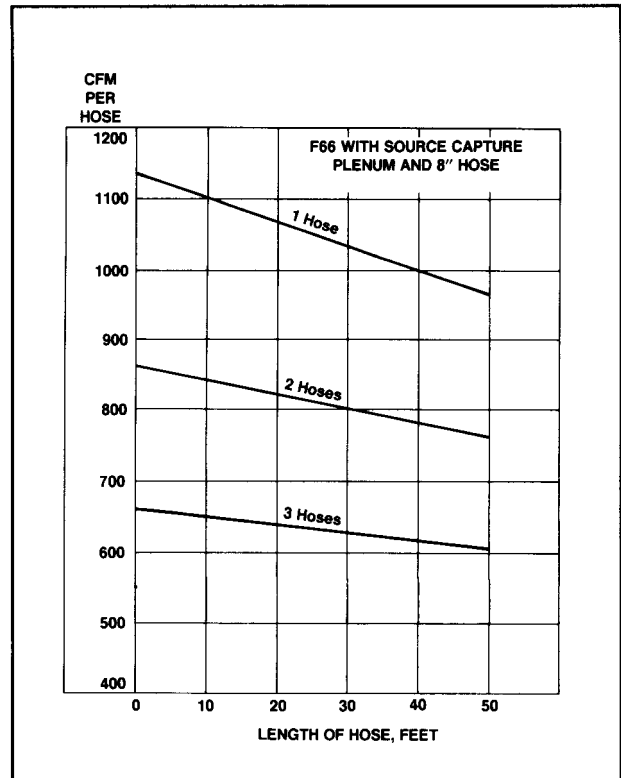


FIGURE 10 - F66 Airflow with hoses

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. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

CAUTION

1. Do not connect the power source until after electronic air cleaner is mounted. This will prevent electrical shock or equipment damage.
2. Be sure to turn the air cleaner off before servicing it. The air cleaner motor is equipped with an automatic thermal overload. Should the motor become overheated, it will automatically stop. It will automatically start after a sufficient period of cooling (several minutes to an hour).
3. If the air cleaner must be turned on for an electrical check, be extremely careful in avoiding electrical shock. Also, take care when working near the air cleaner's moving parts.

UNPACKING

The F66, mounting brackets and hardware are packed in one box. Check all air cleaner components carefully when unpacking. Remove all shipping cardboard. Be sure to inspect all packing materials before discarding them.

STAND MOUNTING

Securely place the F66 on an appropriate stand or cart and locate as close to the contaminant source as possible. The position should also allow satisfactory distribution of air from the outlet of the air cleaner. If a source capture hood, plenum, and hose are used, observe the instructions in **PLANNING THE INSTALLATION** for selecting a suitable location for the unit.

OVERHEAD MOUNTING

When installing the F66 in an overhead location, position the air cleaner as close to the contaminant source as possible. This increases the air cleaner's effectiveness. It is important to select an overhead mounting location for the air cleaner which provides easy access for cell cleaning and maintenance. Do not place a ladder against the air cleaner, when it is mounted overhead, in order to gain access to the air cleaner interior.

Be certain that the mounting hardware (not included) from the air cleaner to the ceiling provides adequate strength and

stability, and that it is securely attached to the overhead structure. Do not fasten the air cleaner to a false ceiling or to plaster or plasterboard. In some cases it may be necessary to construct supports which will bear the weight of the F66 when it is hung in an overhead location.

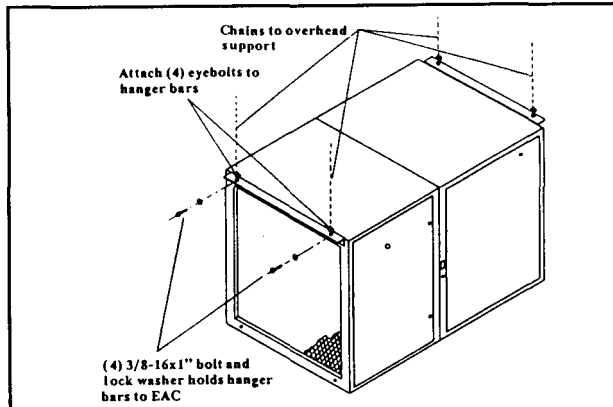


FIGURE 11 - Mounting the F66 overhead

SOURCE CAPTURE PLENUM PN07039 (optional)

1. Center the plenum over the intake opening of the air cleaner, then use the plenum as a template to mark 4 corner holes.
2. Use a No. 24 bit (0.152 inch [3.9 mm]) to drill the 4 holes.
3. Fasten the plenum to the air cleaner using No. 10 sheetmetal screws 1/2 to 3/4 inch (12.7 mm to 19 mm) long (not furnished).
4. Drill holes at remaining screw locations around the plenum. Fasten with sheetmetal screws. The 2-cell air cleaner plenum uses 18 screws.

5. Remove any metal chips and shavings from the interior of the air cleaner.

Replace the prefilter and cells. Connect hose length to desired plenum flange using hose clamps (not furnished). Block off unused plenum openings with capplugs available separately.

Route the hose(s) to the source capture hood. Support the hose(s) as necessary using hangers and support bands. Support bands on the hose should be at least 2 1/4 inches (57.2 mm) wide and placed at 5 foot (1.52 m) intervals. Do not pinch or flatten the hose.

Hood size and location should be determined by an accepted authority or reference, such as the INDUSTRIAL VENTILATION MANUAL, to meet applicable codes and ordinances for a particular application.

