RECEIVING • INSTALLATION • MAINTENANCE

INSTRUCTIONS

TYPE PX

HORIZONTAL AIR FLOW
MOVING NOZZLE WASHING
AND
ADHESIVE APPLICATION

Westinghouse Precipitron®

THE *ELECTRONIC* AIR CLEANER

for

Industrial and Commercial Applications

115 Volts **60 and 50 Cycle**
Single Phase **Alternating Current**

The PRECIPITRON is an electronic air cleaning apparatus used in ventilating and air conditioning systems of industrial plants and commercial establishments to remove soot, smoke, dust, dirt and other air borne particles.

Type PX PRECIPITRON unit includes facilities for washing off the collected dirt and for applying adhesive with motorized moving nozzles, controlled from outside the duct.

In order to produce the results expected of the PRECIPITRON, it must be properly installed and maintained. Whether installed by itself or in conjunction with air conditioning equipment, this instruction book gives the correct steps and precautions to be taken.

WESTINGHOUSE ELECTRIC CORPORATION
HYDE PARK • STURTEVANT DIVISION • BOSTON 36, MASS.

SUPERSEDES TEMPORARY I. B. 1415-1
EFFECTIVE SEPT. 15, 1953

EFFECTIVE MAY, 1955

INDEX

RECEIVING AND HANDLING

A separate instruction package is forwarded to the customer's shipping address for each PRECIPITRON unit. This includes a bill of material, an instruction book, two name plates and a check chart.

To facilitate handling and erection, parts are packed in individual containers, each marked as to contents. The bill of material may be checked with the shipping notice. Handle the equipment carefully to prevent damage.

Upon receipt of shipment, any evidence of damage or loss should be reported immediately to the last carrier for inspection by an agent of the transportation company. A claim should be filed by the customer against the carrier to cover any shipping damage or loss.

Except for the initial inspection, store the parts until needed in the original shipping containers in a clean, dry location protected from the weather.

For actual erection, the parts will be used in the following order:

1. Instruction Package
2. Bedplates
3. Frames & Filter Hardware
4. Top Plates
5. Cells
6. Tracks & Spray Header
7. Header Drive Mechanism
8. Drive Cable
9. Pump & Filter
10. Hoses
11. Control Box
12. Power Packs
13. Accessories
14. H. V. Cable
15. Air Filters
16. Adhesive

INSTALLATION

Westinghouse Supplies necessary basic parts to erect a complete PRECIPITRON assembly as listed in the Bill of Material. Westinghouse also supplies such items as: special hardware, special electrical fittings, high voltage cable and an initial supply of adhesive.

Customer Supplies regular construction items which are not included in the Bill of Material, such as duct work, foundation, mounting bolts, conduit, low voltage wiring and plumbing. The following installation instructions give further details as to the source of individual items.

Locating the Unit. Successful installation and operation of a PRECIPITRON unit requires consideration of the following points both before and during installation.

1. Sufficient space for unit, including service access.

2. Satisfactory air handling system.

3. Level and plumb foundation.

4. Adequate water supply and drains.

5. Correct power supply.

Space Requirements. For overall dimensions, see Dimension Sheet 1415 supplied with the order. A 36" clear space is required at the inlet and outlet air sides of the frame bank for inspection and maintenance.

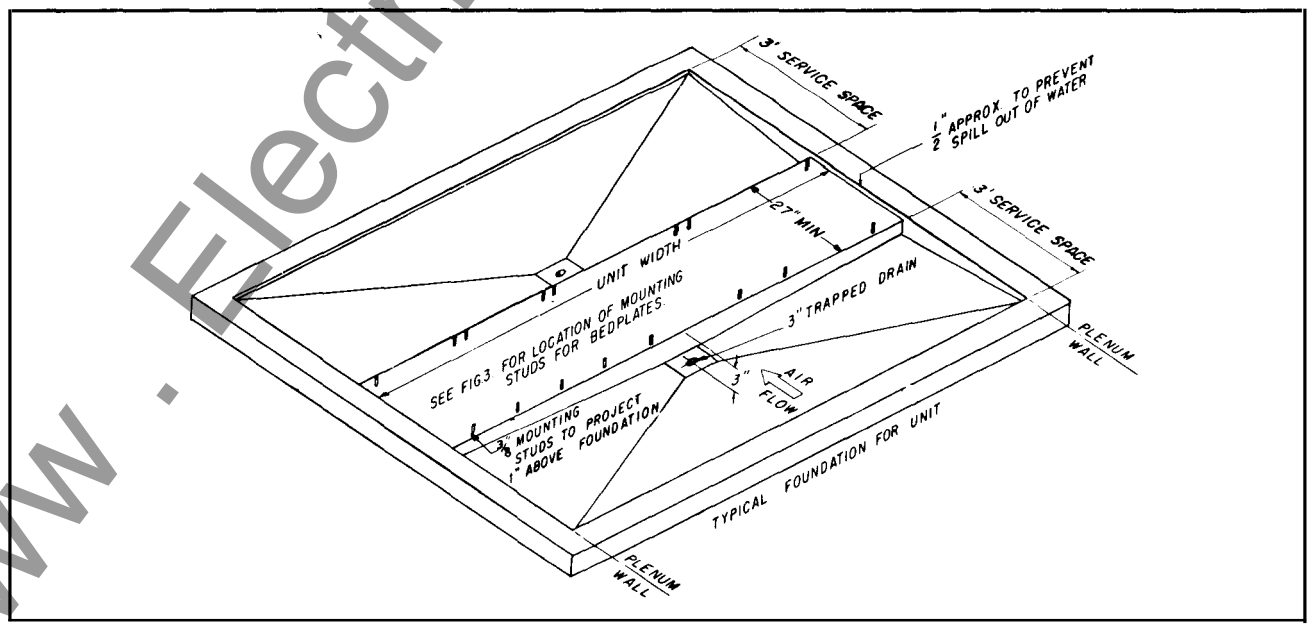


Fig. 1. Typical Foundation and Drain Basin (Code PX-4022 Unit Shown)

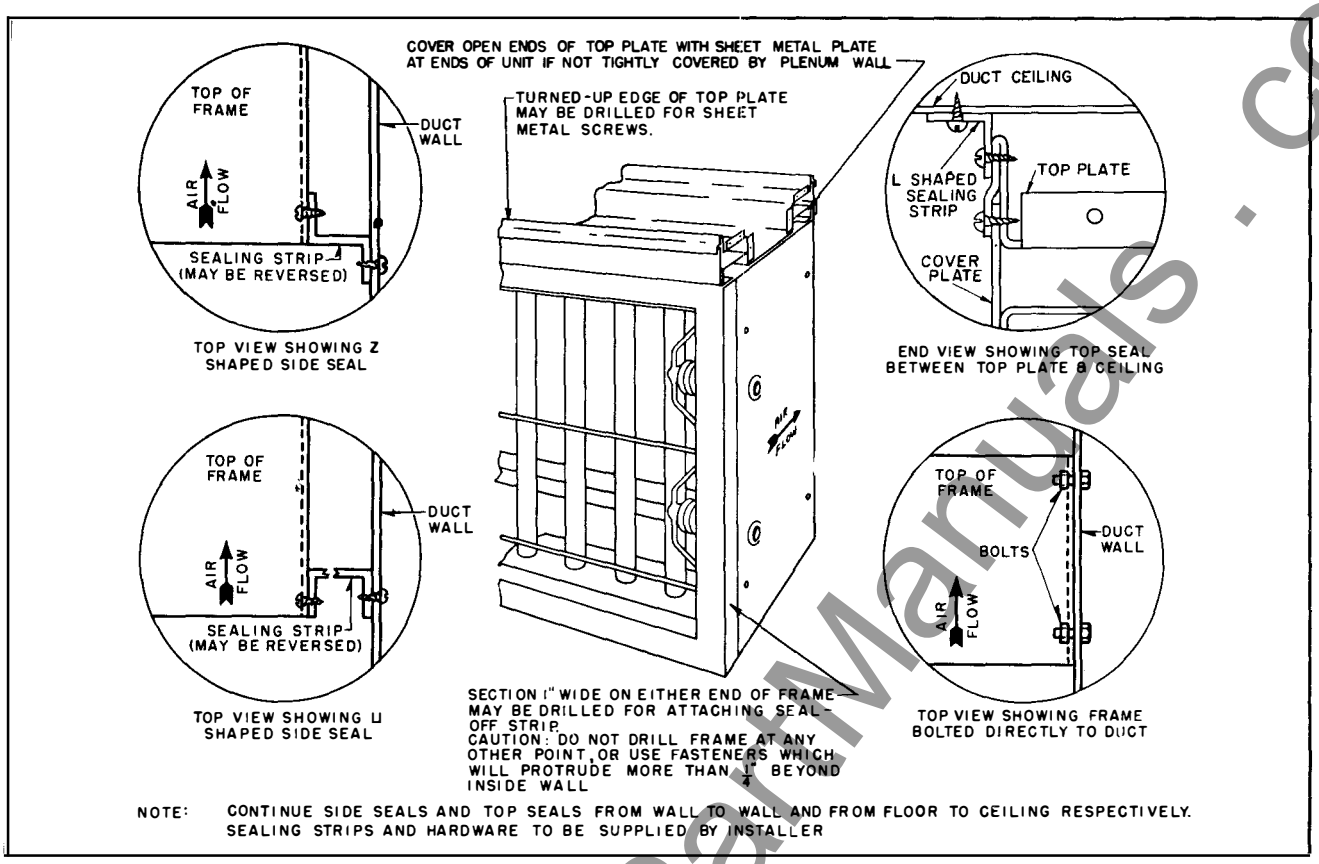


Fig. 8. Sealing the Framework

Top Plates (supplied in 36" and 24" lengths) are installed as illustrated in Fig. 7. Remove the cover from the wiring raceway on the outlet air side prior to installation. Securely attach the top plates to the frames using sheet metal screws provided. Fasten ends of wiring raceways together with small bolts and nuts provided. Be careful not to lose the remaining hardware packed in the bags.

Sealing the Framework. All spaces around or above the frame bank must be sealed. By-passing of air is prevented under the frame bank by air baffles in the bedplates. Top plates have a turned up edge on both sides for attaching sealing strips between the top of the unit and the duct. Drill the turned up edge only, and attach seal-off strip with sheet metal screws. See Fig. 8.

Sealing between ends of the frame bank and duct may be accomplished as shown in Fig. 8. It is best to attach the duct directly to the ends of the unit, using existing bolt holes in the frames. If space is very narrow caulking compound (Minnesota Mining & Mfg. Co. EC-801) or felt strips may be used.

