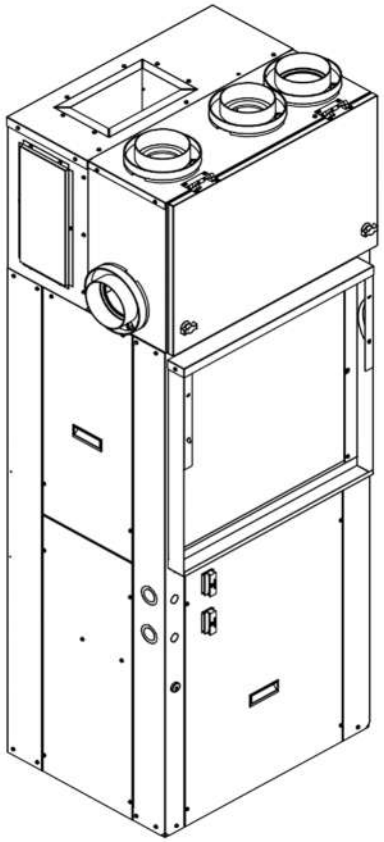
Installation, Operation, & Maintenance

IOM 8507
Rev. A 09/23

EPE Low Ambient Heat Pumps
Space Constrained Unit w/ Energy Recovery Ventilation

ATTENTION:

Read all instructions thoroughly and retain all manuals for future reference.



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The Manufacturer works to continually 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 FRESH-PAK unit is not installed properly the warranty will be void as the manufacturer cannot be held accountable for problems that stem from improper installation.

******WARNING TO INSTALLER, SERVICE PERSONNEL AND OWNER******

Altering the product or replacing parts with non-authorized factory parts voids all warranty or implied warranty and may result in adverse operational performance and/or a possible hazardous condition 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 HVAC Contractor or service agency.
5. All "kits", parts, 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:

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

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 insure proper installation, reliability, or operation.