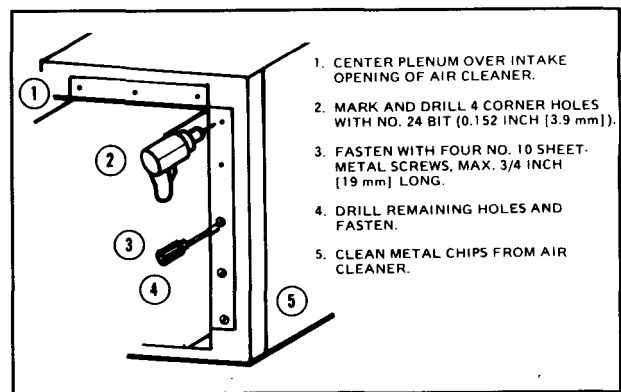


FIGURE 12 - Installing source capture plenum

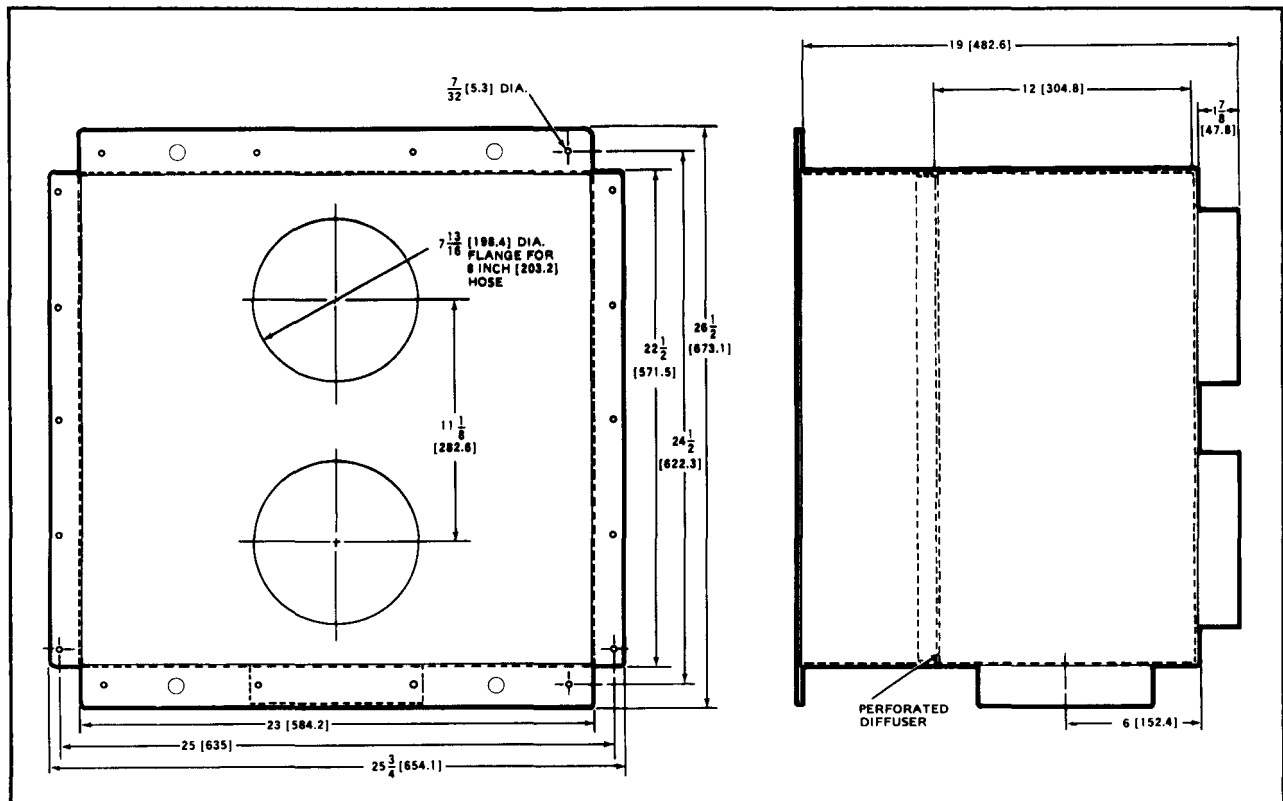
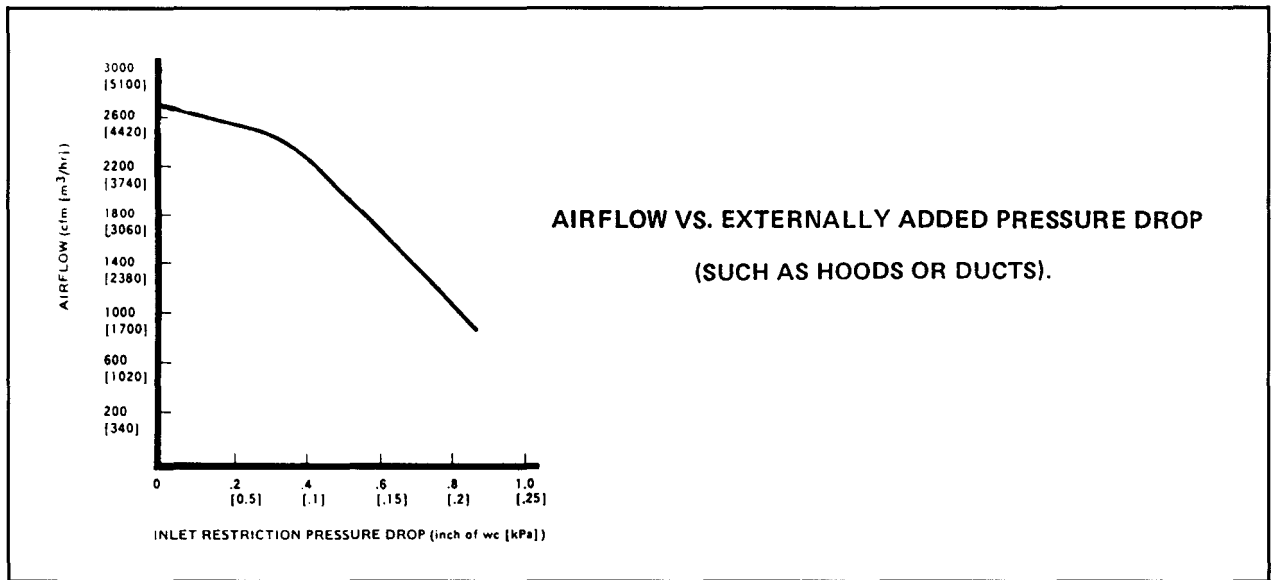


FIGURE 13 - Source Capture Plenum dimensions in inches [millimeters in brackets]



ELECTRICAL INSTALLATION

1. CORD CONNECTED

The power cord must not be concealed above the ceiling or behind the walls. Route the power cord so it will be out of the way of the building's occupants.

The F66 single phase models have 10 foot power cords with standard (15 AMP rated) 3-prong plugs. There must be a standard grounded outlet provided within 10 feet of the air cleaner. Do not use an extension cord.

The three phase F66 models have a 10 foot power cord. An appropriate plug is required since it is not standard with the air cleaner.

2. CONDUIT CONNECTED

CAUTION

This procedure should be attempted only by persons qualified to install electrical wiring. All wiring must comply with applicable codes and ordinances.

All wiring must comply with applicable codes and ordinances. Be sure the power source is compatible with the model ordered.

It is recommended that No. 12 gauge wire be used to complete the wiring from the air cleaner wiring compartment to the external power source. However, be certain to comply with local codes. A green wire is provided in the wiring compartment for a grounding connection. Proper grounding of this device is mandatory for proper operation and safety.

1. Remove wiring compartment cover and 10 foot power cord.

2. Run the 12 gauge wires through the conduit. Attach the conduit to the knockout desired, 1/2" or 3/4".

3. Use wire nuts to make connections in wiring compartment. See Figure 14 for single phase models. See Figure 15 for three phase models.

