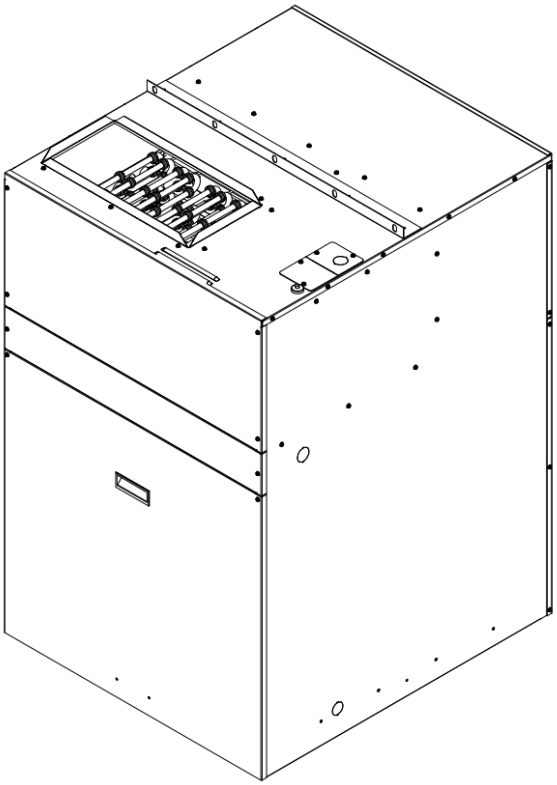
Installation, Operation, & Maintenance Manual

IOM 8414
Rev. A 1/25

FPE SERIES
Vertical Packaged Electric Heat / Electric Cooling Unit

FIRST-PAK AC



AHRI CERTIFIED®
www.ahridirectory.org
Unitary Small AC
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

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First Co./ AE- Air works to continuously improve its products and as a result, it reserves the right to change design and specifications without notice.

The warranty may be void unless the Startup & Performance Checklist is completed and returned to the warrantor. If the FIRST-PAK air conditioner is not installed properly, the warranty will be void, as the manufacturer cannot be held accountable for problems that stem from improper installation.

WARNING

This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety

Children should be supervised to ensure that they do not play with the appliance

Use adequate personal protection equipment when installing and performing maintenance. After switching off and locking-out an electrical disconnect, verify a safe condition with an electrical tester. Discharge a capacitor before handling any PSC motor and wiring. Use eye protection, cut resistant gloves and sleeves to protect against metal edges and screws.

Do not alter this product by using non-authorized parts. Such action voids all warranties or implied warranties and may result in adverse operation and performance and may be hazardous to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning.

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SAFETY CONSIDERATIONS

1. READ THE ENTIRE MANUAL BEFORE STARTING THE INSTALLATION.
2. These instructions are intended as a general guide and DO NOT supersede national, state, or local codes in any way.
3. Altering the product, improper installation, or the use of unauthorized factory parts voids all warranty or implied warranty and may result in adverse operation and/or performance or may result in hazardous conditions to service personnel and occupants. Company employees or contractors are not authorized to waive this warning.
4. This product should only be installed and serviced by a qualified, licensed, and factory authorized installer or service agency.
5. All "kits" and "accessories" used must be factory authorized when modifying this product. Refer and follow instructions packaged with the kits or accessories when installing.

RECOGNIZE THE FOLLOWING SAFETY NOTATIONS THROUGHOUT THIS MANUAL AND POSTED ON THE EQUIPMENT:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation or unsafe practices that could result in severe personal injury or death and/or damage to property.

WARNING

ELECTRIC SHOCK HAZARD

This warning signifies potential electrical shock hazards that could result in personal injury or death.

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate personal injury.

IMPORTANT

Suggests important procedure steps to ensure proper installation, reliability, or operation.

NOTE

Used to highlight suggestions, which may result in enhanced installation, reliability or operation.

WARNING

ELECTRIC SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in property damage, dangerous operation, serious injury, or death. Improper servicing could result in dangerous operation, serious injury, death, or property damage.

- Before servicing, disconnect all electrical power to the unit.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly. Verify proper operation after servicing.

SAFETY CONSIDERATIONS CONTINUED

WARNING

Installation and service must be performed by a licensed professional installer (or equivalent), service agency. Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

WARNING

These instructions are intended as an aid to qualified, licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.

WARNING

HIGH VOLTAGE!

Disconnect all power before servicing. Failure to do so may result in property damage, personal injury, or death.

CAUTION

Compressors and sealed system tubing components may be extremely hot!

CAUTION

Do not use compressors to evacuate the air conditioning system. A vacuum may cause internal electrical arcing resulting in a damaged or failed compressor.

WARNING

The unit cabinet must have an uninterrupted / unbroken ground to minimize personal injury if an electrical fault should occur. Failure to do so can cause electrical shock resulting in severe personal injury or death

WARNING

"USE COPPER CONDUCTORS ONLY!"

MODEL NOMENCLATURE

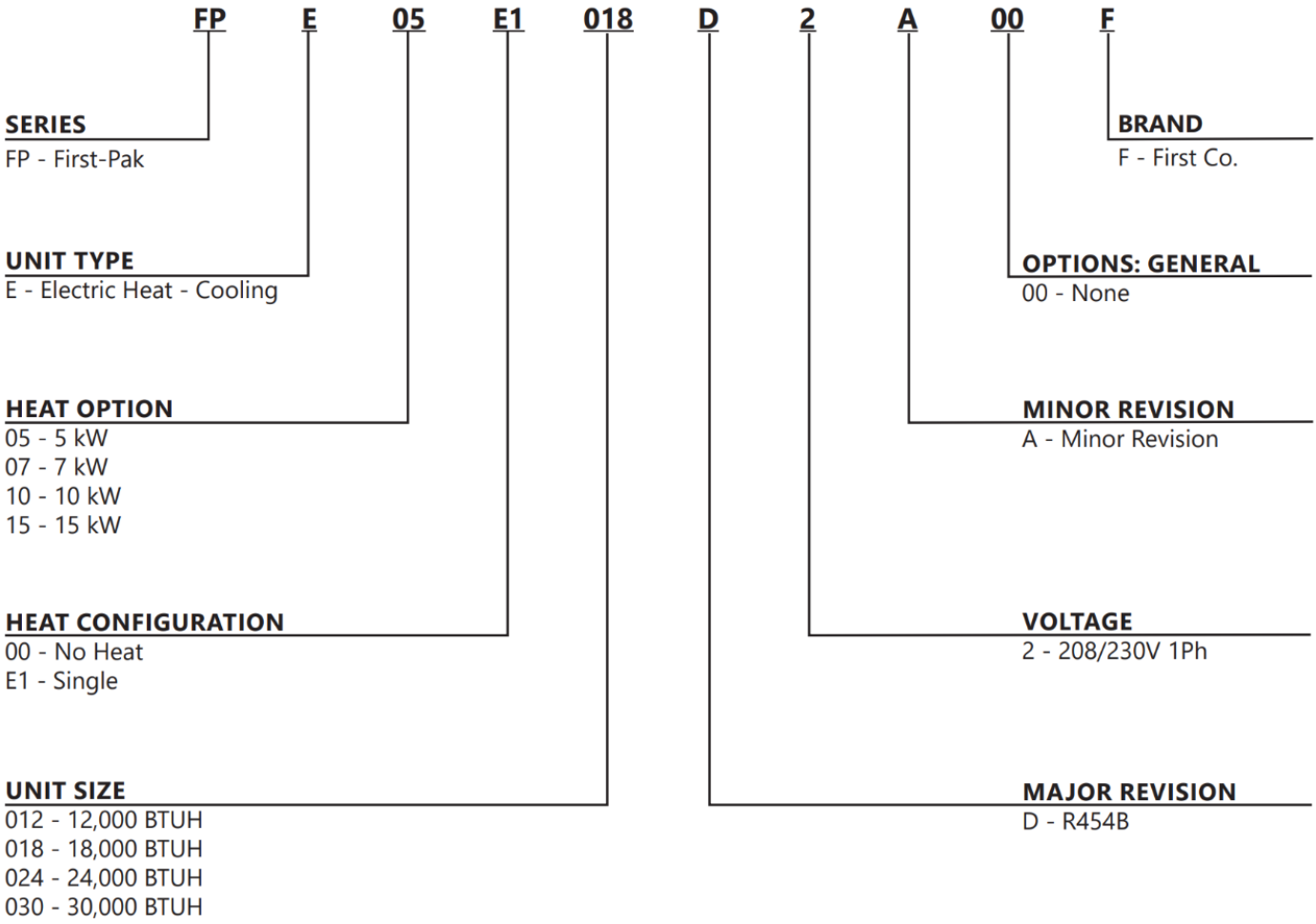


FIGURE 1 - MODEL NOMENCLATURE

GENERAL INFORMATION

WARNING

Do not operate this unit during building construction due to excessive airborne dust and debris. Do not operate this unit without an air filter in place. The manufacturer does not warrant equipment subjected to abuse.

WARNING

ELECTRIC SHOCK HAZARD

Before servicing equipment, ALWAYS turn off all power to the unit. There may be more than one disconnect switch. Electrical shock can cause injury or death.

WARNING

This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

Children should be supervised to ensure that they do not play with the appliance

Use adequate personal protection equipment when installing and performing maintenance. After switching off and locking-out an electrical disconnect, verify a safe condition with an electrical tester. Discharge a capacitor before handling any PSC motor and wiring. Use eye protection, cut resistant gloves and sleeves to protect against metal edges and screws.

Clear surrounding area of all tools, equipment, and debris before operating this unit.

These instructions are provided for the installation of the FIRST-PAK air conditioner specifically. For any other related equipment, refer to the appropriate manufacturer's instructions.

WARNING

This air conditioner is certified for through-the-wall indoor installation only. This air conditioner is NOT approved for mobile homes, recreational vehicles or outdoor applications. Such use could result in property damage, personal injury, or death.

NOTE

Material in this shipment has been inspected at the factory and released to the transportation agency in good condition. When received, a visual inspection of all cartons should be made immediately. Any evidence of rough handling or apparent damage should be noted on the delivery receipt in the presence of the carrier's representative. If damage is found, a claim should be immediately filed against the carrier.

This air conditioner is designed for through-the-wall indoor installation only. Installation of this equipment, wiring, ducts, and any related components must conform to current agency codes, state laws, and local codes. Such regulations take precedence over general instructions contained in this manual.

CAUTION

Take extreme caution that no internal damage will result if screws or holes are drilled into the cabinet

Unit Operating Range °F [°C]		
Condition	Cooling	
	Min.	Max.
Outdoor DB	60 [15.6]	115 [46.1]
Indoor DB	60 [15.6]	90 [32.2]

TABLE 1

INTRODUCTION

The FIRST-PAK FPE series air conditioners are self-contained, electric heating with electric cooling models. The unit design has been certified by Intertek Testing Services for compliance with the Standard of UL 60335-2-40 for Safety for Heating and Cooling Equipment. The FPE models are certified to be in compliance with the latest edition of AHRI Standard 210/240.

This unit may be installed at altitudes up to 10,000 ft. (3,048 m). Altitudes over 4,500 ft. (1371.6m) require an additional high-altitude kit detailed in the High Altitude Operations section of this document.

These installation instructions are intended as a general guide only, for use by an experienced, qualified contractor.

Work with extreme caution to minimize the risk of refrigerant ignition while installing and servicing a system containing a flammable refrigerant. Control the work environment as much as possible while potentially flammable vapors are present. Inform all persons on site about the risks of the nature of the work underway and the necessary safety precautions. Do not work in confined spaces. Test the work area for refrigerant in the air using an intrinsically safe A2L refrigerant leak detector before beginning work. Have a dry powder or CO2 fire extinguisher available. Use proper tools designed for A2L class refrigerants. While working near A2L refrigerants, use only non-sparking tools. Open flames and other ignition sources must not be present except during brazing. Brazing must only take place on evacuated and nitrogen purged refrigerant lines and components that are open to the atmosphere.

Consult local building codes and current editions of the National Electrical Code (NEC) NFPA 70. In Canada, refer to current editions of the Canadian electrical code CSA CEC22.1.

STORAGE

Equipment should be stored in a clean dry, conditioned area with maximum temperatures up to 120°F [48.89°C] and minimum temperatures to 32°F [0°C]. Units should be stored upright and in an indoor environment. It is recommended to leave packaging on the unit until the installation is to begin.

WARNING

REFRIGERANT UNDER PRESSURE

Units are factory charged with refrigerant. Store units in a location that will minimize the potential for damage. Do not store the unit where sources of ignition are continuously present.

Do not use means to accelerate the defrosting process, or to clean the unit, other than those recommended by the manufacturer.

Be aware that refrigerants may not contain an odour.

Do not pierce or burn.

WARNING

DO NOT stack more than FOUR units when storing. Failure to follow these instructions may result in property damage, personal injury or death.

The manufacturer does not warrant equipment subjected to abuse.

SHIPPING & PACKAGE LIST

SHIPPING INSTRUCTIONS

The units must remain in the upright position throughout the shipping and handling process to maintain a proper level of oil in the compressor.

NOTE

Remove shrink-wrap and all packaging materials before installation. Ensure louvered areas are free from obstructions before installation.

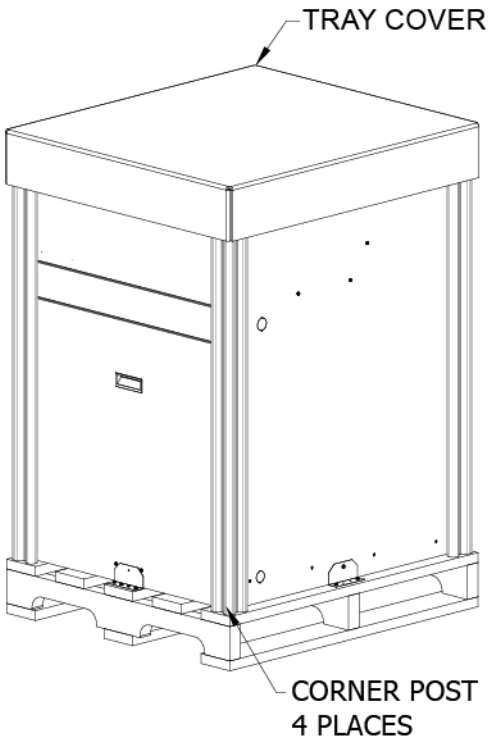


FIGURE 2 - Standard Packaging

PACKAGE LIST

The units will be shipped with the following items:

1- FPE (FIRST-PAK) package electric heat/dx cooling unit:

   A- Shipping bracket
      a. Screws
   B- Top mounting bracket
      a. Screws

2- Literature package
   A- IOM - Installation & Operations Manual

Check the unit for shipping damage; if found, immediately contact the last carrier.

UNIT INSPECTION CHECKLIST

Complete the inspection procedures below before preparing unit for installation:

1) Visually inspect unit for any shipping damage. Damage must be reported immediately to the shipping company to make a claim.
2) Ensure that the carrier makes proper notation of any shortages or damage on all copies of the freight bill and completes a common carrier inspection report.
3) Verify that unit nameplates on the data label match the sales order or bill of lading (including, unit configuration, size and voltage).
4) Immediately before installation, remove unit front panel and verify that all electrical connections are tight.
5) Check to make sure that the refrigerant piping is free from any kinks, no visible refrigerant leak and there is no interference between unit piping and sheet metal or electrical wires.
6) Check that the blower spins freely within the housing and that there are no obstructions between the wheel and housing. The wheel can sometimes come loose in shipping.
7) Check to make sure compressor mounting bolts and nuts are not loose.
8) Ensure that the evaporator distributor tubes are not touching one in another and that they are over the drain pan.
9) Check the air-coil fins for any damage during shipping.
10) Ensure that the shipping brackets and screws are removed from the chassis section. Refer to **FIGURE 3 - Standard Packaging with Shipping Brackets – Front View & FIGURE 4 - Standard Packaging with Shipping Brackets – Back View** for more information.
11) Inspect the electric heater section:
    a. Verify that there are no loose or damaged parts.
    b. Check to make sure all wiring connections are tight and there are no loose or broken wires.
    c. Verify that insulation is in place and not in contact with heating elements.

NOTE

Verify the supply voltage requirements on the unit nameplate while installing the equipment

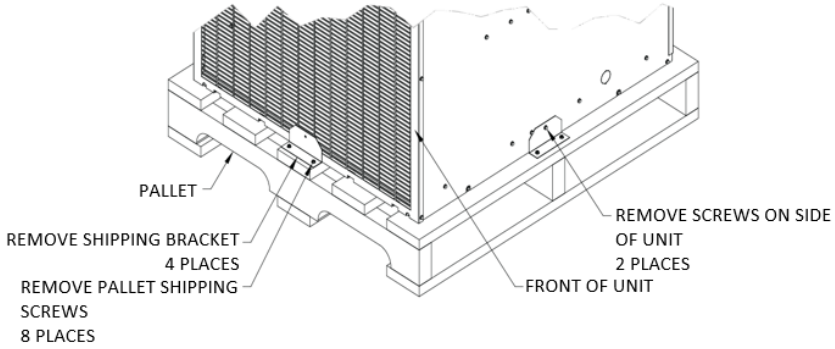


FIGURE 3 - Standard Packaging with Shipping Brackets - Front View

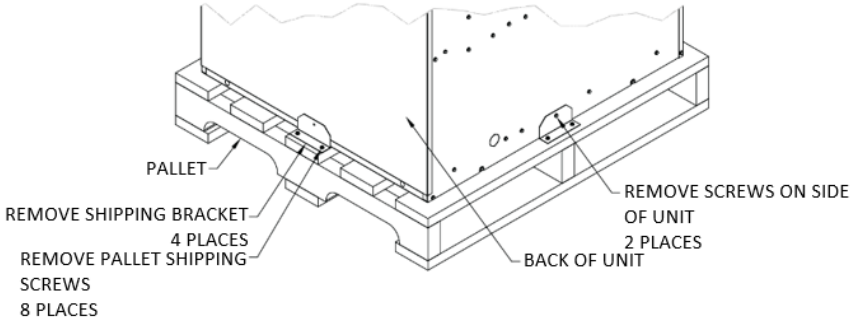


FIGURE 4 - Standard Packaging with Shipping Brackets - Back View

UNIT DIMENSIONAL DATA

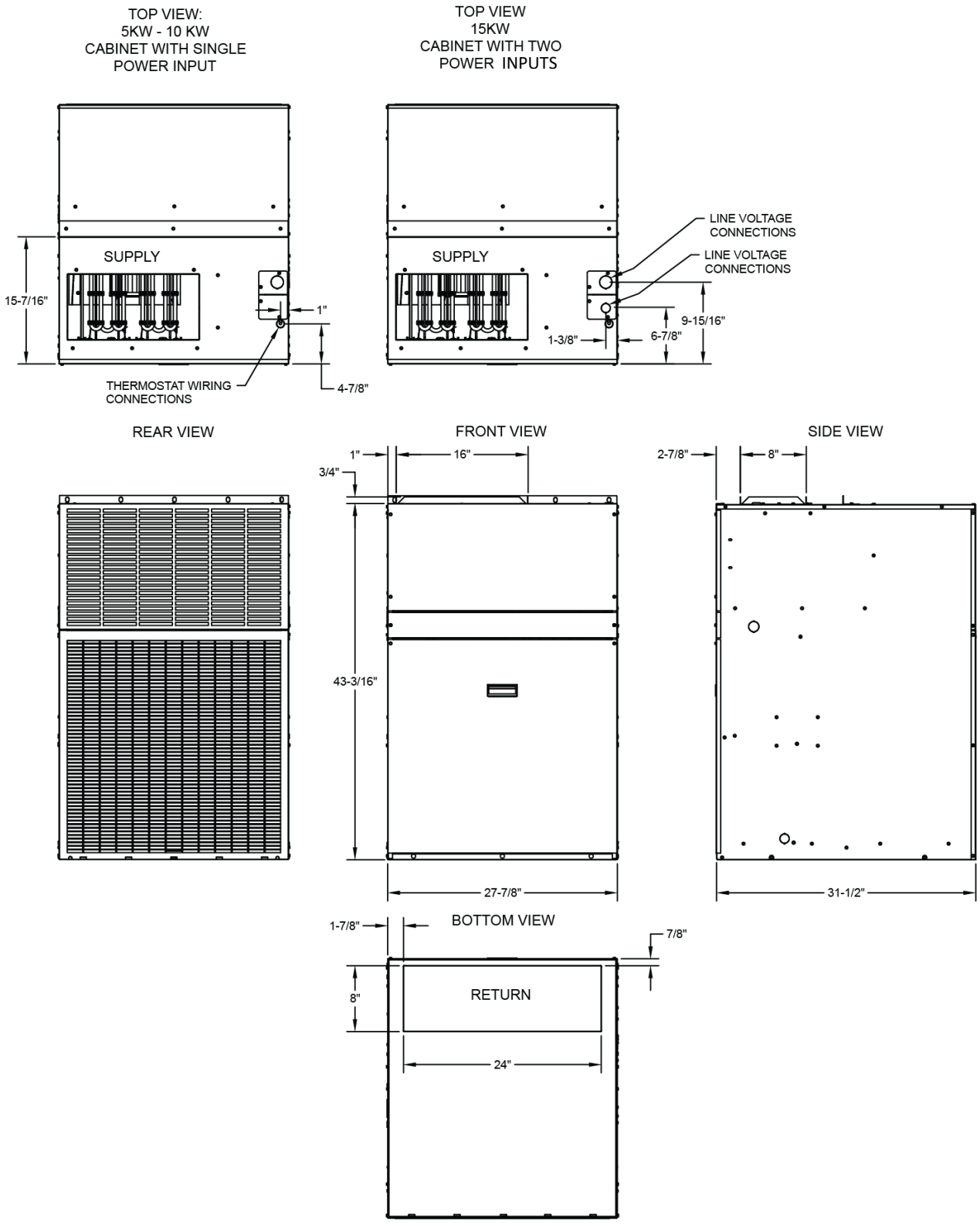


FIGURE 5 - Unit Dimensions

UNIT PHYSICAL DATA

PHYSICAL DATA							
FPE MODELS		05E1012D	07E1012D	10E1012D	05E1018D	07E1018CD	10E1018D
UNIT INFORMATION							
Compressor Qty/Type		Rotary (1)	Rotary (1)	Rotary (1)	Scroll (1)	Scroll (1)	Scroll (1)
Factory Charge (R454B)	lb.	4.8	4.8	4.8	4.5	4.5	4.5
	kg	2.18	2.18	2.18	2.04	2.04	2.04
Minimum Room Area	m^2	6.6	6.6	6.6	6.2	6.2	6.2
	ft^2	70.9	70.9	70.9	66.3	66.3	66.3
Minimum Air Flow	cfm	130	130	130	122	122	122
	m^3/hr	221	221	221	207	207	207
Compressor Capacitor		35MFD/370V	35MFD/370V	35MFD/370V	35MFD/370V	35MFD/370V	35MFD/370V
Condenser Fan HP [kW]		1/5 [.15]	1/5 [.15]	1/5 [.15]	1/5 [.15]	1/5 [.15]	1/5 [.15]
Indoor Fan HP [kW]		1/4 [.17]	1/4 [.17]	1/4 [.17]	1/3 [.25]	1/3 [.25]	1/3 [.25]
Blower Size (D x W) in. [cm]		10 x 6 [25.4 x 15.24]					
Condenser Dimension (H x W) in. [cm]		26.46 x 22.25 [67.2 x 56.5]					
Evaporator Dimension (H x W) in. [cm]		23.15 x 22.25 [58.8 x 56.5]					
Filter Size (H x W) in. [cm]		24 x 24 [60.96 x 60.96]					
Electric Heater [kW] @240V		5(1x5kW)	7(2x3.5kW)	10(2x5kW)	5(1x5kW)	7(2x3.5kW)	10(2x5kW)
Max. Static Pressure IWC [pa]		.5 [125]					
A2L Mitigation		YES	YES	YES	YES	YES	YES
Operating Weight lb. [kg]		280 [127]	280 [127]	280 [127]	330 [149.7]	330 [149.7]	330 [149.7]
Shipping Weight lb. [kg]		300 [136.1]	300 [136.1]	300 [136.1]	350 [158.8]	350 [158.8]	350 [158.8]

