



**MODEL
ESP-JV SYSTEM
INSTALLATION,
OPERATION
& MAINTENANCE
MANUAL**

**Central Air Conditioning Series
2 to 5 Tons
Fan Coil Unit/Air Supply
Components**



SECTION 1: INTRODUCTION

SpacePak System Design.....	2
Code Compliance.....	2
Air Distribution Requirements	2
Air Distribution Components.....	3
Warranty Information.....	Back Cover
Shipment of Unit.....	5

SECTION 2: SYSTEM INSTALLATION

Step 1: Locating the Unit.....	6
Step 2: Cutting Return Air Opening.....	7
Step 3: Attaching Supply Air Plenum Adaptor.....	8
Step 4: Setting the Unit.....	8
Step 5: Connecting Refrigerant Lines.....	8
Step 6: Installing the Condensate Trap & Line.....	9
Step 7: Wiring the Unit.....	10
Step 8: Installing Air Distribution Components.....	12

SECTION 3: START UP & OPERATION

Sequence of Operation.....	16
Prior to Start-Up	16
System Start-Up & Adjustments.....	16
Charging Cooling Only Systems.....	17
Factors Affecting the Balance of the System.....	17

SECTION 4: MAINTENANCE

Before Each Cooling Season.....	18
If System Fails to Operate.....	18
Troubleshooting Guide.....	19-23
Service/Troubleshooting Form.....	24
Parts List.....	25



IN UNITED STATES: 260 NORTH ELM ST. WESTFIELD, MA 01085 (413) 564-5530/FAX (413) 564-5815
IN CANADA: 7555 TRANMERE DRIVE, MISSISSAUGA, ONTARIO, L5S 1L4 (905) 670-5888/FAX (905) 670-5782

Section 1: INTRODUCTION

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the product:

▲ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

▲ WARNING Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

▲ CAUTION Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or property damage.

NOTICE: Used to notify of special instructions on installation, operation or maintenance which are important to equipment but not related to personal injury hazards.

SPACEPAK SYSTEM DESIGN

SpacePak is a hi-velocity central air conditioning system which utilizes a conventional outdoor condensing unit matched with the indoor Model ESP-JV fan coil unit to provide conditioned air through the specially-designed, pre-fabricated flexible duct system. The system and its basic components operate the same as in any conventional air-to-air cooling system.

The SpacePak system is covered by the following U.S. Patents: 3,507,354; 3,575,234; 3,596,936; 3,605,797; 3,685,329; 4,045,977; 4,698,982; 926,673 and Canadian Patents: 891,292; 923,935; 923,936.

CODE COMPLIANCE

Fan coil unit installation must conform to the requirements of the local authority having jurisdiction or, in the absence of such requirements, to the National Board of Fire Underwriters regulations. Fan coil unit meets ETL listing requirements.

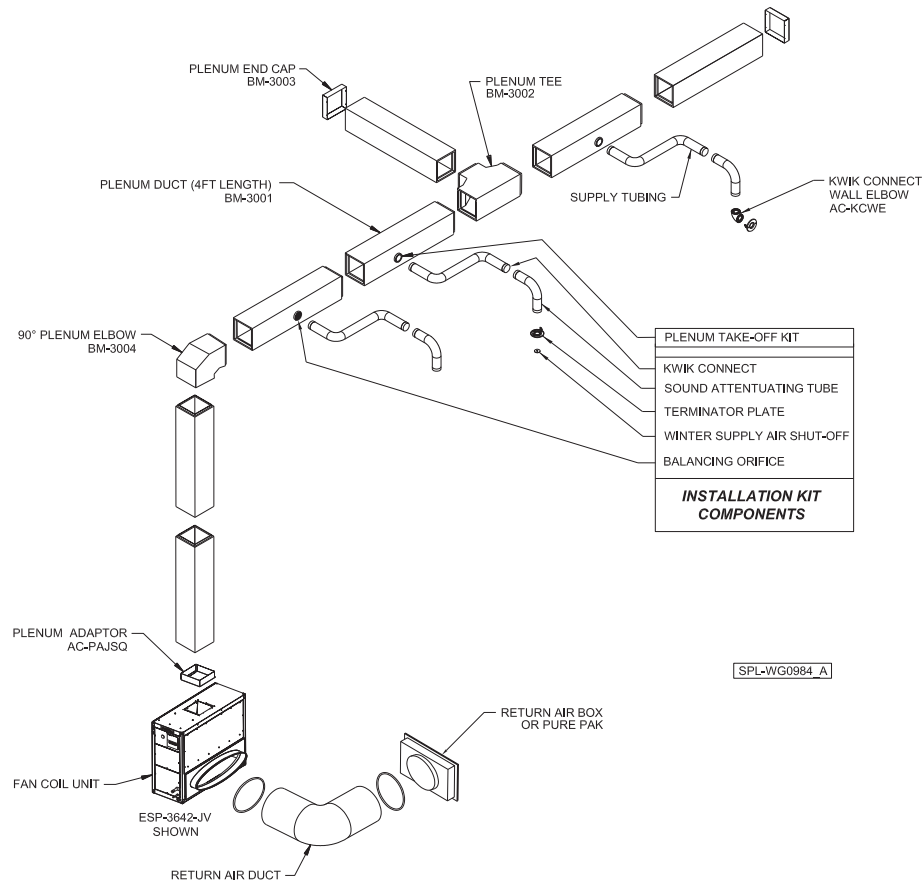
All electrical wiring must be in accordance with the National Electrical Code ANSI/NFPA No. 70-latest edition and any additional state or local code requirements. If an external electrical source is utilized, the fan coil unit, when installed, must be electrically grounded.

NOTICE: It is a requirement of the International Mechanical Code (307.2.3) to install a secondary drain or an auxiliary drain pan where damage to any building components will occur as a result of overflow from the equipment drain pan or stoppage in the condensate drain piping from a cooling or an evaporator coil. Follow local code requirements.

AIR DISTRIBUTION SYSTEM COMPONENT REQUIREMENTS

Air distribution components installation must conform to the requirements of local authority having jurisdiction or, in the absence of such requirements, to the National Fire Protection Association 90A or 90B.

Do not begin the installation of the system without performing a load calculation to determine heat gain, system layout and material take-off. If a layout plan is not already available and room terminator requirements determined, then refer to the SpacePak Application Manual, SP9, to complete this information. A description of air distribution system components is shown in Figure 1.1.



SPACEPAK
ASSEMBLY, ESP-JV & 10 INCH SQUARE DUCT

RETURN AIR BOX (SPC-1D, AC-RBF-3, SPC-3D):

Each includes filter grill with metal frame, permanent filter, and 2 clamp bands. SPC-1D is for ESP-2430JV. AC-RBF-3 is for ESP-3642JV and SPC-3D is for ESP-4860JV.

RETURN AIR DUCT (SPC-4,5, & 6): Flexible, 10 feet long with round shape. SPC-4 (15" dia.) for ESP-2430JV. SPC-5 (19" dia.) for ESP-3642JV and SPC-6 (24" dia.) is for ESP-4860JV.

PLENUM ADAPTOR: 9" round OR 10" x 10" square metal component to attach plenum duct to fan coil unit.

Plenum Adaptor - 9" Round - AC-PAJ

Plenum Adaptor - 10" x 10" Square - AC-PAJSQ

PLENUM DUCT & COMPONENTS: May be 9" round sheet metal or 10" x 10" (O.D.) square, fiberboard duct types as specified by the installing contractor. Above layout is shown as an illustrative assembly reference only.

SUPPLY TUBING (SPC-25-100): Flexible, insulated, 2" I.D. and 3-1/4" O.D. Each section is 100 feet long.

R6 SUPPLY TUBING (AC-ST6-75): Flexible, R6 insulated, 2" I.D. and 5-3/8" O.D. Each section is 75 feet long.

R8 SUPPLY TUBING (AC-ST8-50): Flexible, R8 insulated, 2" I.D. and 6-1/4" O.D. Each section is 50 feet long.

INSTALLATION KITS: Contains a specified amount of sound attenuating tubes, kwik-connects, terminator plates (incl. spring clips & screws), winter supply air shut-offs and a balancing orifice set to complete installation of room outlets. Supplied in (2) [AC-IKLT-2] and (5) [AC-IKLT-5] outlet boxed quantities.

PLENUM TAKE-OFF KIT: Contains a specific amount of plenum take-offs, gaskets and fasteners to complete installation of room outlets. Take-offs available for round sheet metal or square fiberboard duct as specified by installing contractor. Supplied in (2) [AC-TKMR-2] and (5) [AC-TKMR-5] outlet boxed quantities for round sheet metal and (2) [AC-TKFS-2] and (5) [AC-TKFS-5] outlet boxed quantities for square fiberboard.

KWIK CONNECT WALL ELBOW (AC-KCWE): To allow for wall terminations in 2" x 4" stud spaces.

PLIERS (SPC-72): To assure full setting of all clips (fasteners) in plenum take-off (not shown).

PLENUM HOLE CUTTER (SPC-71-10): To cut 2" hole in fiber board for plenum take-off installation (not shown).

FIGURE 1.1: AIR DISTRIBUTION SYSTEM COMPONENTS

Plenum Duct

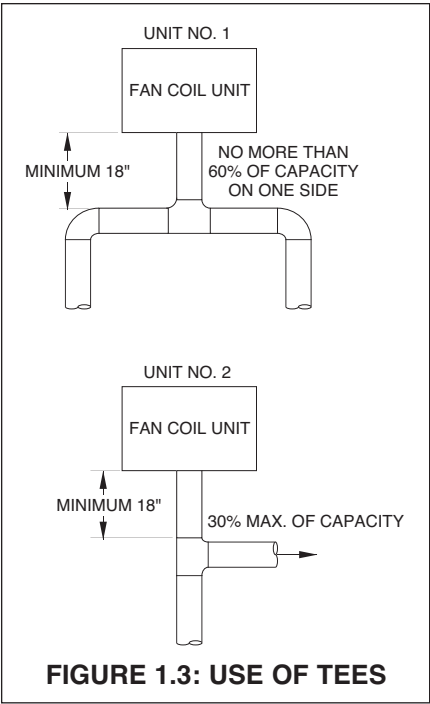
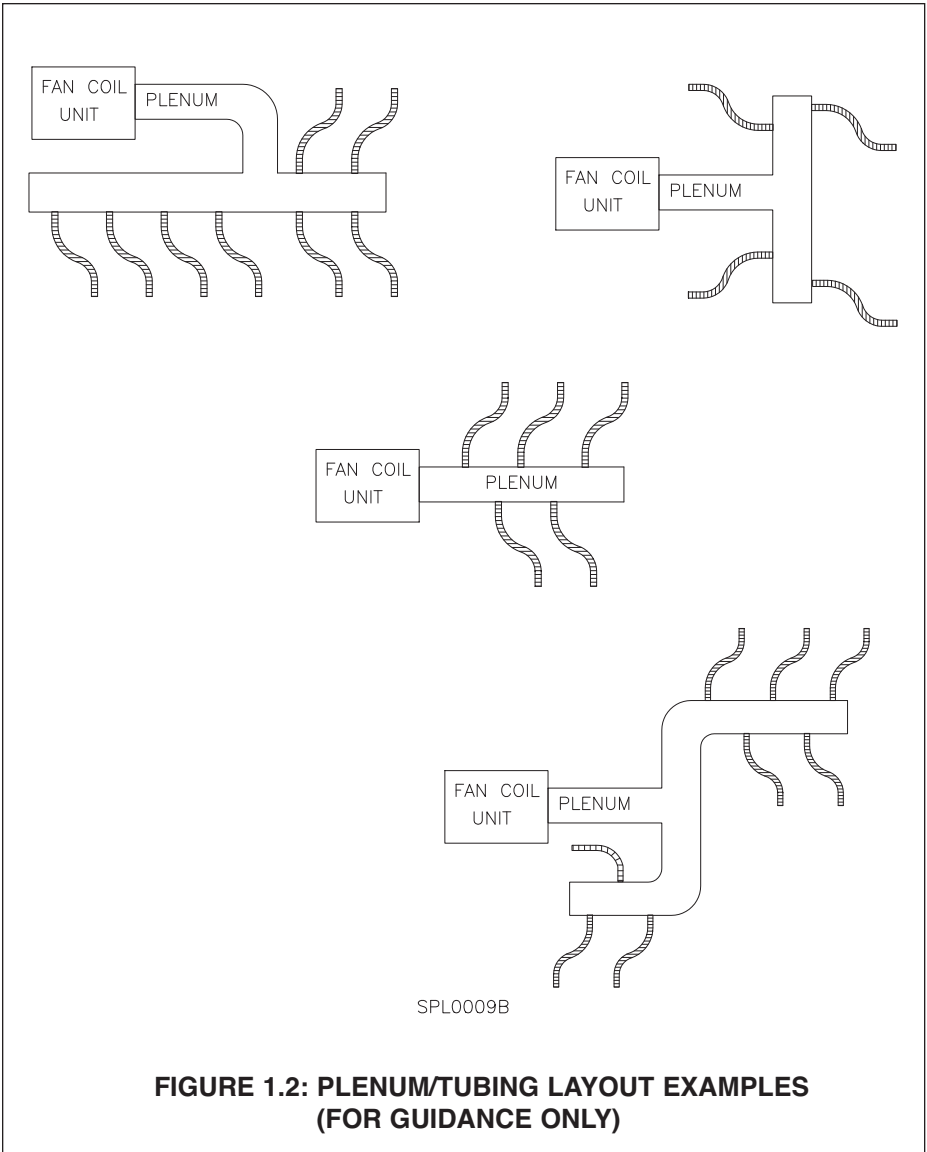
The plenum duct can be run in practically any location accessible for the attachment of the supply tubing (see suggested layouts in Figure 1.2). The plenum is normally located in the attic or basement, and it is usually more economical to run the plenum where it will appreciably shorten the lengths of two or more supply runs.

In some two-story split level homes, it may be advantageous to go from one level to another with the plenum duct. Whenever necessary, either between floors or along the ceiling, the small size of the plenum makes it easy to box in.

The fan coil unit is designed to operate with a total external static pressure of 1.5 inches of water column (minimum 1.2 - maximum 1.5). Excessive static pressure increases the air flow in individual runs and may cause some or all terminators to be noisy.

For systems designed with a bullhead tee installed as on Unit No. 1 (Figure 1.3), the best results are obtained if not more than 60% of the total number of system outlets are attached to any one branch of the tee. For systems with a branch tee installed as on Unit No. 2 (Figure 1.3), not more than 30% of the total number of system outlets should be attached to the perpendicular branch of the tee.

The ESP-4860JV has some additional plenum installation requirements that the smaller systems do not. This is due to the twin blower arrangement.



Supply Tubing

In the case of two-story or split-level applications, supply tubing may run from one story to another. It is small enough to go in stud spaces, but this is often difficult in older homes because of hidden obstructions in stud spaces. It is more common to run the supply tubing from the attic down through second story closets to the first story terminators.

Supply tubing runs in the corners of the second story rooms can be boxed in and are hardly noticeable since overall diameter is only 3-1/4" (Model Number SPC-25-100).