Cells should be handled by the end frames to prevent damage. Remove and discard the shipping

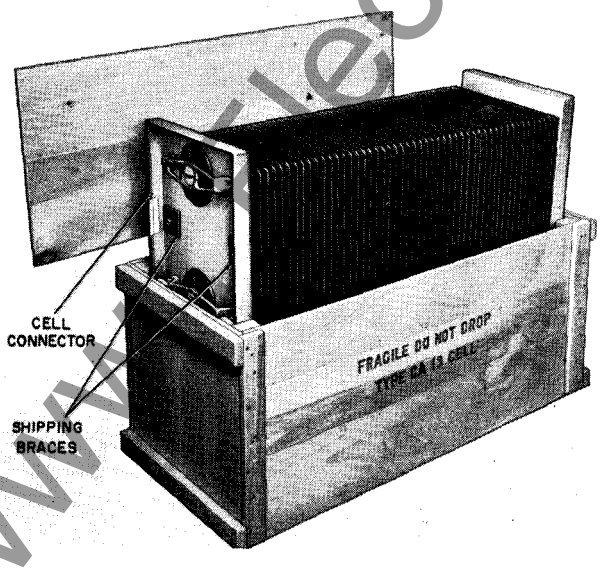


Fig. 9. Details of Cell Packing

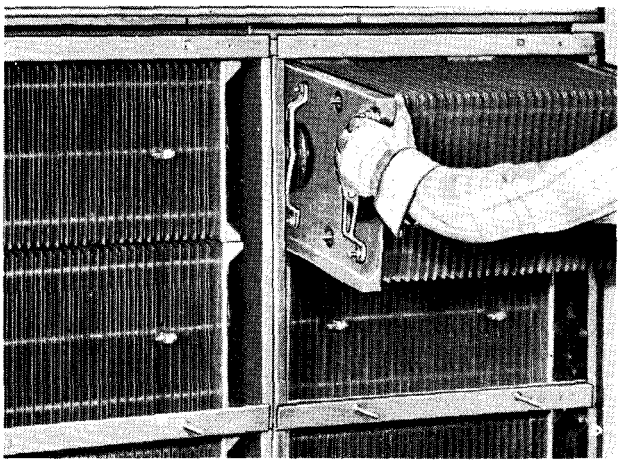


Fig. 10. Installing the Cells

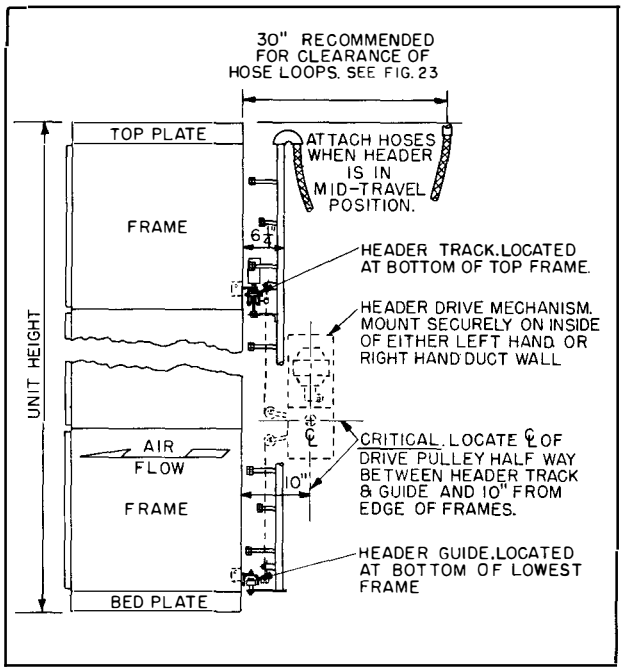


Fig. 11. Location of Tracks, Header and Drive

braces from the ends of the cells. See Fig. 9. These braces will cause a short circuit if not removed. Also remove the cell connectors which are taped on the cells, but save them for high voltage connections later. Carefully inspect all cells for uneven spacing and damage. Install cells with the connector posts pointing toward the outlet air side. See Fig. 10. Push cells into frames as far as they will go.

Cell Clamp Angles (supplied with frame hardware) should be installed as shown in Fig. 33, to hold the cells in place.

Tracks & Spray Header. The header track and guide are located as shown in Fig. 11. One or

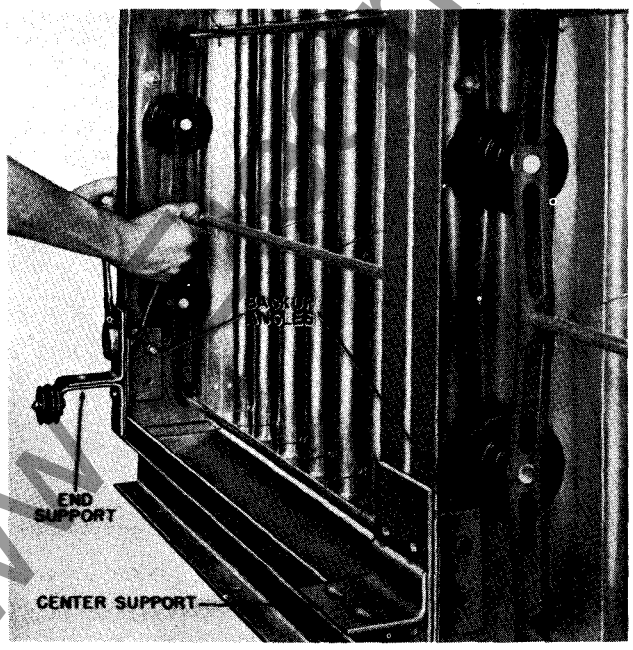


Fig. 13. Mounting Bottom Guide Supports

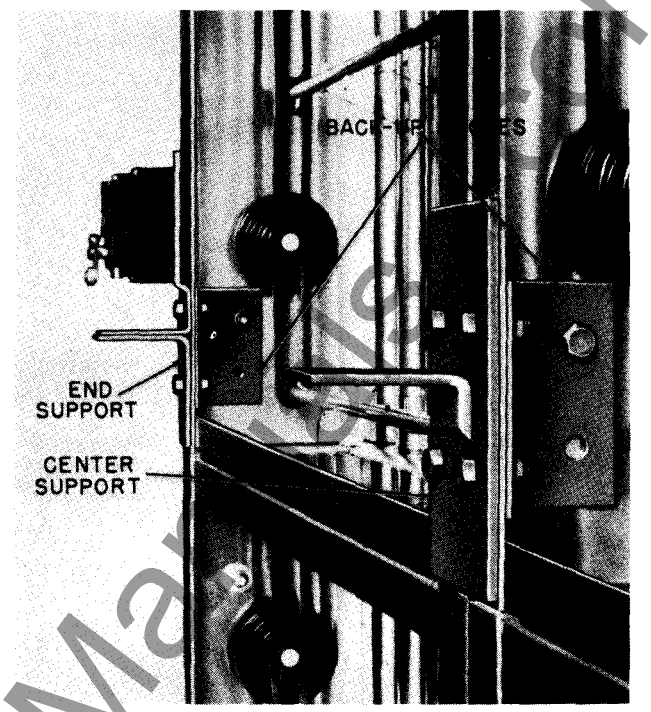


Fig. 12. Upper Track Supports

more lengths may be supplied as shown on the B/M (See Instr. Package). A center support is furnished for each track and guide joint.

Install the end supports and back-up angles first. See Figs. 12 & 13. If there is more than one length of track and guide, pair them on the floor so that every joint is in line with a frame joint. Install the center supports at those joints. See Figs. 12 & 13. Note: If PX washer parts are being added to an existing early design frame bank, holes must be drilled in some frames for mounting the supports. See Fig. 14.

Install the upper track sleeves and track loosely. See Fig. 15. If the duct walls butt closely to ends of track, insert the top roller of the spray header in one section of track before installing this section. See Fig. 15. Check track for alignment

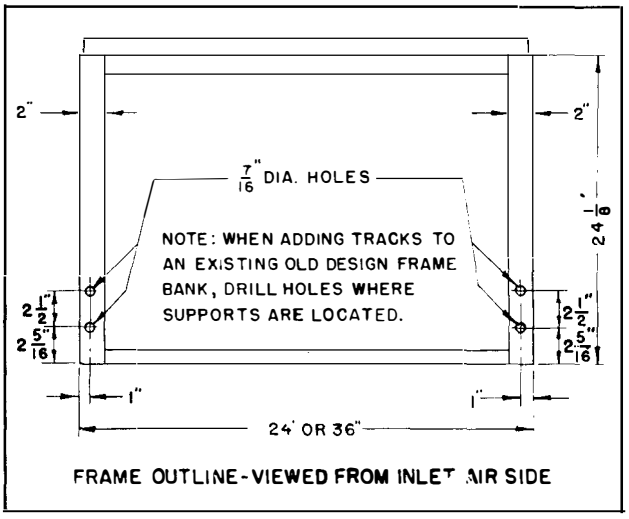


Fig. 14. Location of Track Support Mounting Holes (for Existing Frame Banks only)

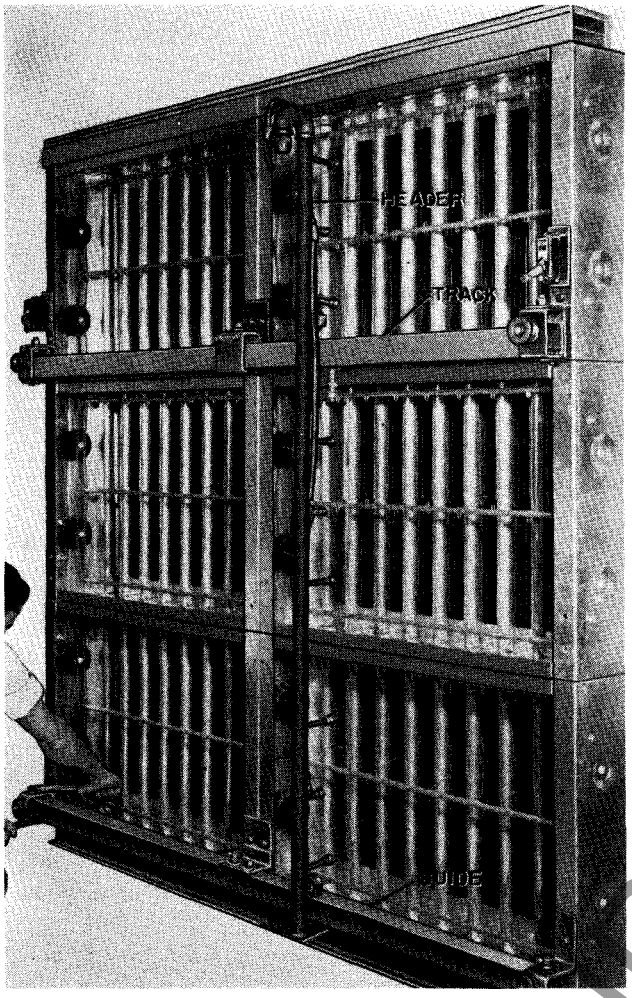


Fig. 15. Typical Mounting of Tracks

and smoothness of joints and then tighten bolts. Be sure clamps at both ends of track are installed as shown in Fig. 16.

