

120 INCH POLAR AXLE ELECTROSTATIC AIR FILTER

INSTALLATION AND OPERATION MANUAL



**ELECTRO-
AIR**

ELECTRONIC AIR CLEANERS

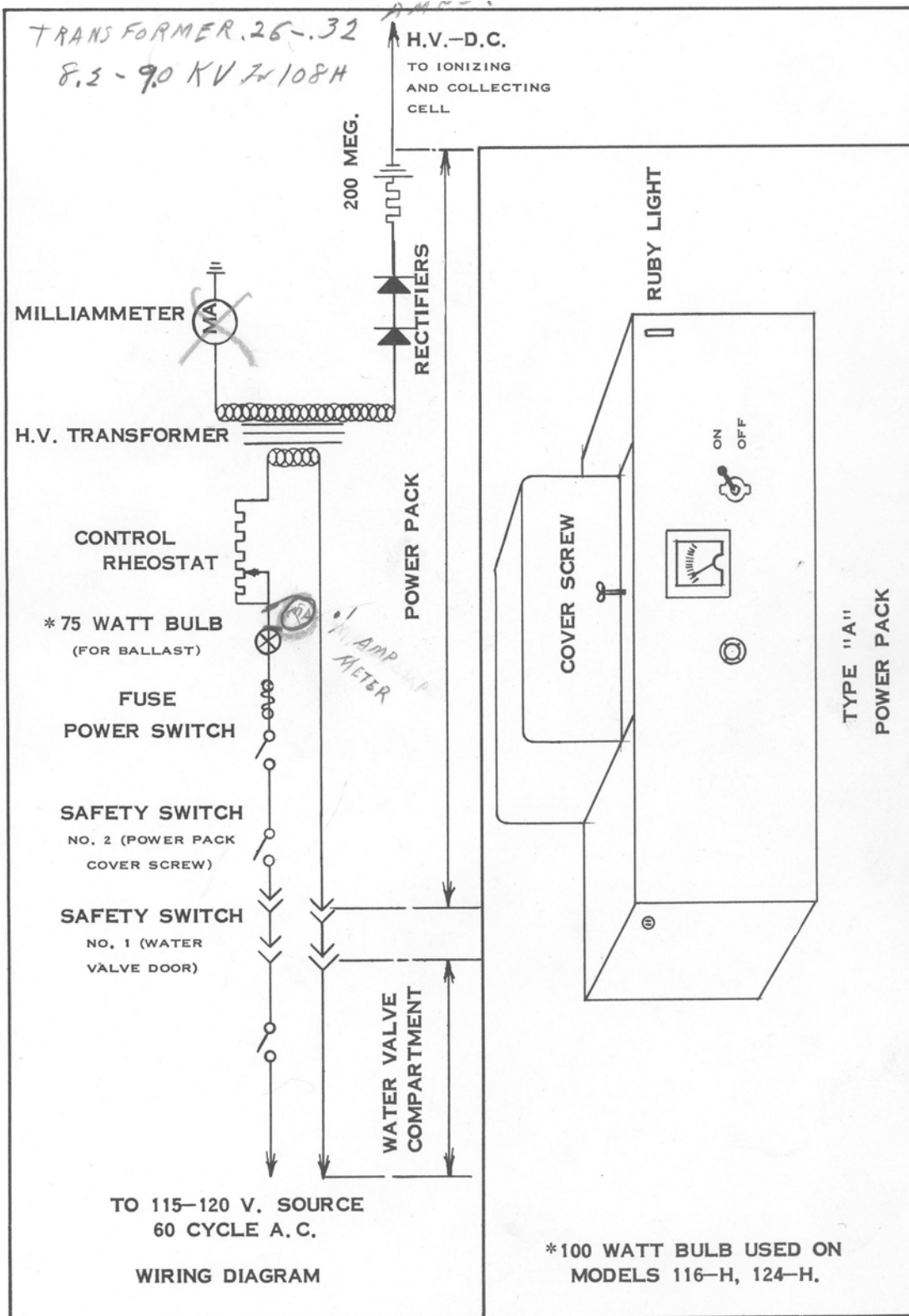
ELECTRO-AIR "COMPACT" UNITS

MODELS

108-H, 108-V, 112-H, 112-V, 116-H, 124-H

ELECTRO-AIR CLEANER COMPANY
1285 REEDSDALE STREET • PITTSBURGH 33, PA.