Table 2 - Physical Data

UNIT PHYSICAL DATA (CONTINUED)

PHYSICAL DATA									
FPE MODELS		05E1024D	07E1024D	10E1024D	15E1024D	05E1030D	07E1030D	10E1030D	15E1030D
UNIT INFORMATION									
Compressor Qty/Type		Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)	Scroll (1)
Factory Charge (R454B)	lb.	4.8	4.8	4.8	4.8	4	4	4	4
	kg	2.18	2.18	2.18	2.18	1.81	1.81	1.81	1.81
Minimum Room Area	m^2	6.6	6.6	6.6	6.6	5.5	5.5	5.5	5.5
	ft^2	70.9	70.9	70.9	70.9	58.9	58.9	58.9	58.9
Minimum Air Flow	cfm	130	130	130	130	108	108	108	108
	m^3/hr	221	221	221	221	183	183	183	183
Compressor Capacitor		35MFD/370V	35MFD/370V	35MFD/370V	35MFD/370V	40MFD/370V	40MFD/370V	40MFD/370V	40MFD/370V
Condenser Fan HP [kW]		1/3 [.25]	1/3 [.25]	1/3 [.25]	1/3 [.25]	1/3 [.25]	1/3 [.25]	1/3 [.25]	1/3 [.25]
Indoor Fan HP [kW]		1/2 [.37]	1/2 [.37]	1/2 [.37]	1/2 [.37]	1/2 [.37]	1/2 [.37]	1/2 [.37]	1/2 [.37]
Blower Size (D x W) in. [cm]		10 x 6 [25.4 x 15.24]							
Condenser Dimension (H x W) in. [cm]		26.46 x 22.25 [67.2 x 56.5]							
Evaporator Dimension (H x W) in. [cm]		23.15 x 22.25 [58.8 x 56.5]							
Filter Size (H x W) in. [cm]		24 x 24 [60.96 x 60.96]							
Electric Heater [kW] @240V		5(1x5kW)	7(2x3.5kW)	10(2x5kW)	15(3x5kW)	5(1x5kW)	7(2x3.5kW)	10(2x5kW)	7(2x3.5kW)
Max. Static Pressure IWC [pa]			0.5 [125]						
A2L Mitigation		YES	YES	YES	YES	NO	NO	NO	NO
Operating Weight lb. [kg]		350 [158.8]	350 [158.8]	350 [158.8]	350 [158.8]	350 [158.8]	350 [158.8]	350 [158.8]	350 [158.8]
Shipping Weight lb. [kg]		370 [167.8]	370 [167.8]	370 [167.8]	370 [167.8]	370 [167.8]	370 [167.8]	370 [167.8]	370 [167.8]

Table 3 - Physical Data Continued

ELECTRICAL DATA

ELECTRICAL DATA																	
MODEL NUMBER	Voltage – PH-HZ	COMPRESSOR		CONDENSOR MOTOR		INDOOR MOTOR		MIN. CIRCUIT AMPACITY				MAX. CIRCUIT PROTECTION				MIN. VOLTAGE	MAX. VOLTAGE
		RLA	LRA	FLA	HP	FLA	HP	CKT1		CKT2		CKT1		CKT2			
								230V	208V	230V	208V	230V	208V	230V	208V		
FPE05E1012D	208/230-1-60	4.6	25	1.9	1/5	2.3	1/4	29	25	0	0	30	30	0	0	197	252
FPE07E1012D	208/230-1-60	4.6	25	1.9	1/5	2.3	1/4	39	34	0	0	40	35	0	0	197	252
FPE10E1012D	208/230-1-60	4.6	25	1.9	1/5	2.3	1/4	55	48	0	0	60	50	0	0	197	252
FPE05E1018D	208/230-1-60	7.2	47	1.9	1/5	2.8	1/3	30	26	0	0	30	30	0	0	197	252
FPE07E1018D	208/230-1-60	7.2	47	1.9	1/5	2.8	1/3	40	35	0	0	40	40	0	0	197	252
FPE10E1018D	208/230-1-60	7.2	47	1.9	1/5	2.8	1/3	56	49	0	0	60	50	0	0	197	252
FPE05E1024D	208/230-1-60	10.2	58	2.8	1/3	4.1	1/2	31	28	0	0	35	30	0	0	197	252
FPE07E1024D	208/230-1-60	10.2	58	2.8	1/3	4.1	1/2	42	37	0	0	45	40	0	0	197	252
FPE10E1024D	208/230-1-60	10.2	58	2.8	1/3	4.1	1/2	57	50	0	0	60	60	0	0	197	252
FPE15E1024D	208/230-1-60	10.2	58	2.8	1/3	4.1	1/2	57	50	26	23	60	60	30	25	197	252
FPE05E1030D	208/230-1-60	12.8	77	2.8	1/3	4.1	1/2	31	28	0	0	35	35	0	0	197	252
FPE07E1030D	208/230-1-60	12.8	77	2.8	1/3	4.1	1/2	42	37	0	0	45	40	0	0	197	252
FPE10E1030D	208/230-1-60	12.8	77	2.8	1/3	4.1	1/2	57	50	0	0	60	60	0	0	197	252
FPE15E1030C	208/230-1-60	12.8	77	2.8	1/3	4.1	1/2	57	50	26	23	60	60	30	25	197	252

Table 4 – Electrical Data

INSTALLATION

REQUIREMENTS

Follow manufacturer's installation instructions, as well as local and municipal building codes. In addition, the installation shall conform to the following Fire Protection Association (NFPA) Standards:

- NFPA No. 90A – Standard for Installation of Air Conditioning and Ventilation Systems
- NFPA No. 90B – Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems.

This unit is approved for installation clearance to combustible material as stated on the unit rating plate. However, stated minimum clearances to combustibles may be inadequate for future accessibility and service needs which must be considered when planning of the installation.

INSTALLATION PRECAUTIONS

CAUTION

Always wear appropriate Personal Protective Equipment (PPE) when installing and servicing these units.

WARNING

Use multiple people when moving and installing these units. Failure to do so could result in injury or death.

CAUTION

Contact with metal edges and corners can result in injury. Wear protective gloves when handling. Exercise caution when installing and servicing unit.

Observe the following precautions for typical installation:

- Always use proper tools and equipment
- No wiring or any work should be attempted without first ensuring the unit is completely disconnected from the power source and locked out. Also, verify that a proper permanent and uninterrupted, ground connection exists prior to energizing power to the unit.
- Review unit nameplate and wiring diagram for proper voltage and control configurations. This information may vary from unit to unit.

UNIT LOCATION

This product is certified for through-the-wall, indoor, up-flow vertical position installation only. This appliance is not design certified for installation in mobile homes, recreational vehicles, or outdoors. A First Company approved wall sleeve must be used to install the unit.

DO NOT install directly on carpeting, tile, or other combustible material other than wood flooring.

The Installation must conform with local building codes or, in the absence of local codes, to the Protection Association Standards NEPA. No. 90A and NEPA. No. 90B.

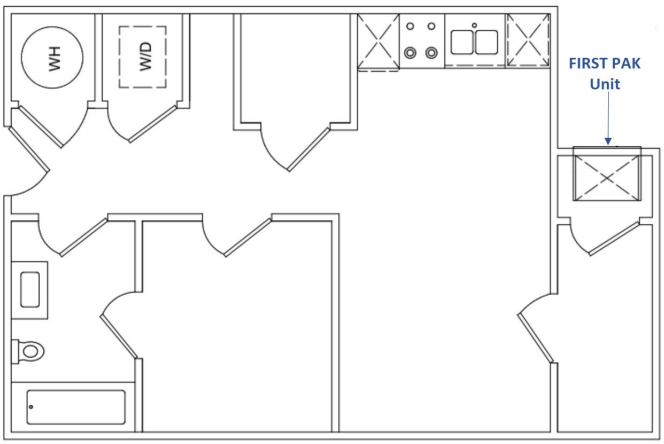


FIGURE 6 - Typical Floorplan with FIRST-PAK on Exterior Wall

INSTALLATION CONTINUED

UNIT CLEARANCE REQUIREMENTS

The unit may be installed with zero clearances to adjacent combustible surfaces. This unit shall not be installed directly on carpeting, tile, or other combustible material, other than wood flooring.

Service clearance must be provided for future maintenance and service. A minimum of 32 in [81.28 cm] open area must be left unobstructed in front of the access panels.

The grille side must be kept free from any obstructions to air flow. The unit must be installed at least 4 ft [1.2192 m] from electric meters, gas meters, regulators, and relief equipment.

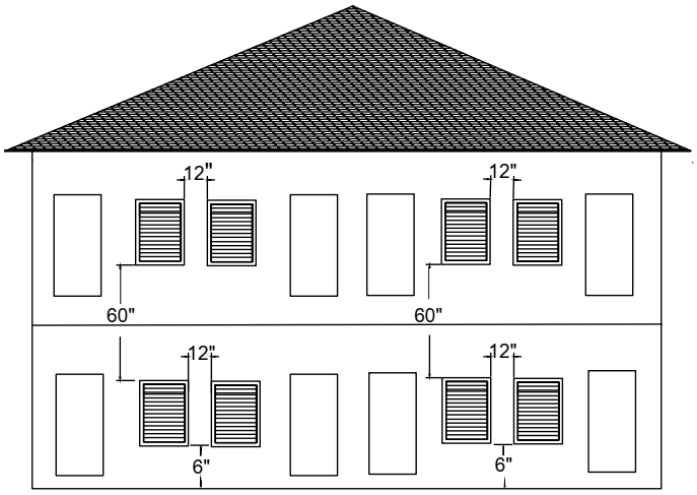


FIGURE 7 - Required Exterior Building Clearance

CLEARANCE REQUIREMENTS		
MINIMUM CLEARANCE	INCHES	CM
Horizontal distance between units	12	30
Vertical distance between units	60	152
Distance above ground level	6	15
Distance above finished floor	6	15
Distance above a garage floor	18	46

Table 5- Clearance Requirements/Dimensions

An air conditioner installed in a garage must also be protected from damage by vehicles.

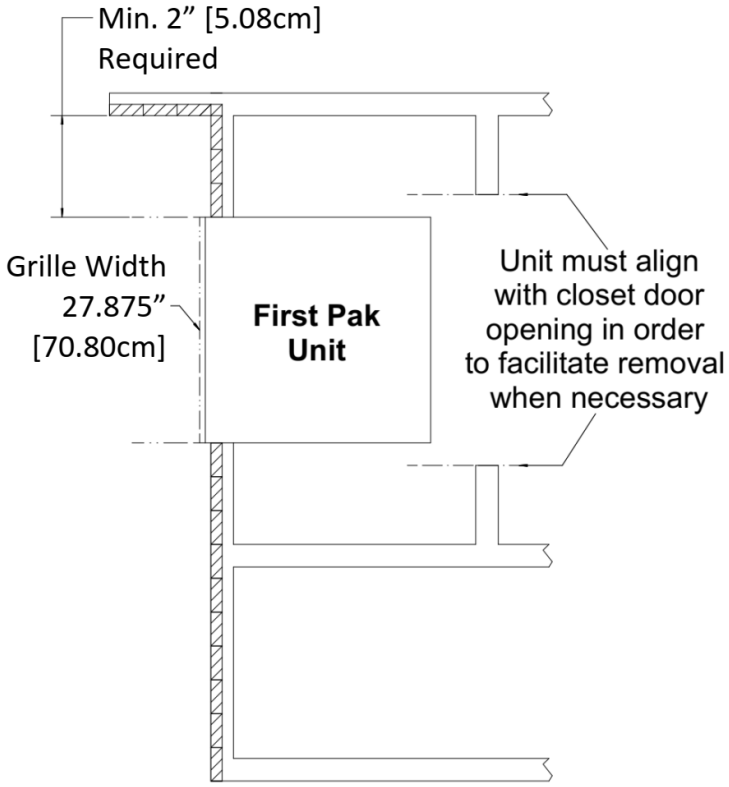


FIGURE 8 - Interior Clearance Requirements

CAUTION

A masonry wall opening must be properly constructed with a lintel for wall support. Wall openings must be flashed and sealed. The unit must be level, front to back, side to side.

Refer to **CLEARANCE REQUIREMENTS** section in this manual for more information.

INSTALLATION CONTINUED

WALL SLEEVE INSTALLATION

WARNING

Installation and service must be performed by a licensed professional installer (or equivalent), service agency. Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

Refer to installation instruction packed with the wall sleeve to assemble and mount into the wall. Before unit installation, make sure sleeve components are not damaged; drain line is not obstructed and is leak free.

Check all seals to ensure that they are in position and un-damaged. Ensure that the wall sleeve is sloped toward the exterior of the building (FIGURE 9 - Wall Sleeve Mounting). Securely fasten the Architectural grille to the front of the sleeve using the supplied hardware.

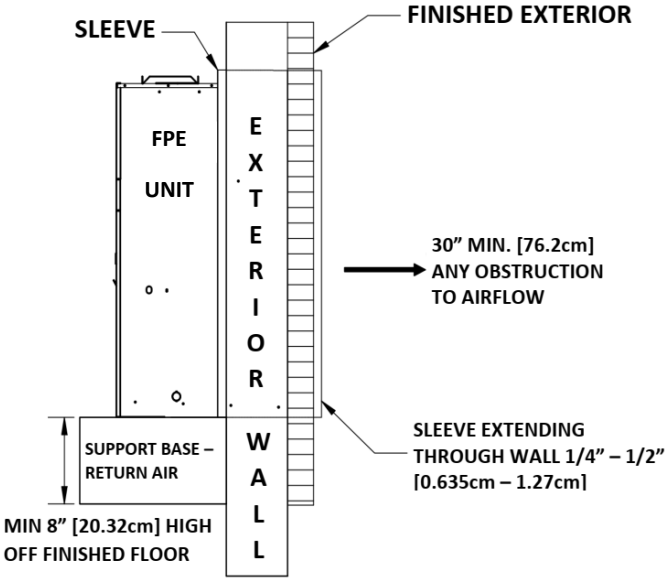


FIGURE 9 - Wall Sleeve Mounting

IMPORTANT

Apply a high grade non-hardening sealant approved for exterior use between the sleeve and the structure, on the inside and outside walls, to prevent air and water from migrating inside (FIGURE 9 - Wall Sleeve Mounting)

REAR INSTALLATION & DIMENSIONS

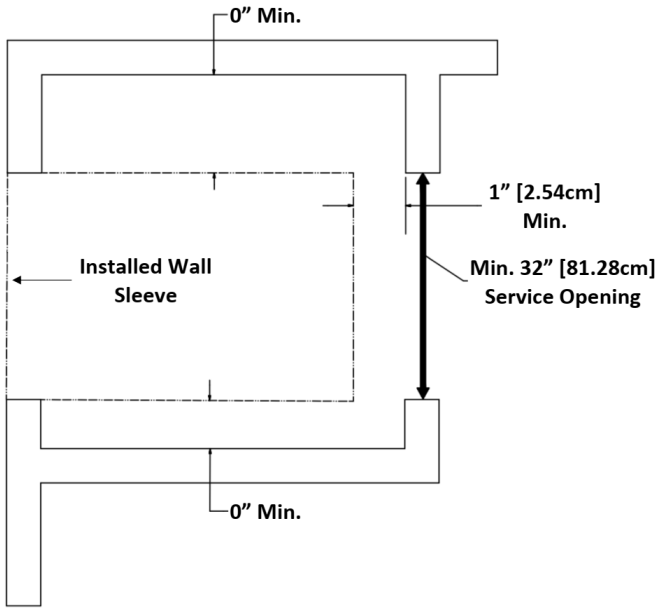


FIGURE 10 - Rear Installation Dimensions

The inside of the unit can be surrounded by a closet with minimum clearance to heater section match to 0 in clearance on the sides, 2 in [5.08 cm] clearance from the top, and 1 in [2.54 cm] from the front and the plenum. Enough clearance should be provided for installing field wiring. DO NOT install directly on any combustible material (such as carpet, tile, etc.) other than wood flooring.

If an architectural louver is used, fasten it securely to the front of the sleeve using the supplied hardware.

INSTALLATION CONTINUED

UNIT SUPPORT

The First Pak wall sleeve is not intended or designed to provide complete support for the First Pak unit. Additional support is required. A field constructed platform may be used for this purpose and may also be constructed to provide a means of attaching the return air duct.

PLYWOOD INSTALLATION

Support base construction should be built as below in FIGURE 11 - Unit Support & Alignment. It must be fabricated with plywood, framing lumber and/or any pre-approved sheet metal construction material. FIGURE 11 - Unit Support & Alignment is showing alignment of the platform top with the base panel of the wall sleeve.

- Minimum height of platform = 8 in [20.32 cm]
- Recommended platform width = 29 in [73.66 cm]
- Recommended platform depth = 16 in [40.64 cm]

Refer to FIGURE 11 - Unit Support & Alignment.

Things to consider prior to building the support structure:

1. Accurately measure the unit and choose a strong building material for the support structure.
2. If additional vibration isolation material is required, non-combustible material MUST be used.
3. Ensure that the platform connection to FIRST-PAK return air opening can fit an 8 in x 24 in [20.32 cm x 60.96 cm] duct. The FIRST-PAK unit must be aligned with return air opening on the unit base.
4. Ensure the support structure and the wall sleeve provide a secure, fixed, and leveled position.