Next install the lower guide. See Fig. 15. Move spray header horizontally along track, holding it

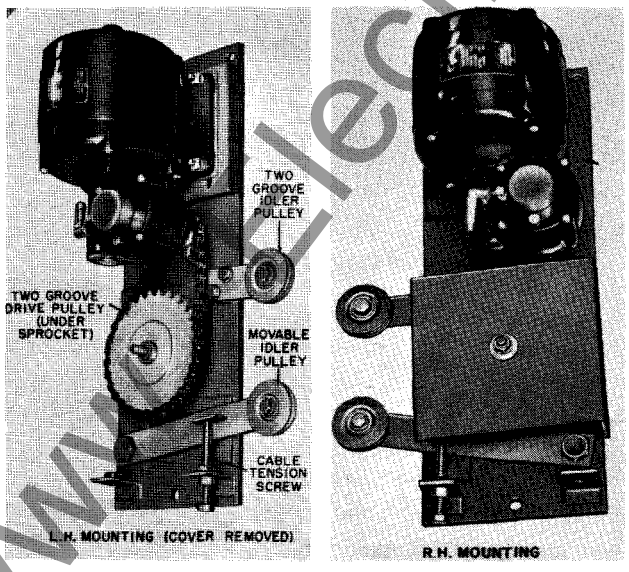


Fig. 17. Header Drive Mechanism

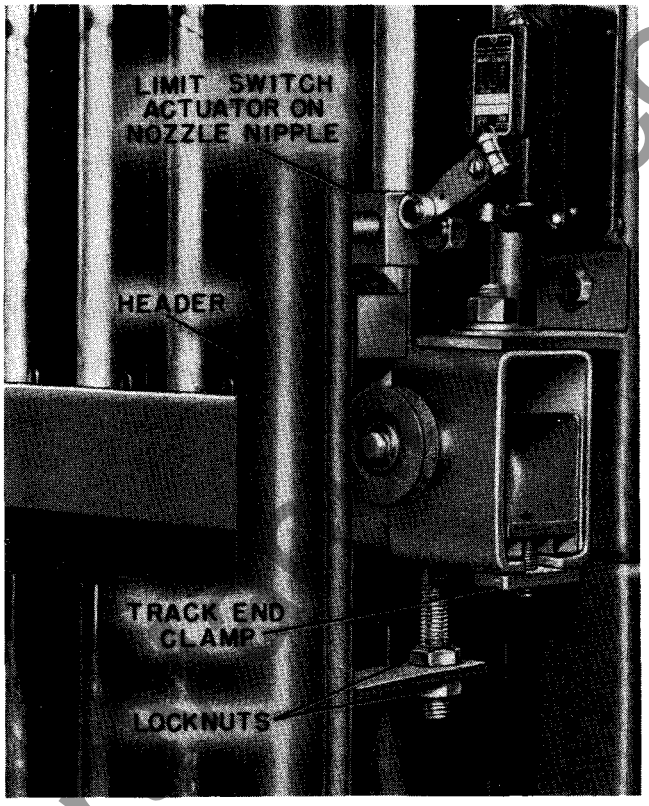


Fig. 16. Track and Header Details

vertical, to check for binding. Check that the limit switches are actuated at each end of travel. See Fig. 16. Be sure locknuts on top roller bolt are tight and that nozzles point parallel to the cell plates. These nuts can be used to raise or lower

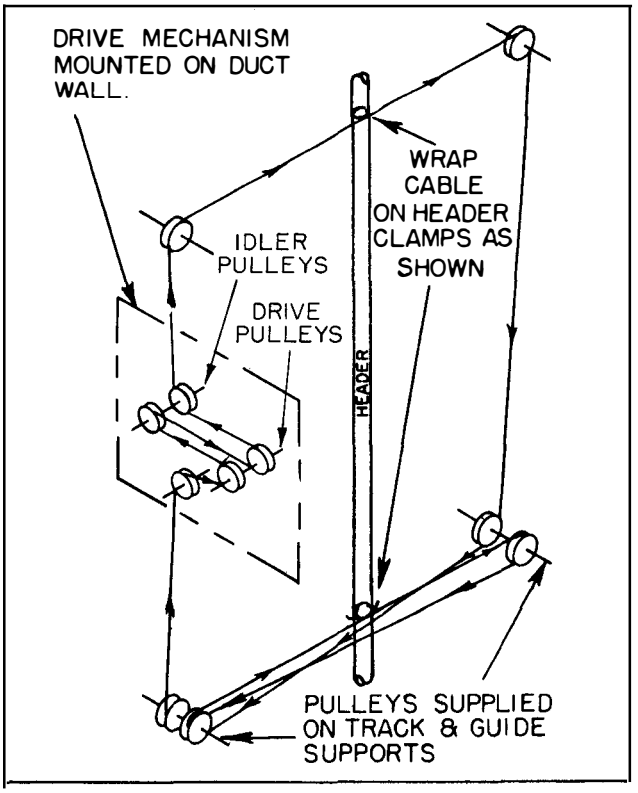


Fig. 18. Arrangement of Drive Cable

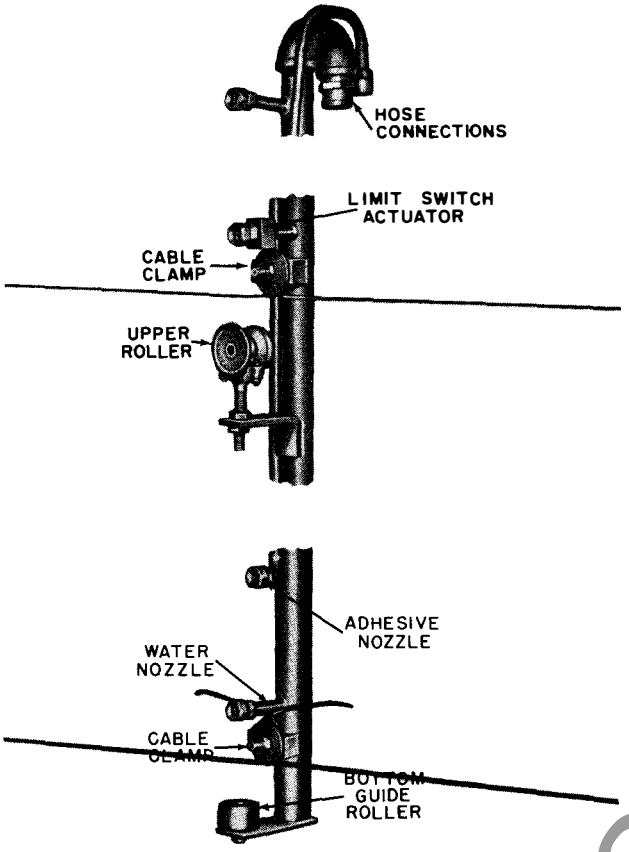


Fig. 19. Spray Header Details

the spray header for alignment of the limit switch actuator and the bottom roller.

Header Drive Mechanism should be rigidly installed inside the duct wall precisely as shown in Fig. 11. The mechanism is shipped arranged for mounting on the left hand wall (facing inlet air side) but the pulley parts may be easily reassembled for right hand mounting. See Fig. 17.

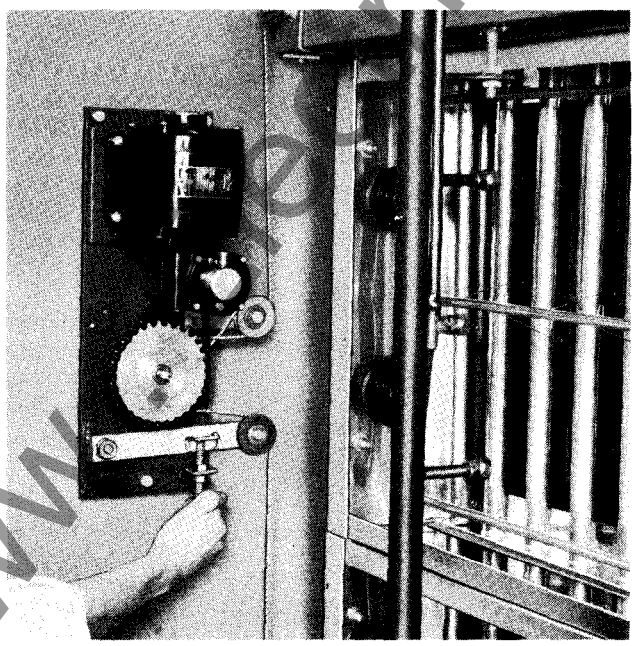


Fig. 21. Cable Tension Adjustment

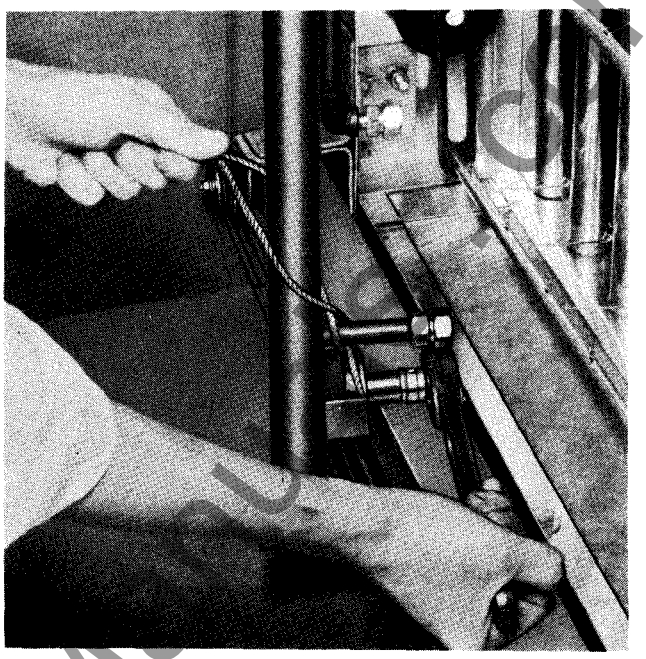


Fig. 20. Tightening Lower Cable Clamp

Drive Cable should be installed as shown in Fig. 18. Before stringing, remove cover from drive mechanism and completely back-off tension arm screw. Also place the spray header at center of the frame bank and loosen the cable clamps.

Starting at the lower cable clamp, thread the cable around the track pulleys and then around the drive pulleys. Be sure to thread the cable under and up around the cable clamps as shown in Fig. 19. Pull cable tightly by hand (see Fig. 20) and snub it around the nozzle nipple while the bottom clamp is tightened. Tie the cable around back of the header and cut off surplus cable.

Tighten the cable tension screw by hand until the slack disappears. See Fig. 21 and tighten locknut. Note: Do not tighten cable enough to bend the track pulleys. Save final adjustment until header is operated, and then tighten only enough that header travels without faltering.

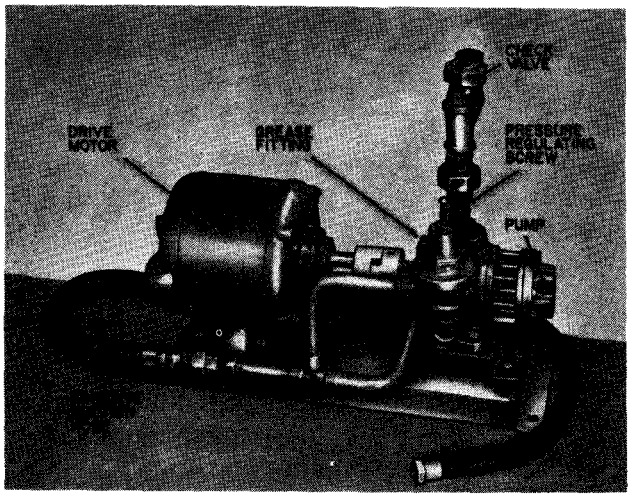
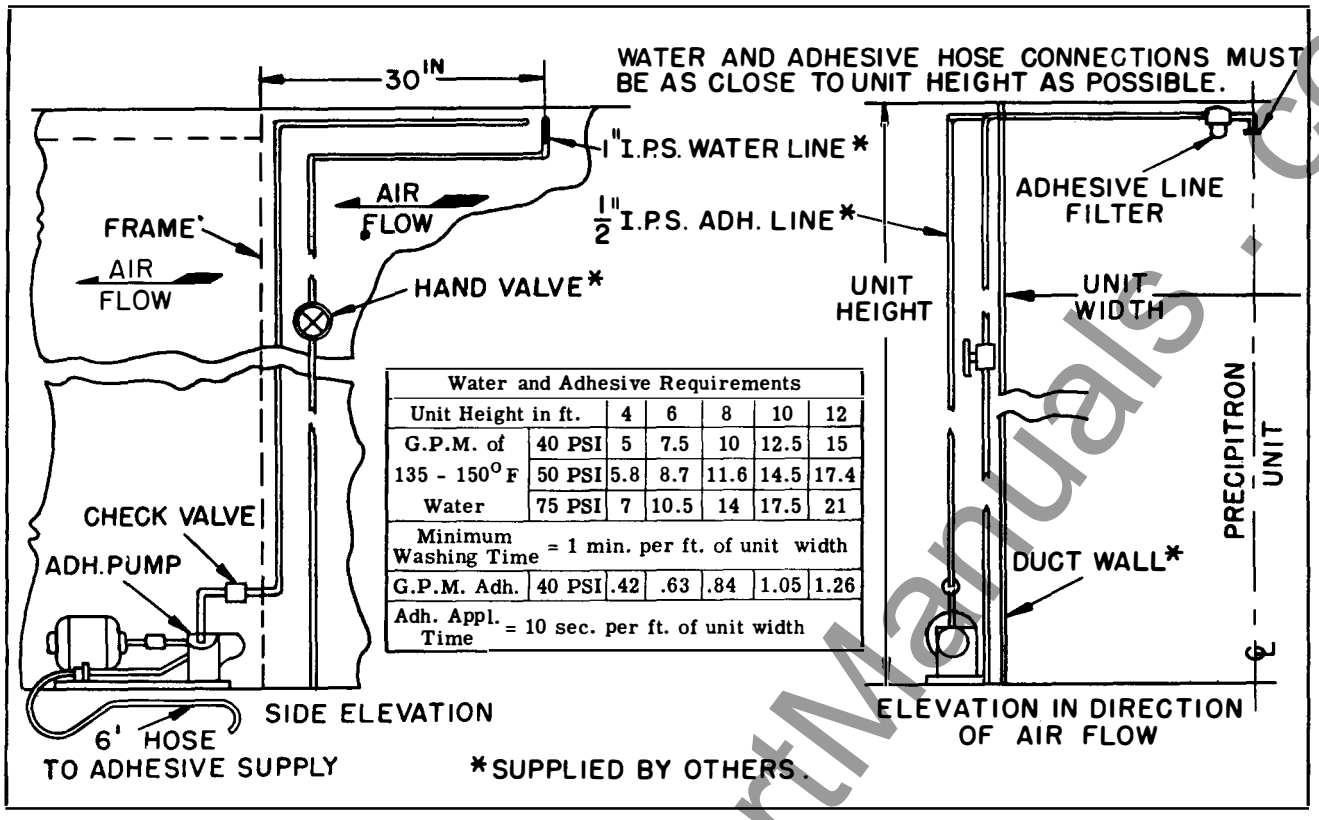