4. Re-attach the wiring compartment cover.

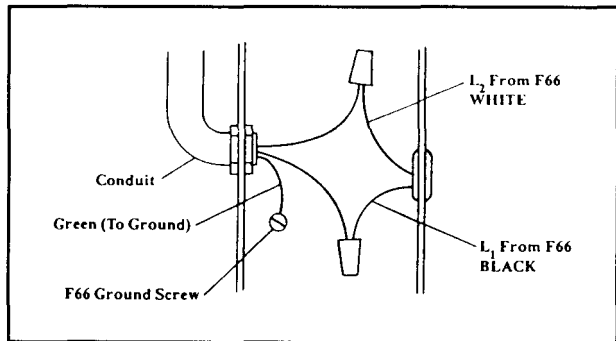


FIGURE 14 - F66 Single phase

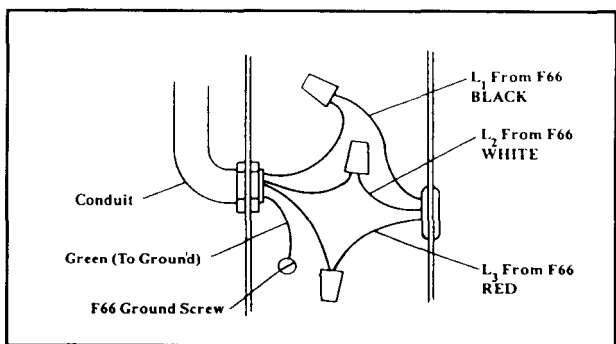


FIGURE 15 - F66 Three phase

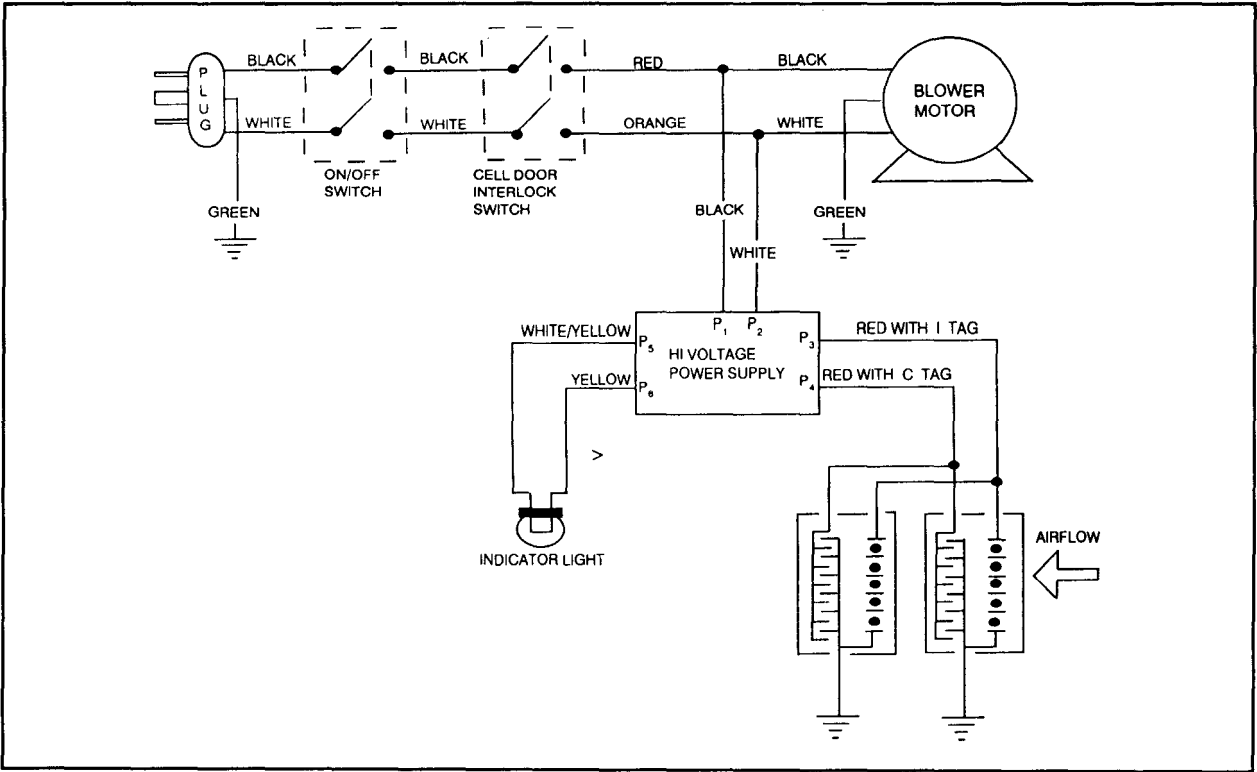


FIGURE 16 - Schematic for Single Phase, Single Pass Air Cleaner

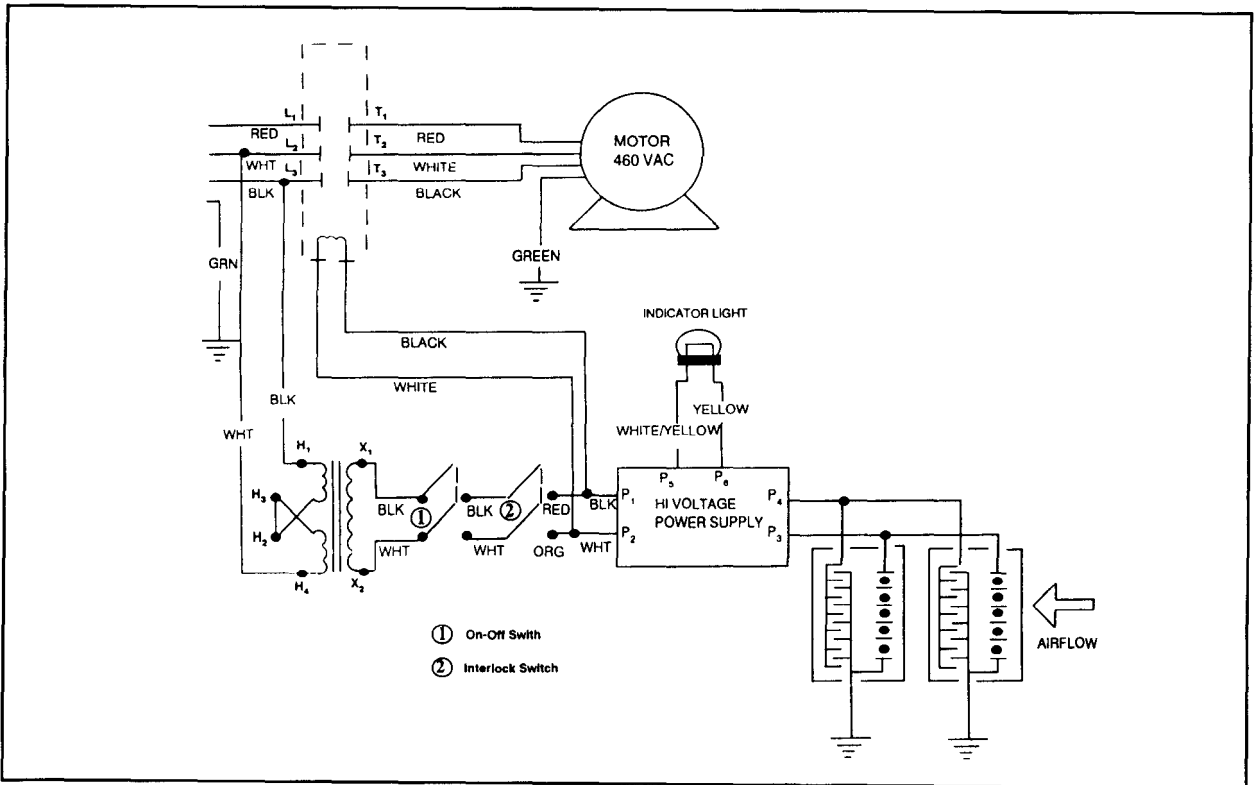


FIGURE 17 - Schematic for Three Phase, Single Pass Air Cleaner - 460 Vac

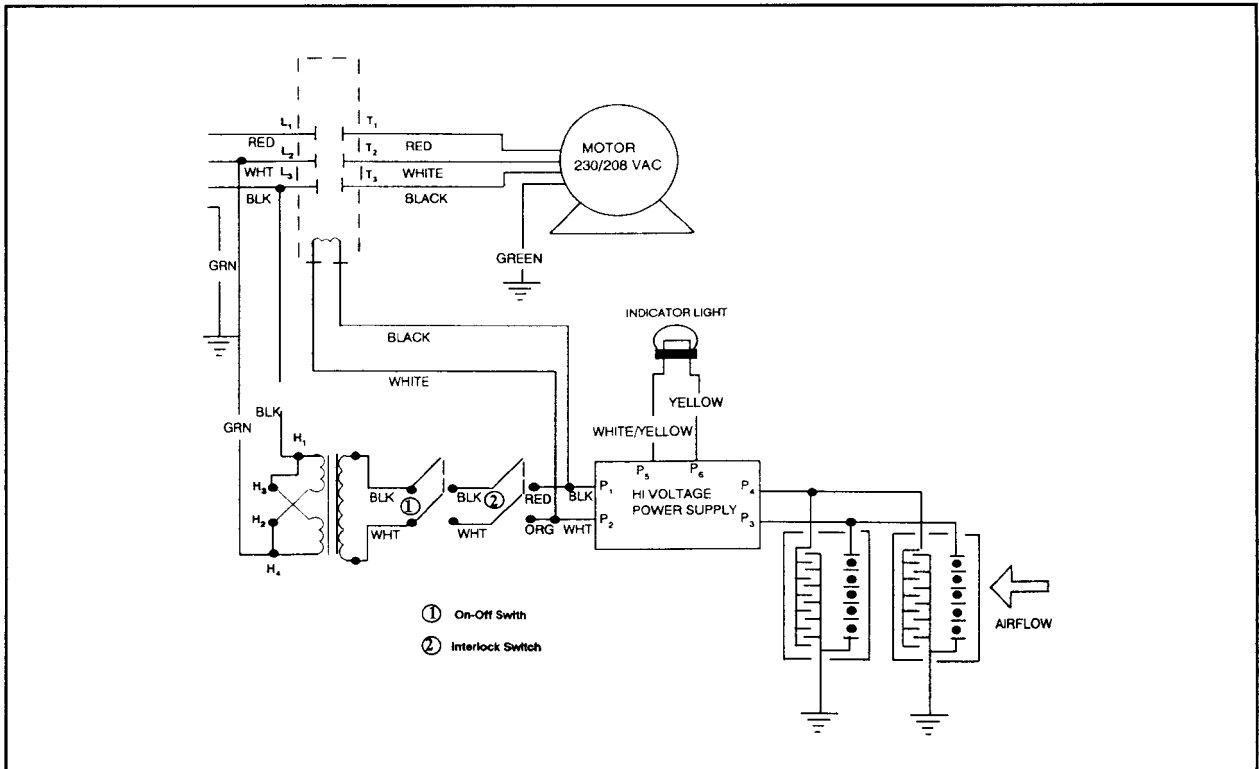


FIGURE 18 - Schematic for Three Phase, Single Pass Air Cleaner - 230 Vac/208 Vac

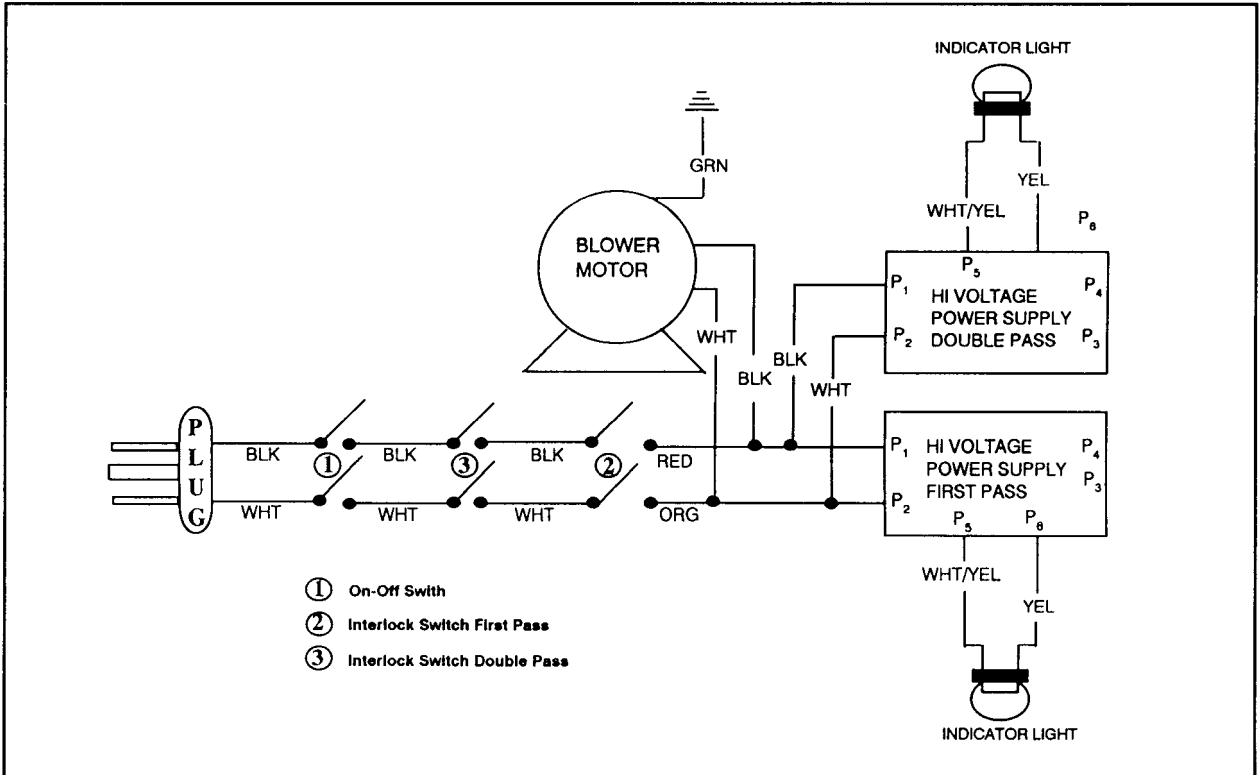


FIGURE 19 - Schematic for Single Phase, Double Pass Air Cleaner

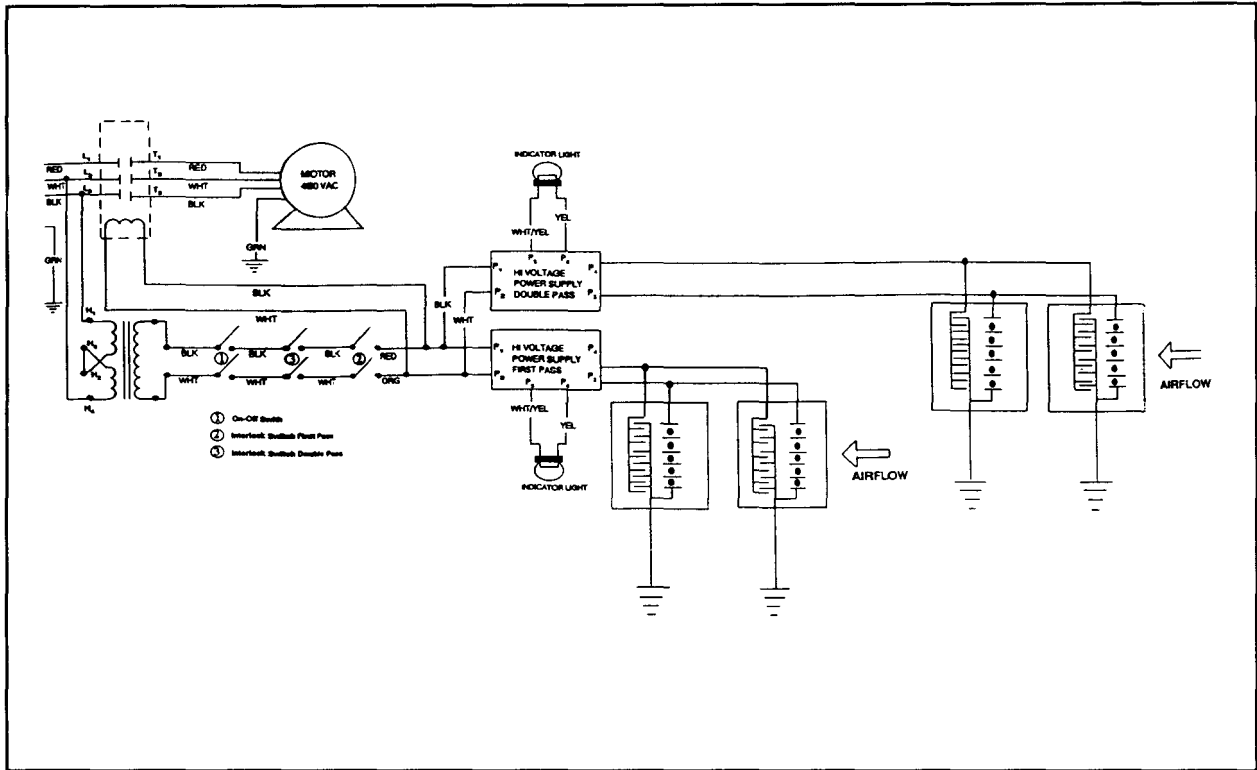


FIGURE 20 - Schematic for Three Phase, Double Pass Air Cleaner - 460 Vac

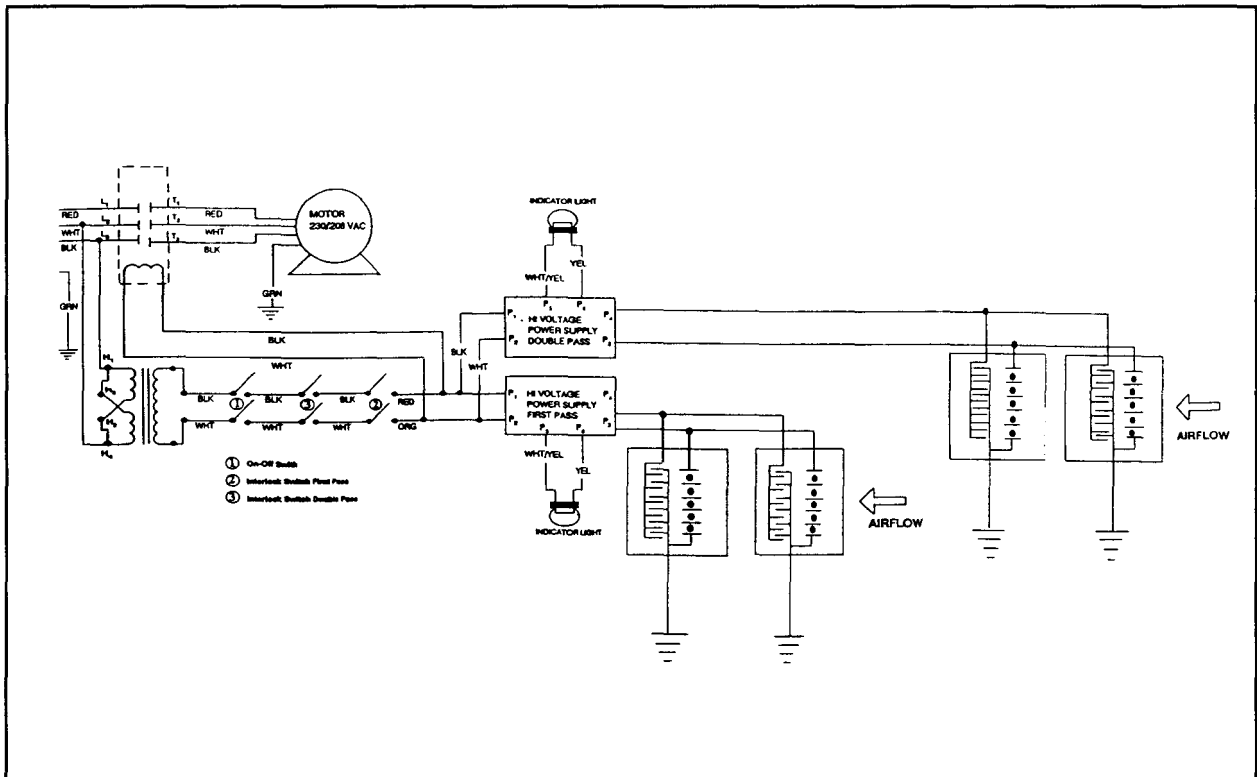


FIGURE 21 - Schematic for Three Phase, Double Pass Air Cleaner - 230 Vac

OPERATION AND CHECKOUT

IMPORTANT

Check for correct blower rotation on three phase models. See Figure 22. Correct by interchanging any two of the power supply connections.

CHECKOUT

Before operating the F66, check out the installation using the following procedure:

1. Observe that the air cleaner is positioned for good air circulation, where it will not interfere with personnel and material traffic. Keep out of fire lanes and away from overhead cranes.