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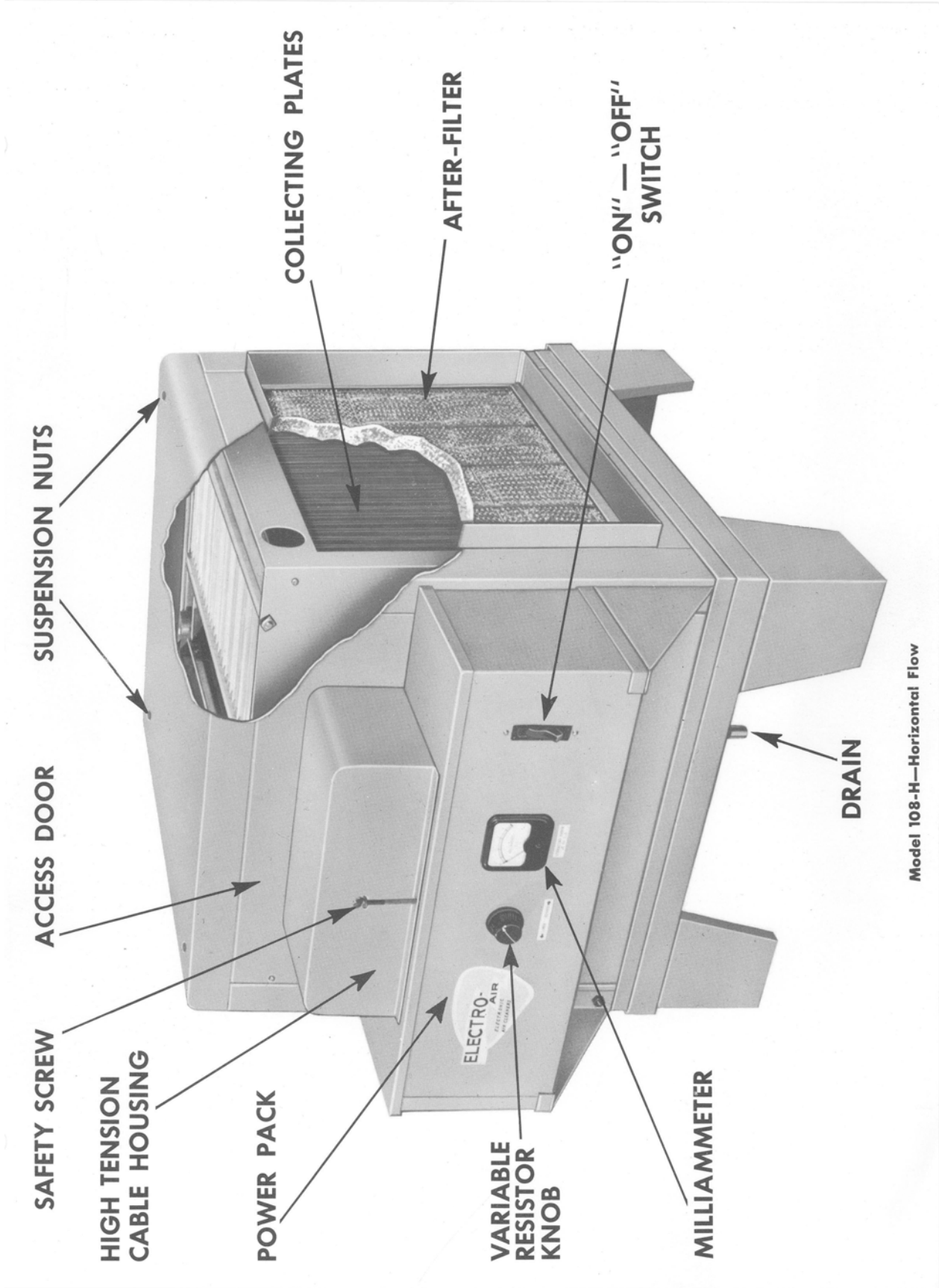
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I. PRINCIPLE OF OPERATION