Fig. 22. Adhesive Pump



Water and Adhesive Requirements						
Unit Height in ft.		4	6	8	10	12
G.P.M. of	40 PSI	5	7.5	10	12.5	15
135 - 150° F	50 PSI	5.8	8.7	11.6	14.5	17.4
Water	75 PSI	7	10.5	14	17.5	21
Minimum Washing Time = 1 min. per ft. of unit width						
G.P.M. Adh.	40 PSI	.42	.63	.84	1.05	1.26
Adh. Appl. Time = 10 sec. per ft. of unit width						

Fig. 23. Water and Adhesive Piping Layout Requirements

Align the spray header vertically before tightening the top cable clamp.

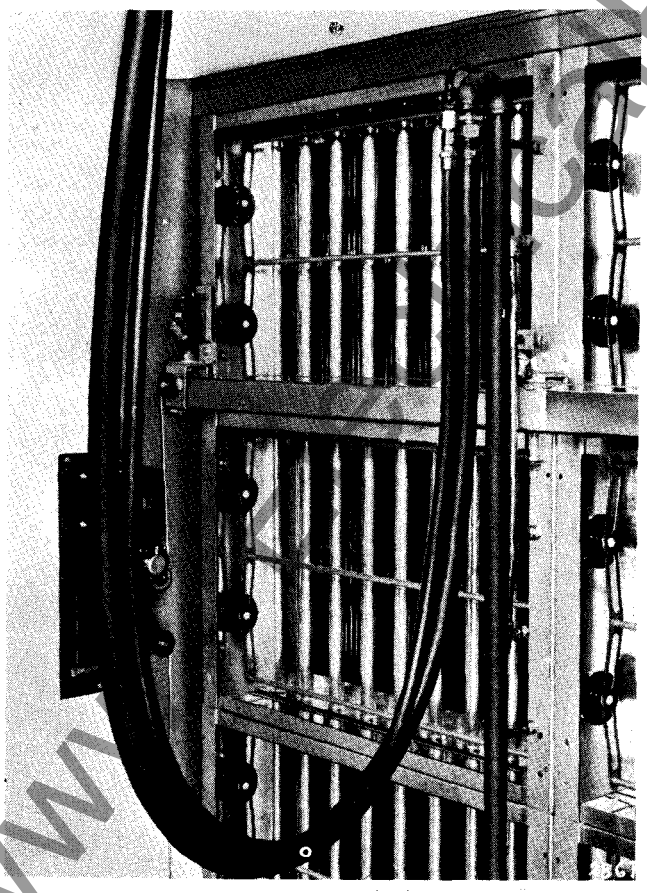


Fig. 24. Installation of Hoses

Adhesive Pump (Fig. 22) should be installed outside the duct, adjacent to the end of the frame bank. See Fig. 23. The hose is for sucking adhesive from a container to the pump. Pump includes an adjustable pressure regulator and a check valve in the discharge line.

Adhesive Piping is installed as shown in Fig. 23. Thoroughly clean this line before installation. Install the adhesive filter as shown in Fig. 23.

Water Supply. To properly wash off the collected dirt, a 130-150°F. water supply with a minimum running pressure of 40 psi at the unit is necessary. See Fig. 23 for water quantities. A clean water supply is essential to avoid clogging of nozzles. Where the supply is dirty, strainers or other filtering means (not supplied) are required.

Water Piping (not supplied) should be at least 1" ips, and a hand operated shut-off valve should be provided convenient to the control box. See Fig. 23. Keep lines clean during installation. As a precaution against freezing temperatures, water lines should be pitched and provided with drain cocks. The union fitting on the water hose may be disconnected for draining.

While not furnished, a 1-1/4" i.p.s. solenoid valve may be installed on the discharge side of the hand valve to automatically control the water flow. See low voltage wiring.

Hoses. 1" water hose and 1/2" oil resistant adhesive hose are furnished with fittings at each end. Position the header at the center of the frame

Fig. 25. Control Box

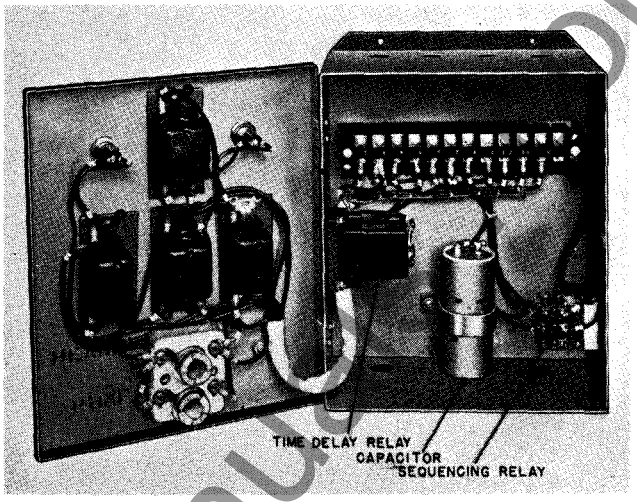


Fig. 26. Control Box (Inside View)

bank before connecting the hoses. If hoses and pipe are dirty, thoroughly flush them out with water. See that hoses are not twisted but drape naturally when installed. See Fig. 24.

LOW VOLTAGE WIRING

Typical low voltage wiring is shown in Figs. 29 & 30. The 115 volt supply to the power packs should be run in conduit. All low voltage wiring inside the duct should be installed in conduit and made water tight.

Control Box (Figs. 25 & 26) is installed outside the duct wall as shown in Figs. 29 & 30.

Power Packs (Fig. 27) should be installed outside the duct, either on the duct wall, if sufficiently braced, on an adjacent building wall, or on a suitable mounting stand. If several power packs are supplied, group them together. Allow at least 6" space vertically between power packs, if mounted one above the other. Be sure the power packs are mounted close to the end of the frame bank. Additional high voltage cable will be required if the cable run to the nearest top plate exceeds 15 feet. Refer to instruction book packed inside the power pack for further details.

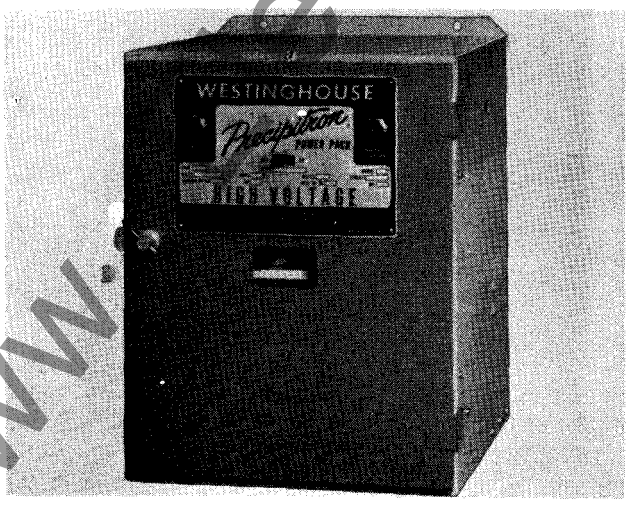


Fig. 27. Power Pack

Header Drive Motor. (Fig. 17) The insulated bushing around the lead wires should be replaced with a 1/2" threaded nipple and a condulet for making a conduit connection. See Figs. 29 & 30 for wiring connections.

Adhesive Pump Motor (Fig. 22) should be installed close to the end of the frame bank, outside the duct. See Figs. 29 and 30 for wiring.

Magnetic Contactor (supplied only with 3 or more power packs) should be mounted outside the duct adjacent to the power packs. See Figs. 29 & 30.

Red Pilot Lights (supplied with accessories) should be installed above the two duct access doors. See Figs. 29 & 30. These lights glow when power is connected to the power packs.

Door Interlock Switches (supplied with accessories) should be installed at the two duct doors as a positive means of de-energizing the power packs before the duct may be entered. See Figs. 28, 29 & 30.

Manual Switches (supplied with accessories) should be installed inside the duct as shown in Figs. 29 & 30. These permit the operator to disconnect the 115 volt supply while he is inside the duct.

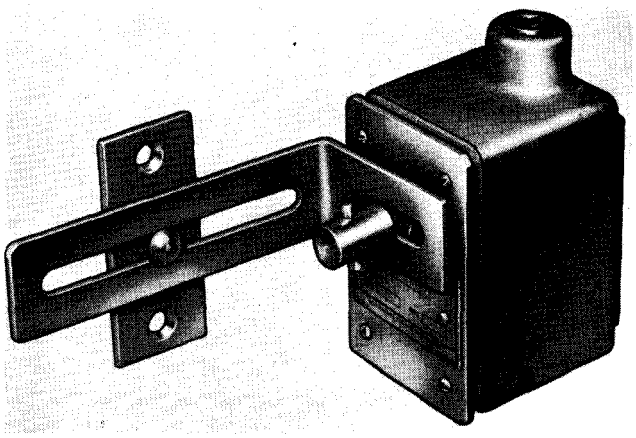
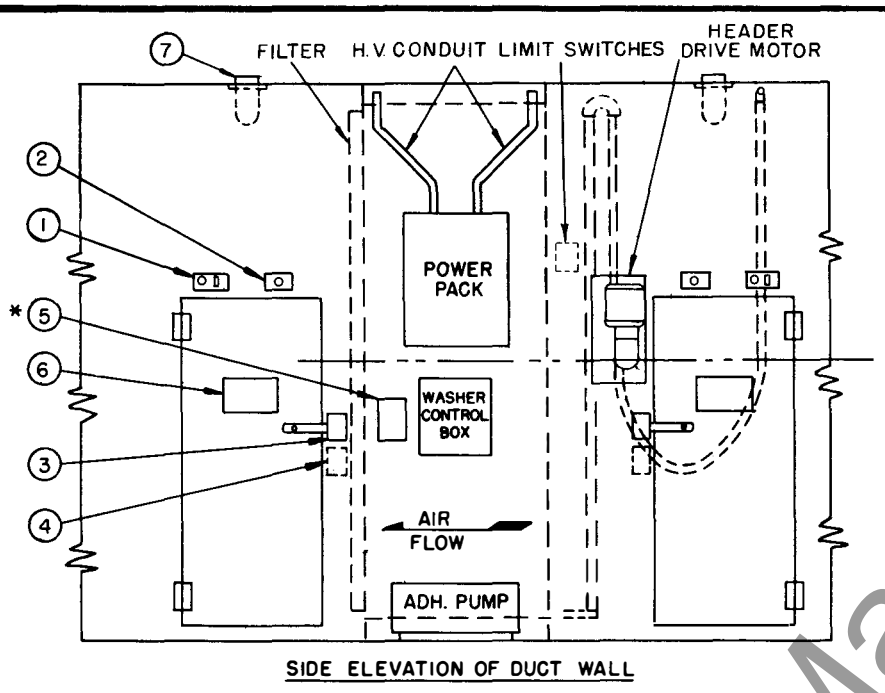