2. Note that the access doors can be easily opened.
3. Check that the F66 is securely mounted overhead or in a stable position on the accessory stand.
4. Check that the electronic cell(s) are correctly positioned; the airflow arrows are pointing toward the blower and the handles are near the access door hinges.
5. Observe that the prefilter and postfilter screens are correctly positioned.
6. Check and adjust belt tension if necessary.
7. Make sure the junction box cover has been re-installed.
8. Clean up the inside of the cabinet, the outside of the cabinet, and the installation area.

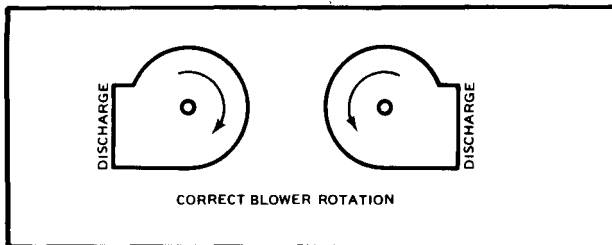


FIGURE 22 - Blower rotation

OPERATION

When the electronic air cleaner is energized, the blower produces an airflow velocity which conveys contaminated air into the air cleaner inlet. Particles that are too small to be caught by the prefilter screen are given an intense electrical charge in the ionizing section of the electronic cell. As the air carries these charged particles into the collecting section of the electronic cell, they are hurled against metal plates by the force of a powerful electrical field. These particles cling to the metal plates and the air passes through a postfilter screen, the blower compartment, and re-enters the building space as cleaned air.