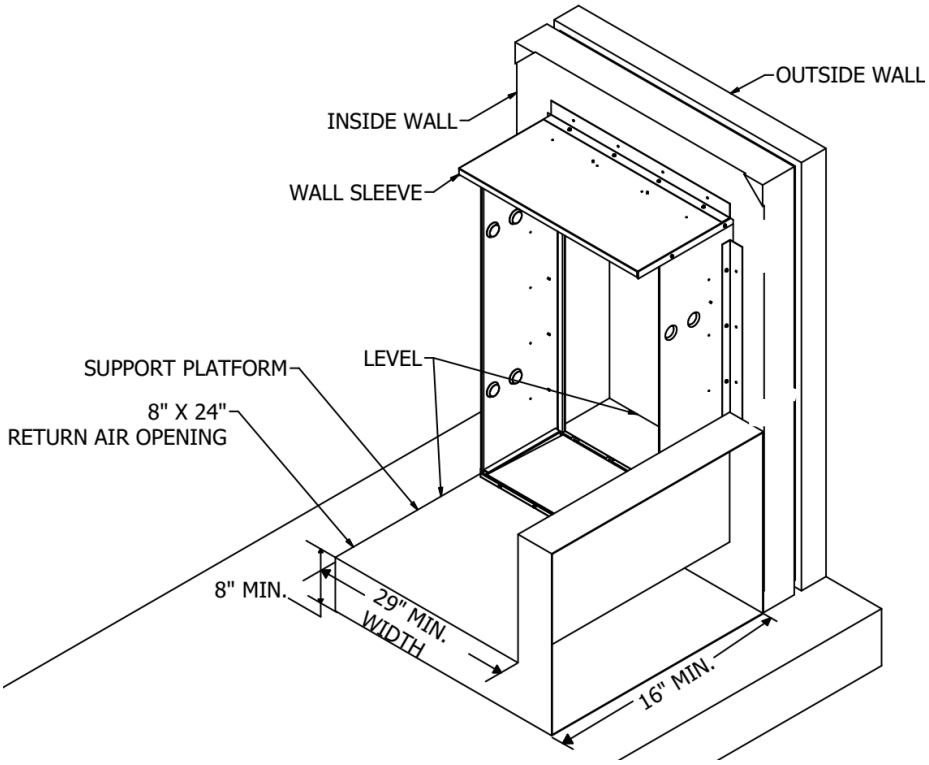


FIGURE 11 - Unit Support & Alignment

CAUTION

The sleeve is not intended or designed to be the sole support for the unit. Additional support must be provided under the return air opening of the unit for adequate support. The use of vibration isolation material between the unit and the support is recommended.

INSTALLATION CONTINUED

PACKAGED UNIT INSTALLATION

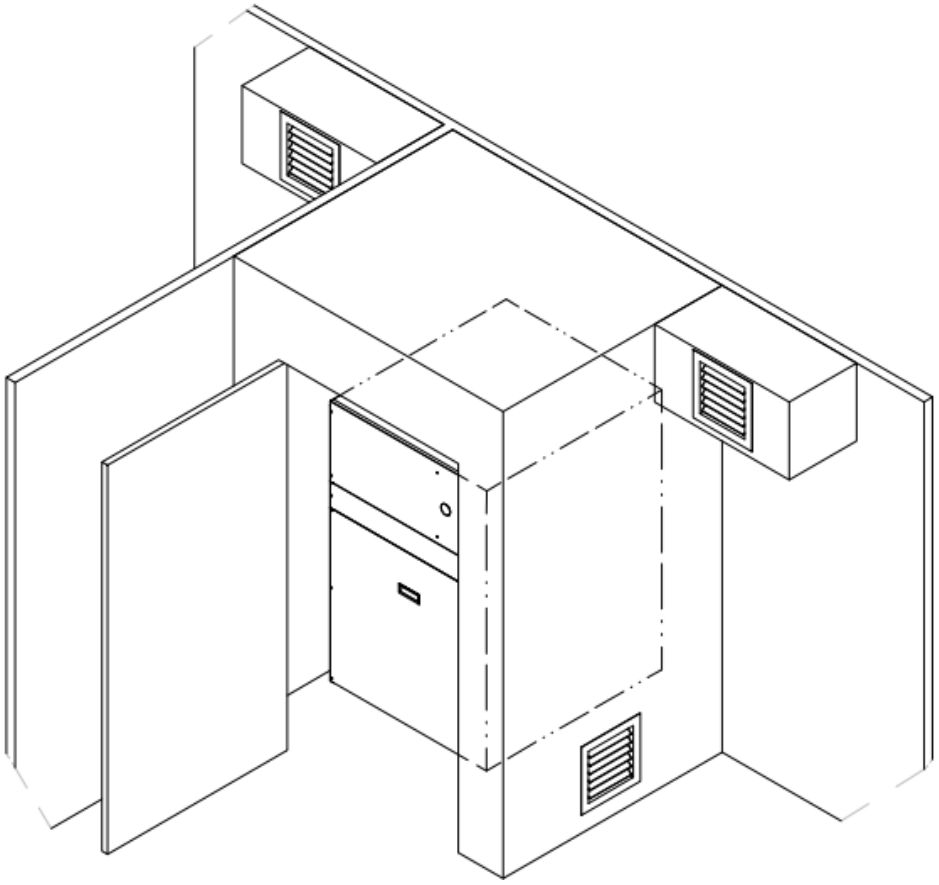


FIGURE 12 - FIRST-PAK Unit Installation

NOTE

Locate the unit in an area that easily provides minimum clearance to all service access panels. Consider all additional clearances needed for water connections, electrical connections, duct connections and sufficient return airflow.

IMPORTANT

These units are for indoor installation ONLY!

NOTE

DO NOT locate unit in areas subject to freezing temperatures or where high humidity levels could cause cabinet condensation. Units should be mounted on the sleeve with a pitch to the outside of the building.

Insulation is installed in indoor equipment to provide a barrier between outside air conditions surrounding the unit and the varying conditions inside the unit. If the insulating barrier is damaged, the surrounding ambient air will affect the inside surface temperature of the cabinet; this may lead to sheet metal corrosion and subsequently, component failure.

IMPORTANT

Damaged insulation must be repaired or replaced before the unit is placed back into operation. Insulation loses its insulating properties when wet, damaged, separated or torn.

The installer must adhere strictly to all local and national code requirements pertaining to the installation of this equipment including the cabinet, discharge plenum and connecting ducts. All units are designed for indoor use only, and are agency listed for installation with clearances specified on the product rating plate.

INSTALLATION CONTINUED

PACKAGED UNIT INSTALLATION

1. Remove the four shipping brackets holding the unit to the shipping pallet and remove unit from the shipping pallet.

NOTE

The top mounting bracket must be attached to the FIRST-PAK unit.

2. Attach the top mounting bracket to the unit with screws (5) provided with unit. Refer to FIGURE 13 -

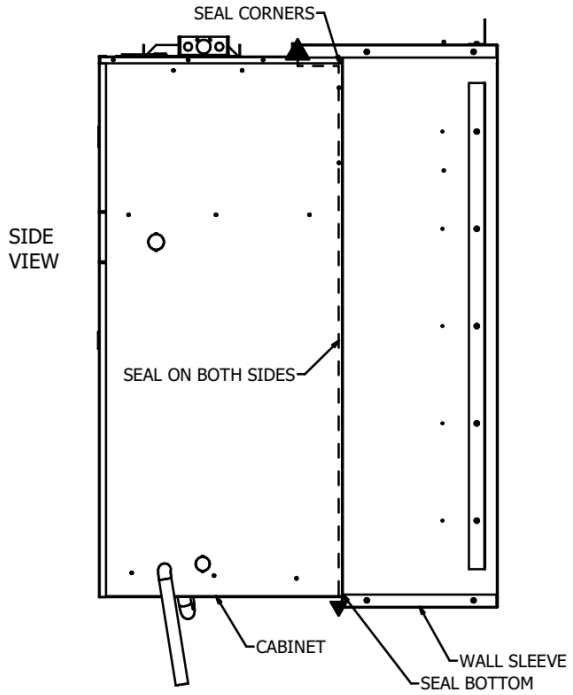


FIGURE 13 - Wall Sleeve Seal

3. Ensure that properly sized ductwork is in place to mate to the connections on the FIRST-PAK.
4. Remove front access panel and verify all electrical connections are secure and check the condenser fan to see it turns freely.

NOTE

Bend the supply air duct flanges up at a 90° angle before attaching duct. Leaving the flanges in the flat shipping position will cause a reduction in airflow and poor performance.

5. If an air filter is to be applied to the unit remove lower front access panel to replace filter. (Error! Reference source not found.). Place the filter into the filter bracket.
6. Ensure that the wall sleeve is installed squarely and is secured before installing the unit.
7. Inspect the sleeve seal, which is supplied with the sleeve, to ensure that it is properly secured and aligned (see FIGURE 13 - Wall Sleeve Seal).
8. Slide the FIRST-PAK unit toward the sleeve seal until the sleeve and cabinet brackets are nested and almost making contact.
9. Center the FIRST-PAK unit in the sleeve.
10. Use screw fasteners to attach the cabinet bracket to wall sleeve.

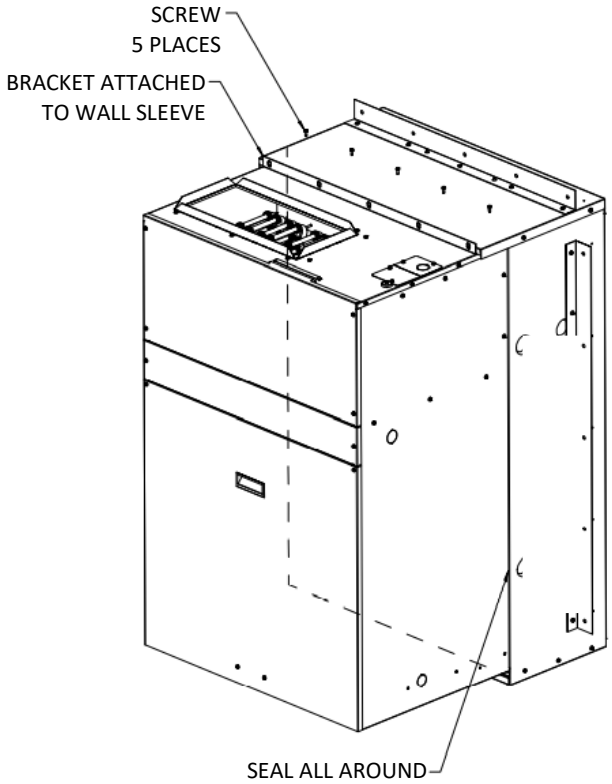


FIGURE 14 - Top Bracket Installation on Sleeve

11. Use a high-grade non-hardening sealant to close any gaps that may exist between the seal and the wall of the sleeve.
12. Check that the unit is completely settled on all four sides against the wall sleeve seals.

CAUTION

Seal exposed joints to prevent water and outside air infiltration into the closet, which can cause improper unit operation and may cause damage the unit and other property.

INSTALLATION CONTINUED

DUCTWORK

IMPORTANT

Supply and return air ducts must be sealed to the unit.

IMPORTANT

Do not restrict supply air by using a vertical duct with dimensions smaller than the supply air flanges in the bent position.

IMPORTANT

All ductwork must be installed in accordance with National Fire Protection Assoc. Codes 90A and 90B.

SUPPLY AIR DUCTING

Supply air ductwork should be sized and constructed in accordance with industry best practices and standards.

Insufficiently sized ductwork will cause low supply airflow, which could cause low cooling performance, liquid flood back to compressor and condensate in the cabinet. In heating operation, low airflow could cause the heater auto-reset limit switch cycle on and off, which would reduce the longevity of heating element. Excessive airflow may result in a noisy duct system and could lower heating supply temps to an uncomfortable level. Unit external static cannot be more than 0.5 in. w.c.

Ductwork should be adequately insulated to prevent condensation and to minimize heat loss within the duct system. A flexible connector is recommended for supply air connections on metal duct systems to limit noise.

RETURN AIR DUCTING

Return air ducting can be brought in through a wall grille or opening and then to the unit. The return duct should be sealed to the return air opening on the bottom of the unit and must terminate inside of the conditioned space. It is recommended to use duct material with acoustically lined insulation for sound attenuation. The return duct must be sized for a 24 in x 8 in [60.96 cm x 20.32 cm] opening.

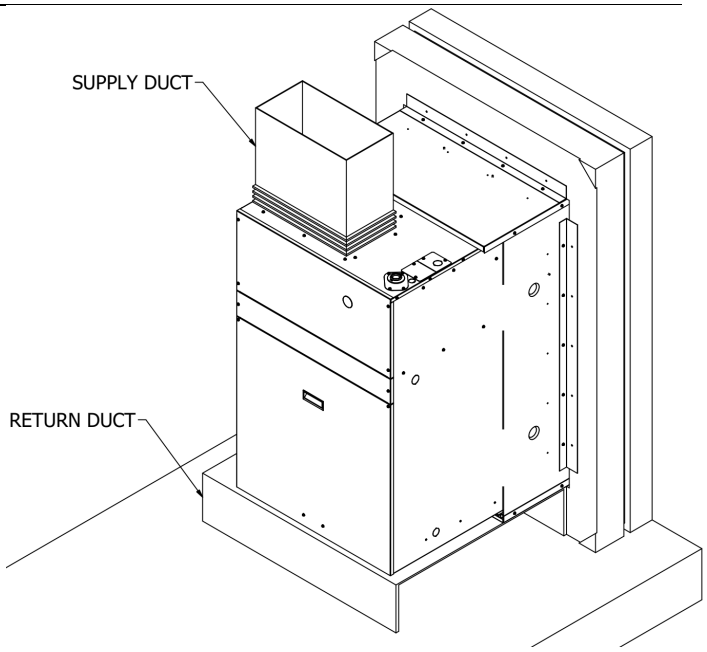


FIGURE 15 - Unit Return Ducting

CONDENSATE DRAINAGE

Condensate drain lines must be properly installed with adequate slope away from unit to ensure proper drainage. A minimum trap of 1.5 in [3.81 cm] must be installed to isolate the negative pressures of the drain pan from the drain line. Refer to for schematic information on the condensate drain lines. Drain line should be insulated to prevent condensate dropping to the ground and duct.

CAUTION

On units with plastic drain pans, the drain connection must be hand tight only.

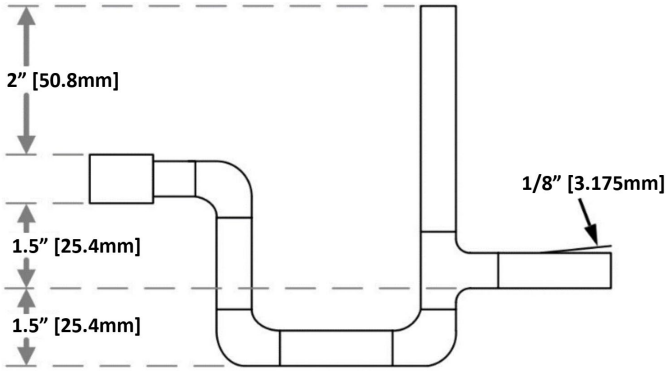


FIGURE 16 - Condensate Drain Layout

INSTALLATION CONTINUED

AIR FILTER

All indoor return air must be filtered. The preferred methods are:

1. The FPE unit ships with factory-installed 1" disposable MERV3/4 filter which attaches to the inlet of the evaporator coil.
2. A same size washable filter may be used to replace the existing disposable filter.
3. If a higher efficiency filter which has higher external static pressure is used, the added air pressure drop must be included in the external static pressure. The total external static pressure including duct work should not be more than 0.5 in. w.g. Airflow table should be checked to see if airflow still meets the application requirement and adjusts speed tap if needed.

AIR FILTER MINIMUM DIMENSIONS	
Model Series	Minimum Area
FPE**E1*****	576 sq. inches [0.3716 sq. meter]

Table 6 - Air Filter Minimum Dimensions

CAUTION

DO NOT operate this unit without an air filter in place

ELECTRICAL

HIGH VOLTAGE

IMPORTANT

Electrical work associated with the installation of this appliance must comply with the National Electrical Code (NEC). Other local or regional electrical and building code requirements may apply.
In Canada electrical work associated with the installation of this appliance must comply with CE CSA C22.

WARNING

The unit cabinet must have an uninterrupted / unbroken ground to minimize personal injury if an electrical fault should occur. Failure to do so can cause electrical shock resulting in severe personal injury or death.

IMPORTANT

Electrical work associated with the installation of this appliance must comply with the National Electrical Code (NEC). Other local or regional electrical and building code requirements may apply.
In Canada electrical work associated with the installation of this appliance must comply with CSA CEC22.1

WARNING

Electrically ground the unit. Connect ground wire to ground lug. Failure to do so can result in injury or death.

WARNING

Do not bypass or eliminate safety devices.

WARNING

ELECTRIC SHOCK HAZARD

Disconnect all power supplies before servicing. Lock out/tag out to prevent accidental electrical shock.

NOTE

Models with 15 kw heater require two separate power sources supplying the unit.

WARNING

Use copper conductors only. Install all parts and panels before operation of unit. Failure to follow these warnings can result in injury or death.

All wiring must comply with local and national code requirements. Units are provided with wiring diagrams and nameplate data to provide information required for necessary field wiring.

Ensure field wiring complies with local and national fire, safety, and electrical codes. Ensure voltage supply is within limits shown on unit rating plate. Contact the local power company for correction of improper voltage. Refer to the unit rating plate for recommended circuit protection device.

The unit cabinet must have an uninterrupted and unbroken ground to minimize personal injury if an electrical fault should occur. Provide ground circuit in accordance with all applicable national and local codes.

These units are provided with a class 2 transformer for 24 VAC control circuits. Should any add-on accessory or component also have a class 2 transformer furnished, care must be taken to prevent interconnecting outputs of the two transformers by using a thermostat with isolating contacts.

WARNING

Connect ground wire to ground terminal marked “GND”. Failure to do so can result in injury or death.

CAUTION

Any device furnished by the factory for field installation must be wired in strict accordance with the associated wiring diagram. Failure to do so could damage components and void warranties.

ELECTRICAL

Units with 5 kW, 7 kW or 10 kW heaters have a knockout hole on the top panel for field line voltage connection. Units with 15 kW heater have two knockout holes for field line voltage connection. The larger knockout (circuit 1) one is for power supply connected to the 60A circuit breaker in the unit. The smaller knockout hole is for power supply connected to the 30A circuit breaker in the unit. See FIGURE 18 - Cabinet with 5 kW, 7 kW, and 10 kW Heaters, FIGURE 19 - Cabinet with 15 kW Heater and FIGURE 20 Heater Electric Panel Layout. The ground wire must be connected to the ground screws with gold disk.

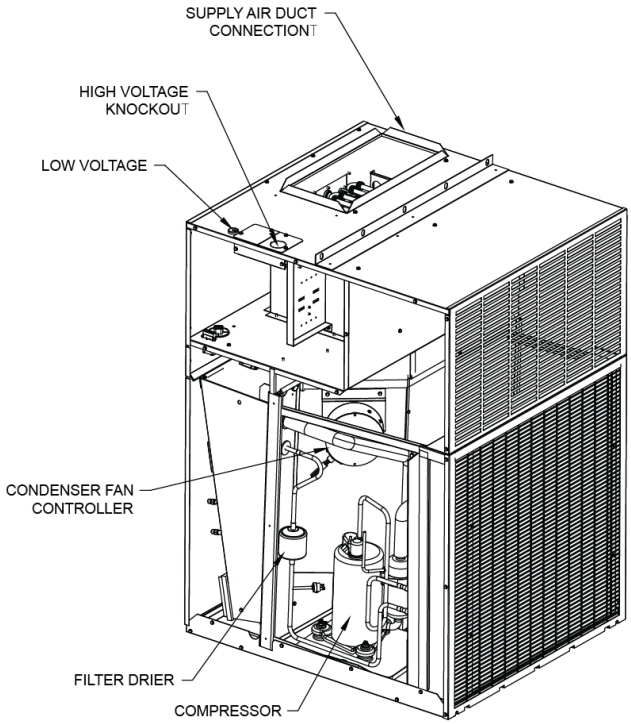


FIGURE 18 - Cabinet with 5 kW, 7 kW, 10 kW Heaters

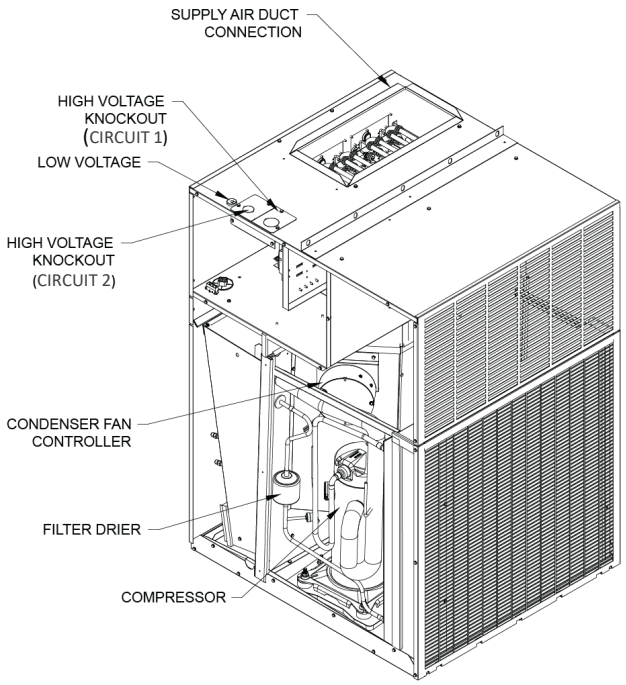


FIGURE 19 - Cabinet with 15 kW Heater

ELECTRICAL CONTINUED

208-230 VOLT OPERATION

All 208-230 Volt units are factory wired for 230 Volt operation. For 208 Volt operation, it is necessary to move the black line voltage wire on the primary side of the transformer from the 230 v terminal to the 208 v terminal. See note 3 on the wiring diagram for instruction.