Room Terminators

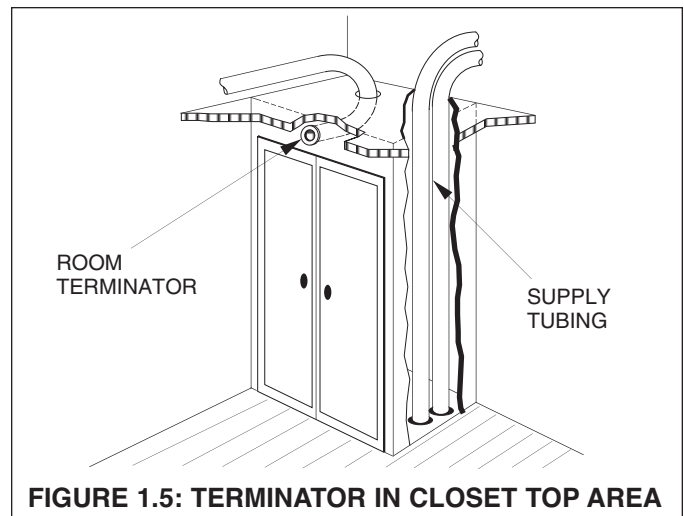
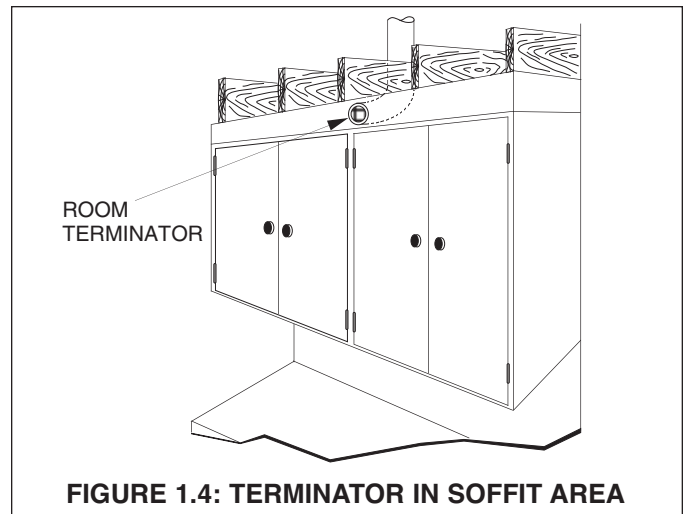
Terminators should be located primarily in the ceiling or floor for vertical discharge or high on a wall for horizontal discharge. Installation of horizontally discharged terminators is assisted with the SpacePak 90° wall elbow (see page 16). Two excellent spots for horizontal discharge are in the soffit area above kitchen cabinets (see Figure 1.4) and in the top portion of closets (see Figure 1.5).

Terminators should always be out of normal traffic patterns to prevent discharge air from blowing directly on occupants. And they should not be located directly above shelves or large pieces of furniture. Outside wall or corner locations are recommended if the room has more than one outside wall. Locating terminators away from interior doors prevents short cycling of air to the return air box.

SHIPMENT OF UNIT

Each fan coil unit is shipped in a single carton. Packed with the unit, there are vibration isolation pads, a condensate trap assembly and a factory installed primary float switch.

Each unit comes from the factory charged with nitrogen. When the unit is unsealed, a slight "pop" or "hissing" noise should be heard. This guarantees that the unit is properly sealed.



SECTION 2: SYSTEM INSTALLATION

NOTICE: Before proceeding with the installation, we recommend reading through this section of the manual for an overall understanding of the air conditioning fan coil unit and air distribution system component installation procedures.

STEP 1: LOCATING THE UNIT

The fan coil unit may be installed in an unconditioned space (as long as it is protected from the weather) or a conditioned space such as a basement, closet or utility room. Please refer to Figure 2.2 for unit sizes and recommended service clearances.

When selecting a location, consider the location of the unit in relation to the return air box or filter box as shown in Figures 2.3, 2.4. The return air duct should have at least one 90° bend to avoid unnecessary sound feed-back to the living space from the fan coil unit.

When selecting a location, consider the layout of the plenum duct, supply tubing, refrigerant lines and condensate drain line.

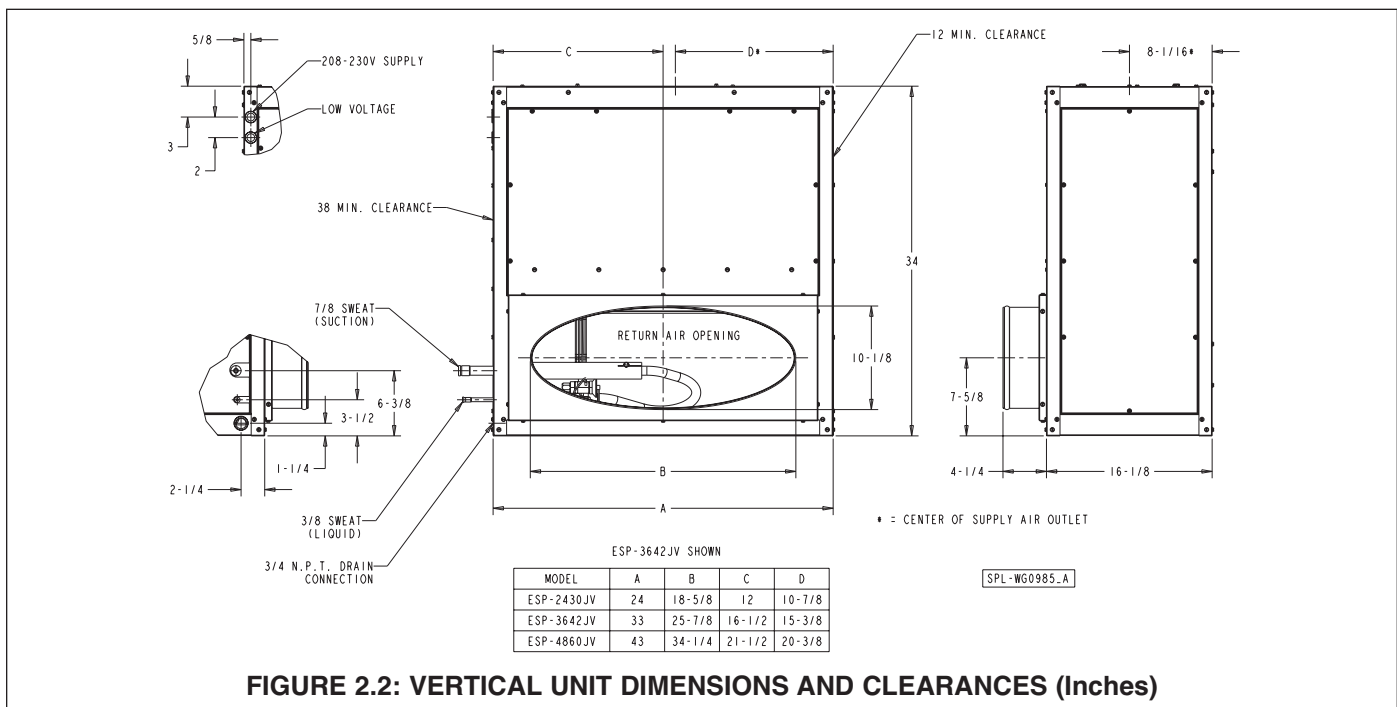
When installing the unit above a finished ceiling or living space, install a secondary drain pan. Always follow local code requirements.

Model	System Capacity (Nom. Tons)	Electrical* Characteristics	Connections				Recommended Condensing Unit	
			Suction Line	Liquid Line	Cond. Drain (FPT)	Return Inlet (Dia.)	Nominal Capacity (MBH)	Min SEER
ESP-2430JV	2 – 2-1/2	230/1/60	7/8"	3/8"	3/4"	15"	24 to 30	13+
ESP-3642JV	3 – 3-1/2	230/1/60	7/8"	3/8"	3/4"	19"	36 to 42	13+
ESP-4860JV	4 – 5	230/1/60	7/8"	3/8"	3/4"	24"	48 to 60	13+

*Unit includes optional conversion kit to 115V

Model	System Capacity (Nom. Tons)	Blower				Coil			Ship. Wt. (lbs)
		Air Volume @ 1.5" WC (SCFM)	Wheel Dia. and Width	Motor HP	F.L. Amps	No. of Rows Deep	Holding Charge (Dry Nitrogen)	Flow Control Type	
ESP-2430JV	2 – 2-1/2	440, 550	10" x 6"	3/4	5.6/2	6	7 psi	Exp. Valve	135
ESP-3642JV	3 – 3-1/2	660, 850	10" x 6"	3/4	7.6/4	6	7 psi	Exp. Valve	170
ESP-4860JV	4 – 5	880, 1150	10" x 6"	3/4	10.6/5.4	6	7 psi	Exp. Valve	210

FIGURE 2.1: MODEL ESP-V SPECIFICATIONS



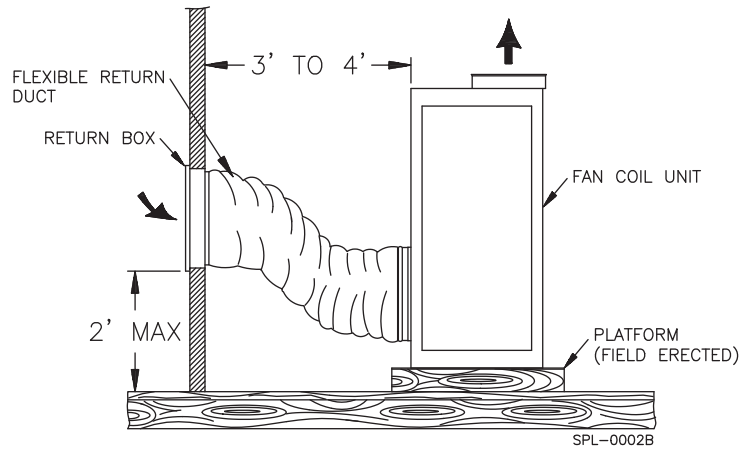


FIGURE 2.3: TYPICAL CLOSET/UTILITY ROOM INSTALLATION

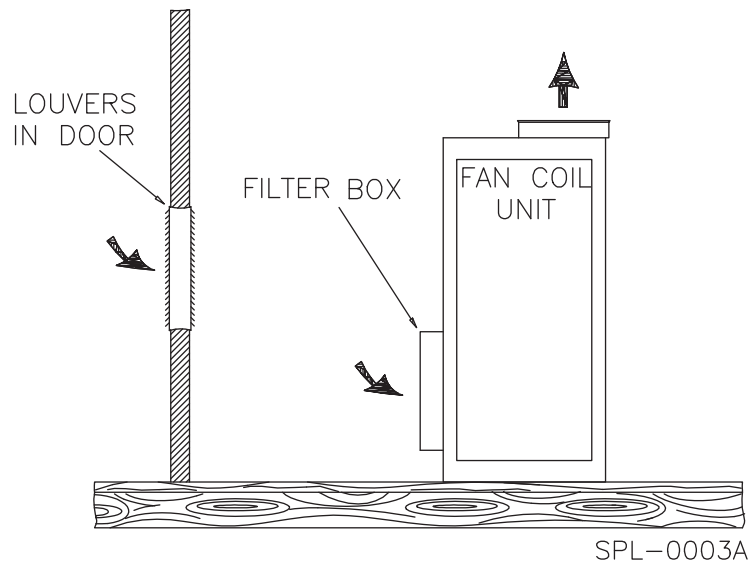


FIGURE 2.4: TYPICAL CLOSET INSTALLATION

STEP 2: CUTTING RETURN AIR OPENING

Select the exact location for the return air box. Avoid installing the box in the dining room, living room, kitchen, etc., unless the return air duct can be installed with at least two 90° bends (accomplished by joining two return air ducts together).

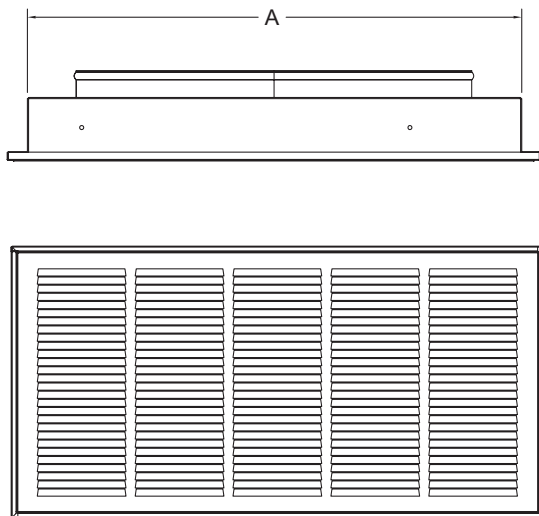
SpacePak optionally supplies Direct Mount Filter Box Models SPC-3B for ESP-2430JV, SPC-4B for ESP-3642JV and SPC-5B for ESP-4860JV units. A direct-mount filter box may be installed directly to the unit (see Figure 2.4).

Cut the rough opening for the return air box 14-1/2" wide by the "A" dimension (Figure 2.5) of appropriate unit size. These openings will accommodate the return air box with sufficient frame lip to cover the opening (See Figure 2.5).

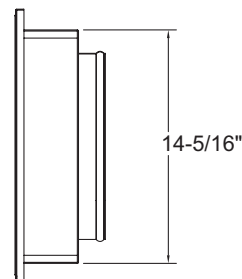
Where joists are 16" on center, the return air box should fit between successive joists. Where joists run in the opposite direction, or to properly center the return, it may be necessary to cut joists and install headers.

For wall return applications, cut the return air opening to accommodate the return air box. Do not place the opening on a straight path to the return air panel. Locate the opening at a different height or at a right angle to the return air panel as shown in Figure 2.3. Alternately, units can be installed without the return air duct as long as the return air is being freely pulled from the conditioned space and filtered before the return air opening.

Check the opening for the proper fit of the return air box. Do not install the return air box until the unit is fully installed if the hole is required to get material or equipment to the installation location.



Measure return air box dimension "A" to determine length of opening.
Height = 14⁵/₁₆"



DWG0045

FIGURE 2.5: RETURN AIR BOX FRAME DIMENSIONS

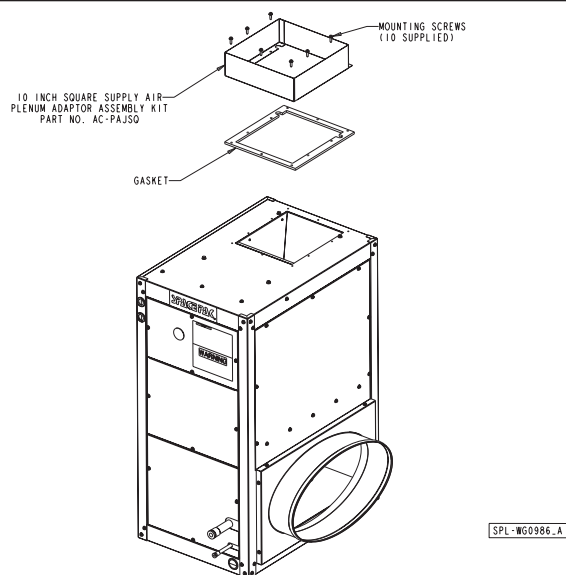


FIGURE 2.6: PLENUM ADAPTOR ASSEMBLY

STEP 3: ATTACHING SUPPLY AIR PLENUM ADAPTOR

Refer to Figure 2.6 and duct installation instructions supplied with fan coil unit.

STEP 4: SETTING THE UNIT

Construct a platform for the fan coil unit, as shown in Figure 2.7. The platform can be constructed of 2x4 (minimum), 2x6, 2x8, or 2x10 lumber. The lumber should be selected based on the minimum required height to achieve proper pitch of 1/4" per foot for condensate drain line. Table 1 shows the approximate run of condensate piping as a function of the framing lumber used to construct the platform. The platform covering should be plywood of a minimum thickness of 1/2".

If the platform is to be suspended from overhead, use 1/4" threaded rods. Otherwise secure the platform to the joists or floor depending on the location selected for the fan coil unit. Make sure the platform is level.

NOTICE: Allow space on sides for servicing.

Attach vibration isolation pads (supplied inside fan coil unit) to platform top as shown in Figure 2.7.

Place the unit on the fully prepared platform.

Do not secure the unit to the platform. The weight of the unit will hold it in position.

STEP 5: CONNECTING REFRIGERANT LINES

Connect refrigerant lines from the outdoor condensing unit to the fan coil unit in accordance with its manufacturer's sizing recommendations for the length of the piping run. Proper line sizing is critical to the operation of the system. Always use proper brazing procedures. A trickle flow (2PSI) of dry nitrogen to avoid scale or blockage in the piping system is recommended while brazing. SpacePak also recommends installing a sight glass on the liquid line outside of the unit as an aid for accurately charging the system.