Start up the air cleaner with the access doors properly closed. Put the rocker switch in the ON position. Check for the following:

1. The blower should be providing a strong discharge airflow. ON THREE PHASE MODELS, THE BLOWER SHOULD BE ROTATING THE DIRECTION SHOWN IN FIGURE 22. If it isn't, correct rotation by interchanging any two power supply leads.
2. The performance indicator light should be on when the blower is running.
3. Push test button to momentarily short out the collector section of the electronic cells. Arcing indicates that the cells are energized properly.
4. Opening the access doors should stop the blower and turn off the performance indicator light. Do not place a ladder against the air cleaner, when it is mounted overhead, in order to gain access to the air cleaner interior. NOTE: If the F66 does not appear to operate correctly, refer to TROUBLESHOOTING section.

ADJUSTMENTS

Adjust the bidirectional louvers of the air cleaner discharge so that the airflow discharge does not produce discomfort or a possible hazard to personnel and equipment.

The blower capacity of the F66 is factory-set. See specifications Page 3. This capacity can be adjusted. Before adjusting the blower capacity, make sure that the ON-OFF switch is in the OFF position. To adjust the blower capacity:

1. Turn the air cleaner off and open the access door to the blower and motor section of the air cleaner.
2. Loosen the two bolts locking the end of the motor rail in position. Remove the belt.
3. Loosen the allen setscrew on the face of the motor sheave.
4. Rotate the sheave into a position which gives the desired blower capacity.

NOTE: When the sheave is rotated all the way into the shaft, the blower capacity is at its maximum. When the sheave is rotated 5 turns out on the shaft, the blower capacity is at its minimum. DO NOT ROTATE THE ADJUSTABLE SHEAVE MORE THAN 5 TURNS OUT ON THE SHAFT. The sheave may already be adjusted one or more turns out on the shaft.

CAUTION

Adjusting the variable sheave changes the load on the motor. Do not exceed the rated amperage for the motor.

5. Make sure that the sheaves are in line. If not, loosen the motor and blower sheaves and align them properly. Tighten sheaves securely.

6. Replace the belt and re-tighten bolts in motor rail. The belt should be tightened enough to prevent slippage but not so tight that vibration occurs. The correct tension results in a 3/4 to 1 in. (19.1 to 25.4 mm) deflection when a 10 lb. (4.5 kg.) force is applied to the center of the belt span.

7. Close the access door and energize the air cleaner.

NOTE: For some blower adjustments, it may necessary to use a smaller belt, instead of the existing belt, to achieve proper tension. Generally, a 1 in. (25.4 mm) shorter belt will be required.

SERVICE

CLEANING THE ELECTRONIC AIR CLEANER

The F66 is used to remove a variety of contaminants from the air. In the process of cleaning the air, however, parts of the air cleaner will become dirty and the cleaning efficiency will be lowered.

In order to maintain a high standard of reliability and efficiency, it is necessary for the F66 to receive periodic maintenance. Periodic maintenance means cleaning the electronic cells and inspecting the electronic air cleaner, both visibly and with instruments. Service will be required if the air cleaner seems damaged or appears to be performing at substandard efficiency.

The manufacturer recommends regular cleaning and the use of an alkaline detergent solution. The exact scheduling is a matter of experience, since each air cleaning situation varies. Actual experience may dictate a greater or lesser period between cleanings.

If the alkaline detergent solution proves inadequate, because of excessive buildup of captured contaminants, the use of physical force (such as high pressure air, water, or steam) or an acid detergent solution may be required.

CAUTION

1. Be extremely careful when working with F66 cells and filters. The edges of the cells and filters, 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 either alkaline or acid detergent solution should be avoided.
3. Electronic air cleaners and their components are susceptible to damage. Take care when working with them to avoid equipment damage.

CLEANING THE PRE/POST FILTERS

Remove the pre/post filter and shake out or vacuum the accumulated contaminants. The pre/postfilter can also be soaked in the alkaline detergent solution, or use high pressure water, air or steam cleaning on pre/postfilter.

NOTE: If the pre/postfilter needs washing, wash it after the cell(s) have been washed. The lint residue from the pre/postfilter will contaminate the wash water and can deposit inside the cell(s). Dispose of the wash water.

THE ALKALINE DETERGENT SOLUTION CLEANING METHOD

NOTE: Be careful to avoid prolonged skin contact with the solution. DO NOT SPLASH SOLUTION IN THE EYES.

1. Provide a container large enough to hold the electronic cell to be cleaned.
2. Fill the container sufficiently with detergent and hot water to cover the electronic cell.
3. Soak the cells in the solution for about 15 minutes. The solution should be agitated in some way, such as sloshing the cells or stirring the solution.
4. Remove the cells from the alkaline cleaning solution and place them in another container of hot water (150°F to 170°F [66°C to 77°C]) for rinsing. The cells should be rinsed for 5 to 10 minutes.

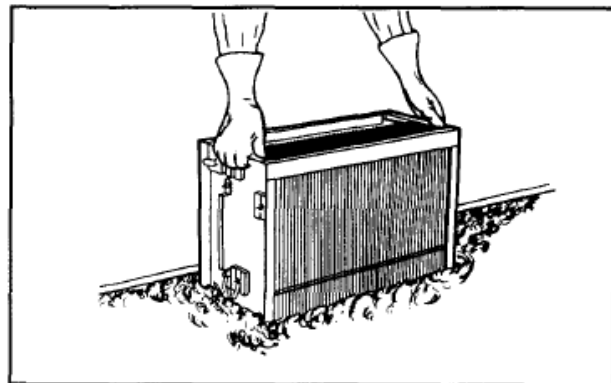


FIGURE 23 - When soaking the cell, agitate the water

5. Remove the cells from the rinse water. Allow the cells to drain and dry before energizing them.

STAINING

Occasionally, after the soaking process, the cell or pre/post filter may seem stained. If the stain is black or very dark, it is probably detergent residue and should be rinsed off at once. Detergent residue may affect the electronic air cleaner's efficiency.

If yellowing appears, it is probably staining. The acid detergent will remove the yellowing. However, it should be noted that the yellowing does not affect air cleaner efficiency.

THE ACID DETERGENT METHOD

The manufacturer does sell an acid detergent, however, acid cleaners should be used only after alkaline detergents have proven inadequate. Acid detergents have been tested and proven to be corrosive. They will decrease the life of the cells. If an acid detergent solution is used, be sure to use a weak mixture. DO NOT place pre/post filters in an acid detergent solution.

IMPORTANT

Acid detergents *must* be properly handled. Refer to the label on the acid detergent used. This means wearing protective clothing, rubber gloves and goggles, and reading all precautions on the label of the detergent used. If contact is made in the eyes, flush with large amounts of water and consult a physician.

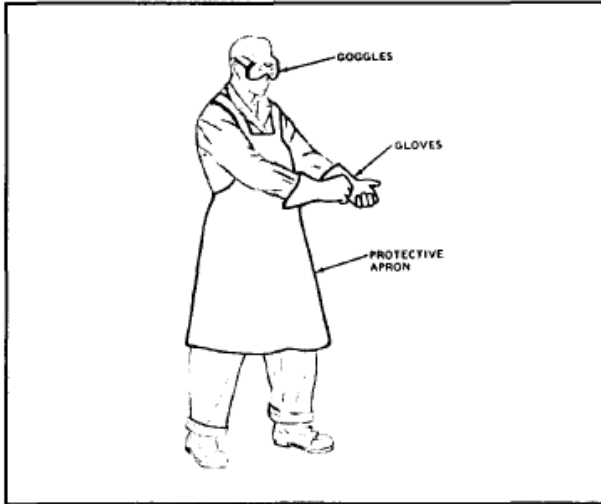


FIGURE 24 - Be sure to wear the proper equipment for working with detergent solutions

NOTE: Be sure to provide adequate ventilation when using acid detergents.

After the cleaning process is completed, the soak water must be neutralized according to the U.S. Environmental Protection Agency, and state and local pollution control guidelines and requirements. Soda ash is one neutralizer.

1. Use a polyethylene or type 316 stainless steel container large enough to hold the electronic cell. Other types of containers should be avoided since the acid detergent may react with the container material.

2. Following the instructions for temperature of the water and amount of acid detergent used, prepare the cleaning solution. The amount of detergent and the soaking time will be determined by the amount of contaminants captured by the cells and the difficulty encountered in removing the buildup. The usual mix for acid solution is 2 oz. of acid detergent to 1 gal. of water [59.2 mL to 3.8 L].

NOTE: It is recommended that acid cleaning of any electronic air cleaner cells containing metal oxide contaminants be performed with room temperature or cold water. NEVER add acid detergent to hot water.