LOW VOLTAGE

THERMOSTAT

Use 18 AWG wire with color–coded insulation (35°C minimum) up to 100 ft. in length (31 m). Use 16 AWG wire if more than 100 ft. of wire is required.

A standard 24 VAC single state heating and cooling thermostat is required to control this unit. A thermostat with a "C" common terminal is preferred. Thermostat should be connectted to the control wire through the LOW VOLTAGE hole on the top panel shown in FIGURE 18- Cabinet with 5 kW, 7 kW, and 10 kW Heaters and FIGURE 19 Cabinet with 15 kW Heater. Thermostat connections and their functions refer to FIGURE 21 - Thermostat Connections as follows:

THERMOSTAT CONNECTIONS KEY		
Abbr.	Color	Function
Y –	Yellow	Compressor Contactor
C –	Brown	Transformer 24VAC Common
W –	White	Call for Heating
G –	Green	Evaporator Blower
R –	Red	Transformer 24VAC Hot

Table 7 - Thermostat Connections Key

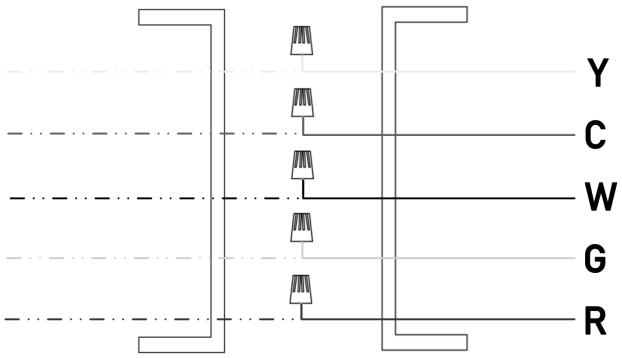


FIGURE 21 - Thermostat Connections

THERMOSTAT INSTALLATION

The Thermostat should be located on an interior wall in a larger room, away from supply duct draft. Position the thermostat back plate against the wall so that it appears level and so the thermostat wires protrude through the middle of the back plate mounting holes and drill holes with a 3/16 in [5 mm] bit. Install supplied anchors and secure plate to the wall. Thermostat wire must be 18 AWG wire.

NOTE

For FPE**E1030C units, a dual stage thermostat must be used in order to reach rated system performance.

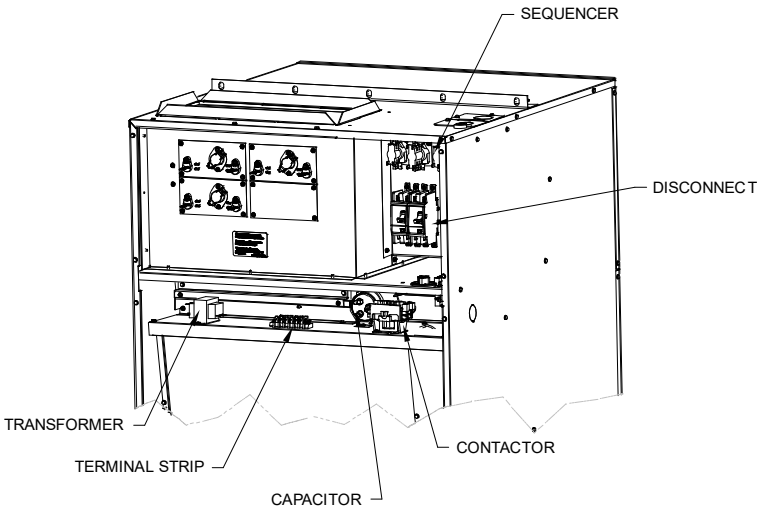


FIGURE 20 - Heater Electric Panel Layout

CONTROLS

COOLING OPERATION

STEADY STATE COOLING

When the unit is given a "Y" input the unit will operate in cooling mode. The compressor will immediately come on after a "Y" input. After a 5 second time delay the indoor fan will be energized. The system will remain in cooling mode as long as the "Y" input is provided to the unit.

CONTINUOUS FAN OPERATION

When the unit is given a "G" input, without an additional "Y" or "W" call, the unit will operate in continuous fan operation mode. The indoor fan is energized with the "G" call after a 0.25 second delay. The fan remains energized as long as the "G" input is provided to the unit without a "Y" or "W".

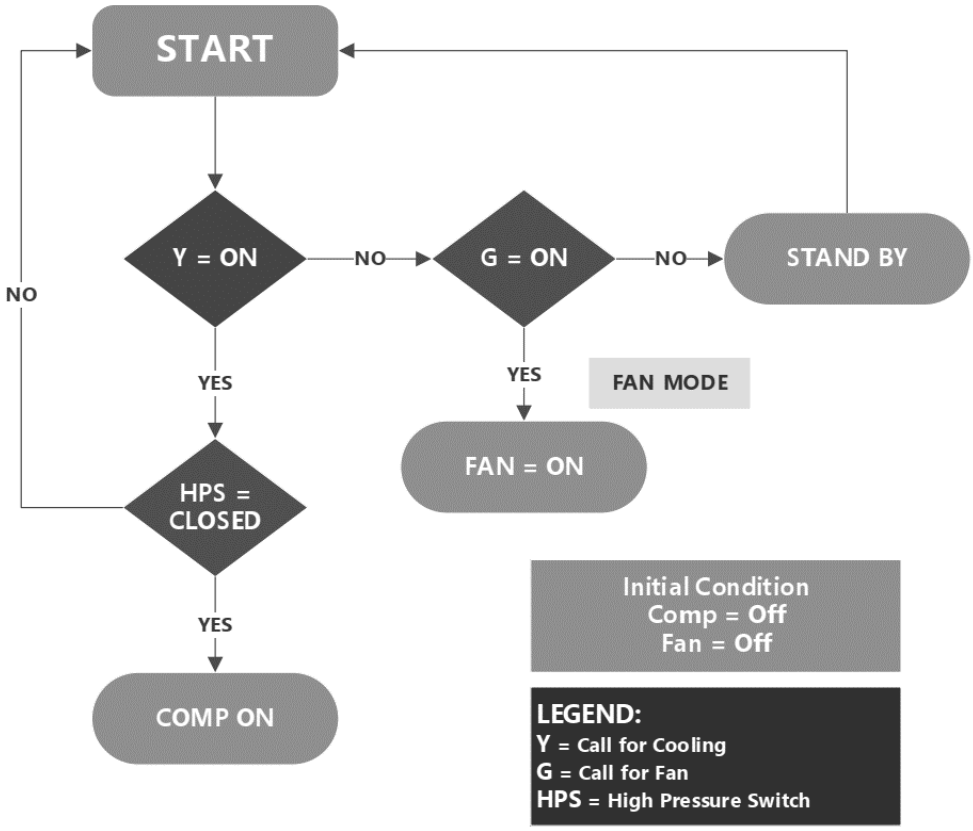


FIGURE 22 - Cooling Sequence of Operations

CONTROLS CONTINUED

BLOWER CONTROL

WARNING

Do not touch any rotating component with any object. Damage to the equipment and personal injury can occur

All models have 5 fan speeds, with 2 fan speeds reserved for heating, 2 fan speeds reserved for cooling, and 1 speed reserved for ventilation. The cooling fan speed selection wire and heating fan speed selection wires are located on separate wires. In order to change the fan speed setting, move the fan speed selection wire to the desired tap. See wiring diagram located on the unit.

- FPE**E1030C units use a dual stage compressor and have 2 cooling fan speeds. T4 for low speed and T5 for high speed

Refer to Table 7 - BLOWER PERFORMANCE DATA and Table 8 - BLOWER PERFORMANCE DATA – CONTINUED for information on the select speed changes for heat and cool mode.

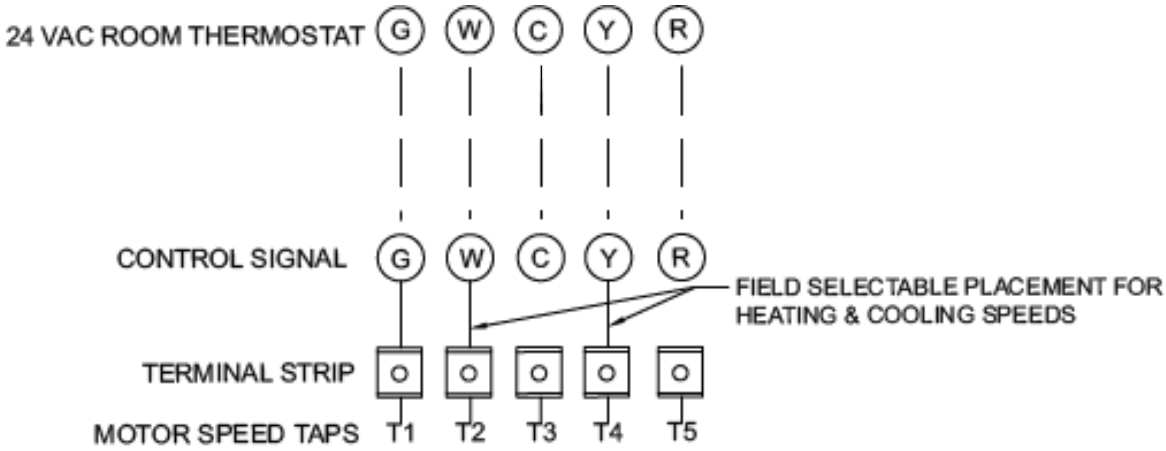


FIGURE 23 - Blower Control Tap

IMPORTANT

The unit is designed to operate at maximum 0.5 in.w.c external static pressure. Operation at higher E.S.P may cause equipment failure. For applications requiring higher static operation, please contact factory or the manufacture's sales representative.

WARNING

High efficiency brushless DC motors have power applied at all times. Disconnect power before servicing. See illustration above. Low voltage thermostat demand and board algorithms will control its use.

CONTROLS CONTINUED

A2L SENSING AND MITIGATION

Units charged with over 4lbs (1.81kg) of R454B refrigerant are shipped with a factory installed refrigerant leak detector attached to the evaporator coil. In the event that a refrigerant leak is detected, the controls will disable the compressor operation, and energize the evaporator fan to disperse the leaked refrigerant. The unit will operate in this mitigation state until the sensor no longer detects a refrigerant leak, for a minimum time of 5 minutes. Once the mitigation period has ended, the unit will return to its normal operation based on the current thermostat inputs. An LED status light is provided with the sensor for diagnostic purposes, the description of the LED status light signals can be found in the troubleshooting section on page 37.

HEATING OPERATION

When the thermostat calls for heating, the "W" signal is energized. The evaporator coil blower starts operation immediately. The heater will energize after a 1 to 10 second delay.

TEMPERATURE LIMIT CONTROL

The electric heater is equipped with auto-reset temperature limit switch and non-resettable fuse link. In the case of supply temperature too high caused by abnormal situations such as low airflow due to a dirty air filter, air leak or no airflow due to failed motor, the auto-reset limit switch will interrupt the power to the heating elements. Once the heating elements cool down, the limit switch will close and the power to the heating elements will be restored. The heater will resume the operation. If the auto-reset switch is permanently closed, the non-resettable fuse link will activate to cut off the power to the heating elements permanently. The heater will stop working until the fuse link is replaced by a certified technician or agency.

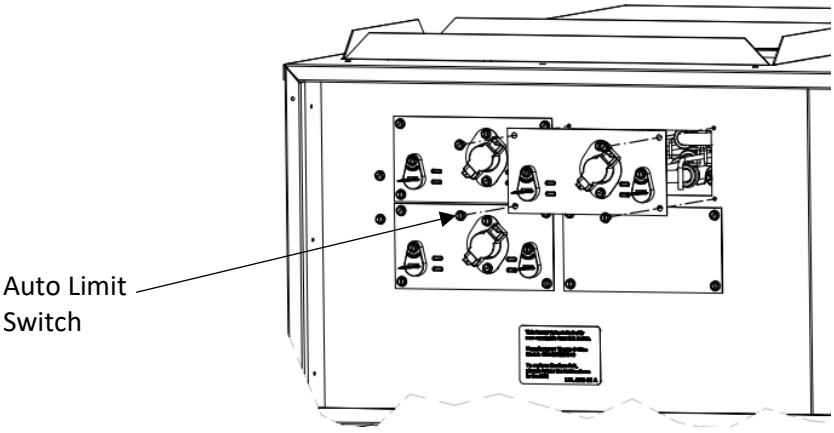


FIGURE 24 - Auto-Reset Temperature Limit Switch

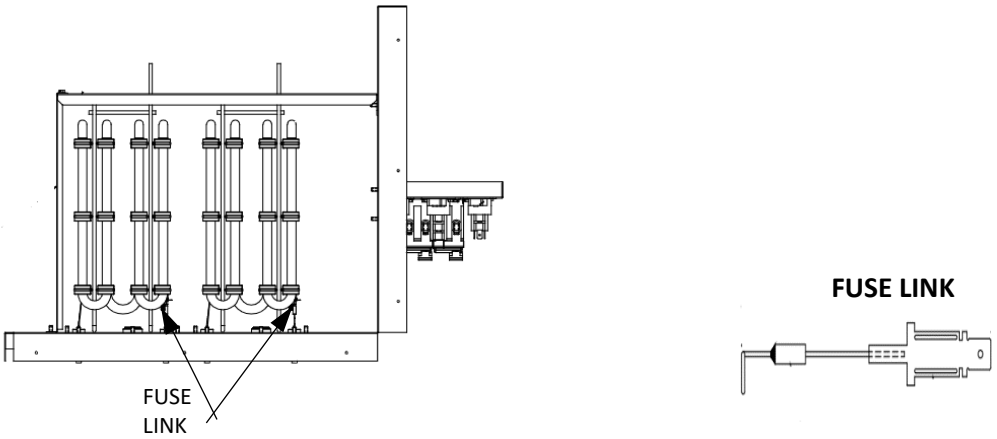


FIGURE 25 - Non-resettable Fuse Link

BLOWER PERFORMANCE

BLOWER PERFORMANCE											
MODEL	Motor Tap	IWC STATIC PRESSURE									
		0.10		0.20		0.30		0.40		0.50	
		SCFM	W	SCFM	W	SCFM	W	SCFM	W	SCFM	W
FPE05E1012D*	1	405	32	365	36	326	39	290	43	259	46
	2	553	63	514	67	475	70	439	74	408	77
	3	527	57	487	60	448	64	412	68	382	71
	4	602	77	562	81	523	84	488	88	457	91
FPE07E1012D*	1	405	32	365	36	326	39	290	43	259	46
	2	645	92	605	95	566	99	531	103	500	106
	3	527	57	487	60	448	64	412	68	382	71
	4	602	77	562	81	523	84	488	88	457	91
FPE10E1012D*	1	405	32	365	36	326	39	290	43	259	46
	2	702	115	663	118	624	122	588	126	557	129
	3	527	57	487	60	448	64	412	68	382	71
	4	602	77	562	81	523	84	488	88	457	91
FPE05E1018D*	1	467	52	420	59	375	65	327	72	292	78
	2	769	132	722	139	678	145	629	152	595	158
	3	675	100	628	107	583	113	535	121	500	127
	4	724	116	677	123	632	128	584	136	549	142
	5	812	149	765	156	720	161	672	169	637	175
FPE07E1018D*	1	467	52	420	59	375	65	327	72	292	78
	2	769	132	722	139	678	145	629	152	595	158
	3	812	149	765	156	720	161	672	169	637	175
	4	724	116	677	123	632	128	584	136	549	142
	5	812	149	765	156	720	161	672	169	637	175
FPE10E1018D*	1	467	52	420	59	375	65	327	72	292	78
	2	769	132	722	139	678	145	629	152	595	158
	3	924	204	877	211	832	217	783	225	749	230
	4	724	116	677	123	632	128	584	136	549	142
	5	812	149	765	156	720	161	672	169	637	175
FPE05E1024D*	1	567	75	530	80	504	85	476	92	443	99
	2	783	142	746	146	720	152	692	159	658	165
	3	650	96	613	101	587	107	559	114	525	120
	4	888	195	851	200	825	206	797	213	763	219
	5	980	261	943	265	917	271	889	278	855	284

Table 8 - BLOWER PERFORMANCE DATA

BLOWER PERFORMANCE

BLOWER PERFORMANCE											
MODEL	Motor Tap	IWC STATIC PRESSURE									
		0.10		0.20		0.30		0.40		0.50	
		SCFM	W	SCFM	W	SCFM	W	SCFM	W	SCFM	W
FPE07E1024D*	1	567	75	530	80	504	85	476	92	443	99
	2	783	142	746	146	720	152	692	159	658	165
	3	827	162	790	166	764	172	736	179	702	186
	4	868	184	831	188	805	194	777	201	744	208
	5	980	261	943	265	917	271	889	278	855	284
FPE10E1024D*	1	567	75	530	80	504	85	476	92	443	99
	2	783	142	746	146	720	152	692	159	658	165
	3	888	195	851	200	825	206	797	213	763	219
	4	868	184	831	188	805	194	777	201	744	208
	5	980	261	943	265	917	271	889	278	855	284
FPE15E1024D*	1	567	75	530	80	504	85	476	92	443	99
	2	783	142	746	146	720	152	692	159	658	165
	3	1198	472	1161	476	1135	482	1107	489	1074	495
	4	868	184	831	188	805	194	777	201	744	208
	5	980	261	943	265	917	271	889	278	855	284
FPE05E1030D*	1	694	109	657	114	631	120	603	127	569	133
	2	838	167	801	172	775	177	747	184	713	191
	3	650	96	613	101	587	107	559	114	525	120
	4	962	247	925	251	899	257	871	264	837	270
	5	1103	372	1066	376	1040	382	1012	389	978	396
FPE07E1030D*	1	694	109	657	114	631	120	603	127	569	133
	2	838	167	801	172	775	177	747	184	713	191
	3	650	96	613	101	587	107	559	114	525	120
	4	962	247	925	251	899	257	871	264	837	270
	5	1103	372	1066	376	1040	382	1012	389	978	396
FPE10E1030D*	1	694	109	657	114	631	120	603	127	569	133
	2	838	167	801	172	775	177	747	184	713	191
	3	650	96	613	101	587	107	559	114	525	120
	4	962	247	925	251	899	257	871	264	837	270
	5	1103	372	1066	376	1040	382	1012	389	978	396
FPE15E1030D*	1	694	109	657	114	631	120	603	127	569	133
	2	838	167	801	172	775	177	747	184	713	191
	3	650	96	613	101	587	107	559	114	525	120
	4	962	247	925	251	899	257	871	264	837	270
	5	1103	372	1066	376	1040	382	1012	389	978	396

NOTE:

- Airflow data is shown with dry coil at 70 °F DB EAT with standard 1.0 in filter
- For models with four speed taps, tap 1 is for ventilation. Tap 2 and 3 are for heating operation. Tap 4 is for cooling operation
- For models with five speed taps, tap 1 is for ventilation. Tap 2 and 3 are for heating operation. Tap 4 and 5 are for cooling operation.