LUMBER SIZE	2 x 4	2 x 6	2 x 8	2 x 10
MAXIMUM HORIZONTAL	8'	16'	24'	32'

TABLE 1: CONDENSATE PIPING RUNS

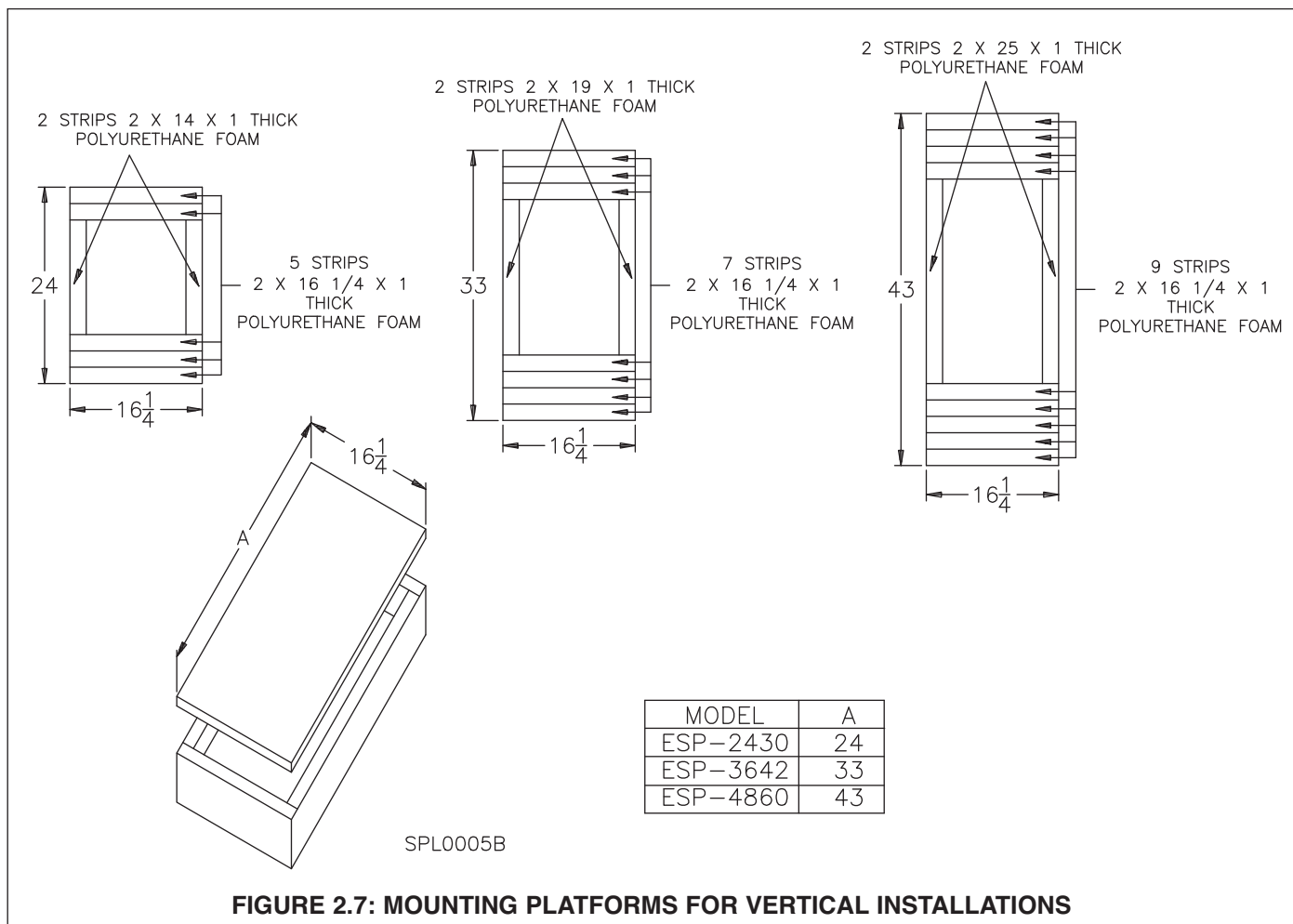


FIGURE 2.7: MOUNTING PLATFORMS FOR VERTICAL INSTALLATIONS

STEP 6: INSTALLING THE CONDENSATE TRAP & LINE

NOTICE: It is a requirement of the International Mechanical Code (307.2.3) to install a secondary drain or and auxiliary drain pan where damage to any building components will occur as a result of overflow from the equipment drain pan or stoppage in the condensate drain piping from a cooling or an evaporator coil. Follow local code requirements.

Refer to Figure 2.2 for condensate drain location. Components for the PVC condensate trap are provided in a separate bag with fan coil unit (see Fig. 2.8) and should be cemented together with PVC pipe cement.

CAUTION Do not use substitute trap. Do not cut off or alter trap components.

Thread male adapter (see Fig. 2.8) into unit condensate line connection. Assemble and cement remaining components together. Then cement assembly to male adapter. The 45° elbow provides an offset from beneath unit suction line for access to clean-out plug.

Run a condensate line from the trap to a suitable drain that is in accordance with local codes. Make sure the line is pitched 1/4" per foot.

NOTICE: Never connect condensate line to a closed drain system.

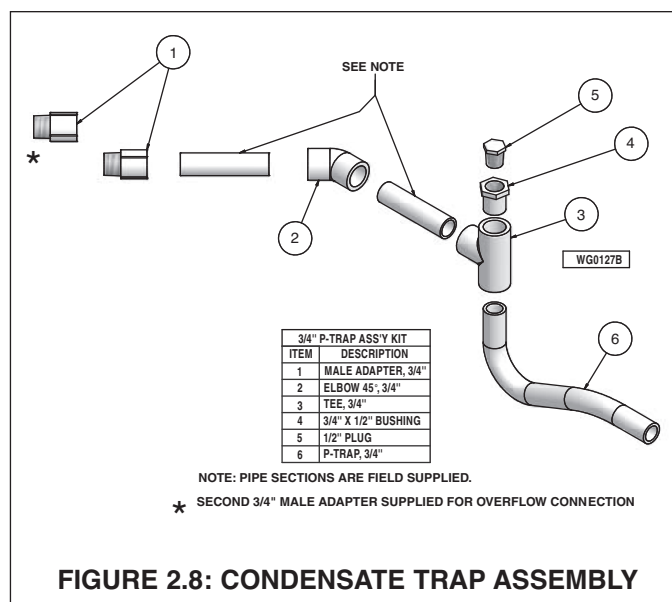


FIGURE 2.8: CONDENSATE TRAP ASSEMBLY

STEP 7: WIRING THE UNIT

⚠ WARNING Turn off electrical power supply before servicing. Contact with live electric components can cause shock or death.

All electrical and control wiring must be installed in accordance with the codes listed in Section 1 of this manual. Standard wiring diagram is provided in Figure 2.9. Optional wiring diagrams are provided in Figures 2.10-2.13. A separate 208-230/1/60 power supply is recommended for the unit. Use standard 15-amp fuse and 14-gauge wire from power supply to unit.

Connect power supply to Terminals L1 and L2 on the high voltage terminal block. Connect a ground wire to the equipment ground terminal located next to the high voltage terminal block.

The low voltage transformer in the unit has a 208 volt tap in the primary winding (color coded RED). If unit is to be operated with 208 volt electrical service, remove the 230

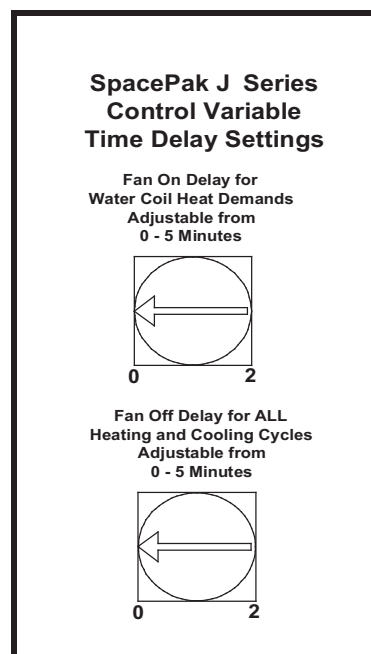
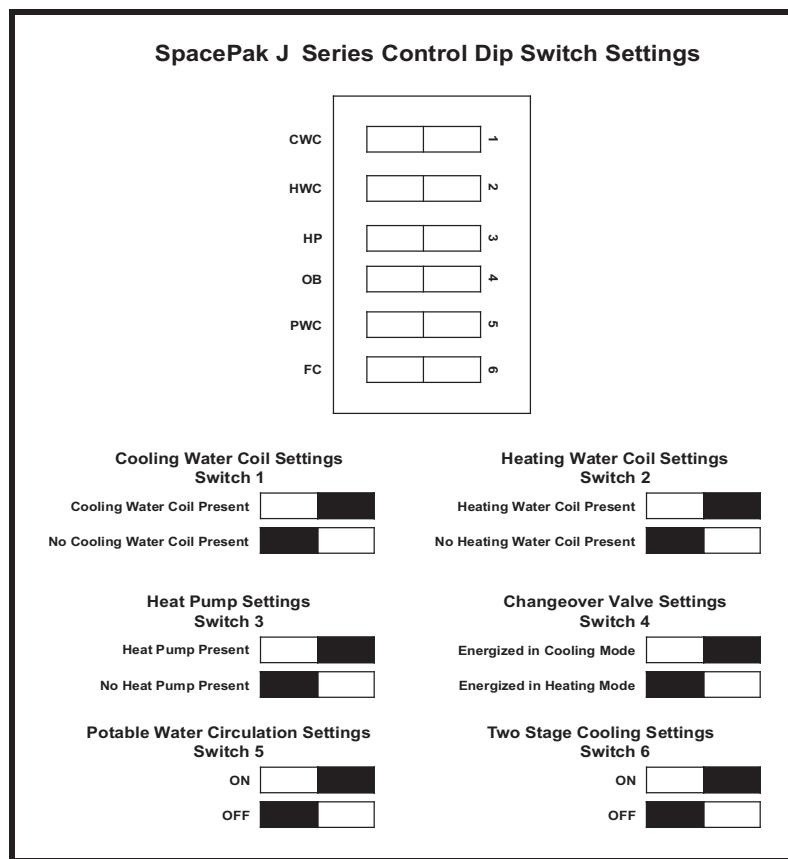
volt ORANGE lead from the L2 terminal and connect the 208 volt RED lead to the L2 terminal. Be sure to insulate the end of the unused ORANGE lead.

Locate the room thermostat on a wall near the return air box, between 40" to 48" from the floor. Connect the low-voltage thermostat wiring from the room thermostat to the low voltage control block in the unit.

Connect low voltage from fan coil unit to condensing unit as shown in Figure 2.9.

Set DIP switches according to application. See SpacePak J Series Control DIP switch settings below.

Alternately, the unit may be configured to run on 115V, 60 Hz power. Refer to kit WG0858 for instructions and material to convert from 230V to 115V shipped with the unit.



SpacePak J Series Control Indicator LEDs

Power Indicator

The Power indicator will blink to indicate that the control is operational.

Fan Prove Indicator

The Fan Prove indicator will illuminate when there is power to the fan and the optional damper is in the open position.

Note: The Fan Prove Terminal will also energize with 24VAC when the above conditions are met.

Fault Indicator

Fault Flash Codes:

Float Switch	1 Flash
Anti-Frost Switch	2 Flashes
Fan Prove Fault	3 Flashes

Note: All Flash Codes are latched until power is cycled, even if the fault is cleared. The Float Switch requires power to be cycled to resume operation.