Fig. 28. Duct Door Interlock Switch



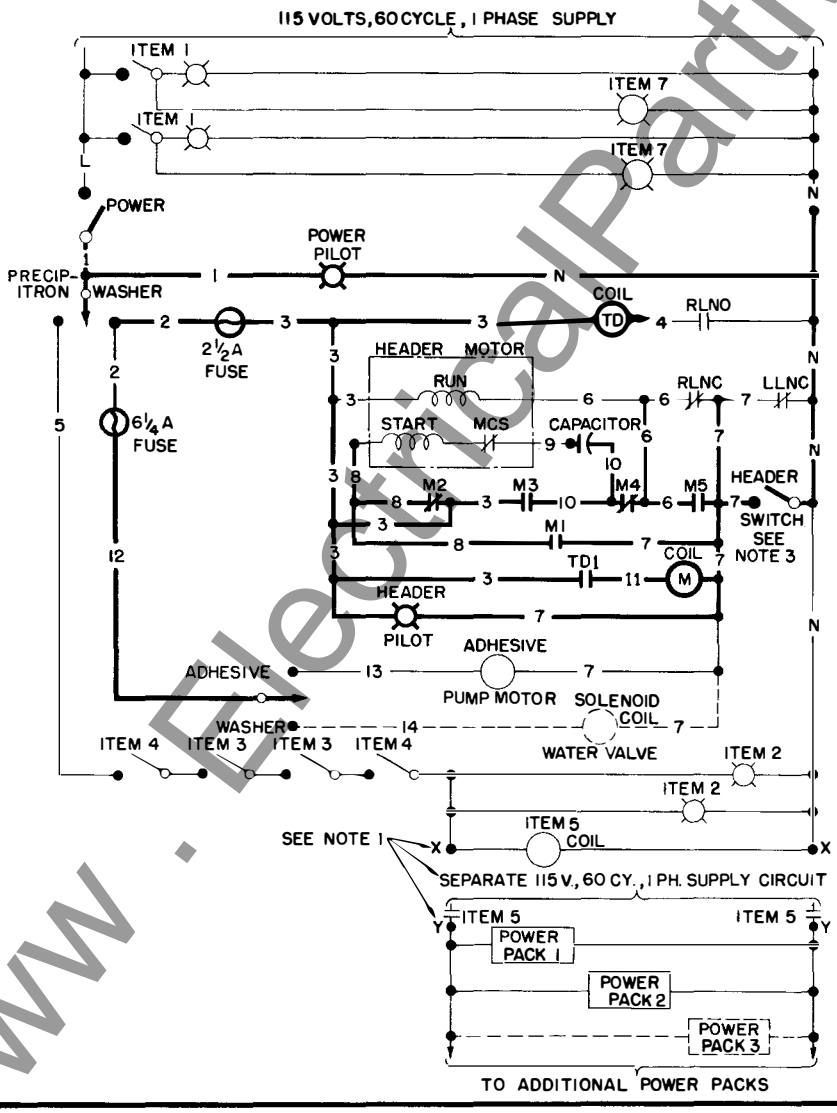
SIDE ELEVATION OF DUCT WALL

*CONTACTOR MAY BE LOCATED AT ANY CONVENIENT PLACE NEAR THE POWER PACKS.

TABLE OF ACCESSORY ITEMS SHOWN ON LAYOUT AND SCHEMATIC DIAGRAMS

ITEM	DESCRIPTION	REQ.	SUPPLIER
1	Amber Pilot Light & Switch	2	Ⓦ
2	Red Pilot Light	2	Ⓦ
3	Door Interlock Switch	2	Ⓦ
4	Manual Switch	2	Ⓦ
5	Contactor (when required)	1	Ⓦ
6	Nameplate & H. V. sign	2	Ⓦ
7	Duct Lights	2	Ⓦ
8	Conduit Fixtures and Wiring	To Suit	Others

NOTE:- Only one Power Pack may be mounted on side of duct without additional supports. For Multiple Power Pack Units, Power Packs may be located elsewhere within 15 feet of the unit.



LEGEND

——— Wiring and parts furnished with washer control box.

——— Wiring by others.

– – – – Optional by others.

RLNO - Right hand limit switch contact - open in free position.

RLNC - Right hand limit switch contact - closed in free position.

LLNC - Left hand limit switch contact - closed in free position.

MCS - Motor centrifugal switch. Opens when motor runs.

TD - Time delay relay. TD1 contact closes 2-3 seconds after coil is energized.

M - Sequencing relay. Contacts M1 to M5 shown with coil de-energized.

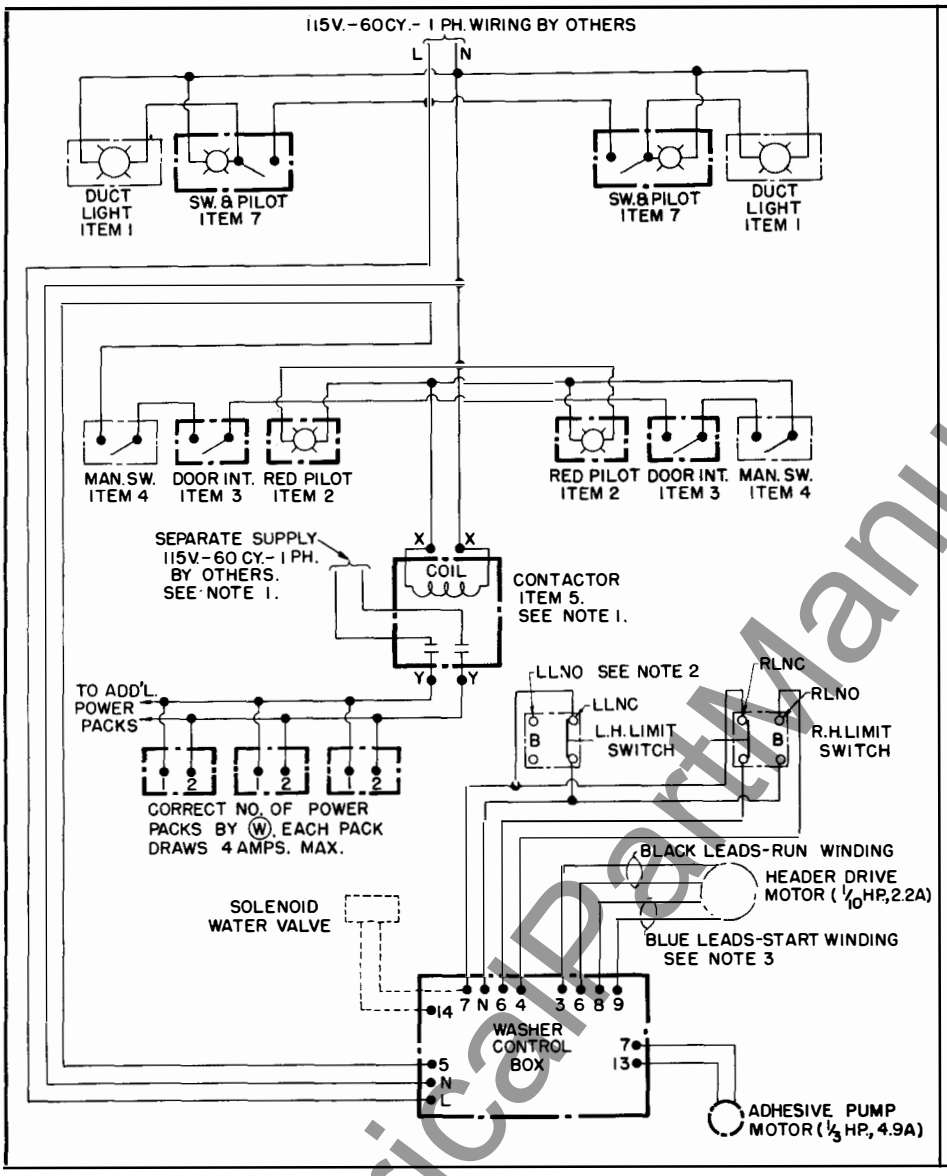
NOTES

1. For units with 1 or 2 power packs, connect terminals x-x to y-y. (It. 5 and sep. supply cir. are not required.) For units with 3 or more power packs, install contactor (It. 5) and sep. supply cir. as shown.

2. Connections shown are for L.H. mounting of the header drive mech. (facing inlet air side). For R.H. mtg., the opposite hand limit sw. contacts must be used (i.e., substitute LLNO for RLNO, LLNC for RLNC and RLNC for LLNC).

3. Header travel is started by flipping on header switch until header pilot stays lit.

Fig. 29. Low Voltage Wiring



LEGEND

——— Wiring by others.

– – – – Equipment by W - Locate inside duct.

▬▬▬ Equipment by W - Locate outside duct.

– – – – Optional by others.

NOTES

1. For units with 1 or two power packs, connect terminals x-x to y-y. (It. 5 and sep. supply cir. are not required.) For units with 3 or more power packs, install contactor (It. 5) and sep. supply circuit as shown.

2. Connections shown are for L.H. mounting of header drive mech. (facing inlet air side). For R.H. mounting, the opposite hand limit sw. contacts must be used (i.e., substitute LLNO for RLNO, LLNC for RLNC and RLNC for LLNC). All limit switches are shown in free position.

3. Interchange blue leads (8 & 9) if necessary to obtain correct rotation of motor.

4. See Fig. 29 for description of "Items".

Fig. 30. Typical Low Voltage Wiring Layout

Duct Lights (supplied with accessories) should be installed at the ceiling on each side of the frame bank to facilitate inspection and servicing. See Figs. 29 & 30.

Duct Light Switches and Pilots (supplied with accessories) should be installed as shown in Figs. 29 & 30.

Limit Switches (supplied with tracks) should be wired as shown in Figs. 15, 29 & 30.

Solenoid Operated Valve (optional - not supplied) is convenient for automatically controlling the wash water. See Figs. 29 & 30.

HIGH VOLTAGE WIRING

High Voltage Cable is supplied with the unit in 50' coils. Remove all top plate covers so that raceways will be accessible for installing the high voltage cables.

Two lengths of high voltage cable are required from each power pack. See Fig. 31. These cables should be installed in conduit between the power packs and the ends of the top plate raceways. The cables are then extended through the raceways to the top cells and ionizers. Cable holes are provided at the bottom of the top plate raceways. The raceway on the inlet air side is for the ionizer cables (12.8 KV) and the outlet side raceway is for the cell cables (5.8 KV).

The extreme ends of the top plate raceways should be covered tightly either by the duct walls or by sheet metal plates fabricated on the job. Terminate conduits from the power packs at the duct wall or at the fabricated plates using pull boxes and conduit bushings where necessary.

Plan to cut cables so that continuous lengths may be installed from the power packs and through the raceways. Enough high voltage cable is supplied for 15' lengths between power packs and nearest

Where two or more power packs are furnished, columns are combined to proportion the load as shown in table No. 1.