Table 9 - BLOWER PERFORMANCE DATA - CONTINUED

LOCATION OF MAJOR COMPONENTS

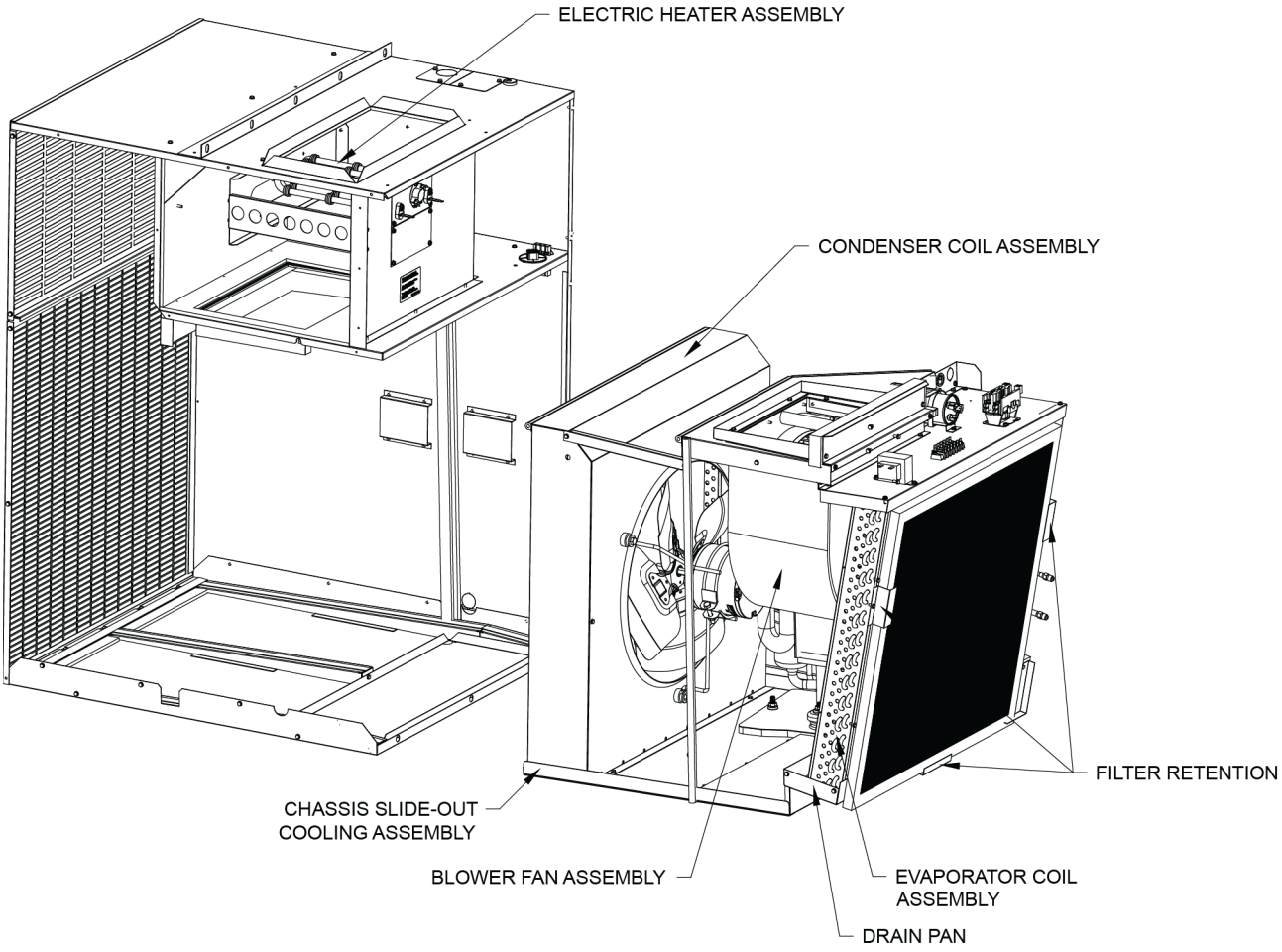


FIGURE 26 - Slide-Out Chassis Assembly

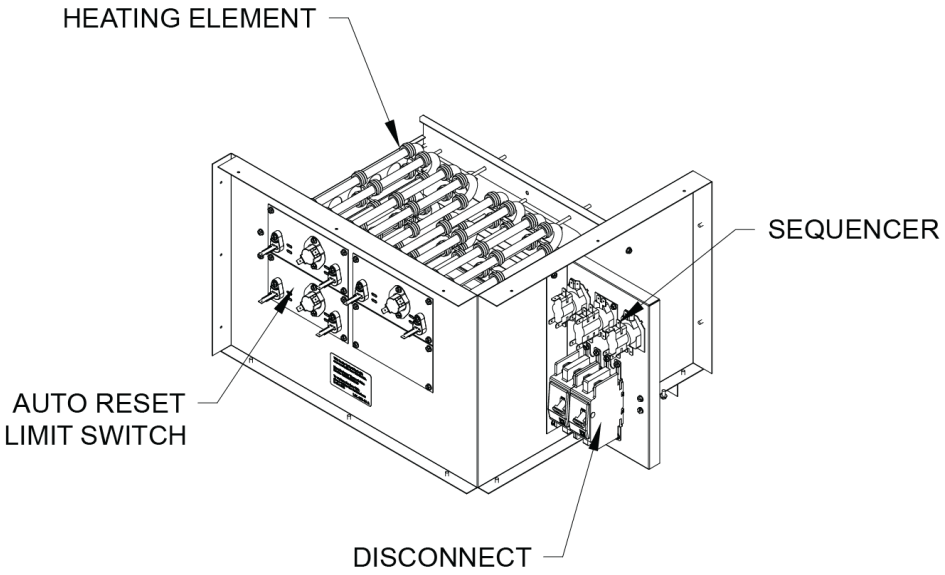
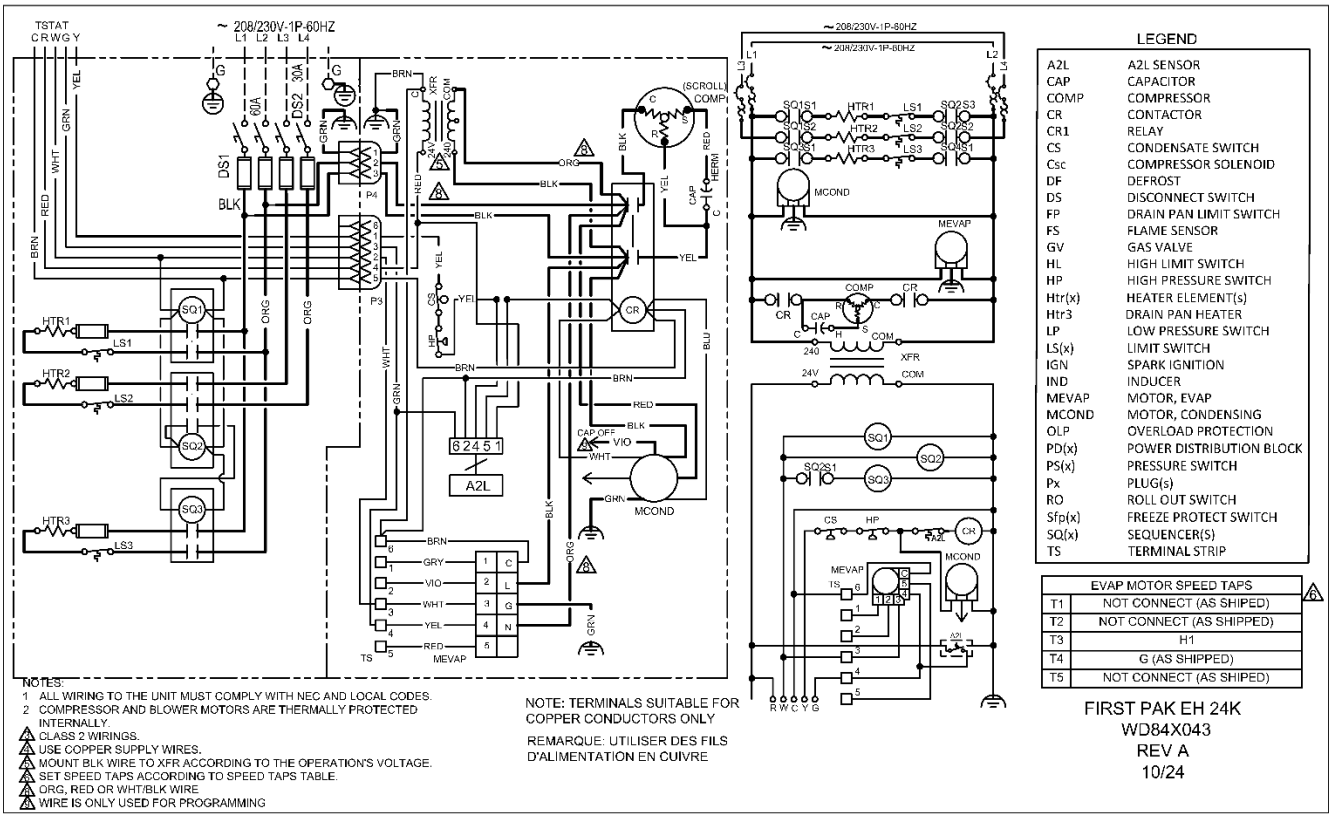
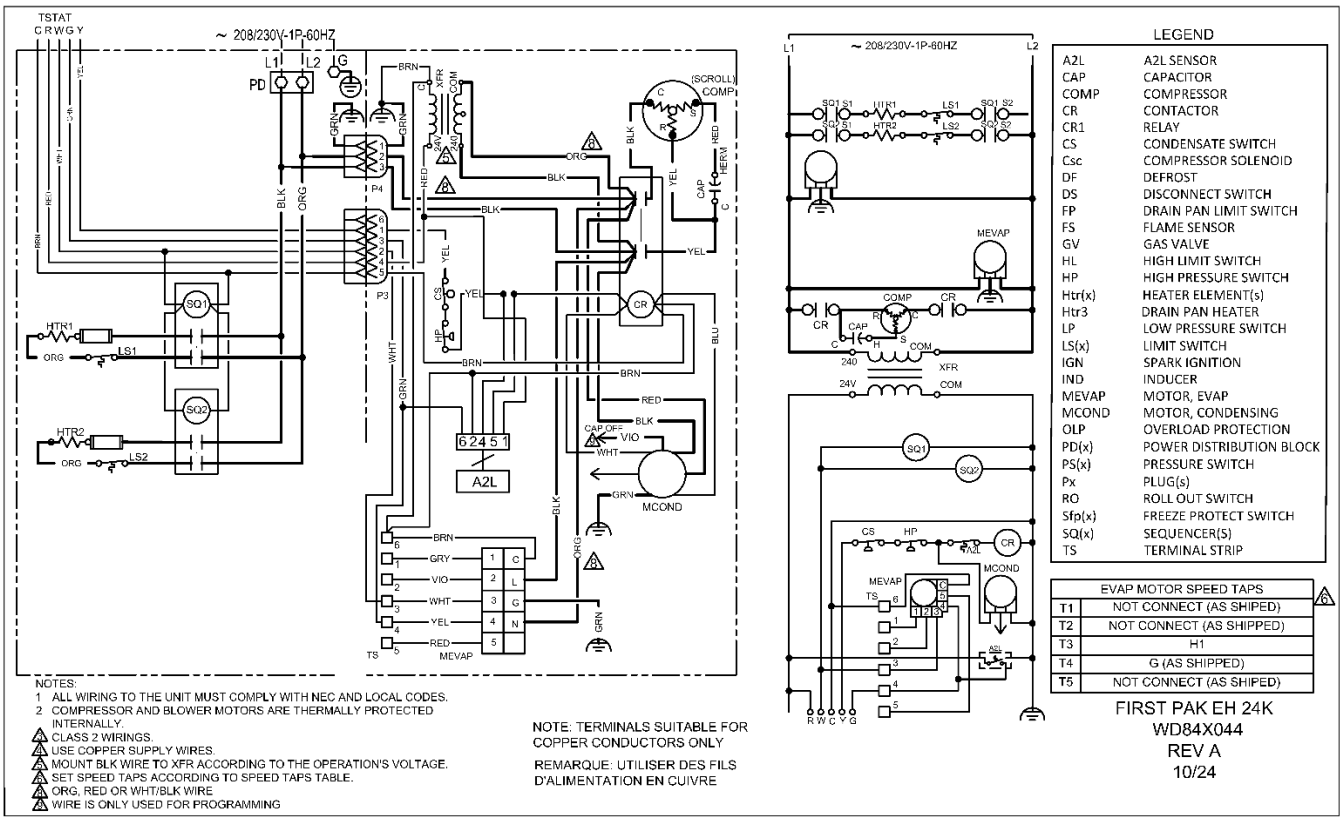


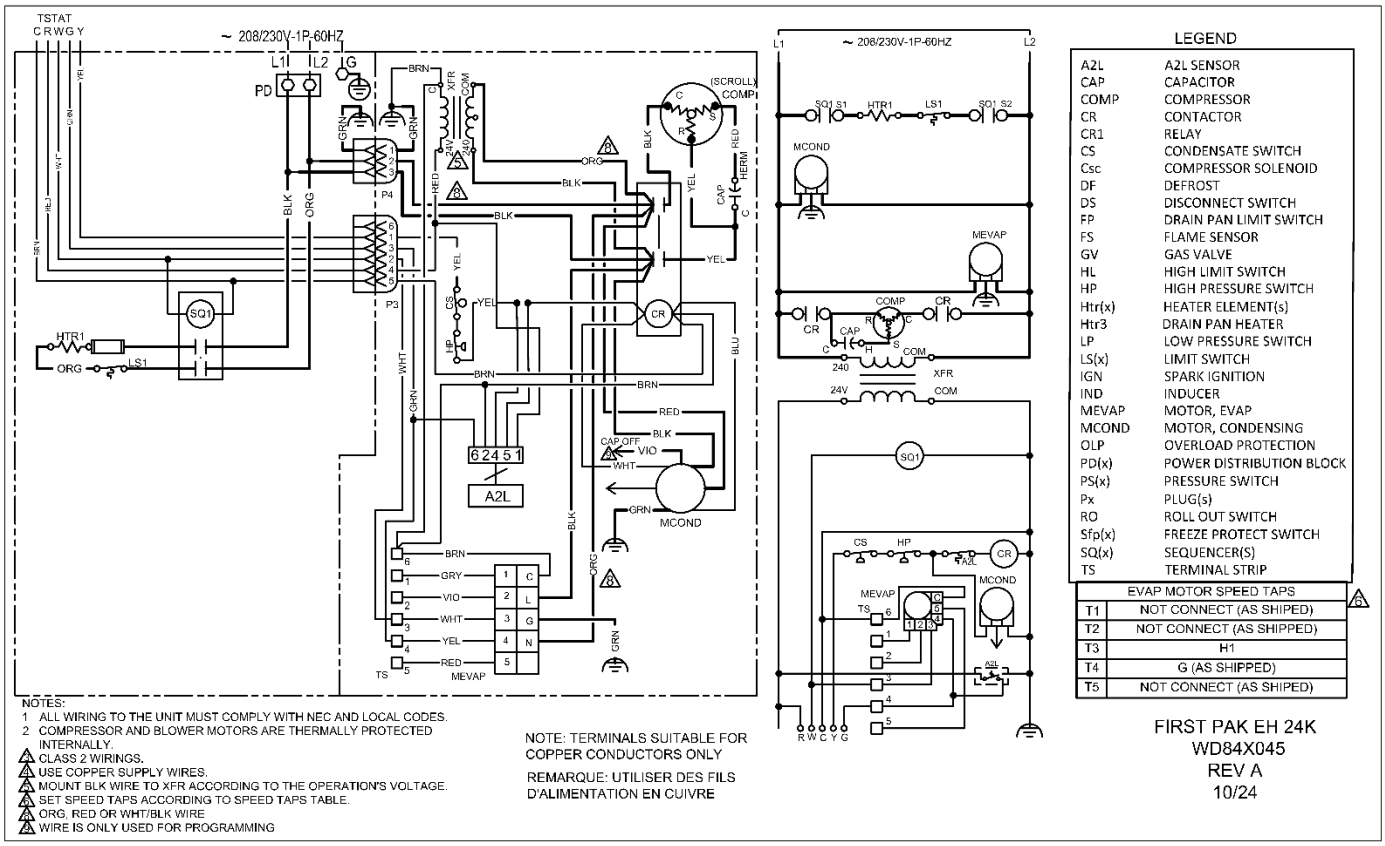
FIGURE 27 - Electric Heater Assembly (15 kW)

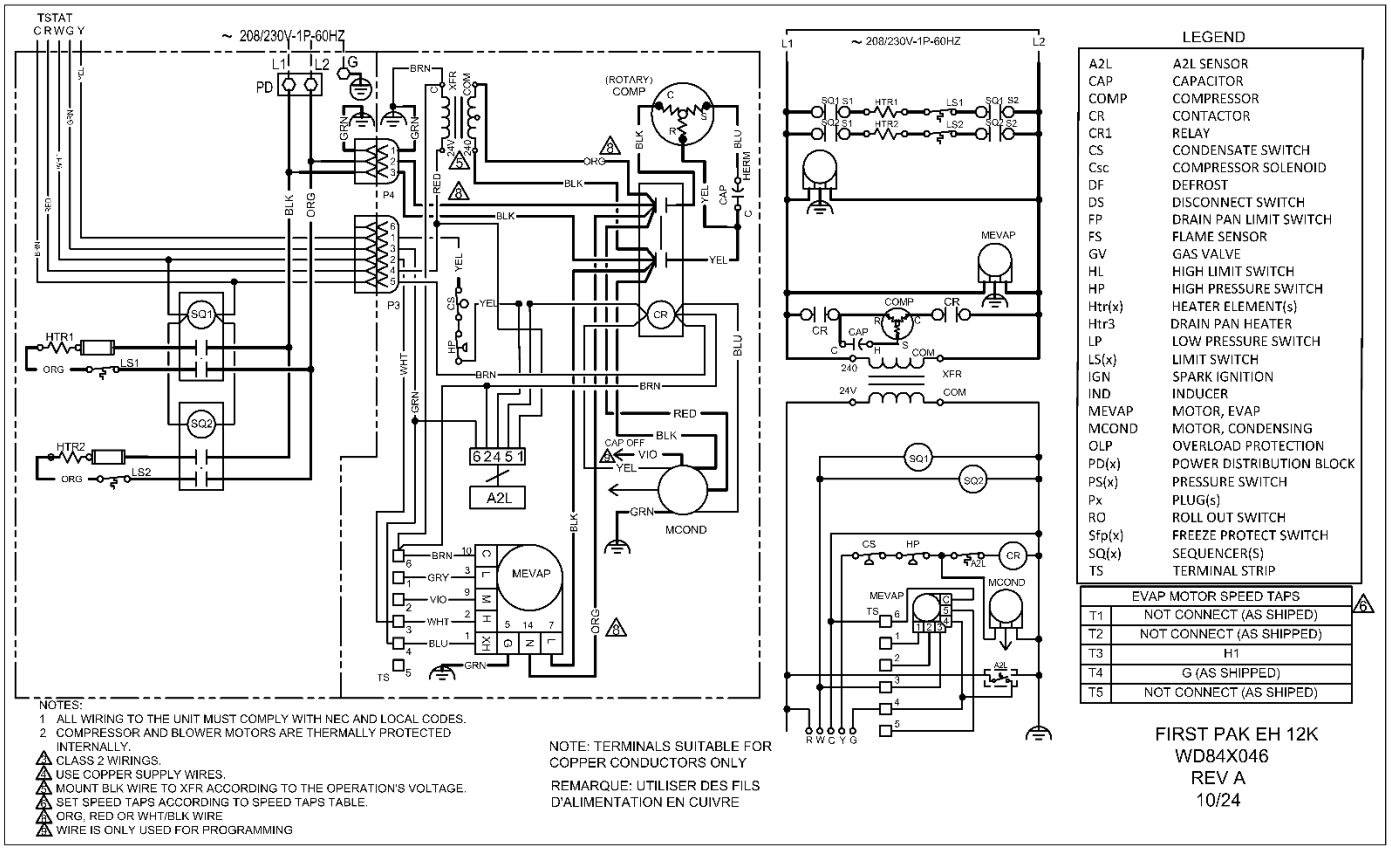
WIRING DIAGRAMS



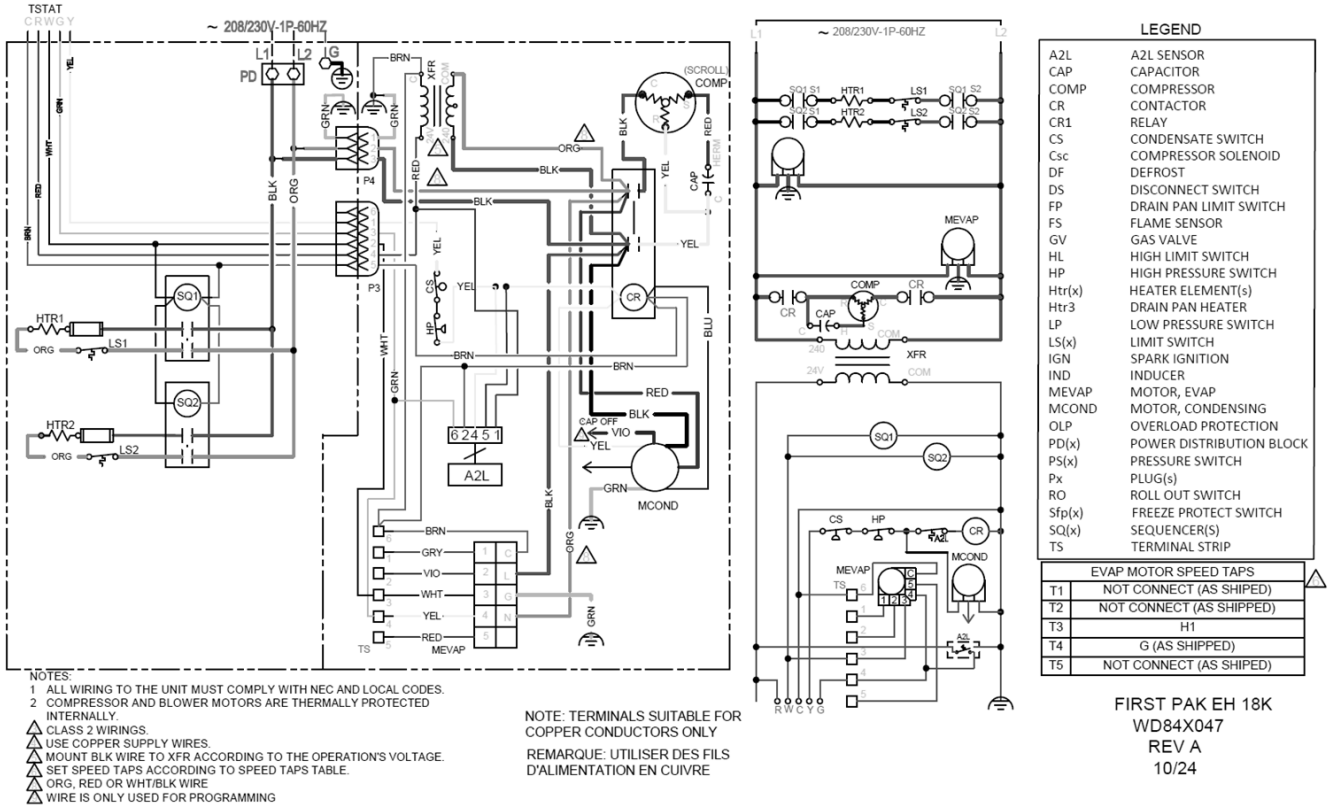


WIRING DIAGRAMS





WIRING DIAGRAMS



NOTES:
1 ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
2 COMPRESSOR AND BLOWER MOTORS ARE THERMALLY PROTECTED INTERNALLY.
△ CLASS 2 WIRINGS.
△ USE COPPER SUPPLY WIRES.
△ MOUNT BLK WIRE TO XFR ACCORDING TO THE OPERATION'S VOLTAGE.
△ SET SPEED TAPS ACCORDING TO SPEED TAPS TABLE.
△ ORG, RED OR WHT/BLK WIRE
△ WIRE IS ONLY USED FOR PROGRAMMING