All air-borne particles, even as small as .001 of a micron take on positive electrical charges when they pass the .007" tungsten wires stretched across the entering side of the collecting cell. The particles then pass to the closely spaced aluminum collecting plates where they are deposited. The ionizing wires carry 7,500 volts DC current and the plates alternately also have 7,500 volts charge with ground plates between.

II. GENERAL DESCRIPTION

1. Cabinet - Horizontal Flow Units.

The Electro-air horizontal flow type "Compact" unit cabinet is designed so that it may be suspended from ceiling rafters or equipped with legs (purchased as an extra) for floor or table mounting. Holes with 3/8" standard thread nuts are welded inside the cabinet so that bolts may be attached for suspension. The holes are spaced 16" apart, the standard spacing of rafters. If legs are used on a horizontal flow Electro-air, the cabinet fits easily into the cradle to which the legs are fastened.

An Electro-air horizontal flow cabinet is shipped with air flow from the left and out the right, facing the control panel. The air outlet side may be changed to the left as follows:

- a. Remove the front access door which has small slots in it.
- b. Remove the collecting cell (or cells).
- c. Remove the back door. It fastens from the inside of the cabinet.
- d. Turn the cabinet around 180 degrees.
- e. Replace the back door, cell and front access door in exactly the reverse position to which they were shipped.

2. Cabinet - Vertical (down) Flow Units.

The vertical flow "Compact" unit is shipped with legs assembled and no nuts for suspension since this type of unit is almost always mounted on the floor or on a low table.

An Electro-air vertical flow cabinet is shipped with air flow down and out the right side of the cabinet, facing the control panel. The air outlet may be changed from right to left by following exactly the same procedure as outlined for horizontal flow units.

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3. Water Wash System.

A water wash system is built in to an Electro-air cabinet and cleans the cell (or cells) by solid cones of hot water spray from nozzles mounted on manifolds. The horizontal flow type of unit has a manifold on the top inside of the cabinet and also in front of the face of the cell (or cells). Vertical flow unit manifolds are in the top of the cabinet only and nozzles spray down on the face of the cell (or cells).

4. After Filter.

A dry-type expanded aluminum filter is built into the leaving or "clean air" side of the cabinet. This mechanical filter gives a slight back pressure which spreads the air evenly as it passes through the collecting cell. It acts as an emergency filter in case of a power failure and also keeps water from entering the duct when the Electro-air is being washed.

5. Power Pack.

The power supply consists of a 7,500 volt transformer, two selenium rectifiers, a condenser, a resistor, and panel instruments. The panel instruments are a ruby light, a switch, a fuse, and rheostat that will increase or decrease voltage, and a milliammeter which registers the power being used by the cell. The power supply provides the collecting cell with single circuit DC current which means that 7,500 volts are carried by ionizing wires and on alternate collecting plates.

6. Ionizing-Collecting Cell.

The air entering side of the ionizing-collecting cell is designed to admit air without turbulence between streamlined ground electrodes, and .007" ionizing wires which set up a solid "ionizing screen". The aluminum collecting plates are die pressed to add rigidity and have no sharp projections which might cause sparking.

7. Adaptor.

Collars projecting from the inlet and outlet of the cabinet are provided for installation of an Electro-air unit in the return air duct of a forced air ventilating system. An adaptor (furnished as an

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extra) fits in to the projecting collar of the air entering side of the cabinet to form a gradual transition to a 9" x 18" opening which is a common size of return air duct. Since there is no standard duct sizes, the installer may often have to furnish his own transition.