Example: Unit Code PX-5023 is an assembly 5 frames high with 2-2 ft. and 3-3 ft. wide columns. 3 power packs supplied are connected as follows:

Pack No. 1 - Columns 1 & 2 (2 ft. wide)
Pack No. 2 - Columns 3 & 4 (3 ft. wide)
Pack No. 3 - Column 5 (3 ft. wide)

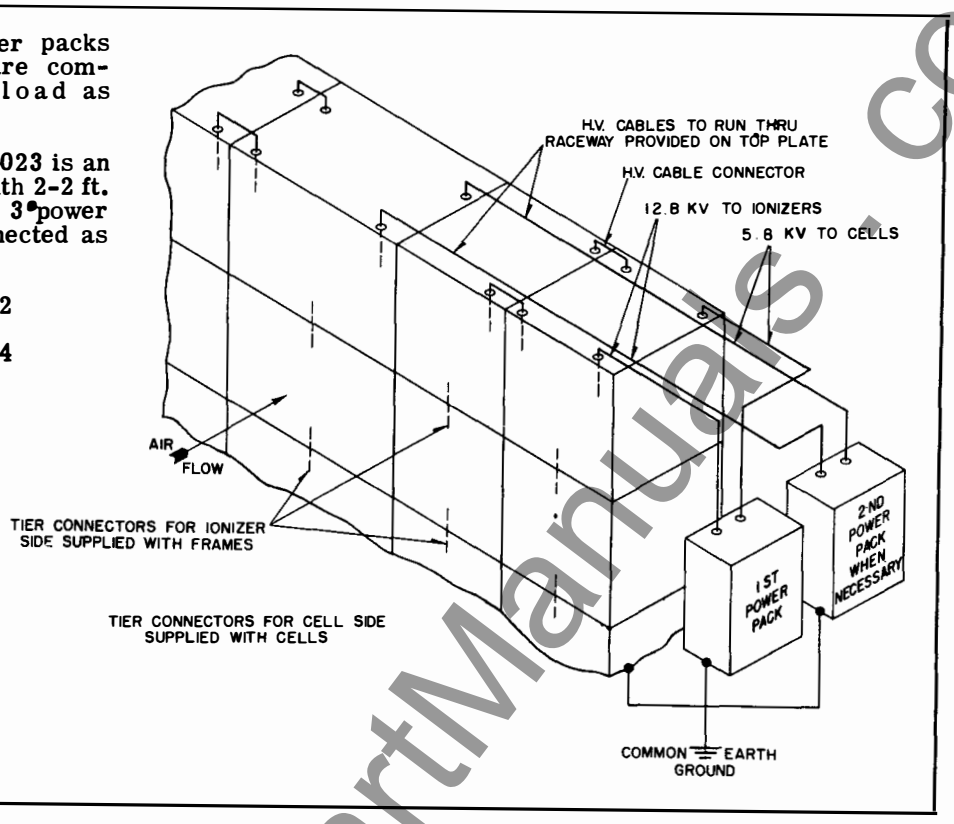


Fig. 31. High Voltage Connections

TABLE NO. 1 POWER PACK LOADING

Unit Code No.	Number of Columns		Power Packs	Power Pack Load Div. By Columns	
	2' Wide	3' Wide	Qty	1st Power Pack	2nd and Succeeding Power Packs
PX 2020	2	0	1	All Columns	-
PX 2011	1	1	1	All Columns	-
PX 2002	0	2	1	All Columns	-
PX 2021	2	1	1	All Columns	-
PX 2012	1	2	1	All Columns	-
PX 2003	0	3	1	All Columns	-
PX 3020	2	0	1	All Columns	-
PX 3011	1	1	1	All Columns	-
PX 3002	0	2	1	All Columns	-
PX 3021	2	1	1	All Columns	-
PX 3012	1	2	1	All Columns	-
PX 3003	0	3	1	All Columns	-
PX 3022	2	2	1	All Columns	-
PX 3013	1	3	2	1-2' & 1-3'	2-3'
PX 3004	0	4	2	2-3'	2-3'
PX 3023	2	3	2	2-2' & 1-3'	2-3'
PX 3014	1	4	2	1-2' & 2-3'	2-3'
PX 3005	0	5	2	3-3'	2-3'
PX 4020	2	0	1	All Columns	-
PX 4011	1	1	1	All Columns	-
PX 4002	0	2	1	All Columns	-
PX 4021	2	1	1	All Columns	-
PX 4012	1	2	2	1-2' & 1-3'	1-3'
PX 4003	0	3	2	2-3'	1-3'

Unit Code No.	Number of Columns		Power Packs	Power Pack Load Div. By Columns	
	2' Wide	3' Wide	Qty	1st Power Pack	2nd and Succeeding Power Packs
PX 4022	2	2	2	2-2'	2-3'
PX 4013	1	3	2	1-2' & 1-3'	2-3'
PX 4004	0	4	2	2-3'	2-3'
PX 4023	2	3	2	2-2' & 1-3'	2-3'
PX 4014	1	4	2	1-2' & 2-3'	2-3'
PX 4005	0	5	3	2-3'	2nd 2-3', 3rd 1-3'
PX 5011	1	1	1	All Columns	-
PX 5002	0	2	1	All Columns	-
PX 5021	2	1	2	2-2'	1-3'
PX 5012	1	2	2	1-2' & 1-3'	1-3'
PX 5003	0	3	2	2-3'	1-3'
PX 5022	2	2	2	2-2'	2-3'
PX 5013	1	3	2	1-2' & 1-3'	2-3'
PX 5004	0	4	2	2-3'	2-3'
PX 5023	2	3	3	2-2'	2nd 2-3', 3rd 1-3'
PX 5014	1	4	3	1-2' & 1-3'	2nd 2-3', 3rd 1-3'
PX 5005	0	5	3	2-3'	2nd 2-3', 3rd 1-3'
PX 6012	1	2	2	1-2' & 1-3'	1-3'
PX 6003	0	3	3	1-3'	1-3'
PX 6022	2	2	3	2-2'	1-3'
PX 6013	1	3	3	1-2' & 1-3'	1-3'
PX 6004	0	4	4	1-3'	1-3'
PX 6023	2	3	4	2-2'	1-3'
PX 6014	1	4	4	1-2' & 1-3'	1-3'
PX 6005	0	5	5	1-3'	1-3'

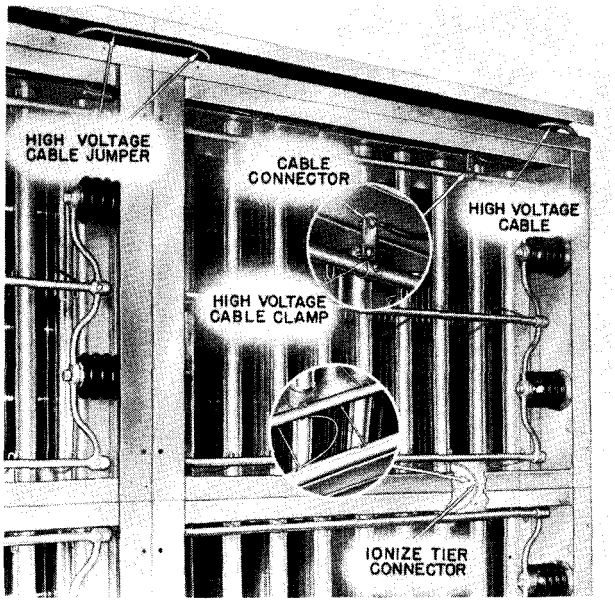


Fig. 32. High Voltage Ionizers Connections

top plate, plus the lengths required through the raceways to the top cells and ionizers. If power packs are located further away, additional cable will be required. Only high voltage cable supplied by Westinghouse, Sturtevant Division is recommended.

High Voltage Connections to the cells and ionizers enter only at the top of each column of frames. All cells and ionizers within columns are interconnected vertically with tier connections. See Fig. 31.

High Voltage Cable Jumpers (supplied with top plate hardware) are used to connect columns of cells and ionizers together, where one power pack is sufficient for more than one column. These thread through the top plate raceways. See Figs. 31, 32 & 33.

When two or more power packs are furnished, columns are combined to proportion the load as specified in Table No. 1.

Cable Terminal Connectors. Connectors are furnished with the top plate hardware and are installed as shown in Figs. 32 & 33.

Ionizer Tier Connectors are furnished with the frame hardware and plug into position as shown in Fig. 32. One connector is required vertically between each frame.

Cell Tier Connectors (taped to each cell) are installed as shown in Fig. 33. One connector is required vertically between cells.

Electrical Grounding. High voltages are fed from the power packs to the cells and ionizers with single conductor cables. A common ground return is required to complete these circuits as well as for safety purposes. See Fig. 31. Connect the power pack cases, the frame structure and the control box to a common ground, using solid copper wire. If

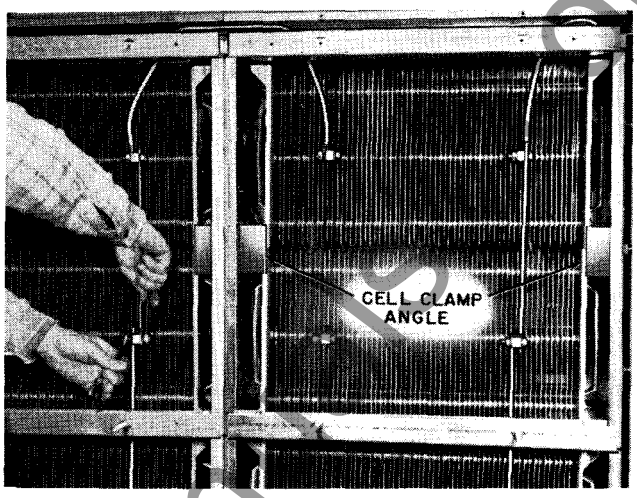


Fig. 33. Installing the Cell Tier Connectors

ground is a water pipe, a jumper may be needed around the water meter, since some meters are insulated.

Air Filter Clamps are installed on the top plate raceway covers at the outlet air side, using the long sheet metal screws supplied with the filter hardware. See Fig. 34.

Air Filters (nominal 3' x 2' and 2' x 2') are supplied to cover the outlet air side of the frame bank. Wing nuts for attaching filters are supplied with the filter hardware.

Install the top row of filters first, with the top edge inserted under the "Z" clamps. Bend these clamps, if necessary to make a snug fit. Push the filter against the frame allowing it to be supported on studs below. Loosely screw on the wing nuts below these filters and tighten after the lower row of filters are installed.

Name Plates (supplied in "Instruction Package") are installed on the outside of the two duct access doors. See Fig. 29. They include a high voltage warning, special cleaning requirements and unit identification.