3. Be sure to observe the cleaning operation when the cells are placed in the acid detergent solution. The amount of acid detergent should be reduced if less than 30 seconds pass before large amounts of bubbles are released. The cells should NOT remain in the acid detergent solution more than 30 seconds after vigorous reaction begins. It is a good idea to remove the cells and inspect the cleaning action of the acid detergent solution. If contaminant deposits remain, the cells can be returned to the solution.

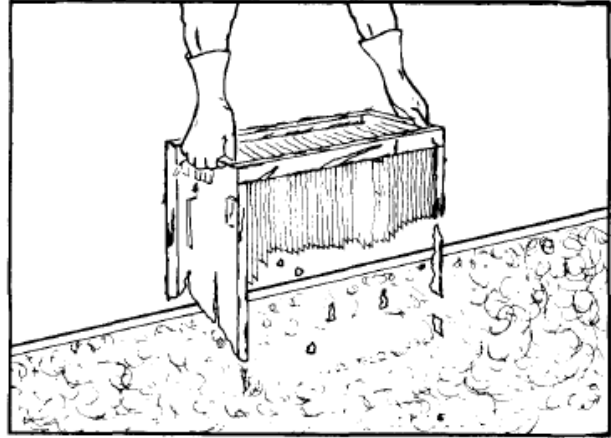


FIGURE 25 - Too much time in acid solution will harm the electronic cell

IMPORTANT

After the contaminants are removed by the acid detergent solution, any further time the cells remain in the solution serves only to decrease their life.

4. After removing the cells from the acid detergent solution, rinse them thoroughly for at least 5 minutes.

5. Allow the cells to drain and dry before energizing them.

PHYSICAL FORCE METHODS

The following physical force methods may be needed to clean some contaminants from the F66 cells. See Figure 26. DO NOT use physical force methods on the filter screens.

1. High Pressure Air or Water. Either of these methods should prove to be adequate. However, care should be taken to avoid damage to the electronic cells.

NOTE: Using any caustic detergent with high pressure is dangerous.

If a detergent is required with the high pressure water, an alkaline detergent should be used, if allowed by the high pressure equipment manufacturer. DO NOT use an acid detergent, except when allowed by the equipment manufacturer.

2. Steam. Extreme care must be exercised when steam cleaning to avoid warping or bending the collector plates of the electronic cells or any other damage to the cells. Remember that the cells will be hot after steam cleaning, and that care must be taken to avoid burns.

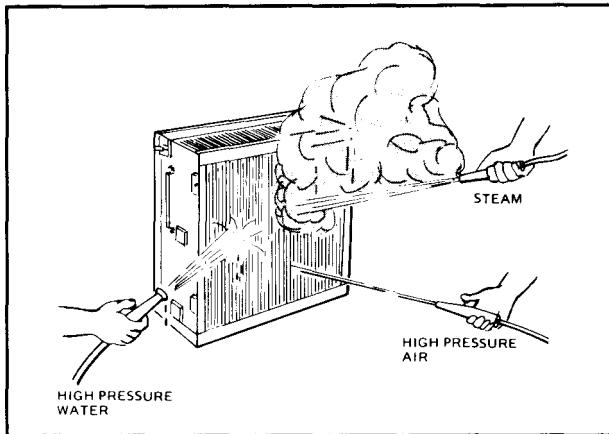


FIGURE 26 - It may be necessary to use physical force methods to remove collected contaminants

CONTAMINANTS AND CLEANING PROCEDURES

The following is a selective listing of contaminants captured by electronic air cleaners. This listing gives the appropriate cleaning procedure for various types of contaminants found on electronic air cleaner collector plates and prefilters.

CONTAMINANT	CLEANING PROCEDURE*
Animal Hair	Alkaline Solution
Cabosil	Alkaline Solution High Pressure Air
Carbon (carbon black, soot, lamp black, graphite, charcoal dust, etc.)	Alkaline Solution High Pressure Air High Pressure Water
Cooking Oils Veg. (soybean, peanut, etc.) Animal (lard, butter, etc.)	Alkaline Solution Steam
Cotton Fibers	Alkaline Solution
Dust (silicon dioxide and calcium carbonate and mineral type compounds)	Alkaline Solution
Flour Dust	Alkaline Solution
Linseed Oil	Alkaline Solution
Lubricants	Alkaline Solution High Pressure Water
Metal Oxides	Acid Solution
Metals	Acid Solution
Mineral Oil (petroleum base, diesters, and silicone)	Alkaline Solution High Pressure Water
Paper Products	Alkaline Solution
Paint Oil Base Water Base	Alkaline Solution Alkaline Solution
Pine Tar Resins	Alkaline Solution Steam
Polyethylene	Alkaline Solution
Polyphenyleneoxide	Alkaline Solution
Polypropylene	Alkaline Solution

(continued next column)

CONTAMINANT	CLEANING PROCEDURE*
Rubber Molding Accelerators	Alkaline Solution
Soaps	Alkaline Solution
Sodium Chloride	Alkaline Solution
Sugar (includes molasses)	Alkaline Solution Steam
Talc	High Pressure Air Alkaline Solution
Tobacco Tars and Smoke	Alkaline Solution
Varnishes	Alkaline Solution
Waxes (all types)	Alkaline Solution Steam
Welding Fumes	Acid Solution
Wood Products	Alkaline Solution

*Cleaning procedures are listed in order of preference.

REPLACING THE CELLS

Before replacing the electronic cells, be sure to visually check the electronic cell for bent or damaged collector plates or broken ionizing wires.

Bent or warped collector plates may be bent back into shape.

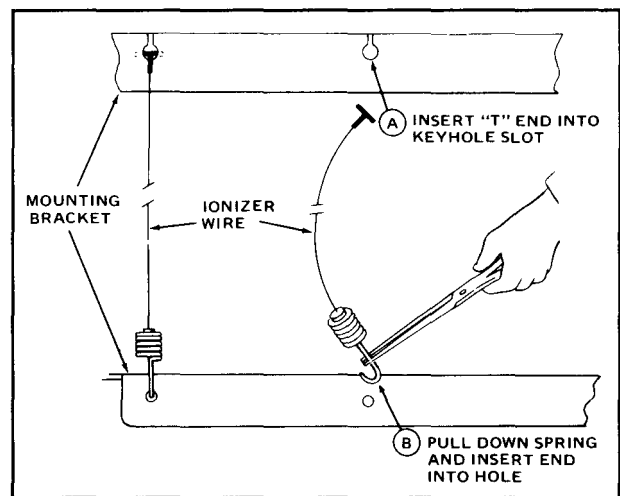


FIGURE 27 - Replacing ionizing wires

Broken or damaged ionizing wires must be replaced for top efficiency. Remove all parts of the broken or damaged wire. Replacement wires come cut to length and ready for installation. Remember, when replacing the ionizing wires, to:

1. Use care to avoid damage to the spring connector or other parts of the cell during installation.
2. Hook "T" end of the ionizing wire in keyhole slot at one end of the cell.
3. Pull down spring with a needlenose pliers and insert hook into hole.

Before replacing the cell, it might be a good idea to check it for a short circuit. This is done by using an ohmmeter to check the resistance between the frame of the cell and both the ionizer and collector contacts. In each case, the resistance should be infinite.

Note that the electronic air cleaner has a cell key, preventing the electronic cell from being replaced the wrong way. If the cell seems to be stuck when it is replaced, or resists, check to be sure that the cell is being replaced the right way. If excessive force is used, the cell or unit could be damaged.

If cells are placed into the air cleaner unit while wet, the indicator light will not come on until the cells are dry.

SUMP PAN CLEANING

If a sump pan is used with the F66, make sure that the pan is periodically inspected and cleaned. Inspect both the drain and the trap in the sump to make sure that it is not plugged. If the drain in the sump plugs, the cabinet will start to fill with liquid and may short out the air cleaner.

TROUBLESHOOTING

CAUTION

1. During troubleshooting, dangerous line voltage circuits are exposed. Use extreme care to avoid electrical shock or equipment damage.
2. Although not normally lethal, the high voltage output of the electronic air cleaner power supply can produce a painful shock. Use caution.
3. To prevent injuries from the motor and blower, always turn the electronic air cleaner off using the control switch before opening the access covers.
4. To insure against unintentional blower operation during troubleshooting, remove the blower drive belt. Beware of motor sheave rotation while conducting troubleshooting procedures.
5. DO NOT place any heavy object, such as a ladder, against the F66.

Troubleshooting can be done with only a few tools:

- Test Meter -- Simpson 248 Hi Voltage meter or equivalent.
- Neon test lamp for line voltage.
- Screwdrivers -- long shank with plastic or rubber handles.
- Needlenose or longnose pliers -- for replacing ionizing wires.