III. PACKAGING

1. Cabinet & Ionizing-Collecting Cell.

The cabinet with built-in water wash system, after-filter and ionizing-collecting cell bolted in place to its runners, are shipped in one carton.

2. Power Pack.

The power pack, high tension lead, high tension lead housing, through bushing and mounting brackets are shipped separately in another carton.

3. Legs with Cradle.

All vertical flow units are shipped with legs. If legs and a cradle are ordered for a horizontal flow unit, they are shipped together in one carton.

IV. LOCATION, POWER SUPPLY, WATER REQUIREMENT & DRAIN

1. Location.

An Electro-air is always installed in the return air duct and located where all return air is gathered in preparation for recirculation.

2. Power.

The only electrical requirement for an Electro-air is a 110 to 120 volt, 50 to 60 cycle, single phase lighting circuit.

3. Water.

Under normal circumstances, Electro-air "Compact" units require the following amounts of water at 125° F. for three minutes each two to four weeks.

Models	108-H & 108-V	- 4	Gallons per minute		
"	112-H & 112-V	- 6	"	"	"
Model	116-H	-8	"	"	"
"	124-H	-8	"	"	"

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4. Drain.

A $1\frac{1}{2}$ " drain pipe or hose should be provided to remove the contaminated water to a sewer during washing.

V. INSTALLATION

1. Cabinet & Duct-Work.

After the carton has been taken off the cabinet and cell, the front door (it has two small slots in it) should be removed. The cell (or cells) can then be slid out of the cabinet after two "hold down" screws have been removed. The dry filter should also be removed by lifting it out of the bottom channel and swinging it inward. This completes the stripping of the inside of the cabinet in preparation for placing the cabinet in the desired position and joining it in the return air duct. If the installation requires that the "leaving air" side of the cabinet be on the right, instructions may be found on Page 1, Section II, Paragraphs 1 & 2. It is IMPORTANT to pitch the bottom edges of the ductwork toward the Electro-Air. This permits any water mist accumulated in the fore and aft ducts to flow back into the Electro-air drain pan. The bottom collar sills in the Electro-air cabinet are pitched accordingly. After the Electro-air has been joined in the duct, all joints MUST be carefully caulked or taped so that a tight air seal is assured. This is particularly important on the "leaving" or "clean air" side of the filter. After the cabinet is in place in the duct, the dry filter should be put back in to place on the outlet of the cabinet, the cell slid back in to place on the cell runners and the front access door replaced.

2. Water Wash & Drain.

The water wash system should be connected to a $1\frac{1}{2}$ " hot water line for models 108-H, 108-V, 112-H and 112-V, and to a $3\frac{3}{4}$ " hot water line for models 116-H and 124-H. Minimum static pressure of 25 psi is required. The line is joined to the safety valve provided with the Electro-air cabinet. The $1\frac{1}{2}$ " drain provided in the center bottom of the cabinet may be connected to the sewer and provided with a safety trap, gate valve, or some other means of preventing any odor from backing up into the Electro-air. A thin plastic hose may also be used and it can be rolled up and tucked under the cabinet between washings. It is important that the drain be closed when the unit is operating because the Electro-air is under negative air pressure and unclean air may be admitted through the drain if it is not sealed.

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3. Electrical.

After the support brackets for the power pack are bolted in place on the front of the cabinet and the access door is in place, the high tension "through bushing" is screwed through the door in to the collecting cell. The top of the power pack is then removed and the box set across the door of the cabinet on the brackets. The high tension lead should be connected to its terminal on the end of the condenser and drawn through the hole in the top of the power pack box. The top of the box is then replaced and the high tension lead is connected with the "through bushing". The high tension lead guard is put in place by sticking its tabs through the slots in the cabinet access door, dropping the guard down on top of the power pack box and tightening the safety screw which completes the circuit. The 110 volt primary power supply is merely "plugged in" like any other electrical appliance. Further details regarding the power pack are shown by the wiring diagram included in the appendix of this manual.