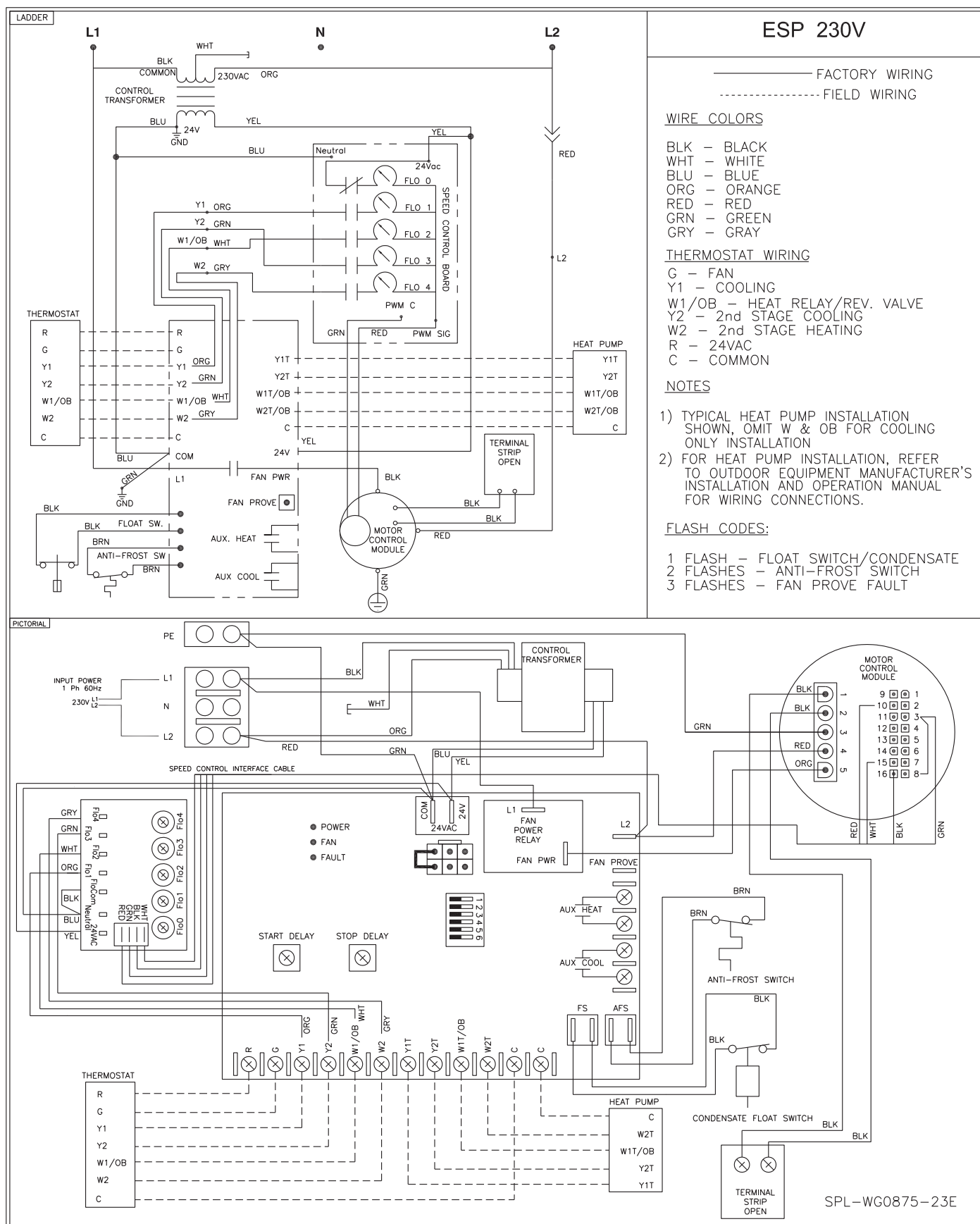


FIGURE 2.9: MODEL ESP-JV STANDARD WIRING SCHEMATIC

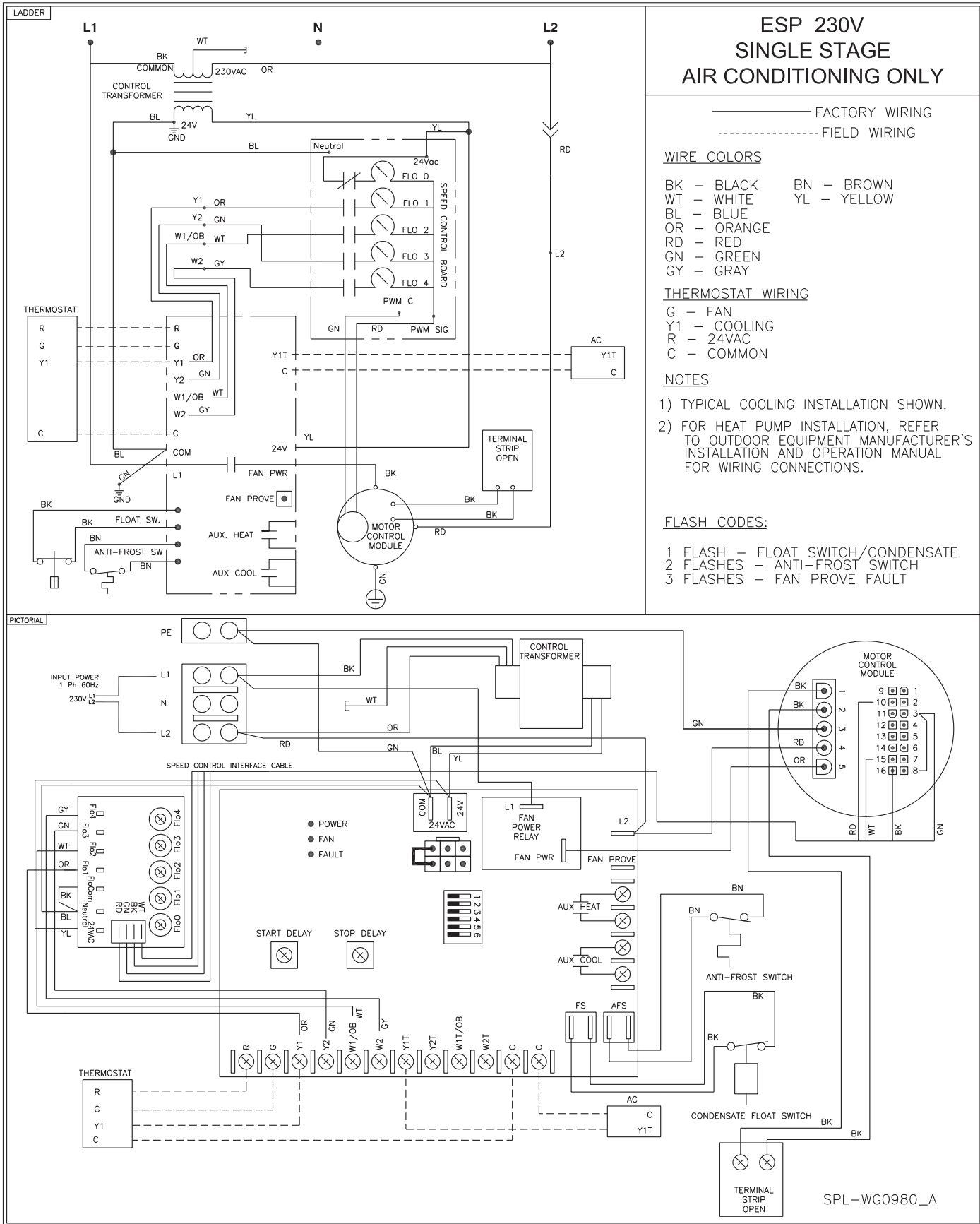


FIGURE 2.10: SINGLE STAGE AIR CONDITIONING ONLY WIRING DIAGRAM

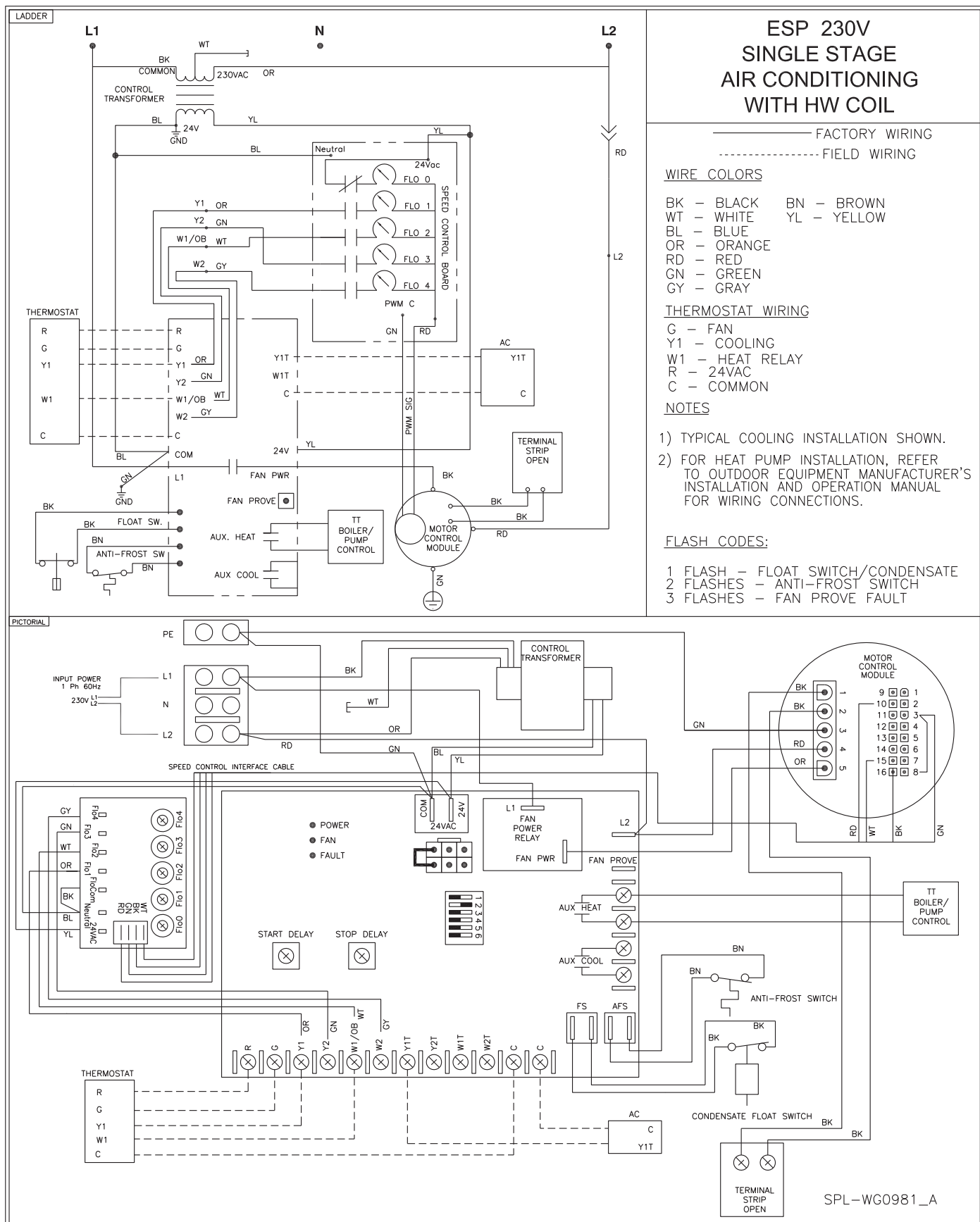


FIGURE 2.11: SINGLE STAGE AIR CONDITIONING WITH HW COIL WIRING DIAGRAM

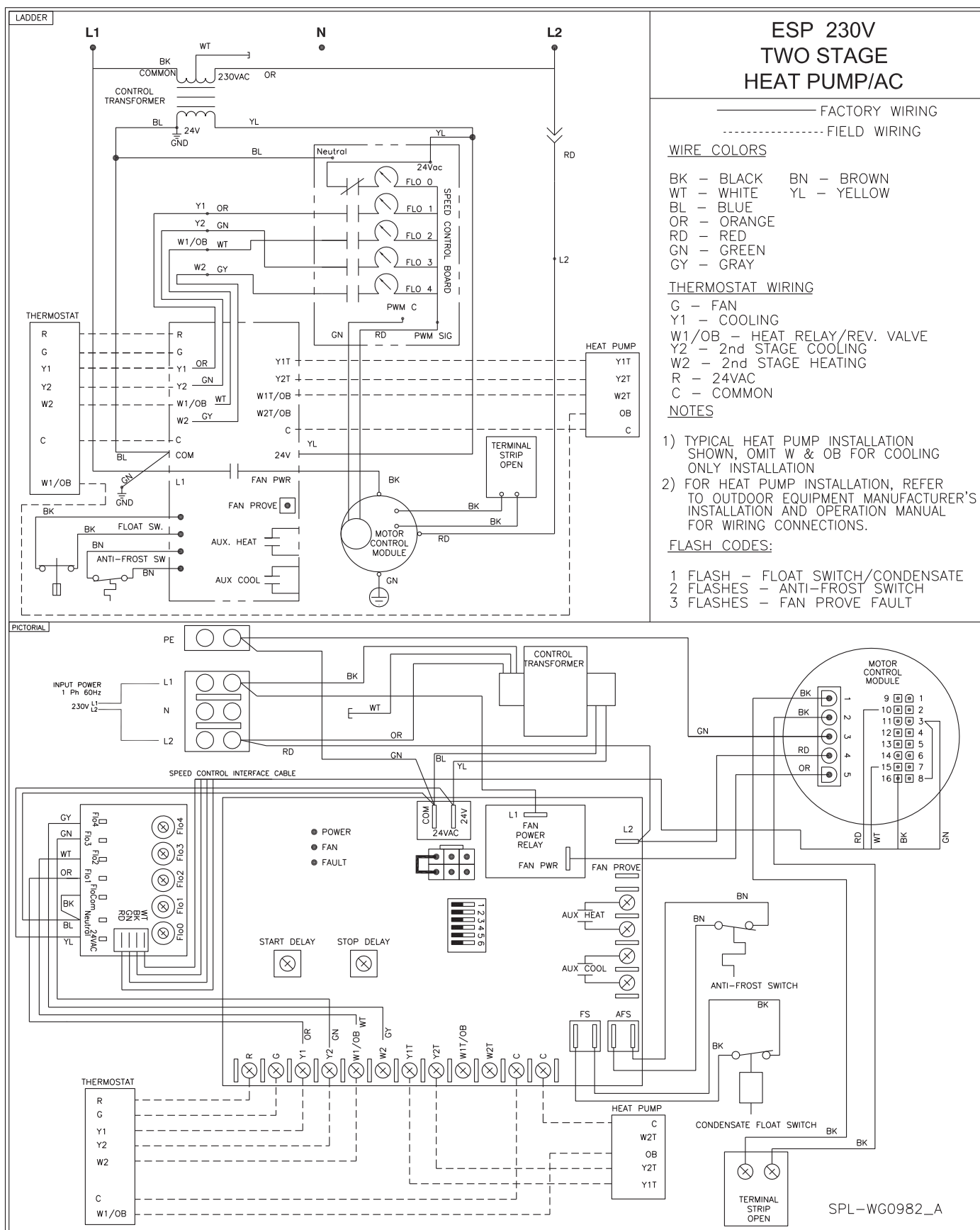


FIGURE 2.12: TWO STAGE HEAT PUMP/AC WIRING DIAGRAM

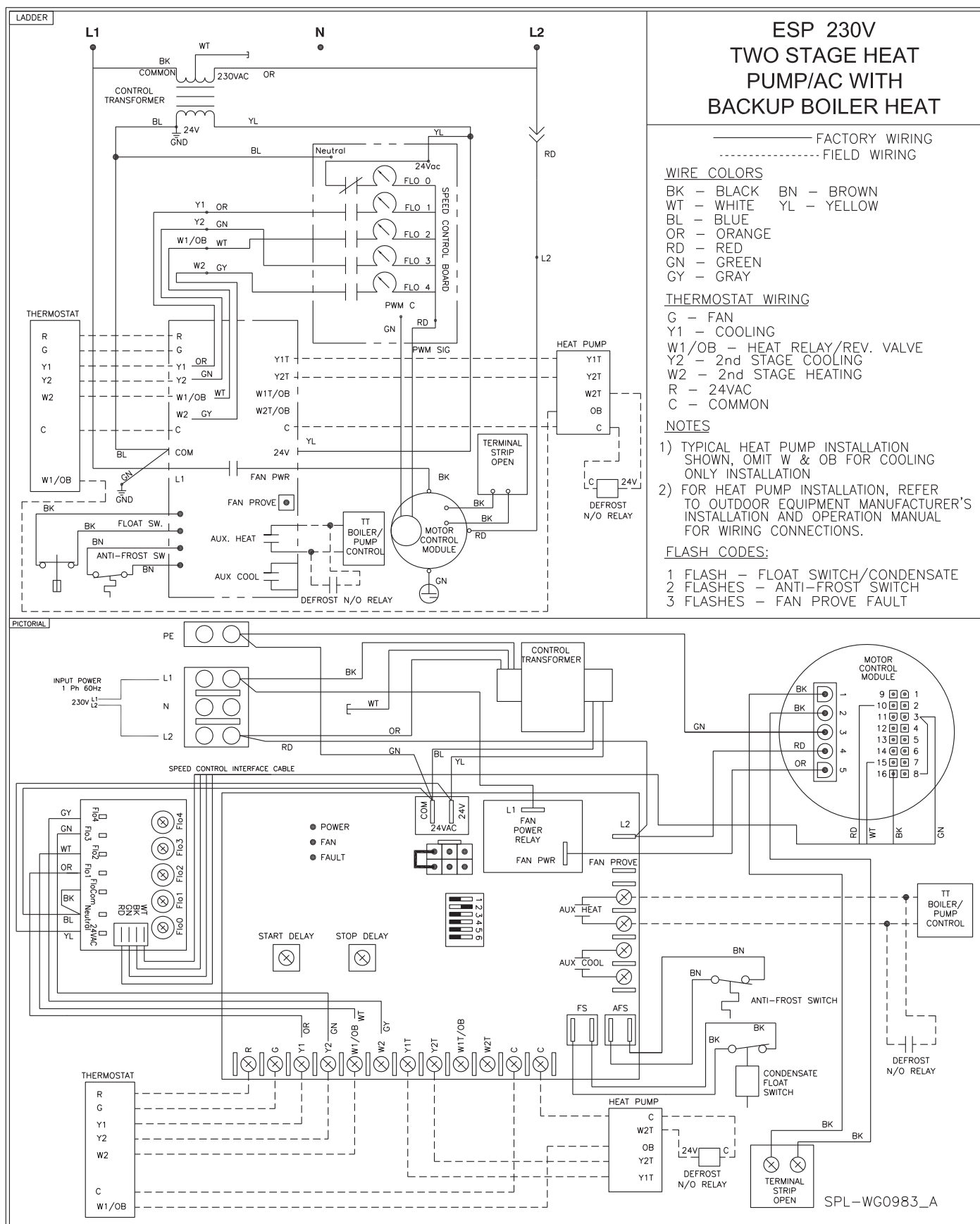


FIGURE 2.13: TWO STAGE HEAT PUMP/AC WITH BACKUP BOILER HEAT WIRING DIAGRAM

STEP 8: INSTALLING AIR DISTRIBUTION COMPONENTS

All plenum duct and supply tubing runs as well as room terminator locations must be in accordance with air distribution system requirements listed in Section 1 of this manual. Use a tape that meets UL181 requirements on all joints.

Plenum Duct Installation

All tees, elbows and branch runs must be a minimum of 24" from the fan coil unit or any other tee, elbow or branch run. Keep all tees and elbows to a minimum to keep system pressure drop on larger layouts to a minimum.

NOTICE: Refer to duct installation instructions supplied with fan coil unit or follow manufacturers instructions supplied with other duct system types.

Room Terminator & Sound Attenuating Tubing Installation

Room terminators and pre-assembled sound attenuating tubes are provided in the Installation Kits.

NOTICE: Do not install terminators in a wall in which a sharp bend in the sound attenuating tube is required (see Figure 2.14). The result would be unacceptable noise.

OPTION: Using a SpacePak Kwik Connect Wall Elbow (Model Number: AC-KCWE) addresses this condition (see Figure 2.15).

In marking location for room terminator (see Figure 2.16), the center of the terminator should be approximately 5" from the wall or, when installed in the corner of a room 5" from both walls.

After marking location, drill a 1/8" diameter hole for outlet. Verify there is at least 2" for tubing assembly clearance all around this hole by visual inspection or inserting a bent piece of wire to feel for obstructions. Adjust direction of hole as needed, to gain this 2" clearance. After all clearances have been checked, take a 4" diameter rotary-type hole saw and cut a hole, using the 1/8" diameter hole as a pilot.

Assemble spring clips to terminator plate with screws provided in installation kit. Tighten clips until they are close to the thickness of the material they are being mounted to.

Assemble the room terminator to the sound attenuating tubing by simply fitting the two pieces together and twisting until tight (see Figure 2.17). If the terminator is to be used in a floor location, then field fabricate a small screen (1-1/2" square; 1/4 x 1/4 20-gauge galvanized wire screen) and place screen over opening on the back of the terminator prior to twisting on the kwik-connect (on the sound attenuating tube).