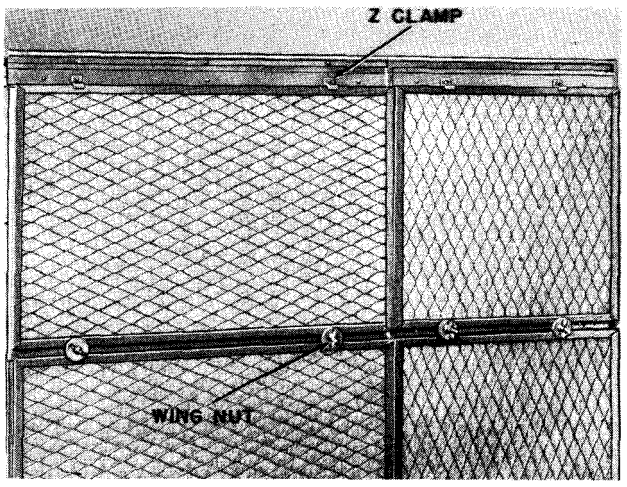


Fig. 34. Installation of Filters

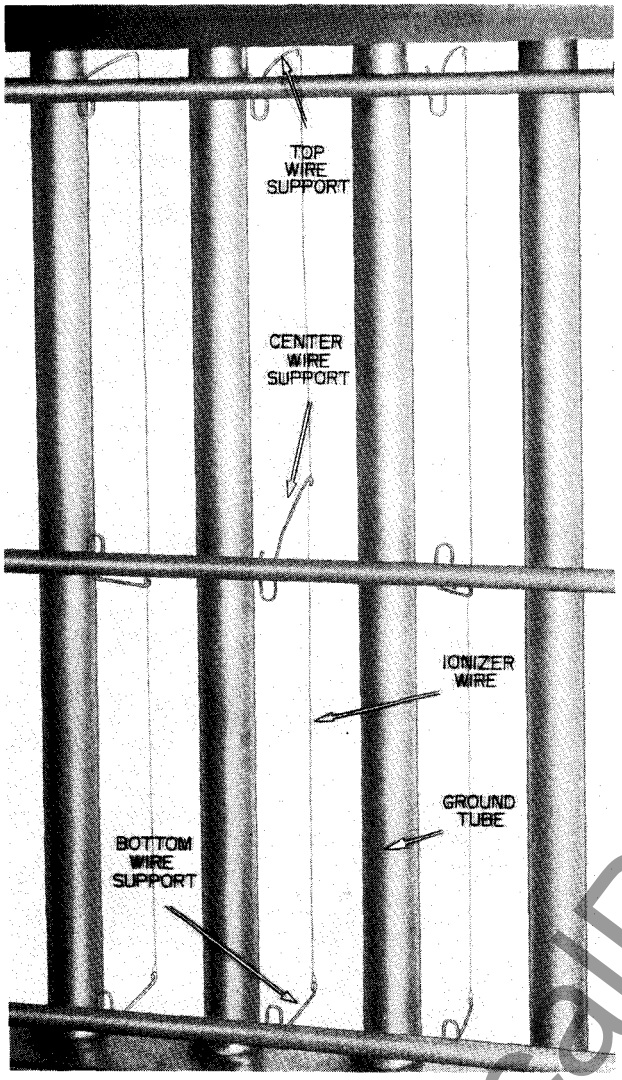


Fig. 36. Details of Ionizers

Inspection Before Washing when the cells are coated with dirt, is a good way to check overall operation.

1. Dirty outlet filters indicate too infrequent washings, excessive air velocity, or operation with the unit de-energized.

2. Some filters dirtier than others, suggest broken ionizer wires, missing high voltage connections, or uneven air distribution.

3. Dirt streaks at sides and top of the frame bank indicate bypassing or leakage of uncleaned air.

Washing the Unit . (See "Water Supply" for water requirements).

1. Turn off fan during washing.

2. With power switch on, move PRECIPITRON-WASHER SWITCH to "Washer" position and WASH-ADHESIVE SWITCH to "Wash" position.

3. Turn on hand water valve. (Optional solenoid valve will not open until header starts to travel). See "Header Maintenance".

4. Hold HEADER SWITCH on until HEADER PILOT LIGHT stays on.

5. After HEADER PILOT goes out, repeat step 4, five or more times as required.

6. Turn water off and allow approximately 20 minutes for excess water to drain and dry. Cell plates should be reasonably dry before applying adhesive. (Drying time may be facilitated by running fan without moving switch to PRECIPITRON position).

Adhesive Requirements . Westinghouse adhesive should be ordered to replace the initial supply furnished. Allowing for unavoidable waste, approximately 1-1/2 gallons of type T-675 adhesive will be required annually for each 1000 cfm unit capacity.

During cold weather, type T-675 adhesive (amount required for one cycle) should be stored at temperatures above 60°F. for 24 hours before using. (This adhesive gets too viscous for good spray pattern when cold) T-675 adhesive should not be diluted with water. Should other types of Westinghouse adhesive be used, be sure to follow any special instructions on the label of the container.

Applying Adhesive. After washing a new coating of adhesive is applied with fan turned off.

1. Insert suction hose (from adhesive pump) into adhesive container.

2. Move WASH-ADHESIVE SWITCH to "Adhesive" position.

3. Hold HEADER SWITCH on, until "Header" pilot light stays lighted. (See "Header Maintenance"). Adhesive will spray for one complete cycle and then stop.

4. Remove suction hose from container and replace cover on adhesive container.

5. Allow 10-15 minutes for excess adhesive to drain and then move PRECIPITRON-WASHER SWITCH to "PRECIPITRON" position. This turns on the power packs. (Some arcing may occur at the cell plates but this is harmless if the arcing subsides in a few minutes).

6. Turn fan on.

Header Maintenance. It is good practice to check the spray pattern of the water and adhesive nozzles at the start of the washing and adhesive cycles. (Cycle may be stopped by turning off POWER SWITCH). Residual dirt in the pipe lines may cause nozzle clogging on new units. If clean water is used there should be little trouble with stoppage of water nozzles. The adhesive filter should prevent clogging of adhesive nozzles.

Unscrew the nozzle cap to clean the internal elements. In replacing, be sure the slot in the disc is in a vertical position.

Water and adhesive nozzles should provide a vertical fan type spray which should cover the ionizers and cells. Pressure has much effect on the spray pattern. High pressure causes misting while low pressure will result in poor washing.

The adhesive spray pattern may be controlled by adjusting the pump pressure regulator. Turn clockwise to increase pressure.

Inspect the header drive system occasionally to be sure that the cable tension is adequate to drive the header properly and that the limit switches function properly. Dirty streaks across the unit indicate that the nearest nozzle is clogged. Slippage of cable at the drive pulley is usually because the cable is too slack. Do not tighten the cable excessively - just enough to keep the header from faltering during the full cycle.

Dirt Build-Up. Thorough washing at least once a month is recommended for best overall results. Infrequent or incomplete washing leaves a film of dirt which will give trouble if allowed to remain after each washing. If inspection discloses such a film, the cause may be: (a) low water temperature or pressure (b) clogged nozzles (c) low adhesive temperature or pressure or (d) using other than Westinghouse adhesive. Should the trouble persist after checking these points an occasional cleaning by one or the other of the following methods is recommended.

(1) Before washing, apply adhesive for one cycle. Allow to soak about 20 minutes. Thoroughly wash off with several cycles of 160-180°F. water. Allow to dry and repeat if necessary.

(2) If the above adhesive soaking method fails to clean the parts, a mild detergent may be used. Make a solution of about one pound of detergent ("ALL" or equal) to each gallon of 100-120°F. water. Apply this solution to the dirty components and allow to soak 10 to 20 minutes. Thoroughly flush with 160-180°F. water. Repeat if necessary to get the parts metal clean. It is better to apply the detergent with a separate spray gun to prevent clogging of the adhesive system. If the adhesive pump and header nozzles are used to apply the solution, the system must be flushed with hot water and thoroughly dried before adhesive is used again, being sure to replace or dry out the adhesive filter cartridge. Drying is important.

Air Filter Inspection is recommended at least once a year. (Splash during washings should keep these filters reasonably clean). Remove the filters and inspect for cleanliness. They may be cleaned by hosing with hot water. If necessary, a mild detergent may be used. (See "Dirt Build-Up"). Before replacing the filters, inspect the outlet air side of the cell plates to determine the effectiveness of regular washings.

Early Design Late Design
Fig. 37. Types of Ionizer Insulators

Lubrication. The shaft bearings on the header drive mechanism should be lightly oiled yearly. The motor gear reducer should be greased or oiled as specified on the manufacturer's tag included with the unit. The Micarta pulleys which guide the drive cable have sealed ball bearings and require no lubrication. Grease the adhesive pump every three months with a small amount of waterproof grease using the Zerk fittings provided.

Adhesive Pump Maintenance. Should the pump vibrate or make excessive noise, check the pump-motor alignment. It may be necessary to periodically tighten up on the packing nut to prevent leakage around the shaft. If packing is too tight the motor will overheat.

Adhesive Filter Maintenance. The replaceable cartridge should be inspected at least once a year and replaced if found dirty.

LOCATION AND CORRECTION OF FAULTS

Replacing Ionizer Wires. Occasionally an ionizer wire may break due to careless handling or due to prolonged use. It is advisable to have several pre-formed wires on hand to save installation time. A simple jig for this purpose may be made with two headless nails (approximately 1/16" diameter) in a board, spaced 21" apart. With the tungsten wire (spare spool supplied with accessories) make one turn around the nail and three turns around the wire itself, forming a loop on both ends of the wire. Bend off excess wire ends as close as possible. Be careful not to kink the wire because it will be weakened at this point.

When replacing wires, be sure to remove all broken pieces and discard outside the duct. Loose pieces of wire can cause a short circuit and are very hard to locate. Install the replacement wire as shown in Fig. 36.

TABLE NO. 2 OPERATION CHART

NORMAL OPERATION	FAULT INDICATION	PROBABLE CAUSES
Sentinel breaker switch on. Normal indicating lamp lit. Short circuit lamp not lit.	Normal indicating lamp not lit. Sentinel breaker switch on. Short circuit lamp not lit.	1. No power supply voltage to power pack. 2. Door switches not closed. 3. Poor contact in a door interlock switch. 4. Burned out indicating lamp.
	Short circuit lamp lit. Sentinel breaker switch on, or breaker has tripped and short circuit lamp lights as breaker is reset.	1. Foreign conducting material between cell plates. 2. Broken ionizing wire touching grounded equipment. 3. Short circuited wiring inside power pack. 4. Faulty HV transformer or capacitor.
	Sentinel breaker switch is tripped. (System otherwise normal when breaker is reset.)	1. Temporary short circuit which has cleared. 2. Momentary surge of excessive line (primary) voltage.
	Blue glow around tube filament.	1. A blue glow is serious only if it is pronounced and appears to be increasing.
The tube filaments approximate a clear incandescent lamp in color, when observed through the window in the power pack door.	Tube does not glow at all.	1. Burned out filament. 2. Open circuit in transformer filament winding. 3. Poor contact between tube prongs and socket.
Occasional arcing or crackling between cell plates is not serious, usually being due to large particles passing between the plates. Some arcing may occur after applying adhesive but should soon stop.	Continual crackling or arcing in cells.	1. Excessive dirt build-up is short circuiting cells. 2. Insulators are dirty, cracked, broken. 3. Broken ionizing wire drawn into cell. 4. Burned out tube in power pack (13 kv portion).
Only clean air should appear on the leaving air side of the cell bank, with circuits, indicating lamps and voltages normal.	Filters excessively dirty or dirt particles on the clean air plenum floor or walls.	1. Dirt on ionizer causing inefficient ionizer operation. 2. Low voltages or a defective power pack. 3. Cell plates not properly coated with adhesive. 4. Improper air distribution: (a) Baffles improperly placed. (b) Fan speed increased or system resistance reduced. (c) Dampers have shifted. 5. Leakage of dirty air into ductwork on clean air side of cell bank. 6. Missing or disconnected ionizer or cell connectors.

Replacing Ionizer Insulators . Late design ionizer insulators are held in place by spring pressure. See Fig. 37. If removal of the high voltage frame work or insulators is necessary, proceed as follows being careful not to drop the insulators: (a) Grasp the frame work with the right hand near the upper left insulator support hole. (b) Grasp the insulator with the left hand. (c) Pull the frame work away from insulator, racking the corner inward so that the insulator can be disengaged and removed from the front. (d) Remove the upper right and lower left insulators in a similar manner being careful not to drop the lower right insulator after the other three insulators have been removed. Assembly should be in the reverse order. During the process anchor the frame work so that force can be directed where necessary.

Electrical Faults can usually be found by careful inspection. Wiring diagrams (Figs. 29, 30 & 31) should be helpful in analyzing possible troubles. Reference to "Operation" and "Operational Check of Washing & Adhesive System" will also aid in locating and correcting faults in the header control box. Common faults and probable causes in the POWER PACK - FRAME BANK circuits are shown in the "Operation Chart". These points should be checked first before attempting the more difficult process of elimination.