VI. FINAL CHECK

After the electrical circuits are complete, throw the handle of the switch to the "up" position. If the milliammeter hand is not within the range shown below the instrument, turn the rheostat knob until the hand comes within the required range. When the milliammeter hand reads with the correct range, the Electro-air is operating at the efficiency for which it is designed.

VII. OPERATION

1. Milliammeter Reading.

The true operating condition of an Electro-air is shown by the milliammeter reading. This should be inspected periodically and adjusted by turning the knob of the rheostat to keep the milliammeter hand within the operating range shown on the power pack panel.

2. Washing.

An Electro-air should be washed for three

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minutes each two to four weeks to insure efficient operation. To accomplish this, turn off the blower and loosen the safety screw on the water wash valve until the valve handle is accessible. Throw the safety switch to the "OFF" position and turn on the water for three minutes. Turn the water off, tighten the safety screw on the valve and turn the blower on for thirty minutes to dry the collecting cell. The Electro-air is then ready to be turned on. A popping noise will be heard when the unit is turned on again; however, this will do no damage and will stop after the cell is completely dry.

4. Periodic Inspection.

About twice a year, the ionizing-collecting cell should be inspected to be sure there is no accumulated dirt that has not been washed off by the water wash system. Any broken ionizing wires should be replaced. The after filter should also be inspected to be sure it is in good condition.

VIII. MAINTENANCE

1. If Milliammeter Reading is Low.

If the milliammeter hand is low and cannot be brought in to range by turning the rheostat knob, the selenium rectifiers may have to be replaced, there may be one or more broken ionizing wires, or the collecting cell may be excessively dirty.

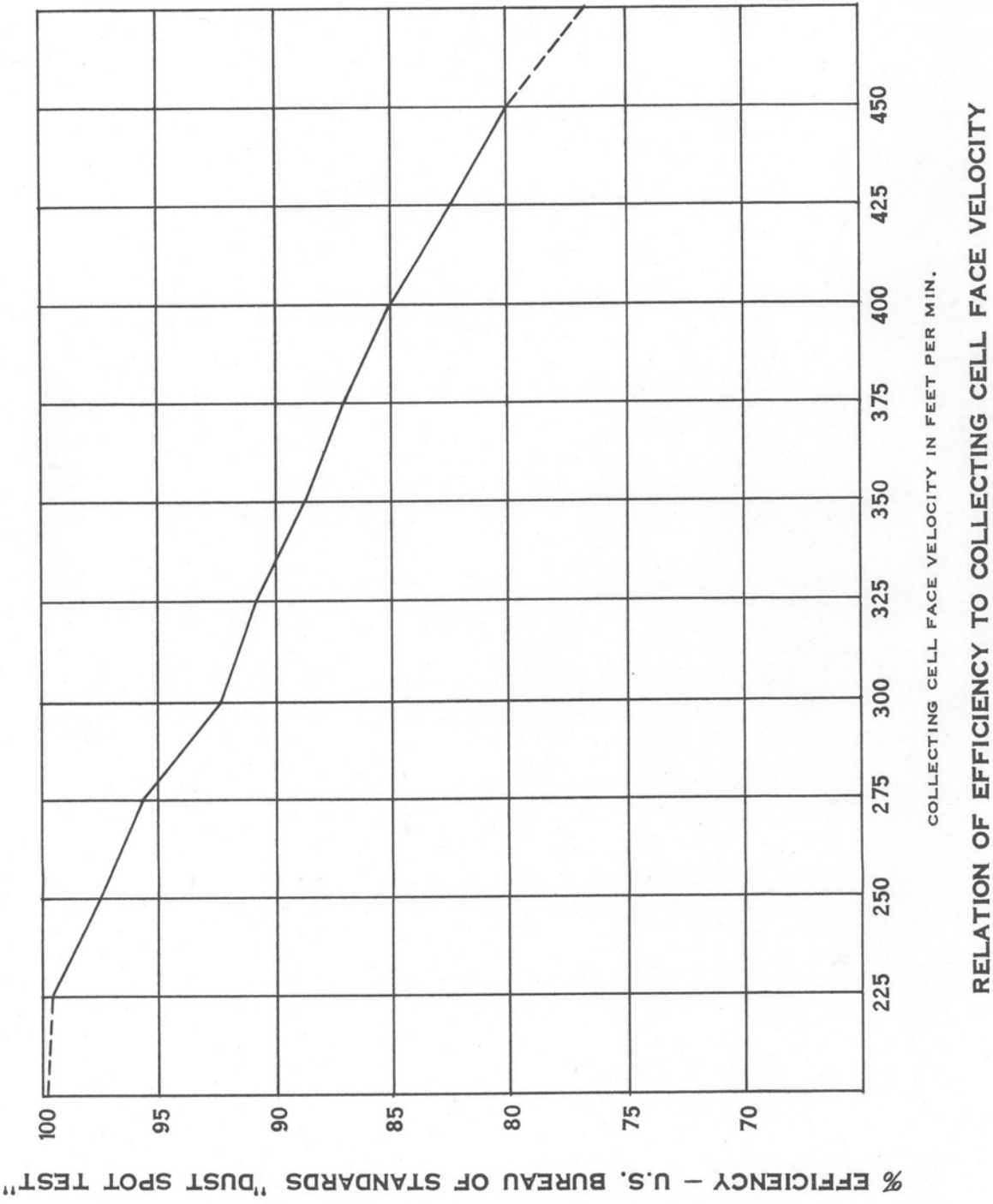
2. If Milliammeter Reading is High.