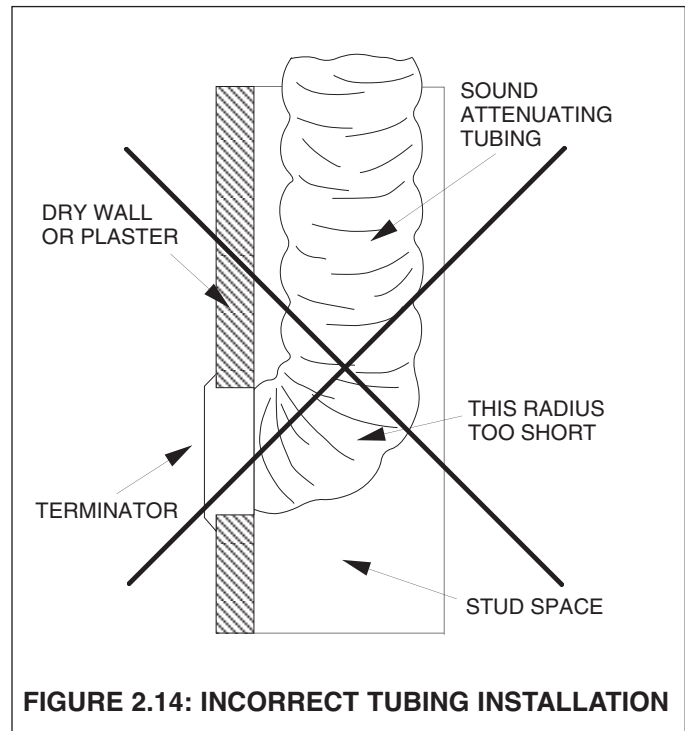


FIGURE 2.14: INCORRECT TUBING INSTALLATION

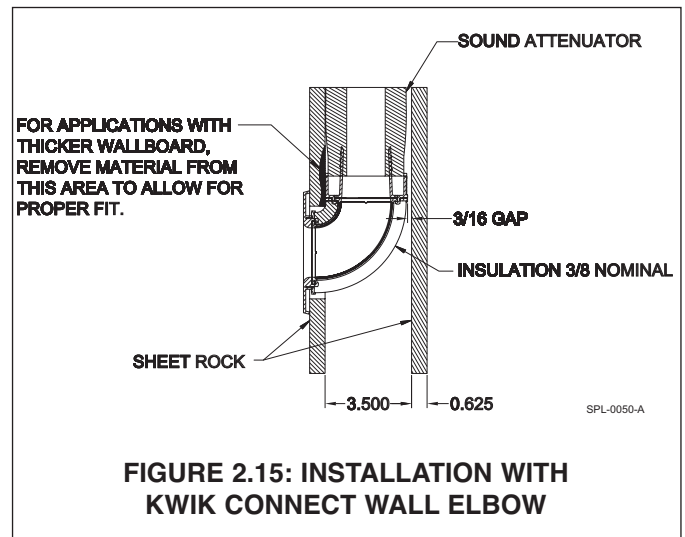


FIGURE 2.15: INSTALLATION WITH KWIK CONNECT WALL ELBOW

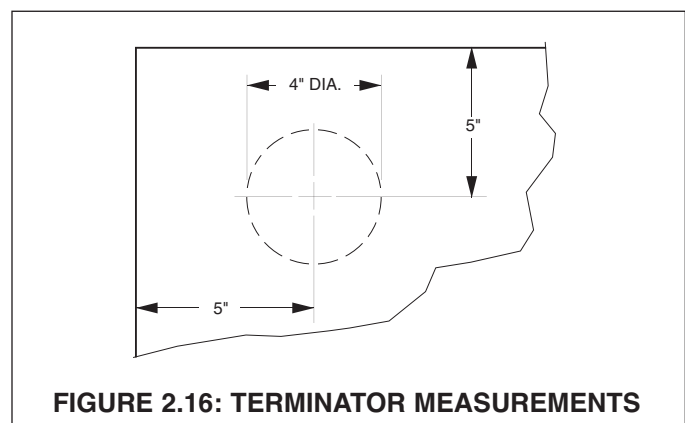


FIGURE 2.16: TERMINATOR MEASUREMENTS

NOTICE: Do not shorten sound attenuating tube length. The result would be unacceptable noise.

Push the free end of the sound attenuating tube through the 4" hole until the two toggle springs on the room terminator snap into place.

Center the two spring clips on a line parallel to the direction of the tubing routing from the room terminator (see Figure 2.17). This is important since the weight of the tubing will have a tendency to cause a part of the terminator to pull away from the ceiling if the clips do not run parallel to the tubing run.

Then tighten the screws (attached to the terminator) until the terminator is snug against the ceiling or floor. **Do not overtighten.** For installations with floors or ceilings which are thicker than normal, field supplied longer toggle screws or special mounting plates may be required.

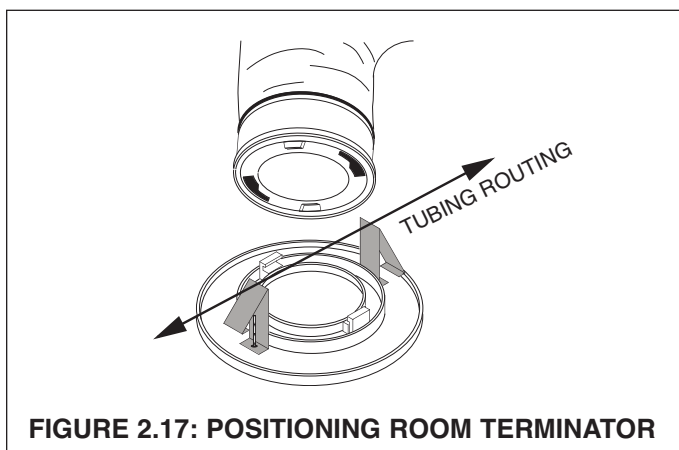


FIGURE 2.17: POSITIONING ROOM TERMINATOR

Supply Tubing Installation

Kwik-connects and balancing orifices are provided in the Installation Kits. Plenum take-offs, gaskets and fasteners are supplied in the separate plenum take-off kit.

Avoid sharp bends in the supply tubing (as well as the sound attenuating tubing). The minimum radius bend is 4" (see Figure 2.18); however, wherever possible, hold to a larger radius.

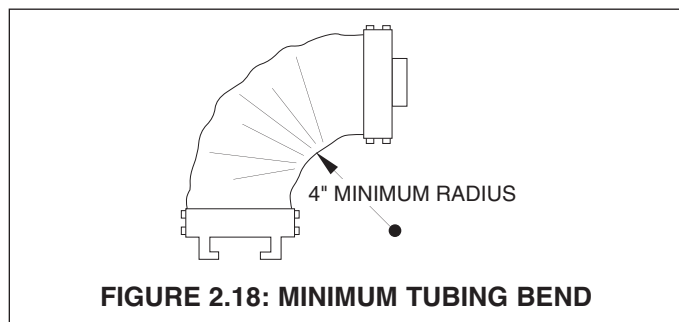


FIGURE 2.18: MINIMUM TUBING BEND

At the plenum, all supply tubing connections must be a minimum of 18" from any plenum tee, plenum elbow or the fan coil unit.

Individual supply tubing runs must be a minimum of 6-feet, even if the distance between the sound attenuating tubing and plenum is less than 6 feet.

Supply tubing comes in 100-foot sections (R8 tubing comes in 50-foot sections and R6 tubing comes in 75-foot sections) and may be cut to length with a knife or fine tooth hacksaw.

For each supply tubing run, estimate and cut the length of tubing that will be needed between the plenum and sound attenuating tube. At the open end of the supply tubing a kwik-connect will be installed (see Figure 2.19). First, push back the cover and the insulation exposing approximately 4" of the inner core. Fold in any tails or frays that may be present after cutting the supply tubing. Second, hand compress the corrugations until they are densely compacted 1-1/2" to 2" from the open end of the supply tube. Third, thread kwik-connect into the inner core until snug. Fourth, pull the insulation and cover forward and tuck it into the deep groove on the back side of the kwik-connect. Fifth, wrap the connection securely with UL181 approved tape.

When finished, simply twist together (see Figure 2.20) the kwik-connect on the sound attenuating tube, and wrap the connection securely with tape.

After attaching the supply tubing to the sound attenuating tube, bring the open end of the tube to the plenum.

To cut a hole in the plenum, refer to duct installation instructions supplied with fan coil unit. Sheet metal duct requires a 2-1/16" hole.

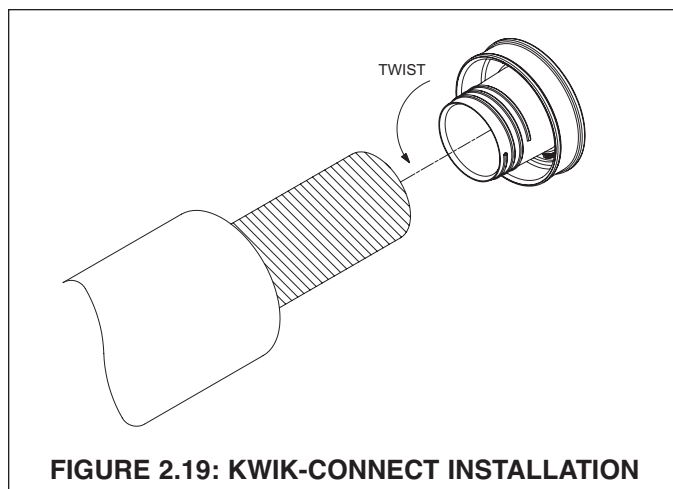


FIGURE 2.19: KWIK-CONNECT INSTALLATION

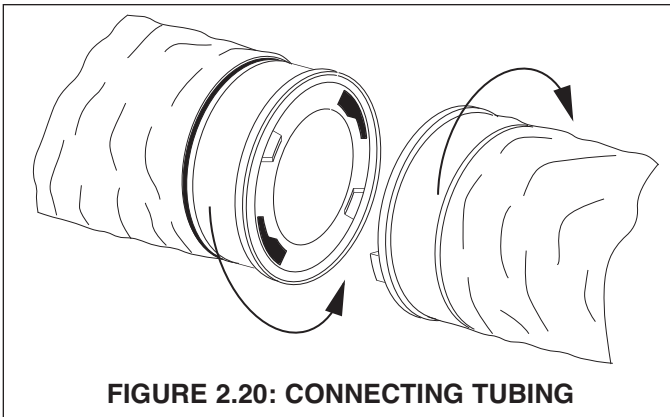


FIGURE 2.20: CONNECTING TUBING

Remove the hole cut-out from the plenum. Make sure there is no “flap” left inside plenum that could block hole during operation.

Place the plenum take-off gasket on the back side of the plenum take-off and insert the assembly into the hole in the plenum (see Figure 2.21).

NOTICE: Gasket must be installed to seal plenum take-off to prevent air leakage.

Orient the plenum take-off to match the curvature of the plenum duct. Hand insert the four plenum take off fasteners one at a time such that each clip reaches the interior of the duct. Using the SpacePak pliers, snap the fasteners into place until they lock in place (see Figure 2.22).

NOTICE: All four fasteners must be installed to assure an air tight fitting between plenum take-off and plenum.

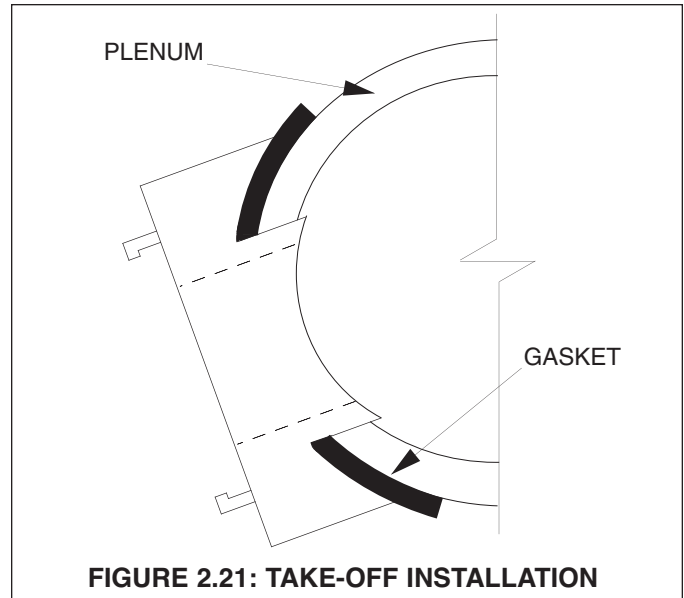


FIGURE 2.21: TAKE-OFF INSTALLATION

In accordance with your calculations as to requirements for balancing orifices, mount the orifice in the outlet of the plenum take-off (see Figure 2.23), prior to attaching the supply tubing.

Next, install a kwik-connect in the open end of the supply tubing, using the same procedures as before, and twist together kwik-connects on supply tubing and plenum take-off. Wrap connection securely with tape.

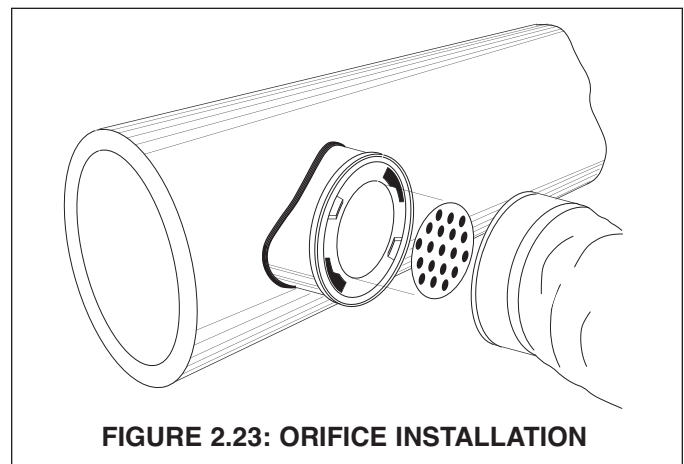


FIGURE 2.23: ORIFICE INSTALLATION

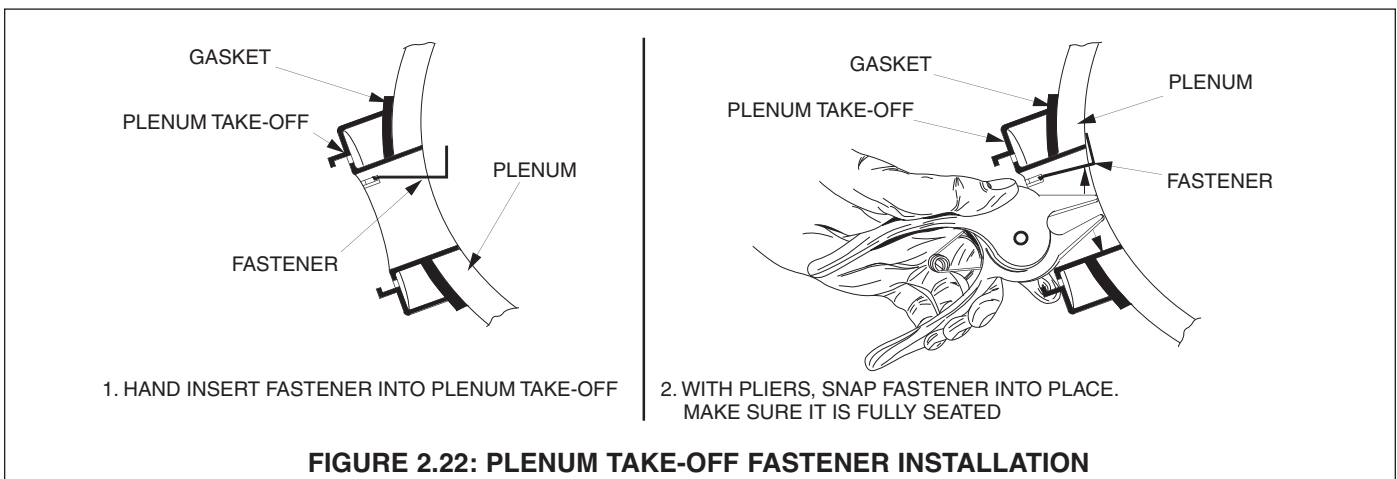


FIGURE 2.22: PLENUM TAKE-OFF FASTENER INSTALLATION

Return Air Box & Duct Installation

Remove the return air grill from the return air box and remove the air filter from the return air grill.