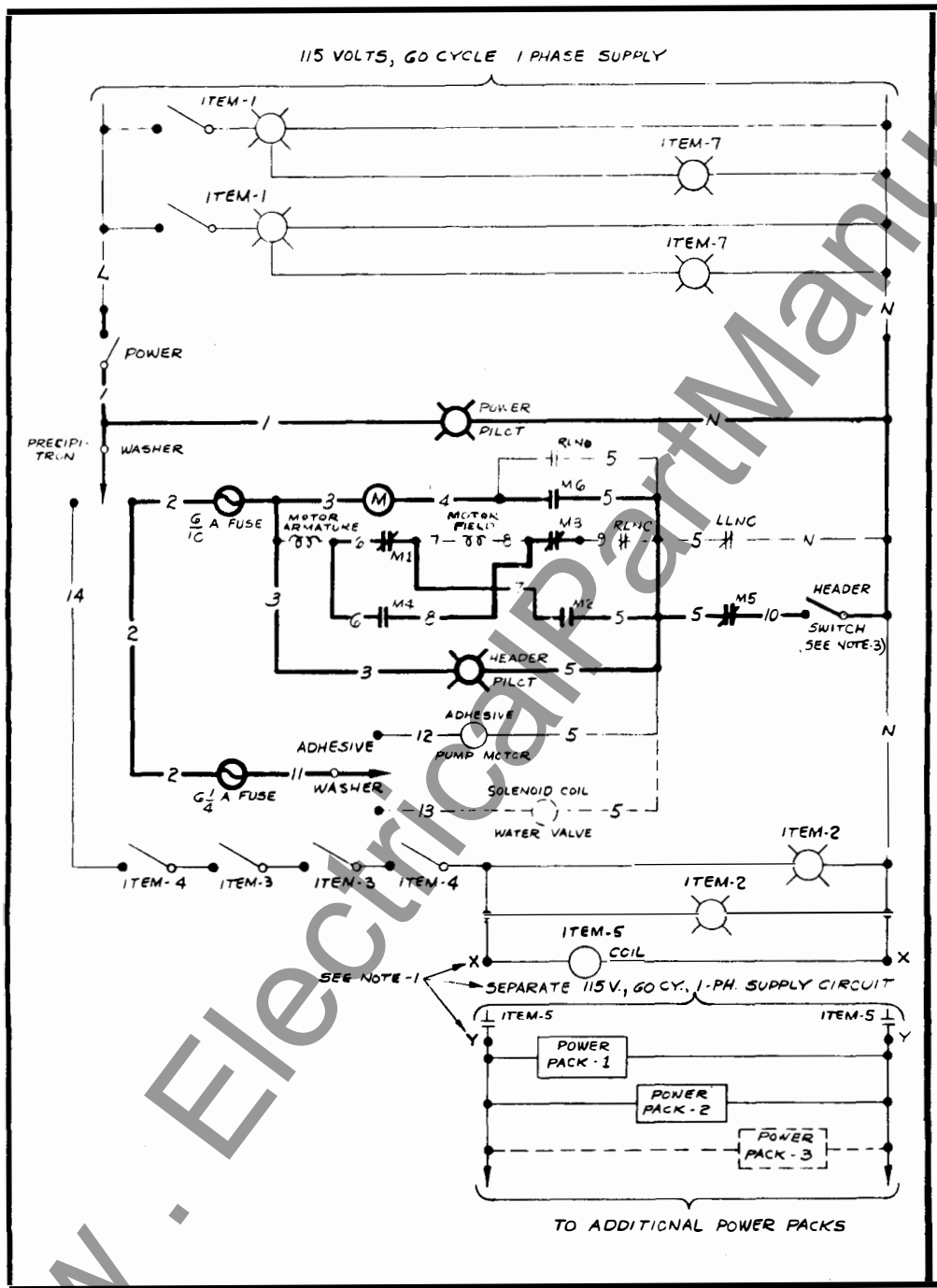
If a high voltage short circuit cannot be located by inspection, first thoroughly wash the frame bank if dirty. Next disconnect the cell and ionizer cables at the power pack terminals (see caution below). Close the power pack door and turn on the circuit breaker. Continued glowing of the short circuit light indicates that the trouble is in the power pack. Consult the power pack instruction book for detailed corrective procedure. If the short circuit light does not light after disconnecting these cables, the trouble is either in the cells, ionizers or the high voltage cables. This may be localized by alternately connecting one cable to the power pack and then disconnecting cell or ionizer jumper cables and tier connectors until the faulty part is located. The individual cell or ionizer high voltage section may be removed if necessary for close examination and correction of the fault.

CAUTION The above test procedure involves handling parts which are normally charged with high voltage. Always turn "off" the power packs and allow at least 1/2 minute before touching the high voltage parts. This time delay is to permit the residual charge in the capacitor and cells to drain to a safe value through the discharge resistor in the power pack. It is also good practice to ground the part with a grounded prod equipped with a suitably insulated handle.

TYPE PX PRECIPITRON HORIZONTAL AIR FLOW

LOW VOLTAGE WIRING

Supersedes Wiring Diagram Figure 29, Page 12, IB-1415-1



LEGEND

Wiring and parts furnished with washer control box.

——— Wiring by others.

------ Optional by others.

RLNO - Right hand limit switch contact - open in free position.

RLNC - Right hand limit switch contact - closed in free position.

LLNC - Left hand limit switch contact - closed in free position.

M - Sequencing relay. Contacts M1 to M6 shown with coil de-energized.

NOTES

1. For units with 1 or 2 power packs, connect terminals x-x to y-y. (lt. 5 and sep. supply cir. are not required.) For units with 3 or more power packs, install contactor (lt. 5) and sep. supply cir. as shown.

2. Connections shown are for L.H. mounting of the header drive mech. (facing inlet air side). For R.H. mtg., the opposite hand limit sw. contacts must be used (i.e., substitute LLNO for RLNO, LLNC for RLNC and RLNC for LLNC).

3. Header travel is started by flipping on header switch until header pilot stays lit.

IMPORTANT: See Instructions on page 2

WESTINGHOUSE ELECTRIC CORPORATION

AIR CLEANING PRODUCTS DEPARTMENT • HYDE PARK, BOSTON 36, MASS.

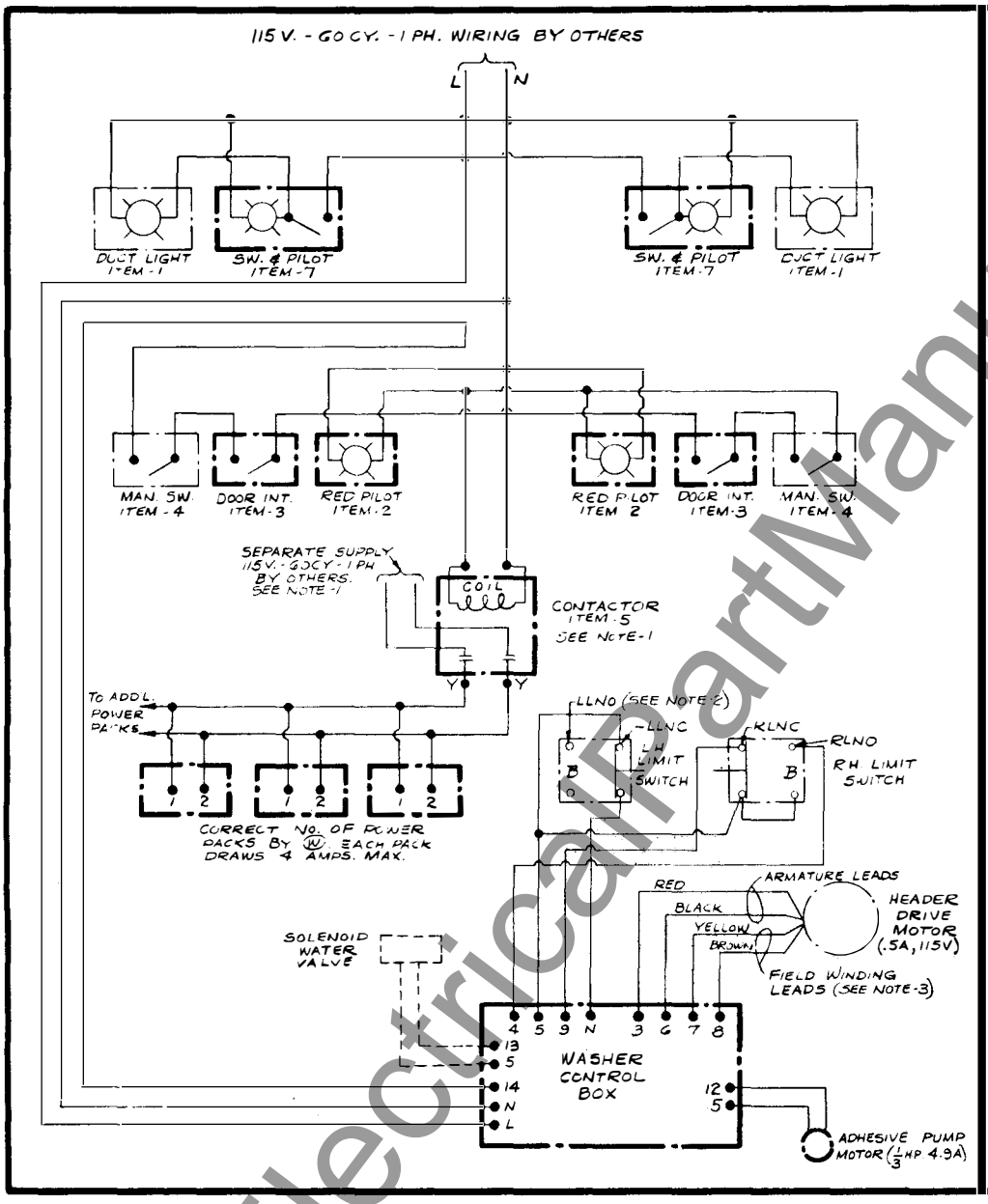
SUPPLEMENT TO IB-1415-1

EFFECTIVE MAY, 1955 **EFFECTIVE MARCH, 1956**

TYPE PX PRECIPITRON

TYPICAL LOW VOLTAGE WIRING

Supersedes Figure 30, Page 13, IB-1415-1



LEGEND

——— Wiring by others.

– – – Equipment by W - Locate inside duct.

—·—·— Equipment by W - Locate outside duct.

———— Optional by others.

NOTES

1. For units with 1 or two power packs, connect terminals x-x to y-y. (It. 5 and sep. supply cir. are not required.) For units with 3 or more power packs, install contactor (It. 5) and sep. supply circuit as shown.

2. Connections shown are for L.H. mounting of header drive mech. (facing inlet air side). For R.H. mounting, the opposite hand limit sw. contacts must be used (i.e., substitute LLNO for RLNO, LLNC for RLNC and RLNC for LLNC). All limit switches are shown in free position.

3. Interchange yellow and brown leads (7 & 8) if necessary to obtain correct rotation of motor.

4. See Fig. 29 for description of "Items".

INSTRUCTIONS

Recent changes in Type PX PRECIPITRON Units require different exterior wiring connections than those shown in IB-1415-1 (Effective May 1955). Units may be identified by checking the make of motor and the style of control box as follows:

Design	Make of Header Drive Motor	Control Box Style Number (Stamped on Nameplate)	Required Wiring Connections
Late	Rae	22B4284G2	As shown on this supplement
Early	Bodine	22B4284G1	As shown in IB-1415-1

Motors or control boxes for the two designs are not interchangeable.
On late design units, the spray header does not pause when it trips the far limit switch.