NOTE

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

MODEL NOMENCLATURE

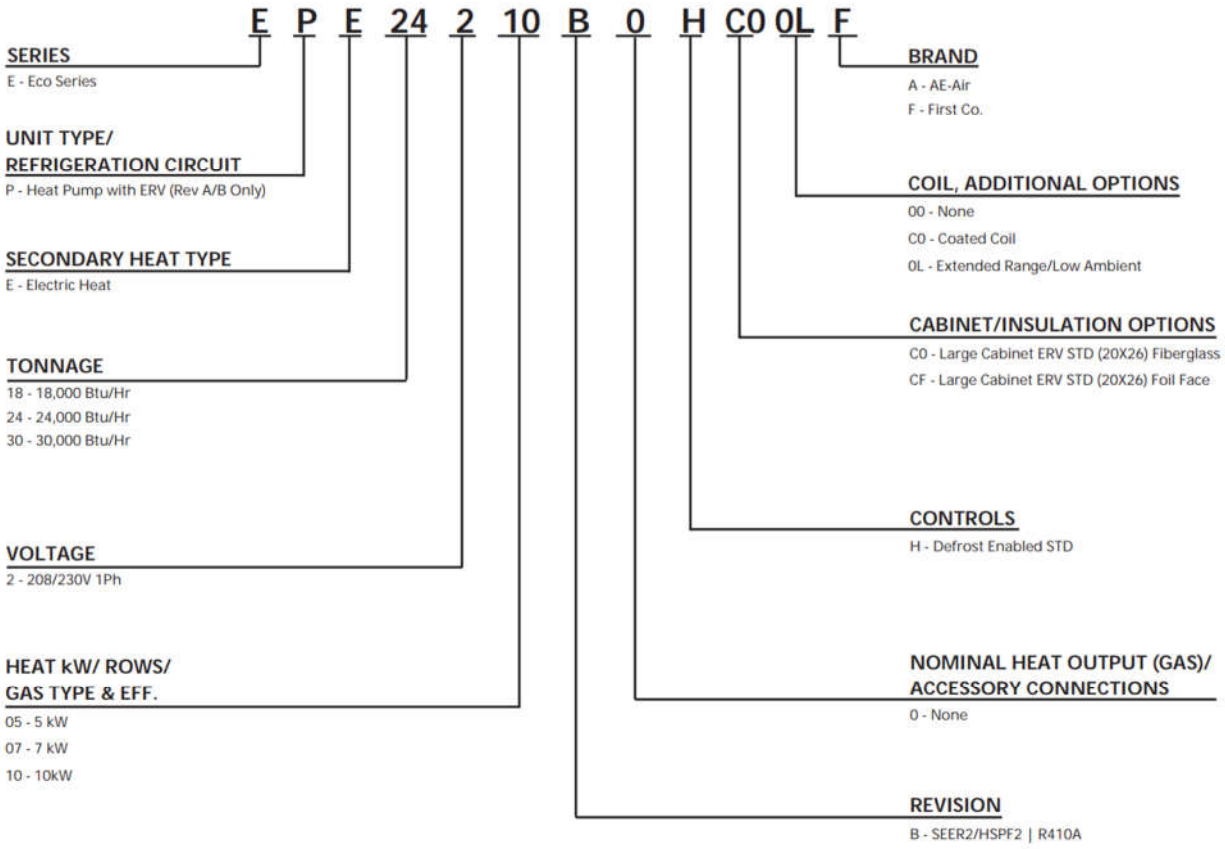


FIGURE 1 - Model Nomenclature

GENERAL INFORMATION

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

These instructions are given for the installation of the Eco Series FRESH-PAK specifically. For any other related equipment, refer to the appropriate manufacturer's instructions.

CAUTION

DO NOT use units during any phase of construction.

Mechanical components and filters can become clogged with dirt and debris, which can cause damage to the system.

The manufacture does not warrant equipment subjected to abuse. Construction debris can void warranties and liability for equipment failure, personal injury, and property damage.

WARNING

ELECTRIC SHOCK HAZARD

ALWAYS turn off all power to the unit before servicing equipment. There may be more than one disconnect switch. All lockout/tag out procedures should be followed.

Electrical shock can cause personal injury or death.

NOTE

Material in this shipment has been inspected at the factory and released to the transportation agency in good condition.

Upon receipt, 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.

CAUTION

Extreme caution must be taken to ensure that no internal damage will result from screws that are drilled into the cabinet.

INTRODUCTION

The Fresh Pak Low Ambient Heat Pumps models are Space Constrained Heat Pumps combined with an integrated Energy Recovery Ventilation (ERV) system. ERV's provide pre-conditioned fresh outdoor air to your space either directly or through the normal return of your air-handling unit. The benefits include improved indoor air quality, reduced energy costs and lower installation cost. The Fresh Pak Low Ambient Heat Pumps come standard with defrost boards and electric heat, allowing compressor operation down to 5°F. All Fresh Pak EPE Low Abient models are certified to AHRI 210/240-2020.

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

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

Stacking the FRESH-PAK systems is strictly prohibited. Failure to follow this directive may result in system and/or property damage.

DO NOT operate units during the construction process. Mechanical components and filters could become clogged with dirt and debris, which can cause damage to the system.

The manufacture does not warrant equipment subjected to abuse. Construction debris can void warranties and liability for equipment failure, personal injury, and property damage.

SHIPPING & PACKAGING LIST

SHIPPING INSTRUCTIONS

FRESH-PAK units must remain in the upright position throughout the shipping and handling process to maintain the proper compressor oil level.

PACKAGE LIST

The units will be shipped with the following. Quantities listed in Paratheses.