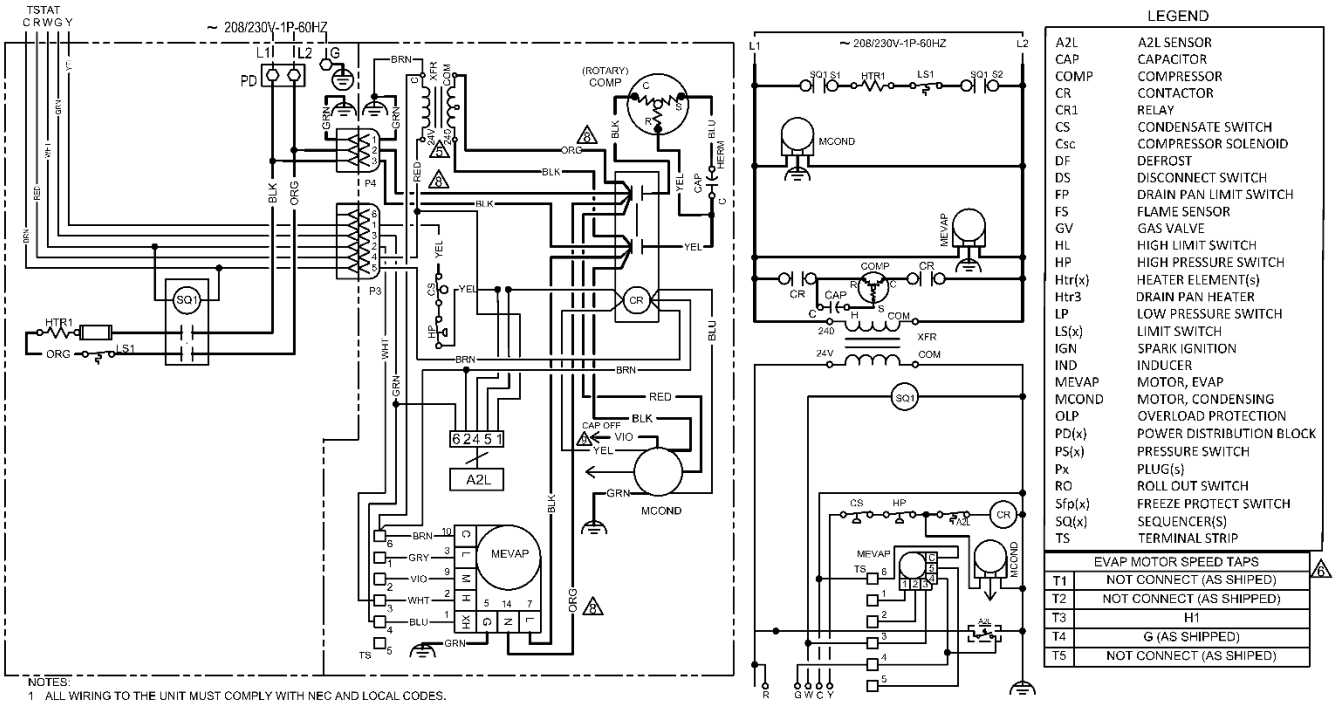
NOTE: TERMINALS SUITABLE FOR COPPER CONDUCTORS ONLY

REMARQUE: UTILISER DES FILS D'ALIMENTATION EN CUIVRE

LEGEND	
A2L	A2L SENSOR
CAP	CAPACITOR
COMP	COMPRESSOR
CR	CONTACTOR
CR1	RELAY
CS	CONDENSATE SWITCH
Csc	COMPRESSOR SOLENOID
DF	DEFROST
DS	DISCONNECT SWITCH
FP	DRAIN PAN LIMIT SWITCH
FS	FLAME SENSOR
GV	GAS VALVE
HL	HIGH LIMIT SWITCH
HP	HIGH PRESSURE SWITCH
Htr(x)	HEATER ELEMENT(s)
Htr3	DRAIN PAN HEATER
LP	LOW PRESSURE SWITCH
LS(x)	LIMIT SWITCH
IGN	SPARK IGNITION
IND	INDUCER
MEVAP	MOTOR, EVAP
MCOND	MOTOR, CONDENSING
OLP	OVERLOAD PROTECTION
PD(x)	POWER DISTRIBUTION BLOCK
PS(x)	PRESSURE SWITCH
Px	PLUG(s)
RO	ROLL OUT SWITCH
Sfp(x)	FREEZE PROTECT SWITCH
SQ(x)	SEQUENCER(S)
TS	TERMINAL STRIP

EVAP MOTOR SPEED TAPS	△
T1	NOT CONNECT (AS SHIPED)
T2	NOT CONNECT (AS SHIPPED)
T3	H1
T4	G (AS SHIPPED)
T5	NOT CONNECT (AS SHIPED)

FIRST PAK EH 18K
WD84X047
REV A
10/24



NOTES:
1 ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
2 COMPRESSOR AND BLOWER MOTORS ARE THERMALLY PROTECTED INTERNALLY.
△ CLASS 2 WIRINGS.
△ USE COPPER SUPPLY WIRES.
△ MOUNT BLK WIRE TO XFR ACCORDING TO THE OPERATION'S VOLTAGE.
△ SET SPEED TAPS ACCORDING TO SPEED TAPS TABLE.
△ ORG, RED OR WHT/BLK WIRE
△ WIRE IS ONLY USED FOR PROGRAMMING

NOTE: TERMINALS SUITABLE FOR COPPER CONDUCTORS ONLY

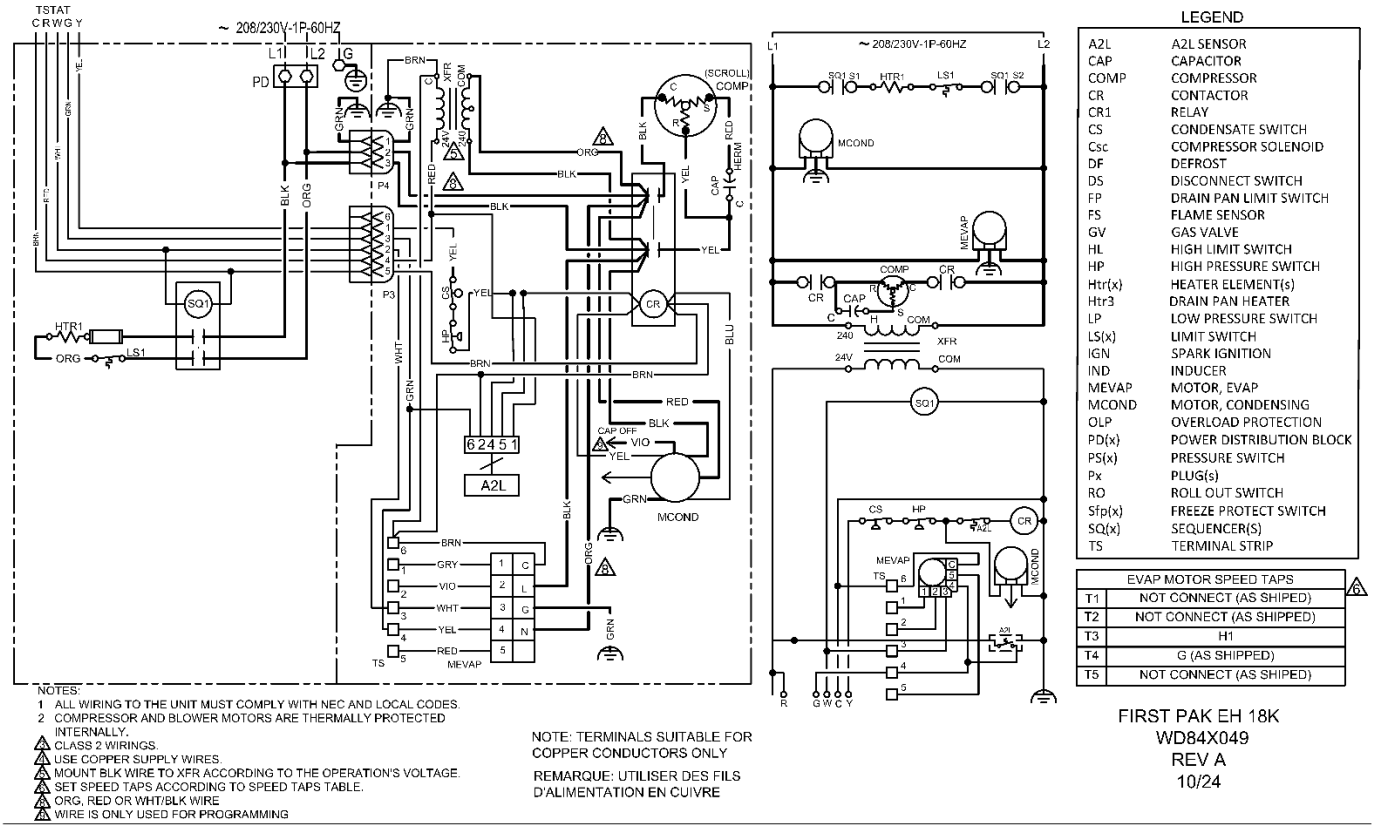
REMARQUE: UTILISER DES FILS D'ALIMENTATION EN CUIVRE

LEGEND	
A2L	A2L SENSOR
CAP	CAPACITOR
COMP	COMPRESSOR
CR	CONTACTOR
CR1	RELAY
CS	CONDENSATE SWITCH
Csc	COMPRESSOR SOLENOID
DF	DEFROST
DS	DISCONNECT SWITCH
FP	DRAIN PAN LIMIT SWITCH
FS	FLAME SENSOR
GV	GAS VALVE
HL	HIGH LIMIT SWITCH
HP	HIGH PRESSURE SWITCH
Htr(x)	HEATER ELEMENT(s)
Htr3	DRAIN PAN HEATER
LP	LOW PRESSURE SWITCH
LS(x)	LIMIT SWITCH
IGN	SPARK IGNITION
IND	INDUCER
MEVAP	MOTOR, EVAP
MCOND	MOTOR, CONDENSING
OLP	OVERLOAD PROTECTION
PD(x)	POWER DISTRIBUTION BLOCK
PS(x)	PRESSURE SWITCH
Px	PLUG(s)
RO	ROLL OUT SWITCH
Sfp(x)	FREEZE PROTECT SWITCH
SQ(x)	SEQUENCER(S)
TS	TERMINAL STRIP

EVAP MOTOR SPEED TAPS	△
T1	NOT CONNECT (AS SHIPED)
T2	NOT CONNECT (AS SHIPPED)
T3	H1
T4	G (AS SHIPPED)
T5	NOT CONNECT (AS SHIPED)

FIRST PAK EH 12K
WD84X048
REV A
10/24

WIRING DIAGRAMS



NOTES:
1 ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
2 COMPRESSOR AND BLOWER MOTORS ARE THERMALLY PROTECTED INTERNALLY.
⚠3 CLASS 2 WIRINGS.
⚠4 USE COPPER SUPPLY WIRES.
⚠5 MOUNT BLK WIRE TO XFR ACCORDING TO THE OPERATION'S VOLTAGE.
⚠6 SET SPEED TAPS ACCORDING TO SPEED TAPS TABLE.
⚠7 ORG, RED OR WHT/BLK WIRE
⚠8 WIRE IS ONLY USED FOR PROGRAMMING

NOTE: TERMINALS SUITABLE FOR COPPER CONDUCTORS ONLY

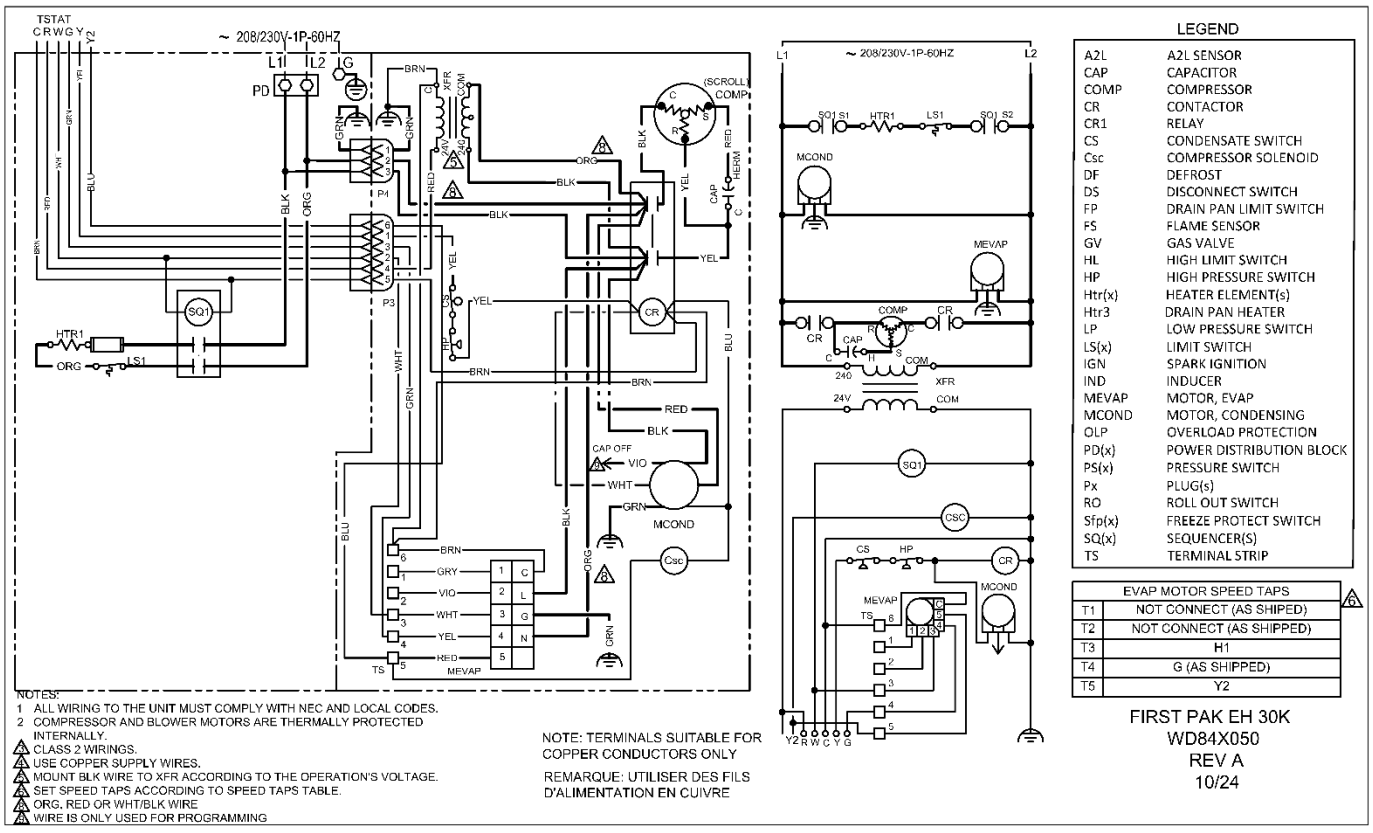
REMARQUE: UTILISER DES FILS D'ALIMENTATION EN CUIVRE

LEGEND

A2L	A2L SENSOR
CAP	CAPACITOR
COMP	COMPRESSOR
CR	CONTACTOR
CR1	RELAY
CS	CONDENSATE SWITCH
Csc	COMPRESSOR SOLENOID
DF	DEFROST
DS	DISCONNECT SWITCH
FP	DRAIN PAN LIMIT SWITCH
FS	FLAME SENSOR
GV	GAS VALVE
HL	HIGH LIMIT SWITCH
HP	HIGH PRESSURE SWITCH
Htr(x)	HEATER ELEMENT(s)
Htr3	DRAIN PAN HEATER
LP	LOW PRESSURE SWITCH
LS(x)	LIMIT SWITCH
IGN	SPARK IGNITION
IND	INDUCER
MEVAP	MOTOR, EVAP
MCOND	MOTOR, CONDENSING
OLP	OVERLOAD PROTECTION
PD(x)	POWER DISTRIBUTION BLOCK
PS(x)	PRESSURE SWITCH
Px	PLUG(s)
RO	ROLL OUT SWITCH
Sfp(x)	FREEZE PROTECT SWITCH
SQ(x)	SEQUENCER(S)
TS	TERMINAL STRIP

EVAP MOTOR SPEED TAPS	⚠6
T1	NOT CONNECT (AS SHIPED)
T2	NOT CONNECT (AS SHIPPED)
T3	H1
T4	G (AS SHIPPED)
T5	NOT CONNECT (AS SHIPED)

FIRST PAK EH 18K
WD84X049
REV A
10/24



NOTES:
1 ALL WIRING TO THE UNIT MUST COMPLY WITH NEC AND LOCAL CODES.
2 COMPRESSOR AND BLOWER MOTORS ARE THERMALLY PROTECTED INTERNALLY.
⚠3 CLASS 2 WIRINGS.
⚠4 USE COPPER SUPPLY WIRES.
⚠5 MOUNT BLK WIRE TO XFR ACCORDING TO THE OPERATION'S VOLTAGE.
⚠6 SET SPEED TAPS ACCORDING TO SPEED TAPS TABLE.
⚠7 ORG, RED OR WHT/BLK WIRE
⚠8 WIRE IS ONLY USED FOR PROGRAMMING