Insert the return box from below for ceiling installation (or from the front for wall installations) and fasten with four screws through holes provided on the long side of the box. (see Figure 2.24).

Remove the grill and the filter from the grill frame. Insert the frame into the box and mount in place with the screws provided through a hole at each corner of the frame. Finally, place the air filter into the frame and replace the grill. Turn the latches a quarter turn to lock the grille in place. Slide a clamp band (provided with return air box) over one end of the return air duct. Place that end over the elliptical flange on the fan coil unit (see Figure 2.25). Move the clamp over the flange and tighten so the clamp holds the return air duct securely to the flange.

Follow the same procedures to attach the return air duct to the return air box (see Figure 2.25).

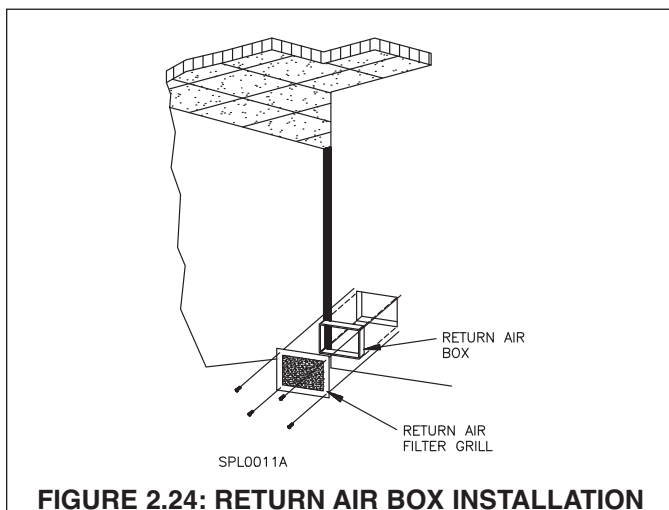


FIGURE 2.24: RETURN AIR BOX INSTALLATION

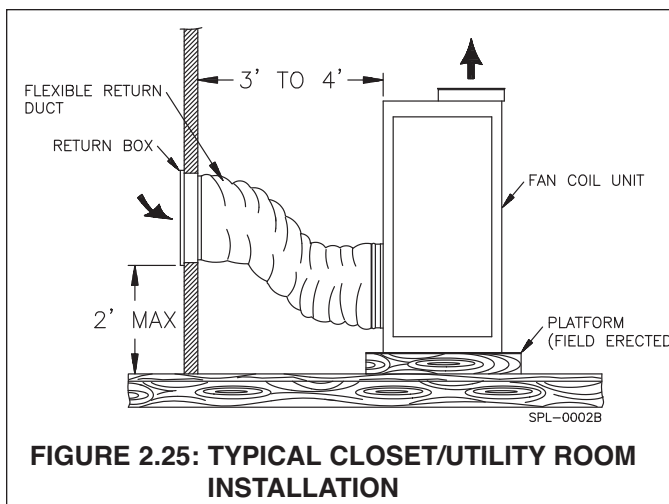


FIGURE 2.25: TYPICAL CLOSET/UTILITY ROOM INSTALLATION

Direct Mount Filter Box & Ductless Returns

Center filter box over the elliptical flange of fan coil unit (see Figure 2.26). Mark the (4) hole locations on fan coil unit and drill holes using 5/32" bit. Mount filter box to unit using screws provided and insert air filter.

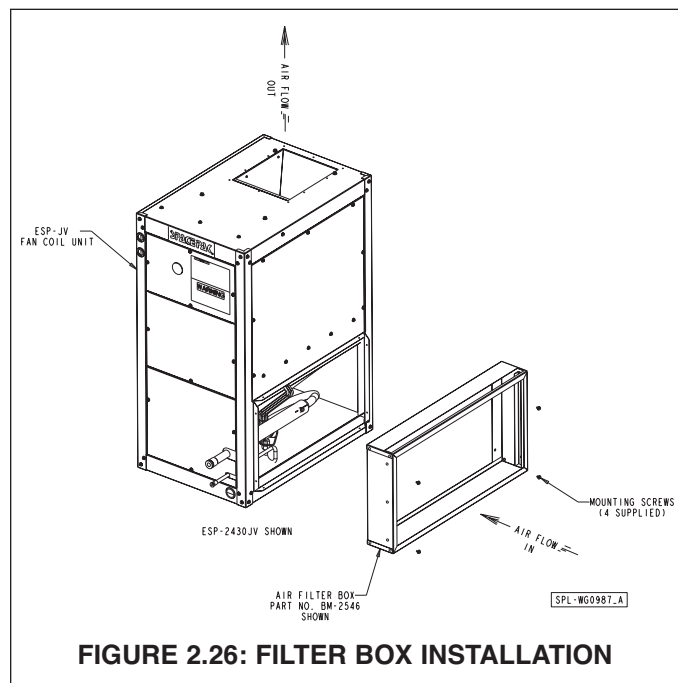


FIGURE 2.26: FILTER BOX INSTALLATION

Winter Supply Shut-Off Installation

Simply insert winter supply shut-offs into the room terminator openings (see Figure 2.27). Wrap the return air filter in a plastic bag and reinstall it to block the return air opening. Winter supply shut-offs prevent moisture from collecting in ductwork during winter months. Be sure to remove the plastic bag and all winter supply shut-offs before operating the system

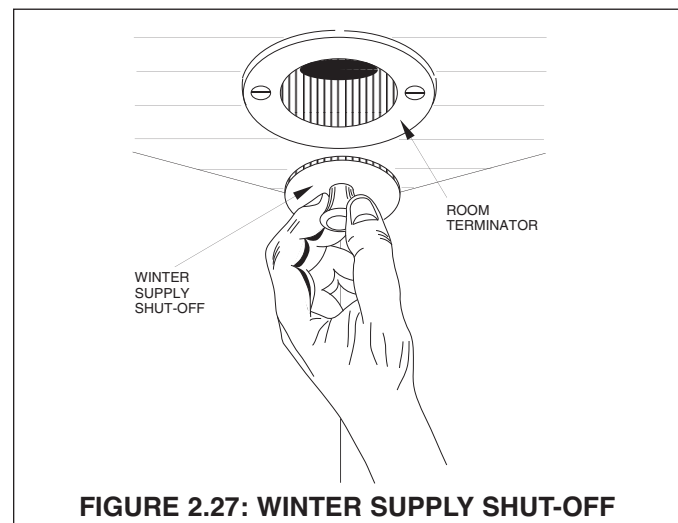


FIGURE 2.27: WINTER SUPPLY SHUT-OFF

SECTION 3: START-UP & OPERATION

SEQUENCE OF OPERATION

When power is turned on and thermostat fan switch is set to ON and the cooling indicator is set to OFF, the indoor fan motor is energized in approximately 2 minutes. The outdoor unit is off.

When power is turned on and thermostat fan switch is set to ON or AUTO and the cooling indicator to COOL the indoor and outdoor units will start.

AUTO position on the thermostat will stop and start your system when the temperature setting is satisfied. The ON position on the thermostat will stop the outdoor unit only when the temperature setting is satisfied and the indoor unit will continue to run, recirculating indoor air.

The fan coil unit is equipped with a protective device called an anti-frost control which will automatically stop the outdoor unit (while the indoor unit continues to run) if ice accumulates on the indoor unit evaporator coil causing abnormal operating conditions. When the accumulated ice has melted, the anti-frost control will restart the outdoor unit.

The fan coil unit is equipped with primary float switch, and the system will automatically shut down if the drain pan is full of water (condensate) and not draining. The system requires service.

PRIOR TO START-UP

1. Check all electrical connections for tightness.
2. Check air filter has been installed in return air box or filter box.
3. Remove all winter supply shut-offs and store them in a safe place.

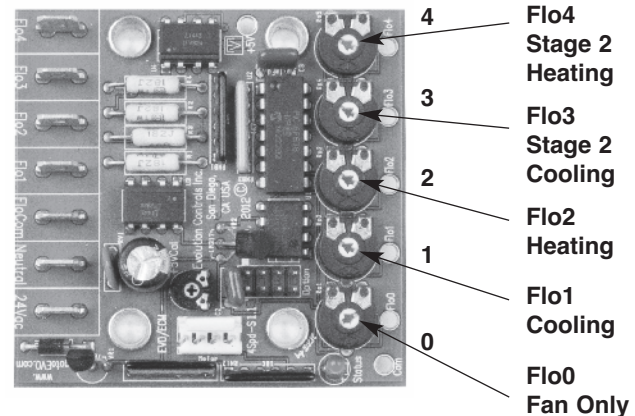
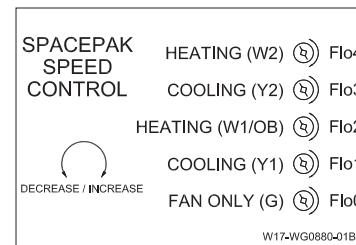
SYSTEM START-UP & ADJUSTMENTS

1. Place thermostat fan switch in ON position and cooling indicator in OFF position. In about 2 minutes, indoor unit blower will start.
2. Check blower operation for excess noise or vibration.
3. Check entire distribution system for leakage and apply additional tape where necessary.
4. Measure/adjust blower voltage/speeds
 - a. Remove the control box cover located on the side of the unit.
 - b. With the unit powered and operating from a conventional thermostat, ensure there is no conditioning call (Thermostat is satisfied) and switch the fan control to "Manual" or "On" to create a G call.

NOTE: IF NO AIRFLOW DURING W OR Y CALL, POTENTIOMETER MAY BE IN "OFF" POSITION. TURN CW TO ACHIEVE AIRFLOW

- c. Place the ground/neutral probe in the lower right hole marked "COM" and the volt probe in the hole marked "Flo0" (for fan only, G call) and measure DC volts between 0 and 5V. Adjust the potentiometer adjacent to the "Flo0" to achieve the desired volt reading. Repeat for remaining adjustments marked Flo1 through Flo4 as indicated on the label inside the cover. (Refer to Figure 3)
- d. To determine unit airflow, in CFM, measure the voltage corresponding to the current conditioning call, and measure the external static pressure in the plenum, at least 18" from the unit or nearest transition point. Locate the static pressure on the left side of the charts (Figure 3.2/3.3/3.4) and read across until you reach the curve corresponding to the measured voltage. From the point where this crosses, drop a line straight down to read the airflow at the bottom of the chart. For system settings of 1.2" inch static pressure, refer to tables in Figures 3.21, 3.31 and 3.41.
- e. To adjust airflow, locate the nearest system curve, and follow parallel to this curve while adjusting the signal voltage to achieve the desired airflow. If the static pressure falls above or below the desired operating range for the given airflow, then the air delivery system must be adjusted. To lower static pressure, provide additional outlets to the system, to raise the static pressure, install restrictor orifices as described in the Installation and Operations Manual.
- f. Replace the speed control cover.

FIGURE 3: SPEED CONTROL PANEL



OPERATING SETPOINTS

FIGURE 3.2

SpacePak XXX-2430JV

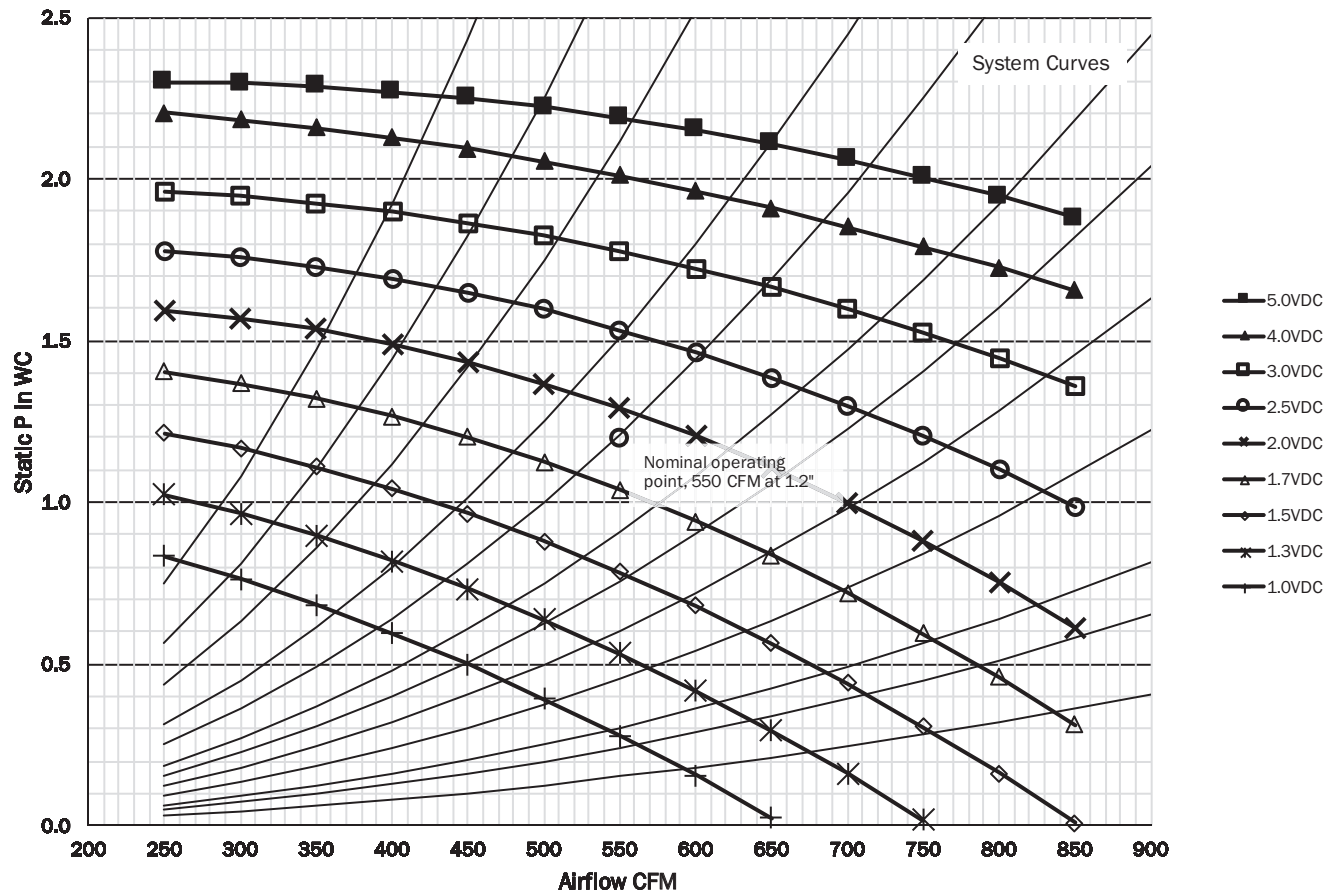


FIGURE 3.21

Static P \"WC	CFM's @ Speed Control Setting (VDC) -2430JV								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	530	390	250						
2.0	766	652	550	351					
1.8		828	740	598	530				
1.6			870	717	690	500	250		
1.5				819	762	575	385		
1.4					825	680	475		
1.2						750	600	260	
1.0						845	700	475	
0.8							780	540	270
0.6							865	630	400