If the milliammeter hand is high and cannot be brought in to range by turning the rheostat knob, there may be a voltage leak across the insulators. If washing does not help the condition, remove the cell, clean the insulators, and look for foreign material on the collecting plates.

3. If Milliammeter Reading is Zero.

Check fuse, then check for open circuits, particularly in the two micro-switches. If no open circuit is located, then check the selenium rectifiers, condenser and transformer as to output.

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Keep This Card—Do Not Throw Away

BLOWER INSTALLATION AND MAINTENANCE INSTRUCTIONS

It is very important to read the following instructions in order to obtain the best possible results.

1. OILING

If oil does not show in tube, remove oil cap and fill tube by working wire in the tube to relieve air pockets. Bearings and tube can be filled in approximately 30 seconds and should last several heating seasons. Check and fill oil cups on motor every three months. S.A.E. No. 30 motor oil is recommended. Check and oil felt collars on blower shaft. Blowers are equipped with porous bronze bushings which allow the correct amount of oil to pass through to the friction surfaces.

2. PARTS BAG

Remove parts bags, belt, motor pulley and all wires from the unit.

3. BLOWER WHEEL ALIGNMENT

(a) Check blower wheel to make sure it is equally spaced between housing inlets. If blower wheel has moved in shipment, loosen set screws in thrust collars and blower wheel. Reset wheel and *tighten set screw on flat spot of shaft*. Reset thrust collars with felt washers snug against the bearings. *Tighten set screws on flat spots of shaft*.

(b) Insert rubber base bumpers in blower base holes (4 required).

4. MOTOR AND DRIVE MOUNTING INSTRUCTIONS

(a) Bolt adjusting bracket and thumb screw to motor base as shown in Figure 1, with rubber bumper placed on end of adjusting screw.

(b) Bolt *but do not tighten* hinge clips to motor as shown in Figure 1.

(c) Place motor on blower by tilting motor so that hinge clips slide under mounting rod.

(d) Slide motor so that motor base is resting on top of mounting rod.