NOTE: TERMINALS SUITABLE FOR COPPER CONDUCTORS ONLY

REMARQUE: UTILISER DES FILS D'ALIMENTATION EN CUIVRE

LEGEND

A2L	A2L SENSOR
CAP	CAPACITOR
COMP	COMPRESSOR
CR	CONTACTOR
CR1	RELAY
CS	CONDENSATE SWITCH
Csc	COMPRESSOR SOLENOID
DF	DEFROST
DS	DISCONNECT SWITCH
FP	DRAIN PAN LIMIT SWITCH
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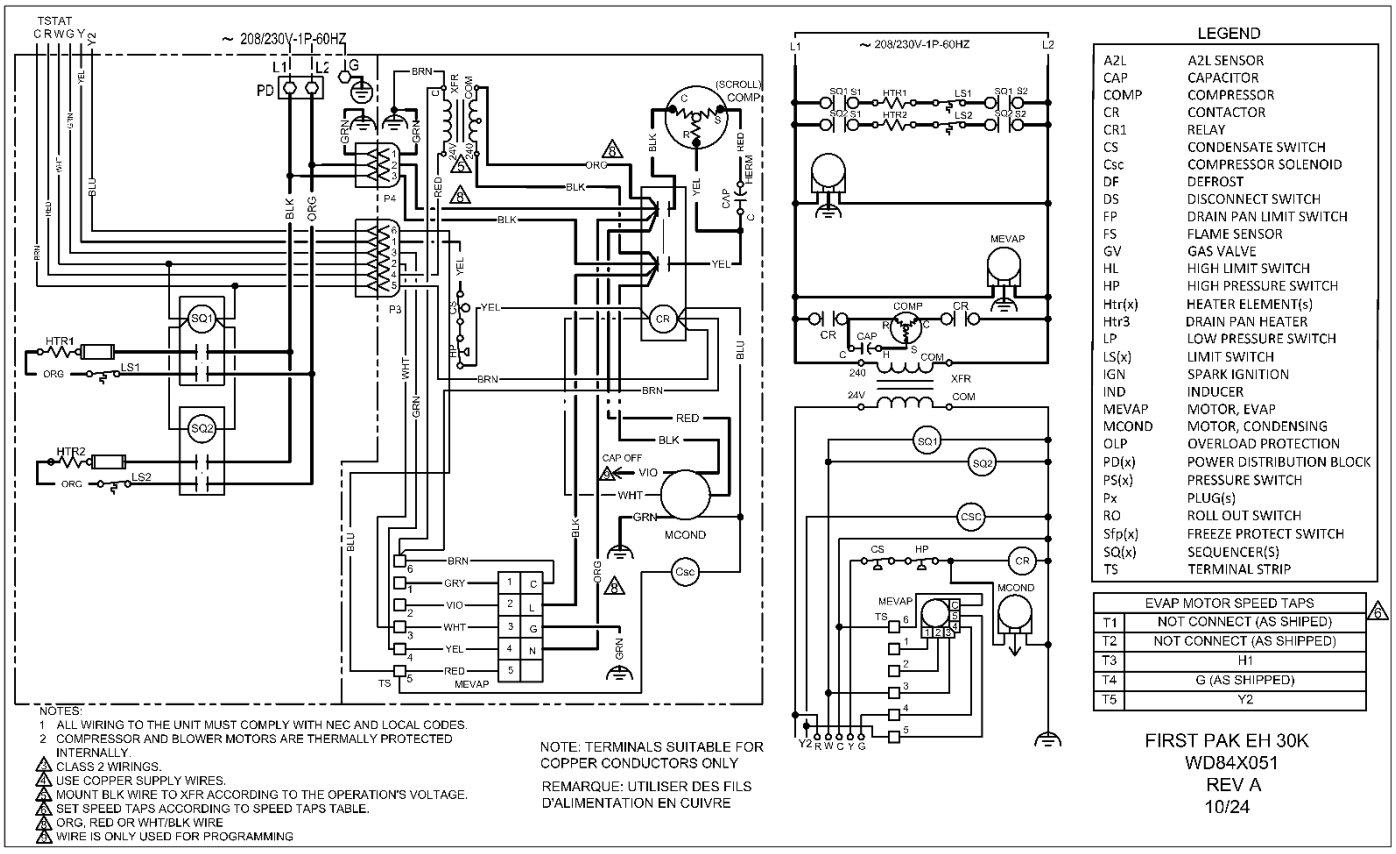
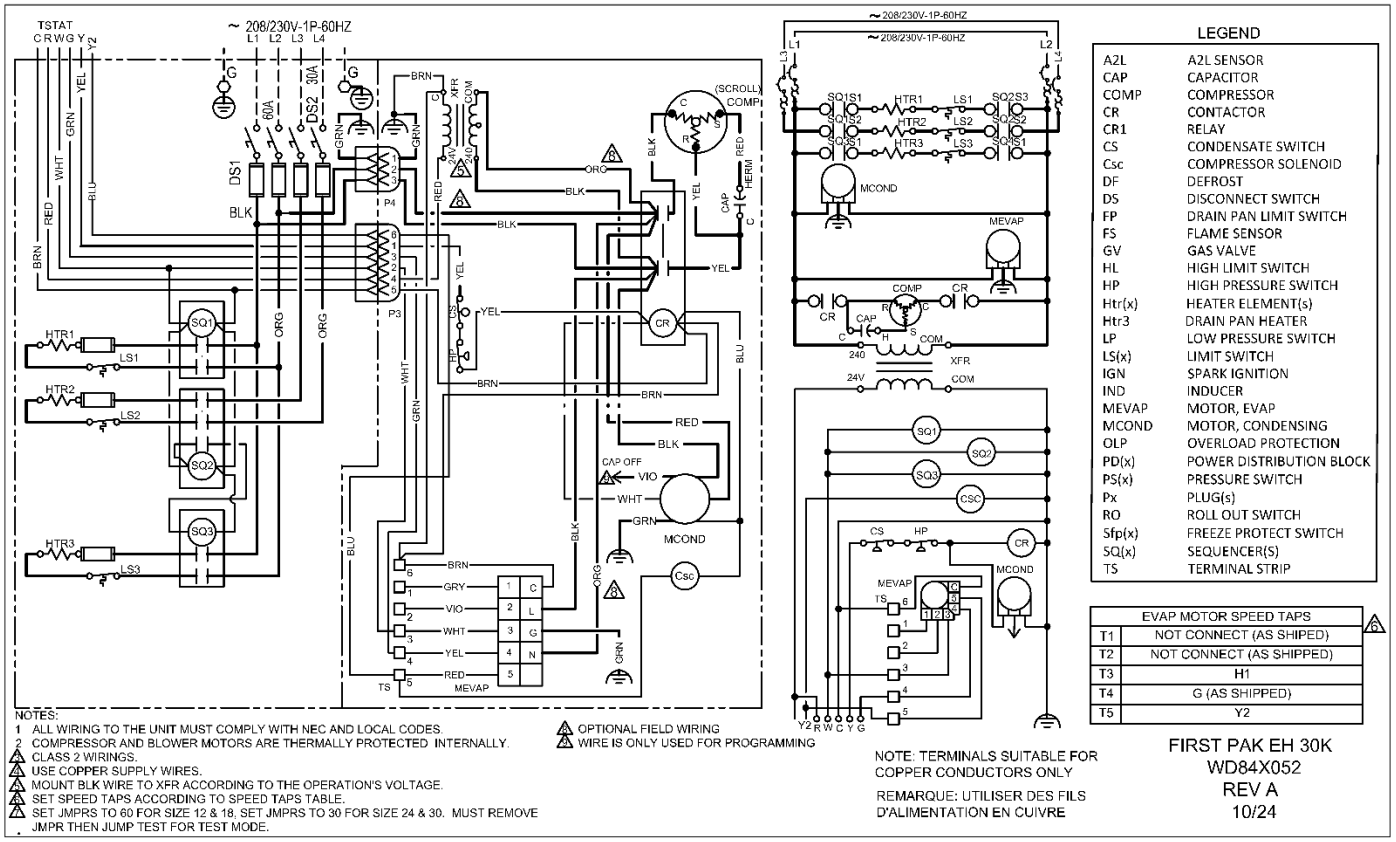
GV	GAS VALVE
HL	HIGH LIMIT SWITCH
HP	HIGH PRESSURE SWITCH
Htr(x)	HEATER ELEMENT(s)
Htr3	DRAIN PAN HEATER
LP	LOW PRESSURE SWITCH
LS(x)	LIMIT SWITCH
IGN	SPARK IGNITION
IND	INDUCER
MEVAP	MOTOR, EVAP
MCOND	MOTOR, CONDENSING
OLP	OVERLOAD PROTECTION
PD(x)	POWER DISTRIBUTION BLOCK
PS(x)	PRESSURE SWITCH
Px	PLUG(s)
RO	ROLL OUT SWITCH
Sfp(x)	FREEZE PROTECT SWITCH
SQ(x)	SEQUENCER(S)
TS	TERMINAL STRIP

EVAP MOTOR SPEED TAPS	⚠6
T1	NOT CONNECT (AS SHIPED)
T2	NOT CONNECT (AS SHIPPED)
T3	H1
T4	G (AS SHIPPED)
T5	Y2

FIRST PAK EH 30K
WD84X050
REV A
10/24

WIRING DIAGRAMS





CIRCUIT SCHEMATIC

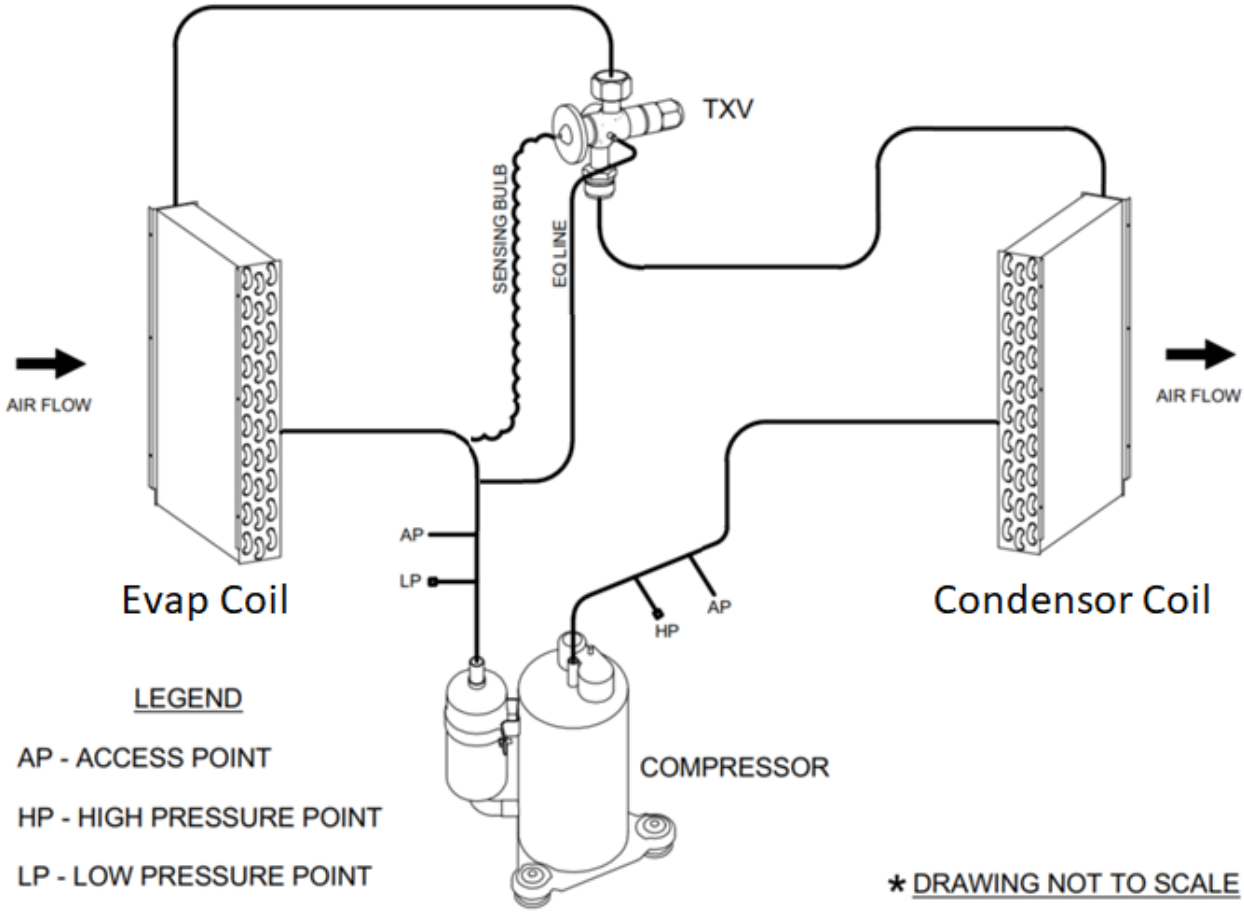


FIGURE 36 - Circuit Diagram

STARTUP INSTRUCTIONS

PRE-STARTUP CHECKS:

Before start-up, thoroughly check all the components. Optimal operation of equipment requires cleanliness. Often after installation of the equipment, additional construction activities occur. Protect the equipment from debris during these construction phases.

PRIOR TO THE STARTUP OF THE UNIT:

1. Ensure supply voltage matches nameplate data.
2. Ensure the power cable is connected to the unit and the ground cable is connected to the ground lug of heater.
3. With the power off, check blower wheel set screws for proper tightness and that the blower wheel rotates freely.
4. Ensure unit will be accessible for servicing.
5. Ensure condensate line is properly sized, run, trapped, pitched and tested.
6. Ensure all cabinet openings and wiring connections have been sealed.
7. Ensure clean filters are in place.
8. Ensure all access panels are in place and secured.
9. Make sure that all electrical connections are tight and secure.
10. Check the electrical overcurrent protection and wiring for the correct size.

STARTUP INSTRUCTIONS CONTINUED

11. For 208 voltage power, make sure the line voltage tap on the 24 Volt control transformer has been moved and rewired.
12. Verify that the low voltage wiring between the thermostat and the unit matches the wiring diagram.
13. Make sure the supply duct and return duct have been installed properly and sealed well.
14. **Models with 15 kW heater (FPE15E10***) should have two separate power supplies connecting to the unit. Make sure each line voltage is connected to the correct circuit breaker in the unit.**

UNIT STARTUP:

WARNING

Do not supply power to unit with the compressor terminal box cover removed.

LABORATORY TESTING

When the unit has less than 100 operational hours and the coils have not had sufficient time to be "seasoned", it is necessary to clean the coils with mild surfactant such as Calgon to remove the oils left by manufacturing processes

1. Ensure that power is connected to the unit and the local disconnect is switched to ON position.
2. Turn on the power.
3. Check that there is 24V from the control transformer. The controller module LED should light up.

COOLING

1) Turn the thermostat system switch to "COOL" and the fan switch to "AUTO" position.
2) Set the temperature below room temperature.

HEATING

3) Turn the thermostat system switch to "HEAT" and the fan switch to "AUTO" position.
4) Set the temperature above current room temperature.

STARTUP & PERFORMANCE CHECKLIST INSTRUCTIONS

Follow the **Startup and Performance Checklist** on Page 53 and Page 54 to check if the temperature and refrigerant pressure are normal, and if compressor and fan are running properly without abnormal sound. The warranty may be void unless the checklist is completed and returned to the warrantor. If the unit is not installed properly, the warranty will be void as the manufacturer can't be held accountable for problems that stem from improper installation.

TROUBLESHOOTING

HEATING

PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
NO HEAT	Power is not turned on	Turn on the power
	Wiring is incorrect or loose	Check the wiring with the wiring diagram and check for loose wiring connections
	Thermostat setpoint is too low	Set the temperature higher than current room temperature
	Fuse link is open	Replace fuse
	No airflow	Check if the blower is on or if there's any obstruction in the duct
	Heater fuse link is open	Replace fuse link
TEMPERATURE IS TOO HIGH	Thermostat setpoint too high	Set the temperature lower
	Low airflow caused by dirty or clogged air filter	Clean or replace air filter
	Low airflow caused by excessive external static	Check if supply duct and return duct are sized properly or if there's any obstruction in the duct
	Power voltage is too high	Maximum voltage for operation is 252V
	Current speed tap is not high enough	Change heating speed tap to the optional heating tap with higher torque value
HEATER TURNED ON BUT STOPPED WORKING QUICKLY	Fuse link is open	Check if fuse is sized correctly or if power cable is loose
NOT ENOUGH HEAT, AIR NOT WARM	Heating elements are not all on (for 7 kW, 10 kW, and 15k W heaters)	Check if the protection devices (auto-reset switch and non-resettable fuse link) of heating element is activated
	Power supply voltage is too low	Minimum voltage for operation is 187V
	Air leak in the unit or in duct	Check if the ducts are sealed well
	Thermostat setpoint is too low	Set the temperature higher

Table 10-Heating Troubleshooting Table

TROUBLESHOOTING CONTINUED

COOLING

PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
ENTIRE UNIT DOES NOT RUN	Power supply off	Apply power; close disconnect.
	Blown Fuse	Replace fuse or reset circuit breaker. Check for correct fuses.
	Voltage supply low	If voltage is below minimum voltage specified on unit data plate, contact power company.
	Wiring	Check if there's any wire loose or broken
	Thermostat	Set the fan to "ON", the fan should run. Set thermostat to "COOL" and lowest temperature setting, the unit should run in the cooling mode. If neither the blower nor compressor run with the thermostat set to "COOL", check that the unit is wired correctly.
BLOWER OPERATES BUT COMPRESSOR DOES NOT RUN	Thermostat	Check setting, calibration and wiring.
	Wiring	Check for loose or broken wires at compressor, capacitor or contactor.
	Compressor overload open	If the compressor is cool and the overload will not reset, replace the compressor.
	Compressor motor grounded	Internal wiring grounded to the compressor shell. Replace compressor. If compressor is burnt out, also replace the filter-drier.
	Compressor windings open	After compressor has cooled, check continually of compressor windings. If the windings are open, replace the compressor.
	Refrigerant Sensor	For units over 4lbs, an active refrigerant leak will/faulty sensor will disable the compressor operation. Verify absence of refrigerant leak and replace sensor.
UNIT OFF ON HIGH PRESSURE CONTROL	Condenser has no airflow	Condenser fan motor faulty or wire loose.
	Condenser coil too dirty	Clean condenser coil
	Outside ambient temperature is too high	Unit is designed to run up to 115°F outside ambient temperature. Consult factory for application with higher ambient temperature.
	Refrigerant charge	The unit is overcharged with refrigerant. Reclaim refrigerant, evacuate and recharge with factory recommended charge.
	High pressure switch	Check for defective or improperly calibrated high-pressure switch.
A2L SENSOR STATUS LIGHT	Solid Green	Sensor is in startup mode
	Blinking Green	Sensor is in normal operation
	Solid Red	Sensor has detected a leak and is in mitigation mode
	Blinking Red	Sensor fault, unit compressor will not energize and fan will be continuous

Table 11 - Cooling Troubleshooting Table

OPERATION & MAINTENANCE - HEATING

CAUTION

All appropriate personal protection equipment should be worn when servicing or maintaining this unit.

Personal injury can result from sharp metal edges, moving parts, and hot or cold surfaces.

The heating module is a single assembly composed of heating elements, first protection device (auto-reset temperature switch), second protection device (non-resettable fuse link), sequencers and power distribution block (unit with 15 kW heaters has two circuit breakers instead of power distribution block). See Figure 27 - Electric Heater Assembly.

The heating module should be inspected annually (minimum) before heating season starts by a qualified technician or agency. Power to the unit MUST be turned off and disconnected before serving.

WARNING

ELECTRIC SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings operation may result in property damage, serious injury, or death.

Improper servicing may result in dangerous operation, property damage, serious injury, or death.

- Before servicing, disconnect all electrical power to the unit.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

OPERATION & MAINTENANCE – HEATING CONTINUED

FUSE LINK REPLACEMENT

5 kW heater has one heating element. 7 kW and 10 kW heaters have two heating elements. 15 kW heater has three 5 kW heating elements. Each heating element is installed with one non-resettable fuse link (see FIGURE 25 - Non-resettable Fuse Link). If the fuse link is broken, order the replacement part from company (see Table 7 - BLOWER PERFORMANCE DATA and Table 8 -BLOWER PERFORMANCE DATA CONTINUED), and follow below procedures to replace it.

1) Turn off electrical power to the unit
2) Remove front top panel from the unit. See FIGURE 37 – Front Top Panel Removal.
3) Disconnect wires from the heating element whose fuse link is broken. And remove screws from the mounting plate.
4) Take out the mounting plate with heating element. Replace the broken fuse link.
5) Put the heating element back to the unit, install the screws and connect the wires.

NOTE: When putting the heating element back to the unit, make sure the rod is inserted into the hole on the heater support panel. The window covered by the blank mounting plate is to help to locate the hole when interesting the heating element.

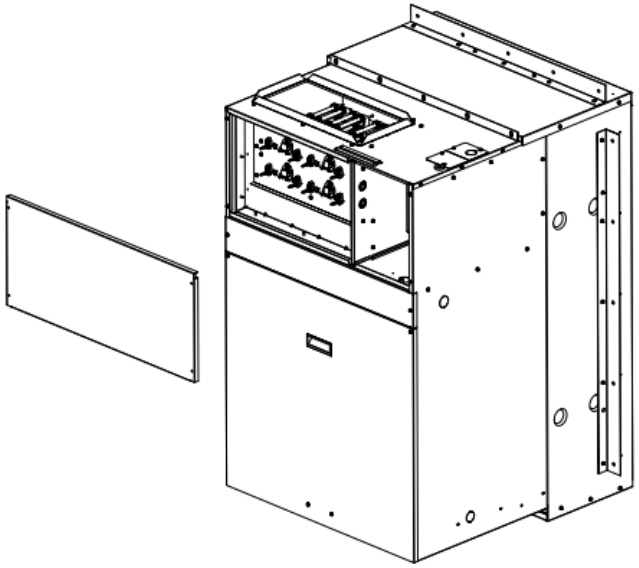


FIGURE 37 - Front Top Panel Removal

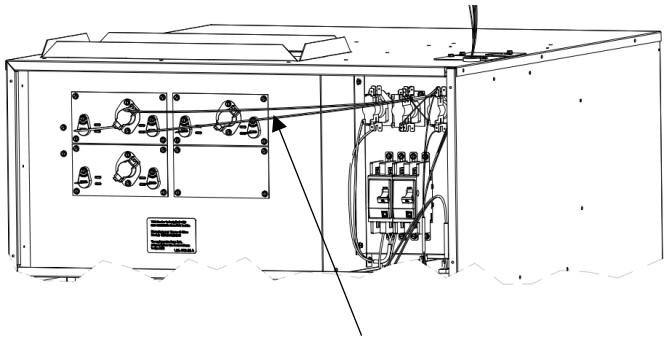


FIGURE 38 - Wire Disconnection

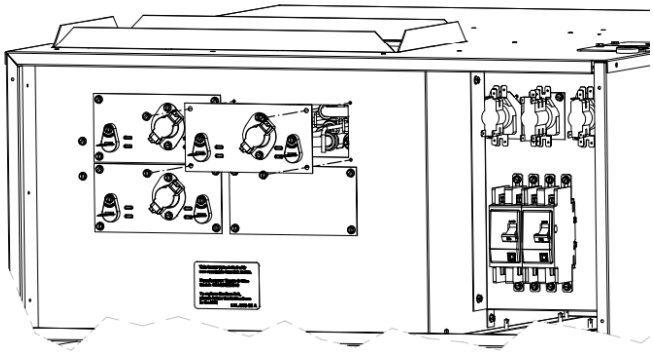


FIGURE 39 - Mounting Plate Removal

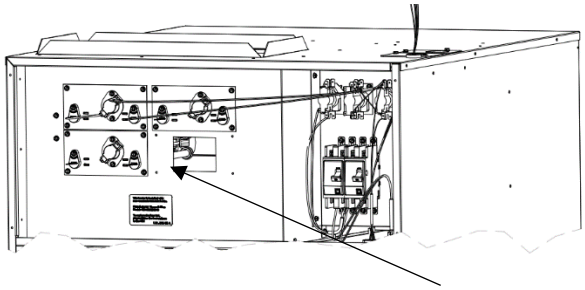


FIGURE 40 - Heating Element Replacement

OPERATION & MAINTENANCE – COOLING

AIR CONDITIONING SYSTEM TROUBLESHOOTING

WARNING

FIRE OR EXPLOSION HAZARD

IMPROPER HANDLING OF REFRIGERANTS CAN CAUSE INJURY, EXPLOSION AND DEATH

- It is illegal to release refrigerant into the atmosphere. Refrigerant released into an enclosed space will displace oxygen causing unconsciousness and death.
- If an indoor refrigerant leak is suspected, thoroughly ventilate the area before beginning any work
- DO NOT purge or allow refrigerant to be released into an interior space
- Contact with liquid refrigerant can cause frostbite and blindness. Avoid skin contact with liquid refrigerant, wear goggles and gloves when working with refrigerants. Seek medical help immediately if any refrigerant contact with skin or eyes occurs
- Never burn refrigerant as highly toxic gas will be produced
- Only EPA certified technicians should handle refrigerants.
- In Canada technicians must be ODP / ODS certified to handle refrigerants
- Follow all EPA regulations

WARNING

FIRE OR EXPLOSION HAZARD

Explosion risk, recover refrigerant only in a cylinder designed and intended for this purpose

- Do not use a damaged cylinder
- Do not apply flame or excessive heat to a refrigerant cylinder
- Do not fill a refrigerant cylinder to more than 80% of its capacity
- Do not use a refrigerant cylinder for anything other than its designed and intended purpose
- Do not use an expired refrigerant cylinder
- Use recovery equipment designed to handle the refrigerant being recovered
- Earth-ground refrigerant cylinders before using

REFRIGERANT CHARGE

First-Pak units are factory charged with refrigerant. All First-Pak units use an adjustable thermostatic expansion valve (TXV) to control refrigerant flow to the evaporator coil. Do not adjust the TXV unless an evaluation of the system as described below indicates it is necessary. Superheat is increased (decrease refrigerant flow) by turning the TXV stem clockwise, turning the stem counter-clockwise will decrease superheat (increase refrigerant flow). Ideal conditions for checking refrigerant charge in cooling mode exist when the outdoor temperature is above 70°F (21° C) and indoor temperature is between 70°F (21°C) & 80°F (26.7° C).