Before troubleshooting the F66, study the flow chart in Figure 28. The boxes in the chart describe actions to take when troubleshooting the F66. In between the boxes are possible responses of the F66 to these specific actions. Note that the flow chart branches into three problem areas:

1. Fan motor
2. Ionizer circuitry
3. Collector output voltage

To complete the troubleshooting procedure, read the following information which describes how to perform the actions called for in the boxes of the flow chart.

TROUBLESHOOTING PROCEDURE

The following procedure has been designed to speed troubleshooting and insure the quick detection and proper repair of any malfunction in the electronic air cleaner.

NOTE: If the F66 is a double-pass configuration, all troubleshooting procedures must be repeated on each of the two stages.

Most of the troubleshooting steps can be performed by observing the performance indicator light and by pushing the test button.

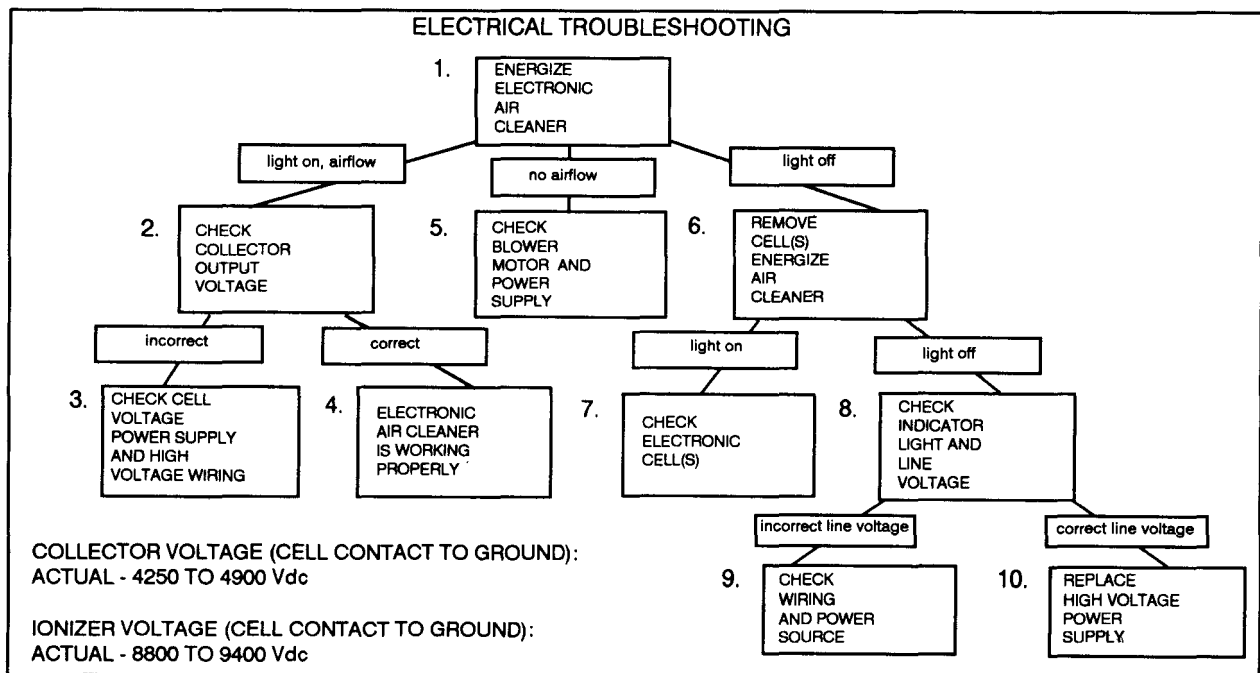


FIGURE 28 - F66 TROUBLESHOOTING FLOW CHART

DIAGNOSTIC CHECKS

1. ENERGIZE THE ELECTRONIC AIR CLEANER

- Be sure the electronic cells are properly installed, with the airflow arrow pointing toward the fan blower. The cells should be clean and dry. (Though wet cells may be placed in the air cleaner, it will not operate until the cells are dry.)
- Be sure the filters are installed correctly.
- Close the access door properly, and turn the air cleaner control switch ON.
- Go to Step 2, if there is airflow and the light is ON.
- Go to Step 5, if there is NO airflow.
- Go to Step 6, if the light is OFF.

2. CHECK COLLECTOR OUTPUT VOLTAGE AND CELLS

Two Options

Method 1

- With air cleaner turned on, push test button to momentarily short out the collector section of the electronic cells.
- Arcing (snapping noise) indicates that the electronic air cleaner is working properly.
- If no arcing noise is heard go to Step 3.

Method 2

- Open the access door to the electronic cells.
- Actuate the interlock safety switch with the power switch on. The belt should be removed from the motor to stop airflow.
- Using a voltmeter, measure the voltage from the collector contact to ground. See Figure 30.
- Actual collector output voltage should be about 4600 Vdc. A voltage measurement taken with a meter could range from 3950 Vdc to 4800 Vdc.
- Using a voltmeter, measure the voltage from the ionizer contact to ground. See Figure 30.
- Actual ionizer output voltage should be about 9200 Vdc. A voltage measurement taken with a meter could range from 8400 Vdc to 9600 Vdc.

3. CHECK HIGH VOLTAGE OUTPUT AND POWER SUPPLY

- Turn the electronic air cleaner OFF, and release the interlock safety switch. Bleed the electronic cells by placing a screwdriver across the ionizer contact to ground and the collector contact to ground. See Figure 30.
- Remove the electronic cells and actuate the interlock safety switch with the power switch on. Removing the belt from the motor will stop airflow.
- Using a voltmeter, measure the voltage from the collector contact to ground. See Figure 29.
- Actual collector output voltage should be about 4700 Vdc. A voltage measurement taken with a meter could range from 4250 Vdc to 4900 Vdc.
- Using a voltmeter, measure the voltage from the ionizer contact to ground. See Figure 30.
- Actual ionizer output voltage should be about 9400 Vdc. A voltage measurement taken with a meter could range from 8600 Vdc to 9600 Vdc.
- If the voltage measurements are correct, check the electronic cells as described in Step 7.

- If the voltage measurements are incorrect, check the high voltage wiring to the power supply as detailed in Step 9.

4. ELECTRONIC AIR CLEANER IS WORKING PROPERLY

- Release the actuated interlock safety switch.
- Read the SERVICE section to find out how to clean the cells, if necessary.

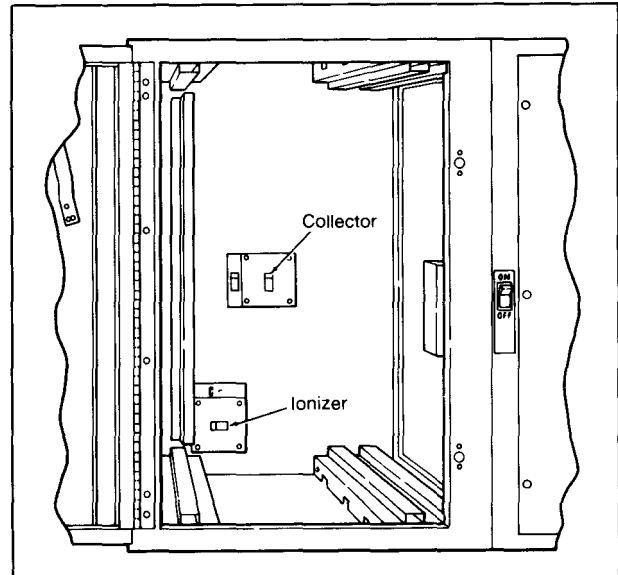


FIGURE 29 - Measuring points for input voltages

5. CHECK BLOWER, MOTOR AND POWER SUPPLY

CAUTION

- Be sure that the electronic air cleaner is OFF before connecting or disconnecting any component. Dangerous line voltage circuits are exposed.
- Use care to avoid electrical shock or equipment damage.

- Turn the electronic air cleaner OFF and open the access cover to the fan and motor.
- Examine the motor for physical damage. Make sure the motor can rotate freely. Replace or repair worn out or damaged parts as necessary.
- Actuate the interlock safety switch and measure the motor voltages.
- If the voltage measured complies with the model requirements, check the motor capacitor, motor wiring, and fan motor.

6. REMOVE CELLS, ENERGIZE ELECTRONIC AIR CLEANER

- Turn OFF the electronic air cleaner and open the access door to the electronic cells.
- Bleed the electronic cells as in Step 3.a. Remove the electronic cells.
- Close the access door and turn the electronic air cleaner ON.

7. CHECK ELECTRONIC CELLS

- Turn OFF the electronic air cleaner.
- Visually inspect the electronic cells for bent collector plates. Bent collector plates may be straightened with a needlenose pliers. If the cell is damaged too badly, replace it.
- Remove dirt accumulated on the insulators and on the ionizer and collector contact tabs. See Figure 30.
- Make sure the cell contact tabs are making good contact with the air cleaner contacts.
- Replace any broken or damaged ionizing wires (see SERVICE section).
- Use an ohmmeter to check resistance between the outside frame of the electronic cell and both the ionizer and collector contacts. In both cases, the resistance should be infinite, because it is an open circuit.