FIGURE 3.3
SpacePak XXX-3642JV

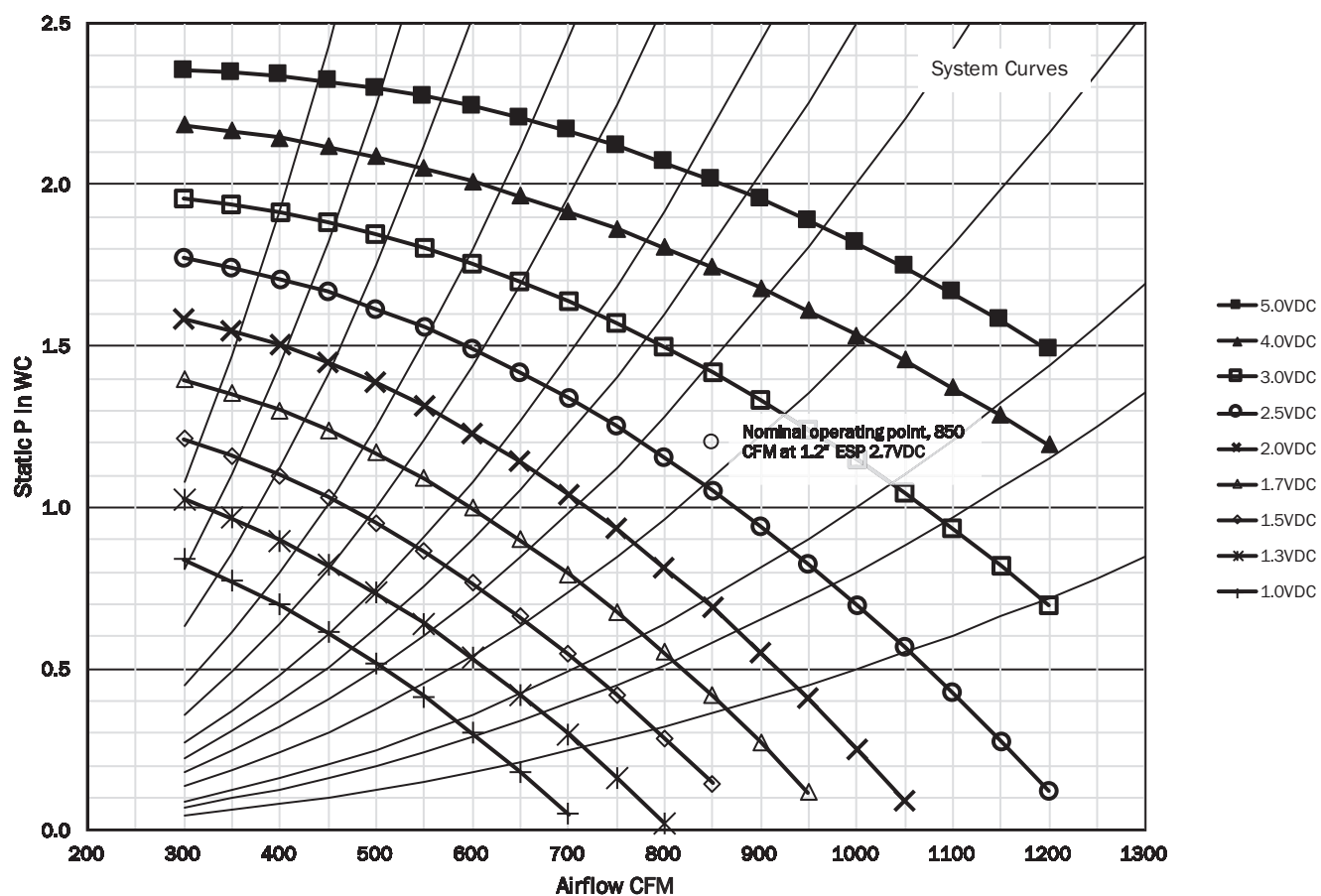


FIGURE 3.31

Static P \"WC	CFM's @ Speed Control Setting (VDC) -3642JV								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	650	460							
2.0	860	735	610						
1.8	1020	910	800	670	550				
1.6	1135	1045	955	800	730	505			
1.5	1190	1115	1040	908	800	595	400		
1.4		1195	1075	1008	860	665	480		
1.2			1200	1073	975	780	625	310	
1.0				1180	1070	875	720	470	
0.8					1160	960	810	580	330
0.6						1035	875	675	460

FIGURE 3.4
SpacePak XXX-4860JV

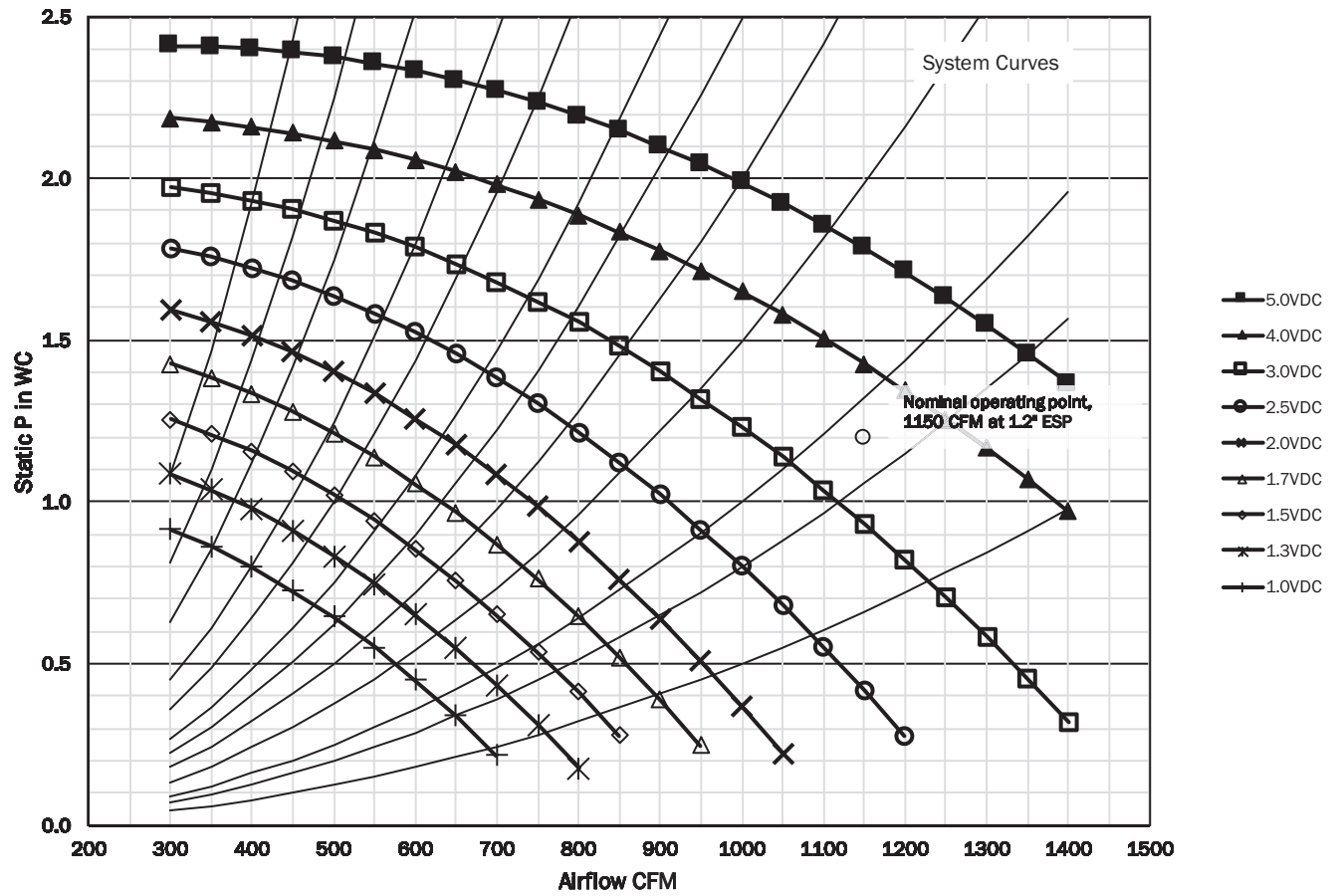


FIGURE 3.41

Static P "WC	CFM's @ Speed Control Setting (VDC) -4860JV								
	5.0V	4.5V	4.0V	3.5V	3.0V	2.5V	2.0V	1.5V	1.0V
2.2	790	535	280						
2.0	980	825	670	430					
1.8	1140	1010	880	715	580				
1.6	1270	1150	1030	860	760	530	300		
1.5	1330	1215	1100	965	840	625	410		
1.4	1380	1305	1230	1060	900	700	500		
1.2		1380	1280	1175	1020	810	630	360	
1.0			1380	1245	1120	910	740	515	
0.8				1330	1210	1020	830	630	400
0.6					1280	1080	920	725	525

5. Check that system static pressure is within acceptable limits (minimum 1.2" WC - ,maximum 1.5" WC). You can use a U-tube manometer to check the external static pressure on the duct system.

1. Puncture a 1/4" diameter hole in the plenum duct at least 18" from the fan coil unit.
2. Insert the high-side manometer tube into the hole so that the end is approximately flush with the inside wall of the plenum, and perpendicular to the direction of airflow.
3. System static pressure should be between 1.2" and 1.5" WC.
 - a. If the pressure is higher than 1.5" provide additional supply runs to increase airflow or lower the fan speed by turning the fan speed adjustment for the current mode of operation counter-clockwise to reduce the static pressure.
 - b. If the pressure is lower than 1.2", look for leaks in the supply plenum, restrictions in the return system (including clogged filters) If more than the recommended number of supply runs are installed, you may install flow restrictors (orifices) in these runs. If the number of runs is appropriate for the load, increase the static pressure by turning fan speed adjustment for the current mode of operation clockwise to increase the static pressure.

6. Check that blower motor amp draw compares with fan coil unit rating plate. Amp draw shown on plate is the FLA of motor (not the actual running amps) and will vary with the pressure and voltage.

7. Place the thermostat cooling indicator in COOL position, which will start the outdoor unit. Let the system run at least 30 minutes to stabilize operating conditions.

8. For outdoor unit start-up, follow manufacturer's instructions.

9. Check that temperature drop across evaporator coil in the indoor unit is between 20°F to 28°F.

NOTICE: Do not introduce refrigerant liquid to system through suction port. Liquid in the suction line may damage the compressor.

NOTICE: Before adding refrigerant to system verify Item #5 in "System Start-up & Adjustment" section has been performed.

10. Verify that system refrigerant is correct by measuring subcooling at liquid service port. Subcooling should be in accordance with outdoor unit manufacturers recommendations..

11. Check the super heat leaving the evaporator coil against the corresponding suction pressure from the schrader fitting at the fan coil unit. Superheat value should be between 9°F and 12°F.

12. If a sight glass has been installed on the liquid line at the air handler check for the presence of flashing. If flashing is occurring, check and adjust subcooling by adding refrigerant.

CHARGING COOLING ONLY SYSTEMS

After start-up, allow the system to operate for approximately 30 minutes in order to establish stable operating conditions. Check that the temperature drop across the evaporator coil is 20°F to 30°F. Do not attempt to adjust the charge at ambient temperatures below 65°F.

Verify and adjust refrigerant charge based upon outdoor unit manufacturer's published recommendations.

▲ CAUTION

Releasing refrigerant gas into the atmo-sphere is a criminal offense.

FACTORS AFFECTING THE BALANCE OF THE SYSTEM

A. Room Terminators (Outlets): Based on the equipment selected, determine the recommended number of fully open outlets from Figure 3.1.

FIGURE 3.1

NOMINAL TONNAGE	MINIMUM RECOMMENDED NUMBER OF FULLY OPEN OUTLETS		
	MODEL	A	B
2	ESP-2430JV	12	14
2-1/2	ESP-2430JV	15	18
3	ESP-3642JV	18	21
3-1/2	ESP-3642JV	21	25
4	ESP-4860JV	26	28
5	ESP-4860JV	30	35

1. The minimum or recommended number of outlets means fully open outlets. Any outlet having an orifice would be only a percentage of an outlet.

2. For systems with average supply tubing lengths of 15 feet or less, use column A. For systems with supply tubing lengths greater than 15 feet, use column B.

NOTICE: The number of outlets and average length of the supply tubing has a significant effect on the overall system performance. It is highly recommended that the adjustment factors outlined in the SpacePak Application Manual are accounted for prior to any installation.

B. Orifice Combinations: Should orifices be required to balance the system (installed at plenum take-off), refer to the combinations listed in Figure 3.2

FIGURE 3.2

DESIRED NUMBER OF TERMINALS*	TERMINAL - ORIFICE COMBINATION
.5	(1) .5
.65	(1) .35
.85	(1) .15
1.00	(1)
1.15	(1) .5 + (1) .35
1.30	(2) .35
1.50	(1) .35 + (1) .15 or (1) + (1) .5 or (3) .5
1.65	(1) + (1) .35 or (2) .5 + (1) .35
1.70	(2) .15
1.80	(2) .35 + (1) .5
1.85	(1) + (1) .15
1.95	(3) .35
2.00	(2)

*For a room with more than two (2) terminals, combinations of the above may be used to achieve the desired fractional number.

C. Supply Tubing Length: An outlet with a supply tubing length of 15 feet is considered one, fully opened outlet. For other lengths refer to Figure 3.3 for adjustment factors.

FIGURE 3.3

2" SUPPLY TUBING LENGTH ADJUSTMENT FACTOR CHART								
RUN	6'	8'	10'	12'	15'	20'	25'	30'
FACTOR	.85	.88	.90	.94	1.0	1.1	1.25	1.50

SECTION 4: MAINTENANCE

The SpacePak system has been designed to provide years of trouble-free performance in normal installations. Examination by the homeowner at the beginning of each cooling season, and in mid-season should assure continued, good performance. In addition, the system should be examined by a qualified service professional at least once every year.

BEFORE EACH COOLING SEASON

1. Check and clean air filter. The air filter is permanent type. Remove and clean thoroughly with soap solution and water.

▲ WARNING

Turn off electrical power supply before servicing. Contact with live electric components can cause shock or death.

2. Check fan coil unit. Turn off unit power disconnect switch and remove service access panels.

- Inspect evaporator coil and blower wheel for build-up of dust and dirt. Clean with solvent and/ or water as necessary.
- Replace service access panels and turn on unit power disconnect switch.

3. Check that unit condensate drain is clear and free running, and plug is in cleanout.

4. For outdoor condensing unit, follow manufacturer's maintenance instructions.

5. Follow "System Start-Up & Adjustments" procedures in Section 3 of this manual.

IF SYSTEM FAILS TO OPERATE

1. Check that thermostat switch is set for proper mode of operation and is set below room temperature.

- Check that outdoor unit is operating.
 - Confirm that compressor and fan are operating properly
 - Confirm voltages to outdoor unit

IF FAN AND COMPRESSOR AT OUTDOOR UNIT ARE NOT RUNNING

1. Check for tripped circuit breaker or blown fuse at either the main fuse box or at unit disconnect box on or near the condensing unit. Replace blown fuse with same size and type.

2. Review Troubleshooting Guide beginning on page 19 of this manual.

TROUBLESHOOTING GUIDE

CONDITION: ESP-JV & CONDENSING UNITS RUN, BUT COOLING INSUFFICIENT

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Low Suction Pressure	Check blower motor as described on page 23 in this manual.	If defective, replace motor.
	Check that filter in return air box is clean.	Clean air filter.
	Check system refrigerant charge.	Charge to proper subcooling according to manufacturer's instructions.
	Check for dirty evaporator coil.	Clean evaporator coil.
High Suction Pressure	Check for air bubbles in system refrigerant.	Charge to proper subcooling according to condensing unit manufacturer's instructions. Install sight glass near indoor unit and monitor.
	Check calculated heat gain to be sure that equipment is sized properly.	Take necessary action.
	Check for obstructions near condensing unit which could cause recirculation of air.	Remove obstructions.
Low Head Pressure	Check system refrigerant charge.	Charge to proper subcooling according to condensing unit manufacturer's instructions.
	Check calculated heat gain to be sure that equipment is sized properly.	Take necessary action.
High Head Pressure	Check condenser fan motor according to condensing unit manufacturer's instructions.	If defective, replace fan motor.
	Check for dirty condensing unit coil.	Clean condensing unit coil.
	Check system refrigerant charge.	Charge to proper subcooling according to condensing unit manufacturer's instructions.
	Check for dirty evaporator coil.	Clean evaporator coil.
	Check for obstructions near condensing unit which could cause recirculation of air.	Remove obstructions.
	Check for restricted liquid lines.	Remove restrictions and kinks from lines.
Distribution System Air Leaks	Check all joints in air distribution system.	Make sure all joints are air tight. Verify static pressure as described on page 23 in this manual.

CONDITION: ESP-JV UNIT & CONDENSING UNIT WILL NOT START

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Thermostat Not Level	Check level of thermostat	If necessary, level thermostat.
Defective Thermostat	With volt meter, check resistance of thermostat contacts.	If resistance, thermostat is O.K. If no resistance, replace thermostat.
Loose Low Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Relay	Check relay as described on page 23 in this manual.	If defective, replace relay.
Defective Low Voltage Transformer	Check transformer as described on page 23 in this manual.	If defective, replace transformer.
Inadequate Electrical Service	Check electrical service against minimum requirements.	Replace electrical service with adequately sized service.