PARTIAL REFRIGERANT CHARGE

Total refrigerant charge is listed on the unit rating plate. For partial system charging, the subcooling and superheat method can be used to make small refrigerant charge adjustments. Optionally, the entire refrigerant charge can be recovered and weighed back in per the total system charge listed on the rating plate.

To check the refrigerant charge, actual subcooling & superheat must be determined.
Allow the unit to operate in cooling mode for 15 minutes before taking readings. Attach refrigerant gauges to the suction line and liquid line access ports.

Subcooling

1) Place an accurate temperature sensor on the liquid line as close as practical to the TXV inlet. Insulate the temperature sensor from ambient to assure an accurate line temperature reading.
2) Record the liquid line temperature
3) Record the saturated temperature on your liquid line gauge that corresponds to the pressure shown on your gauge.
Actual Subcooling = saturated liquid line temperature - liquid line temperature

Superheat

1) Place an accurate temperature sensor on the suction line as close as practical to the compressor. Insulate the temperature sensor from ambient to assure an accurate line temperature reading
2) Record the suction line temperature
3) Record the saturated temperature on your suction line gauge that corresponds to the pressure shown on your gauge

Actual superheat = suction line temperature - saturated suction temperature

Compare your actual subcooling and superheat to the target subcooling and superheat.

OPERATION & MAINTENANCE – COOLING

If subcooling and superheat are both low, adjust the TXV stem clockwise ¼ turn. Allow the system to stabilize before re-checking.

If subcooling is low and superheat is high, add a small amount of refrigerant. Allow the system to stabilize before re-checking.

If subcooling and superheat are both high, adjust the TXV stem counter-clockwise ¼ turn. Allow the system to stabilize before re-checking.

If subcooling is high and superheat is low, adjust the TXV stem ¼ turn clockwise. Recover a small amount of refrigerant. Allow the system to stabilize before re-checking.

Cooling Capacity	12K	18K	24K	30K
Subcooling	8	8	16	10
Superheat at coil	14	7	9	8
Superheat at compressor	17	20	16	10

NOTE

Subcooling and superheat readings are reliable when the conditioned space is at comfortable conditions.

Refrigerant service ports are located in the return air section of the unit. These ports provide easy access to high side (liquid line) and low side (suction line) system pressures for service and maintenance without removing the cooling chassis. To access these two service ports, remove the air filter access panel.

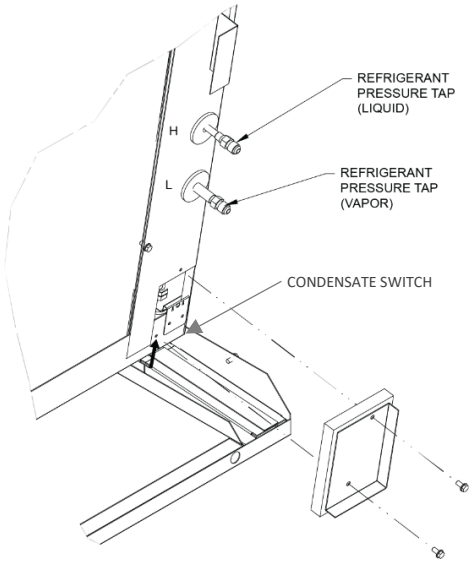


FIGURE 41 – AIR CONDITIONING PRESSURE PORTS

OPERATION & MAINTENANCE – COOLING

AIR CONDITIONER MODULE REMOVAL

Follow the below procedure to remove the air conditioner module from the cabinet for service if required. Electrical power to air conditioning chassis MUST be turned off.

1) Remove screws (8) from top front panel, control cover panel and air filter access panel, then remove all these three panel from the cabinet. See Error! Reference source not found. Front Panels.

   DO NOT REMOVE THE BOTTOM TWO SCREWS ON THE AIR FILTER ACCESS PANEL.

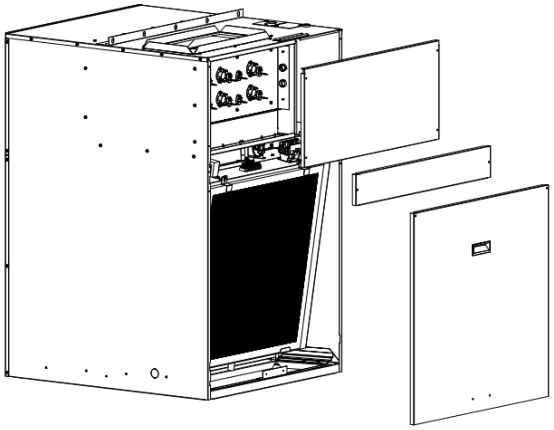


FIGURE 42 - Removal of Front Panel

2) Remove power cable from unit.
3) Disconnect low voltage (6 pin) & line voltage (3 pin) harness connectors by pressing on the release tabs and using a downward motion (FIGURE 44 - Line Voltage Connector (3 Pin) & FIGURE 45 - Low Voltage Connector (6 Pin).

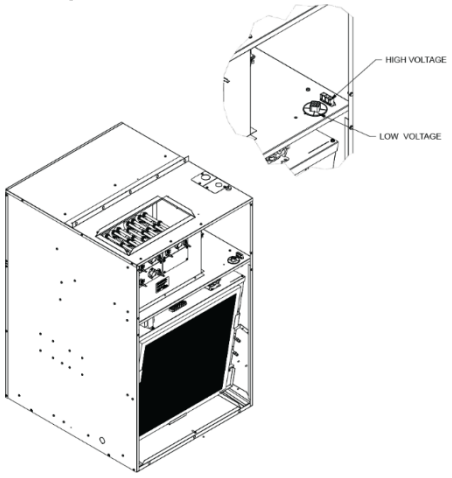


FIGURE 43 - Electrical Power Disconnection

NOTE

All air conditioning components are serviceable in the chassis

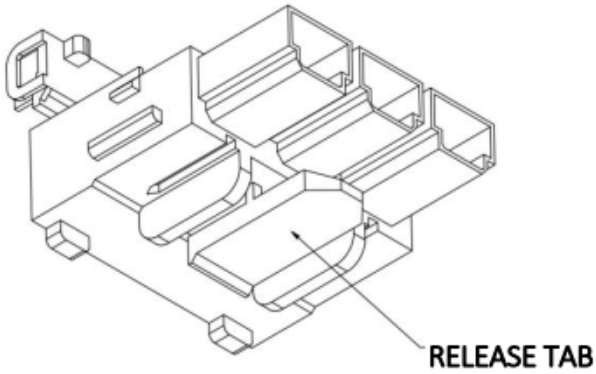


FIGURE 44 - Line Voltage Connector (3 Pin)

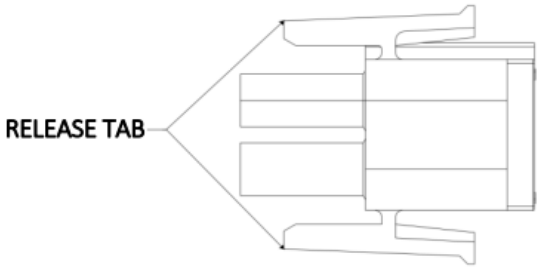


FIGURE 45 - Low Voltage Connector (6 Pin)

4) Slide-out air conditioner module using handles as shown in Figure 46- Slide Out Air Conditioner Module.

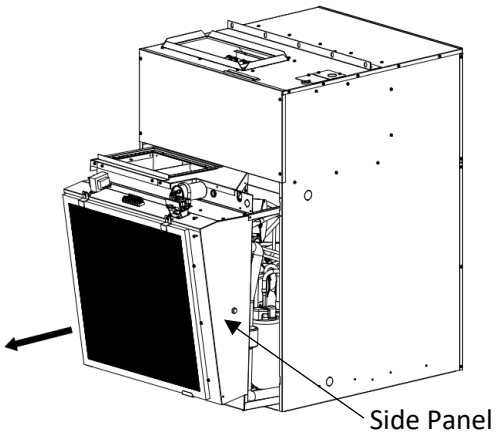


FIGURE 46 - Slide Out Air Conditioner Module

OPERATION & MAINTENANCE – COOLING (CONTINUED)

WARNING

ELECTRIC SHOCK HAZARD

Check motor connections to ensure they are secure and in accordance with the unit wiring diagram. ECM motors have line voltage power applied at all times.
MAKE SURE POWER IS DISCONNECTED BEFORE SERVICING

WARNING

Failure to follow this warning could result in personal injury or death. Recover all refrigerant before attempting a sealed air conditioning system repair. Recover all refrigerant before final unit disposal. Use all service ports and position all refrigerant flow–control devices open, including expansion valves and solenoid valves.

WARNING

FIRE OR EXPLOSION HAZARD

Failure to following this warning could result in personal injury, death and/or property damage.
Do not attempt any sealed system repair without first recovering the entire refrigerant charge. R-454B refrigerant and oil mixture could ignite in the presence of a brazing torch flame. Completely recover the refrigerant charge using both the high and low sides of the system and purge the sealed system with nitrogen before brazing any component or tubing.

WARNING

FIRE OR EXPLOSION HAZARD

Failure to following this warning could result in personal injury, death and/or property damage.
Do not use flames or any potential ignition sources to leak check R-545B refrigerant tubing or components.

WARNING

Do not exceed the maximum operating pressure listed on the unit rating plate.

OPERATION & MAINTENANCE COOLING CONTINUED

AIR CONDITIONER MODULE REASSEMBLY

1) To put-back the chassis, make sure all the refrigerant lines are in place and there are no leaks.
2) Slide chassis back into the unit.
3) Reconnect low & high voltage harnesses.

PREVENTIVE MAINTENANCE

To achieve maximum performance and service life of equipment, a formal schedule of regular maintenance should be established and followed.

IMPORTANT

It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit. Service should be performed by a QUALIFIED service agency. A sealed refrigerant system normally requires no maintenance since it is a closed, self-contained system.

CAUTION

All appropriate personal protection equipment should be worn when servicing or maintaining this unit.

Personal injury can result from sharp metal edges, moving parts, and hot or cold surfaces.

WARNING

- Always wear eye protection.
- When fan coil is operating, some components are operating at high speeds. Do not touch rotating items with any object
- Return and secure all electrical and service access panels in their proper place.
- Clear surrounding area of all tools, equipment and debris.
- Check the entire unit to ensure its cleanliness.

FAN

For any other air conditioning servicing, the air conditioning chassis can be removed as explained in REMOVAL OF AC Section

FILTER

The air filter should be cleaned or replaced every 30 days or more frequently if severe operating conditions exist. Always replace the filter with the same type and size as originally furnished.

COIL

Clean all heat transfer surfaces and remove all dirt, dust, and contaminates that potentially impairs air flow using industry accepted practices. Care should be taken not to bend coil fin material.

CONDENSATE DRAIN PAN AND PIPE

Check and clean all dirt and debris from pan. Ensure drain line is free flowing and unobstructed.

UNIT PERFORMANCE

Record performance measurements of volts, amps, and air temperature differences. A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.

WARNING

ELECTRIC SHOCK HAZARD

Check motor connections to ensure they are secure and in accordance with the unit wiring diagram.

ECM motors have line voltage power applied at all times.

MAKE SURE POWER IS DISCONNECTED BEFORE SERVICING.

OPERATION & MAINTENANCE (CONTINUED)

Compressor bearing products designed for A2L refrigerants may come equipped with a factory installed refrigerant leak detection system. If the sensor is faulty, or disconnected, the appliance will not properly function.
False ceilings or drop ceilings may be used as a return air plenum if a refrigerant detection system is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

QUALIFICATION OF WORKERS

Service shall only be performed by qualified technicians, certified by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. Competence to properly service the appliance should be documented by a certificate.

CHECKS TO THE WORK AREA

Prior to beginning work on the appliance, safety checks are necessary to ensure that the risk of ignition of released gasses is minimized. Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

CHECKING FOR PRESENCE OF REFRIGERANT

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any such a pipe work shall use any sources of ignition in manner that it may lead to the risk of fire or explosion.
All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “NO SMOKING” signs shall be displayed.

VENTILATED AREA

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

CHECKS TO THE REFREIGERATING EQUIPMENT

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.

The following checks shall be applied to installations using FLAMMANLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

OPERATION & MAINTENANCE (CONTINUED)

CHECKS TO ELECTRICAL DEVICES AND SEALED ELECTRICAL COMPONENTS

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
Initial Safety Checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

Sealed electrical components shall be replaced in the event of damage or malfunction.

CABLING

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

DETECTION OF FLAMMABLE REFRIGERANTS

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids (such as the bubble method or fluorescent method agents) are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

REMOVAL AND EVACUATION OF FLAMMABLE REFRIGERANTS

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for FLAMMABLE REFRIGERANTS it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- Remove refrigerant charge following local and national regulations
- Purge the circuit with inert gas (optional for A2L);
- Evacuate (optional for A2L)
- If using flame to open circuit, continuously flush system with an inert gas
- Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.
For appliances containing flammable refrigerants, refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing until the working pressure is achieved, then venting to the atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

OPERATION & MAINTENANCE (CONTINUED)

CHARGING PROCEDURES

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

DECOMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

A. Become familiar with the equipment and its operation.
B. Isolate system electrically.
C. Before attempting the procedure, ensure that:
    a. mechanical handling equipment is available, if required, for handling refrigerant cylinders;
    b. all personal protective equipment is available and being used correctly;
    c. the recovery process is supervised at all times by a competent person;
    d. recovery equipment and cylinders conform to the appropriate standards.
D. Pump down refrigerant system, if possible.
E. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
F. Make sure that cylinder is situated on the scales before recovery takes place.
G. Start the recovery machine and operate in accordance with instructions.
H. Do not overfill cylinders (no more than 80 % volume liquid charge).
I. Do not exceed the maximum working pressure of the cylinder, even temporarily.
J. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
K. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

LABELING

Equipment Shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating that the equipment contains FLAMMABLE REFRIGERANT.

RECOVERY

When removing refrigerant from a system, either for servicing order commissioning, it is recommended good practice that all refrigerants are removed safely.
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak- free disconnect couplings and in good condition.

OPERATION & MAINTENANCE (CONTINUED)

The recovered refrigerant shall be processed according to local Legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely

REFRIGERANT DETECTION SENSOR (RDS) INFORMATION

Refer to the appliance IOM for information regarding the minimum conditioned room requirements, and instructions for the RDS operation, installation, and wiring. Any field installed wiring connected to the RDS must be at least 18AWG and have minimum insulation thickness of 1.58mm or be protected from damage.
The RDS is not intended for service or repair. In the event of a sensor failure, the mitigation mode will engage and the sensor shall be replaced by removing the sensor and replacing it with a new sensor. Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacturer.

DUCTING

If the appliance is connected via an air duct system to one or more rooms with A2L refrigerants is installed in a room with an area of less than the minimum as noted on the unit physical data table, or a minimum effective dispersal volume less than $18m^3$($636\ ft^3$), the room shall be without continuously operating open flames (e.g. an operating gas appliance), or other potential ignition sources (such as an operating electric heater/ hot surface). A flame producing device may be installed in the same space if the device is provided with an effective flame arrest.

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Potential ignition sources include hot surfaces with a temperature exceeding 430°C (806°F) and electric switching devices.

PIPING

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as AHRAE 15, ASHRAE 15.2, IAPMO uniform mechanical code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

STARTUP & PERFORMANCE CHECKLIST

CUSTOMER _____ STARTUP DATE _____ JOB # _____

ADDRESS _____ SERVICING COMPANY _____

_____ TECHNICIAN _____

MODEL # _____ SERIAL # _____ PHONE # _____

INSTALLATION CHECK LIST

- ☐ Inspect the unit for transit damage and report any damage on the carrier's freight bill.
- ☐ Check model number to insure it matches the job requirements.
- ☐ Install field accessories and unit adapter panels as required. Follow accessory and unit installation manuals.
- ☐ Verify field wiring, including the wiring to any accessories.
- ☐ Check all multi-tap transformers, to insure they are set to the proper incoming voltage.
- ☐ Prior to energizing the unit, inspect all the electrical connections.
- ☐ Power the unit. Bump the motor contractor to check rotation. Three phase motors are synchronized at the factory. If the blower fans are running backwards, de-energize power to the unit, then swap two of the three incoming electrical lines to obtain proper phasing. Re-check.
- ☐ Perform all start up procedures outline in the installation manual shipped with the unit.
- ☐ Fill in the Start Up Information as outlined below and on the following page.
- ☐ Provide owner with information packet. Explain the thermostat and unit operation.

START UP INFORMATION SHEET

ELECTRICAL

Supply Voltage L1-L2 _____ L3-L4 _____ Compressor Amps _____

Running Voltage L1-L2 _____ L3-L4 _____ Blower Amps _____

Secondary Voltage _____ Condenser Fan Amps _____

C (black) to G (green) Volts* _____

C (black) to W (white) Volts* _____

*With thermostat calling.

TEMPERATURES

Outdoor Air Temperature _____ DB _____ WB

Return Air Temperature _____ DB _____ WB

Cooling Supply Air Temperature _____ DB _____ WB

Heating Supply Air Temperature _____ DB _____ WB

AIR CONDITIONING

Suction Pressure (Prior to Startup) _____Psig

Liquid Pressure (Prior to Startup) _____Psig

STARTUP & PERFORMANCE CHECKLIST CONTINUED

UNIT OPERATION

HEATING MODE

1 ELECTRIC HEATER AMPS _____

2 INDOOR BLOWER AMPS _____

3 TEMPERATURE RISE

Supply Duct Temperature _____

Return Duct Temperature − _____

Temperature Rise = _____

4 TOTAL EXTERNAL STATIC

Supply Duct Temperature _____

Return Duct Temperature + _____

Temperature Rise = _____

COOLING MODE

5 INDOOR BLOWER AMPS _____

6 TEMPERATURE DROP

Return Duct Temperature _____

Supply Duct Temperature − _____

Temperature Drop = _____

7 TOTAL EXTERNAL STATIC (dry coil)

Supply External Static _____

Return External Static + _____

Total External Static = _____

8 DRAIN LINE

☐ Leak Free

9 THERMOSTAT

☐ Adjusted & Programmed

☐ Explained Operation to Owner

10 AIR CONDITIONING

Suction Pressure _____ Psig Liquid Pressure _____Psig

Suction Temperature _____ °F Liquid Temperature _____°F

The warranty may be void unless the Startup & Performance Checklist is completed and returned to the warrantor. If the HVAC unit is not installed properly the warranty will be void as the manufacturer can't be held accountable for problems stemming from improper installation.

P.O. Box 270969 Dallas, TX 75227
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