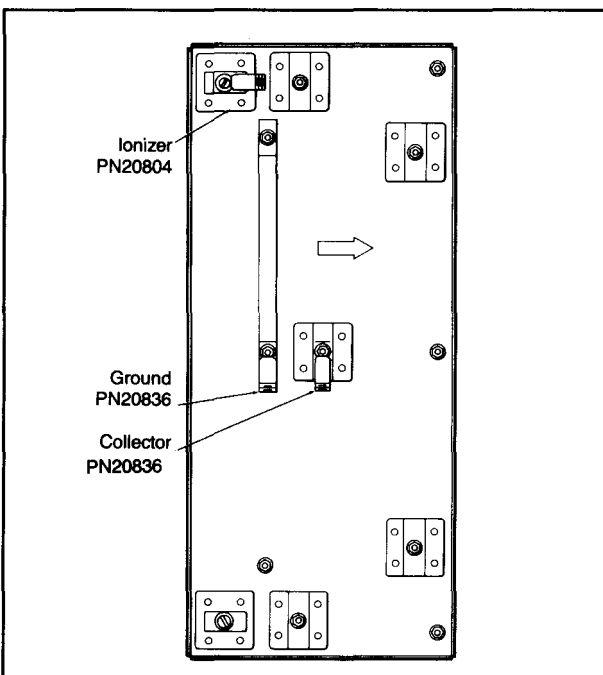


FIGURE 30 - Cell insulators and contacts

8. CHECK INDICATOR LIGHT AND LINE VOLTAGE

- Turn the electronic air cleaner OFF and remove blower access cover to gain access to the indicator light.
- Actuate the interlock safety switch and turn the electronic air cleaner ON.
- Use a voltmeter to measure the voltage across the indicator light terminals. If the voltage is about 120 Vac, replace the indicator light.
- If the indicator light voltage is incorrect, use a voltmeter to check the power supply input voltage at terminals P₁ and P₂ on the power supply.
- If the power supply input voltage is INCORRECT, go to Step 9.
- If the power supply input voltage is CORRECT, the power supply is bad, go to Step 10.

9. CHECK WIRING AND POWER SOURCE

SINGLE PHASE MODELS - SEE FIGURE 16 or 19

- Place voltmeter probes across terminals L₁ and L₂. If no voltage, then check power source wiring, fuses, and circuit breakers.
- If there is voltage at terminals L₁ and L₂, then check the wiring from L₁ and L₂ to the ON - OFF and interlock switches.

THREE PHASE MODELS - SEE FIGURE 17, 18, 20 or 21

- Place voltmeter probes across terminals L₁, L₂ and L₃. If no voltage, check power source wiring, fuses and circuit breakers.
- If there is voltage at terminals L₁, L₂ and L₃, check the voltage at X₁ and X₂ (step down transformer) and the wiring to the ON - OFF and interlock switches.

10. REPLACEMENT OF HIGH VOLTAGE POWER SUPPLY

- Turn OFF the electronic air cleaner, disconnect power at the fuse or circuit breaker.
- Remove blower access cover.
- Unplug the 6 wires from the power supply.
- Remove the 4 screws holding the power supply.
- Install the new power supply and 4 screws.
- Reconnect the 6 wires from the air cleaner to the power supply.
 - Black to P₁
 - White to P₂
 - Yellow to P₅
 - Yellow to P₆
 - Pink with C tag to P₄
 - Pink with I tag to P₃
- Replace the blower cover.
- Turn electronic air cleaner ON. Check that the indicator light is ON and the test button is working.

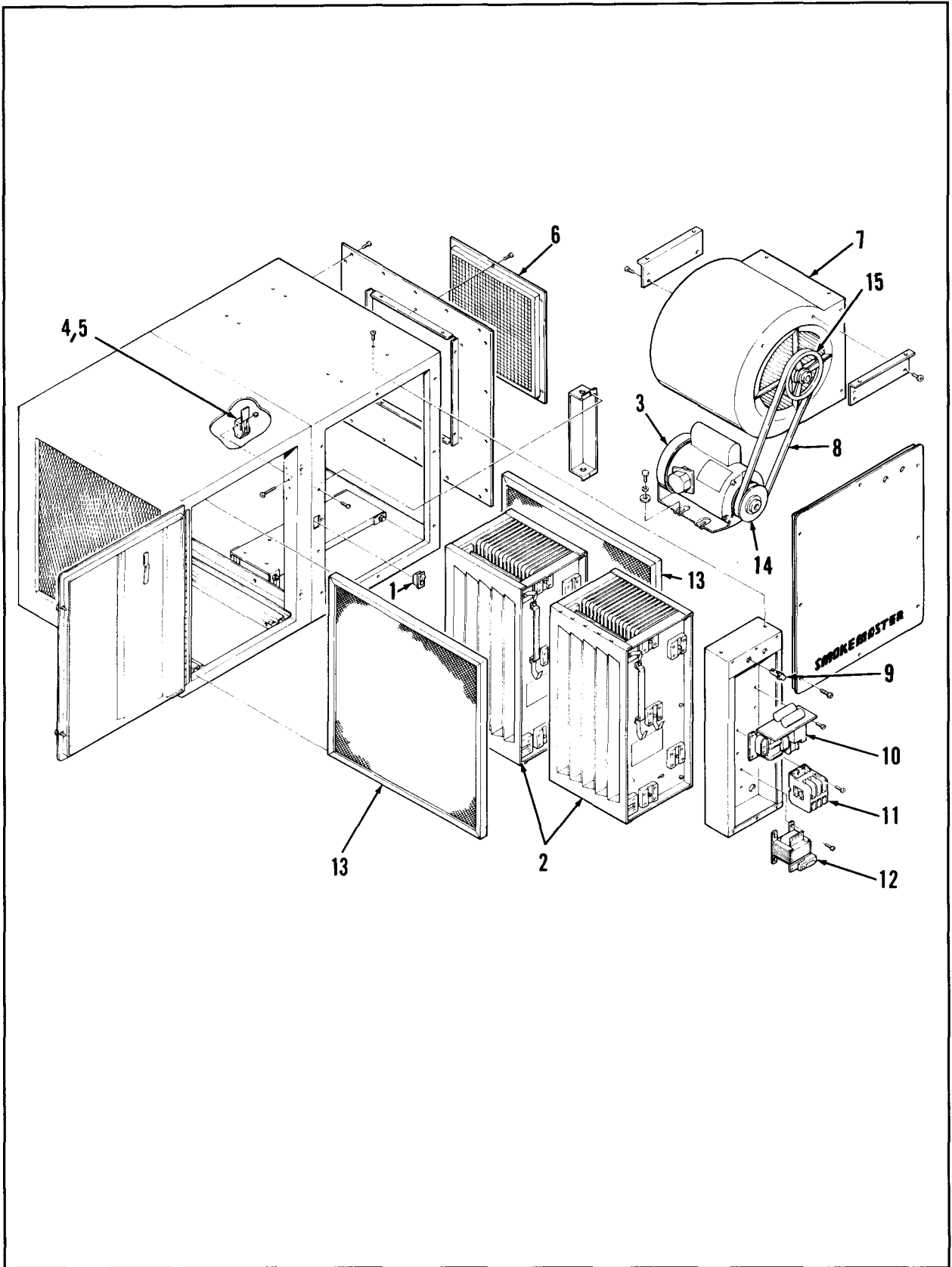


FIGURE 31 - Exploded view of F66 electronic air cleaner

PARTS LIST

NO.	DESCRIPTION	PART NO.	
		1 PHASE	3 PHASE
1	On/Off Switch	10140	10140
2	Electronic Cells	38003	38003
3	Motor	40013	40009
4	Interlock Switch	10079	10079
5	Interlock Switch w/Blade	10176	10176
6	Exhaust Grille	30486	30486
7	Blower	37012	37012
8	Belt	30011	30011
9	Indicator Light	10097	10097
10	Power Supply(120 Volt)	07082	07082
11	Power Supply (208 - 240 Volt)	07085	
	Motor Contactor		10078
12	Step Down Transformer		10075
13	Pre/Post Filter (25.38" x 24.12" x .88")	41052	41052
14	Motor Sheave	30166	30524
15	Blower Sheave	30167	30167
Not Shown	Source Capture Plenum w/Three 8" Diameter Flanged Takeoffs (See Fig. 30)	07039	07039
Not Shown	Hose, 8" diameter x 18'	30548	30548
Not Shown	Sump Adapter Kit (one needed for each EAC stage)	07056	07056
Not Shown	Caplugs (8" diameter) to block unused flanges on source capture plenum	30032	30032
Not Shown	Impinger Assembly	07057	07057
Not Shown	Alkaline Detergent	45008	45008
Not Shown	Acid Detergent	45013	45013
Not Shown	Polyethylene Industrial Wash Container with Lid	30183	30183
Not Shown	Ionizing Wire	38005	38005
Not Shown	Hose, 8" diameter x 10'	30021	30021

For further information:
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 1-800-480-3630
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