CONDITION: ESP-JV UNIT WILL NOT START, BUT CONDENSING UNIT RUNS

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Shorted Or Broken Wiring	Check wiring.	If necessary, repair or replace wiring.
Loose Low or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Motor	Check motor as described on page 23 in this manual.	If defective, replace motor.

CONDITION: ESP-JV UNIT RUNS, BUT CONDENSING UNIT WILL NOT START

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Defective Thermostat	With volt meter, check resistance of thermostat contacts.	If resistance, thermostat is O.K. If no resistance, replace thermostat.
Loose Low Or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Float Switch And Anti-Frost Switch (Switches are wired in series)	Thermostat fan ON. With volt meter, check for 24v across terminal G on the fan relay and terminal C on low voltage terminal strip.	If no voltage, fan relay is defective. Replace it.
		If read 24v, relay is O.K.
	With volt meter, check for 24v at terminals YT and YC on low voltage terminal block.	If no voltage, check coil for ice and drain pan for excessive water. If ice check air filter, return air duct & blower motor for air flow. If excessive water check and clean condensate drain lines.
		If no ice on coil and water level in drain pan is normal, check each switch for continuity. If switch has no continuity, replace it.
Shorted Or Broken Wiring	Check wiring.	If necessary, repair or replace wiring.
Condensing Unit	Check according to manufacturer's instructions.	Repair or replace as directed by manufacturer.

CONDITION: ESP-JV UNIT WILL NOT START, BUT CONDENSING UNIT CYCLES

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Incorrect Low Voltage Connections	Check low voltage connections against wiring diagram.	Correct low voltage connections.
Loose Low Voltage Connections	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Relay	Check relay as described on page 23 in this manual.	If defective, replace relay.
Defective Blower Motor	Check motor as described on page 23 in this manual.	If defective, replace motor.

CONDITION: ESP-JV UNIT CYCLES, BUT CONDENSING UNIT RUNS

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Blower Motor	Check motor as described on page 23 in this manual.	If defective, replace motor.
	Check motor amps and compare to nameplate ratings.	If excessive, the motor may be overloaded. Check supply duct for breaks or leaks.

CONDITION: ESP-JV UNIT RUNS, BUT CONDENSING UNIT CYCLES

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Anti-Frost Switch & Float Switch. Switches Are Wired in Series.	Thermostat fan ON. With volt meter, check for 24v across terminal G on the fan relay and terminal C on low voltage terminal strip.	If no voltage, fan relay is defective. Replace it.
		If read 24v, relay is O.K.
	With volt meter, check for 24v at terminals YT and YC on the low voltage terminal block.	If no voltage, check coil for ice and drain pan for excessive water. If ice check air filter, return air duct & blower motor for air flow. If excessive water check and clean condensate drain lines.
		If no ice on coil and water level in drain pan is normal, check each switch for continuity. If switch has no continuity, replace it If 24v, switches are O.K.
Thermostat in Wrong Location	Check that thermostat is in vicinity of return air box.	If necessary, relocate thermostat.
Loose Low Or High Voltage Wiring	Check all wiring connections for tightness.	Tighten all loose connections.
Defective Blower Motor	Check motor as described on page 23. in this manual.	If defective, replace motor.
Condensing Unit	Refer to manufacturer's instructions.	Repair or replace per manufacturer's instructions.

CONDITION: SWEATING AT ESP-JV UNIT SUPPLY OUTLET

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Air Leak At Supply Air Plenum Adaptor	Check taped joint at adaptor.	Tape joint properly.
Insulation at Outlet Not Installed	Check for insulation at outlet.	Install insulation.

CONDITION: EXCESSIVE NOISE AT TERMINATOR

POSSIBLE CAUSE	VERIFICATION	SOLUTION
High Supply Air Plenum Static Pressure	Check static pressure as described on page 23 in this manual.	Check for and add flow restrictors as necessary in supply runs.
		If necessary, add additional outlets.
Sound Attenuating Tube Not Installed	Check for installation of sound attenuating tube.	Where necessary, install sound attenuating tube.
Tight Radius In Sound Attenuating Tube Or In Supply Tubing	Check all tubing for tight radius.	Where necessary, correct radius.
Incorrect Supply Tubing Length	Check that all supply tubing runs are 9' minimum (includes 3 ft sound atten. tube).	Where necessary, correct supply tubing length.
Improperly Balanced System	Check that correct size orifices have been installed.	Properly orifice supply tubing runs.

CONDITION: EXCESSIVE NOISE AT RETURN AIR GRILL

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Return Air Duct Not Installed Properly	Check for minimum 90° bend in return air duct.	Correct bend in return air duct to minimum 90°.
Dirty Return Air Filter	Remove and inspect.	Clean or replace air filter.

CONDITION: EXCESSIVE VIBRATION AT ESP-V UNIT

POSSIBLE CAUSE	VERIFICATION	SOLUTION
Noisy Blower Motor Assembly	Check blower motor assembly.	Tighten all fasteners.
	Check blower motor for bearing noise.	Replace motor.
	Check for loose or damaged blower wheel.	Tighten or replace blower wheel as necessary.

CHECKING ESP-JV BLOWER MOTOR

1. With volt meter, check voltage at terminals L1 and L2 on line voltage terminal block. Voltage should be $\pm 10\%$ of ESP-JV unit nameplate rating.
2. Disconnect power to the ESP-JV unit at the disconnect switch.
3. Disconnect motor lead at terminal L1.
4. With an ohmmeter, check continuity between the disconnected motor lead and terminal 4 on the fan relay.
 - a. If continuity, proceed to Step 5 below.
 - b. If no continuity, feel the motor to see if it is excessively warm which would indicate the internal over-load may be open. When motor has cooled, check again to make sure you did not get a false reading. If no continuity, motor is defective.
5. With an ohmmeter, check each motor lead to ground to be sure motor is not grounded.
 - a. If not grounded, proceed to Step 6 below.
 - b. If grounded, motor is defective.
6. Check capacitor, if capacitor is suspect, replace it with a capacitor of similar rating of motor operates normally, make a permanent capacitor replacement.
7. Reconnect all electrical leads, restore electrical services to the ESP-JV unit, and place thermostat fan switch in the **ON** position.
8. With an ampmeter, check that amp draw compares with ESP-JV unit rating plate. Amp draw shown on plate is the FLA of motor (not the actual running amps) and will vary with the pressure and voltage.

CHECKING ESPJ-V BLOWER RELAY

The ESP-JV unit is equipped with a time-delay blower relay. Wait one full minute after turning on power for relay to close.

1. With a volt meter, check 24v across terminals R and C on the low voltage terminal block.
 - a. If read 24v, proceed to Step 2.
 - b. If no voltage, check low voltage transformer.
2. With a volt meter, check 24v across terminals G and C on the low voltage terminal block.
 - a. If read 24v, proceed to Step 3.
 - b. If no voltage, check thermostat fan circuit.

3. Check for 230v* across terminal 4 on blower relay and terminal L1.
 - a. If reading is 230v, blower relay is O.K.
 - b. If no reading, replace the relay.

* 208v on 208 line volt systems.

CHECK ESP-JV LOW VOLTAGE TRANSFORMER

1. With volt meter, check for 230v across terminals L1 & L2 on the line voltage terminal block.
 - a. If reading 230v, proceed to Step 2.
 - b. if no voltage, check the power supply to the unit.
2. With volt meter, check for 24v across terminal R and terminal C on the low voltage terminal block.
 - a. If read 24v, transformer is O.K.
 - b. If no voltage, replace transformer.

CHECK EXTERNAL STATIC PRESSURE

You can use a U-tube manometer to check the external static pressure on the duct system.

1. Puncture a 1/4" hole in the plenum duct at least 18" from the fan coil unit.
2. Insert one manometer tube into the hole until the end of the tube is flush with the inside wall of the plenum duct.
3. System static pressure should be between 1.2" and 1.5" WC
 - a. If greater than 1.5" WC add additional supply runs.
 - b. If less than 1.2" WC, check:
 - I. Return air filter is clean
 - II. Return air duct has not been collapsed
 - III. Supply air plenum for leaks
 - IV. If more supply runs than recommended are used, check that flow restrictors (orifices) are in place.



Service / Troubleshooting FORM "1A"

Customer / Dealer Data:

Name: _____

Address: _____

Tel (day) _____ (eve) _____

Installing Dealer / Contractor:

Name: _____

Tel: _____

Equipment Data:

SPACEPAK Model # ESP / WCSP -

SPACEPAK Serial # _____

SPACEPAK Date of Installation: _____

Cond Unit Mfr: _____

Cond Unit Mod #: _____

Rated Capacity: _____ BTUH; SEER: _____

Air-side Data:

Total # of outlets: _____; Supply tube length: _____ Ft (avg)
(Please sketch duct layout on reverse side of this sheet, noting all fittings and distances, including return duct size / length)

Air Filter: Size (LxHxD) _____

Type (pleated, etc): _____

Is the filter clean? _____ (Y/N)

Static Pressure (Ps) in supply plenum: _____"WG
(Measure at approximately 3 feet downstream of blower discharge)

Ps in return duct (downstream of filter, upstream of coil) _____"WG

SpacePak Motor: Amps (measured): _____ Amps

Voltage (measured): _____ Volts

Air Temperatures:

@ Return (indoor ambient): _____°FDB; _____°FWB

@ Condensing unit (outdoor ambient): _____°F

@ AHU (read 3 ft from fan discharge) _____°F

@ last supply outlet _____°F

Refrigeration-side Data:

Line sizes: Liquid _____ Suction _____

Total equivalent length of lines: _____ Ft; Vertical Rise: _____ Ft.

@ Condensing Unit:

Liquid: _____ psi; Temp: _____°F; Subcool: _____°F

Suction: _____ psi; Temp: _____°F; Superheat: _____°F

@ SpacePak:

Liquid: _____ psi; Temp: _____°F; Subcool: _____°F

Suction: _____ psi; Temp: _____°F; Superheat: _____°F

Approximate time running before taking readings: _____ Hrs.

Did you adjust the TXV? _____ (Y/N); (If yes, explain):

Refrigerant Charge (if weighed-in): _____ lbs

R410a / R22 (circle one)

Installed options: (circle one)

sight glass filter/drier zone controls

Other: _____

Water Data: (where applicable)

Line sizes: _____"; Length: _____ FT

Water temperatures:

Supply: _____°F; Return _____°F

Glycol?: _____ (Y/N); % Solution: _____

NOTES: _____

ITEM NO.	PART DESCRIPTION	UNIT SIZE	PART NUMBER
1	ANTI-FROST CONTROL	ALL	460-WG0387-01
2	PRIMARY DRAIN PAN	2430JV	BM-2524
		3642JV	BM-2525
		4860JV	BM-2526
3	COIL ASSEMBLY (R410A)	2430JV	469RWG0698-C2
		3642JV	469RWG0698-C3
		4860JV	469RWG0698-C4
4	THERMAL EXPANSION VALVE, CHATLEFF CONNECTIONS	2430JV	W28RWG0641-H2
		3642JV	W28RWG0641-H3
		4860JV	W28RWG0641-H4
5	TRANSFORMER ASSEMBLY	ALL	460-WG0604-J1
6	BLOWER ASSEMBLY	ALL	W35-WG0802-10
7	TERMINAL BLOCK (HIGH VOLTAGE)	ALL	W09-WG0422-01
8	ELECTRICAL CONTROL BOX COVER	ALL	458-WG0974-J0
9	FRONT PANEL (BLOWER ACCESS)	2430JV	462-WG0691-02
		3642JV	462-WG0691-03
		4860JV	462-WG0691-04
10	PRIMARY FLOAT SWITCH	ALL	70-7996
11	CABLE CONNECTOR, (GROUND)	ALL	W09RWG0313-01
12	CONTROL BOARD	ALL	W11RWG0478-01
13	EVO-ECM SPEED CONTROL BOARD	ALL	W11RWG0806-01
15	SPEED CONTROL HARNESS ASSEMBLY	ALL	460RWG0811-J1
16	MOTOR CONTROL HARNESS ASSEMBLY	ALL	460RWG0844-J1
17	VOLTAGE SELECT TERMINAL STRIP	ALL	W09-RWG0421-01
18	SIDE PANEL	ALL	70-7946
19	RETURN AIR PANEL	2430JV	463RWG0708-02
		3642JV	463RWG0708-03
		4860JV	463RWG0708-04
20	CENTER ACCESS PANEL	ALL	458RWG0975-J0
21	COIL ACCESS PANEL	ALL	458RWG0725
22	WIRING DIAGRAM LABEL, 230V	ALL	W49RWG0875-23
23	WIRING DIAGRAM LABEL, 115V	ALL	W49RWG0875-12

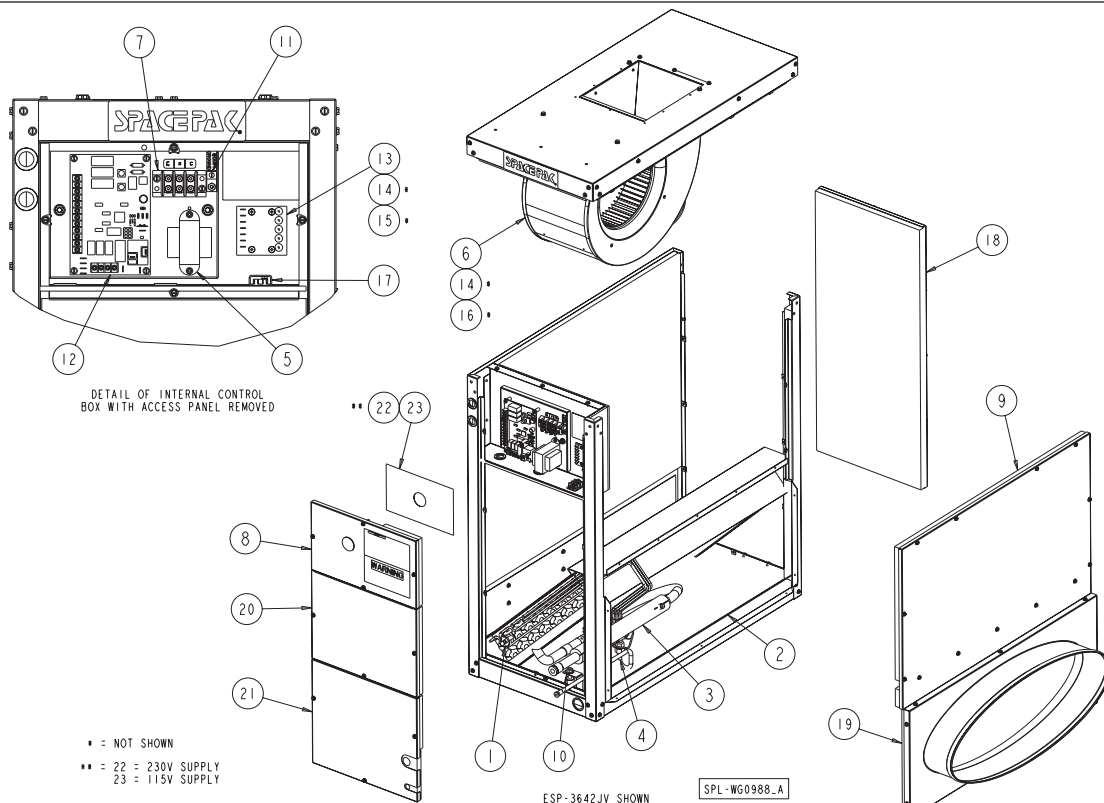


FIGURE 4.1: MODEL ESP-JV GENERAL ASSEMBLY

NOTES:

NOTES:

LIMITED WARRANTY

Central Air Conditioning Products

The "Manufacturer" warrants to the original owner at the original installation site that the Central Air Conditioning Products (the "Product") will be free from defects in material or workmanship for a period not to exceed one (1) year from the startup or eighteen (18) months from date of shipment from the factory, whichever occurs first. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

This limited warranty does not apply:

- a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.
- b) to any expenses, including labor or material, incurred during removal or reinstallation of the defective Product or parts thereof.
- c) to any workmanship of the installer of the Product.

This limited warranty is conditional upon:

- a) shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.
- b) determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.