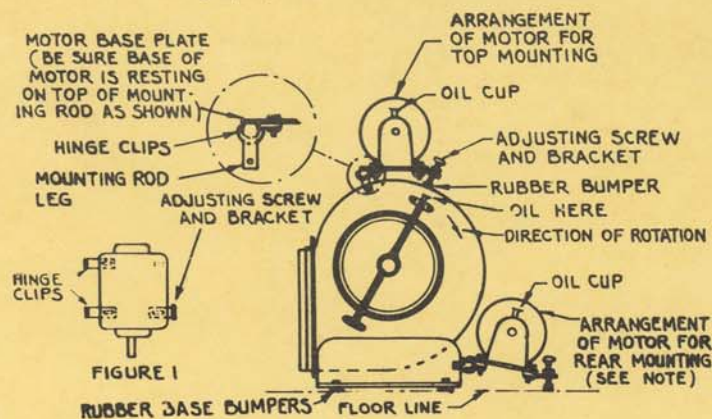
(e) Place adjustable motor pulley on motor shaft *with set screw over flat spot or key-way of shaft*. Be sure to allow clearance between pulley and end bell of motor. Then tighten set screw.

(f) Place belt around pulleys being sure pulleys are in line by sliding motor on mounting rod.

(g) Tighten hinge clip bolts.

(h) Adjust belt tension with adjusting screw so that belt will give about $\frac{1}{2}$ " under pressure of finger. *Avoid excessive tightness*.

NOTE:
REAR MOTOR MOUNT CAN NOT BE USED WHEN
BLOWER IS INSTALLED IN A N° 90, 101, 1210,
120, 131, 140 AND 161 AIR-PAK.



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*Electrostatic Filter for
P.A. Housing*

NOTE: Figure 1 is for top mounting only. For rear mounting, bolt hinge clips and adjusting screw and bracket opposite to the way shown.

5. FINAL STARTING CHECKUP — BE SURE

- (a) All bolts and set screws are tight.
- (b) Pulleys are lined up.
- (c) Blower wheel is centered in housings and turns freely.
- (d) Motor and Bearings are fully oiled.
- (e) Felt washers next to bearings are oiled.

6. TO CHANGE BLOWER SPEED

All blowers are furnished with adjustable motor pulleys. Caution should be taken when installing drive so that the adjustable pulley is set at a speed that will drive the blower at the proper R.P.M. This speed will vary as each installation requires individual attention. Speed variations of approximately 30% may be obtained by changing the pitch diameter of the adjustable motor pulley. To increase speed, close the two halves; to decrease speed, open the two halves. *Be sure to tighten set screw on flat spot of pulley halves and flat spot or keyway of motor shaft and that the pulley hub does not touch the end bell of motor.*

7. SETTING BLOWER SPEED

(As recommended by
The National Warm Air Heating & Air
Conditioning Assoc.)

Blower speed should be set to obtain a rise of 100 degrees F. through the furnace from the cold air return to the warm air plenum. First open all registers and duct dampers. Then place testing thermometers in return air and warm air plenums. After the temperature of the warm air side has leveled off with fan and burner running, compare readings of the two thermometers. If the difference is less than 100 degrees F., slow down blower speed. If it is more, increase blower speed. Keep adjusting until a rise of approximately 100 degrees F. is maintained.

APPROXIMATE ALTERNATE METHOD

(Without Thermometer)

After burner and blower have been operating long enough so that the return air temperature is approximately 65 degrees F., turn the bonnet control temperature up so that it shuts off the blower. Then turn the bonnet control temperature gauge back slowly until blower starts. If reading is less than 165 degrees F., slow down blower speed. If reading is more than 165 degrees F., increase blower speed.

8. BLOWER NOISE

- (a) Check oil in bearings and motor.
- (b) Check belt. Blower will have a thumping noise and will require more horsepower if belt is too tight. Belts with uneven spots will cause noise. Clean belt once each season. If belt squeaks, clean and slightly roughen its sides unless a new belt is available for replacement.
- (c) Pulleys will cause noise in the blower if not in perfect alignment.
- (d) See that there is no metal to metal contact between blower and furnace or cooling unit.
- (e) Remove end play in blower shaft by adjusting thrust collars.

9. RECORD OF UNIT

Model No.....
Motor Horsepower.....
Size of Fan Pulley.....
Size of Motor Pulley.....
Size of Belt.....
Type of Bearings.....
.....
Installed by.....
.....