1. FRESH-PAK Package DX Cooling Unit with Integral ERV
    a. Shipping brackets (3)
    b. Shipping bracket screws (8)
    c. Sleeve mounting bracket (2)
    d. Sleeve mounting bracket screws (6)
2. Literature Package containing
    a. IOM - Installation & Operations Manual (1)
3. Duct Collar Kit
    a. ERV Round Duct Connections (4)
    b. Screws (12)

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

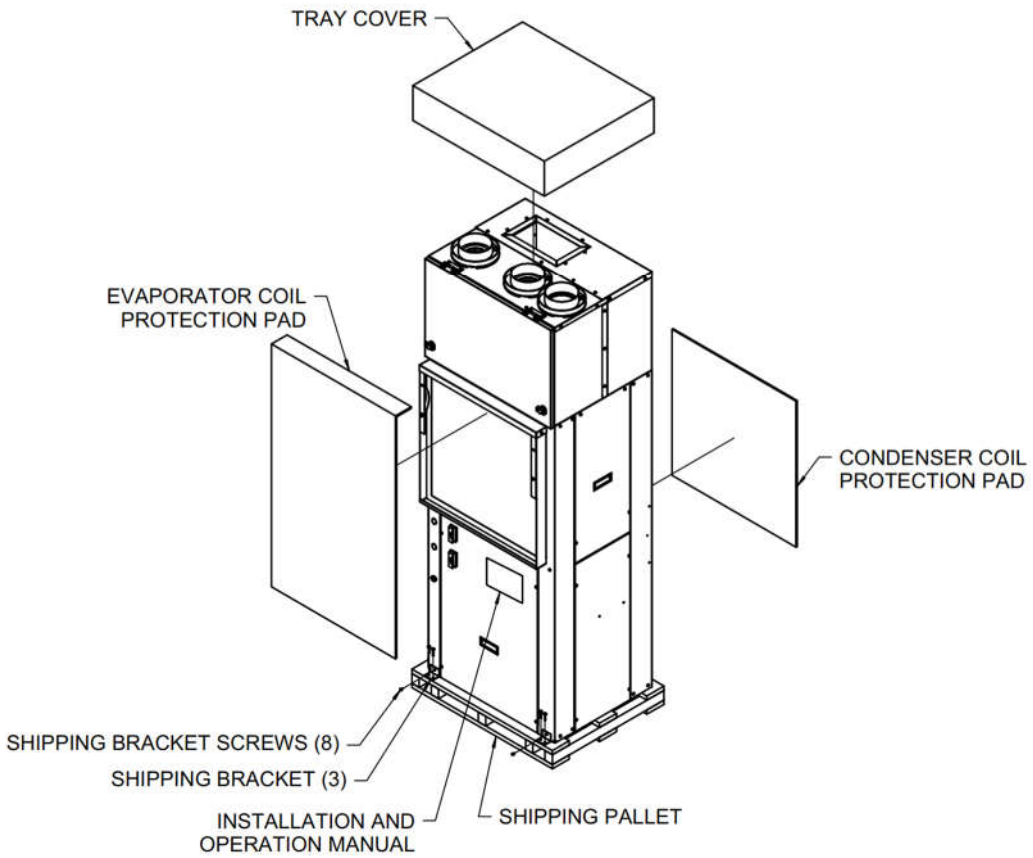


FIGURE 2 - Standard Packaging

UNIT INSPECTION CHECKLIST

Before preparing unit for installation, complete the inspection procedures below.

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 and that there are no loose wires.
5) Verify that the refrigerant piping is free from any kinks and there is no interference between unit piping and sheet metal or electrical wires.
6) Remove the blower access panel and remove the Styrofoam packaging mount underneath the blower.
7) Check that the blower spins freely within the housing and there are no obstructions between the wheel and housing. The wheel can sometimes come loose in shipping.
8) Ensure that evaporator distributor tubes are not touching one another and that they are over the drain pan.
9) Check the air-coil fins for any damage during shipping.
10) Ensure that shipping brackets and screws are removed from condensing section. Refer to **FIGURE 3 - Standard Packaging with Brackets – Front View** & **FIGURE 4 - Standard Packaging with Brackets – Back View** for more information.

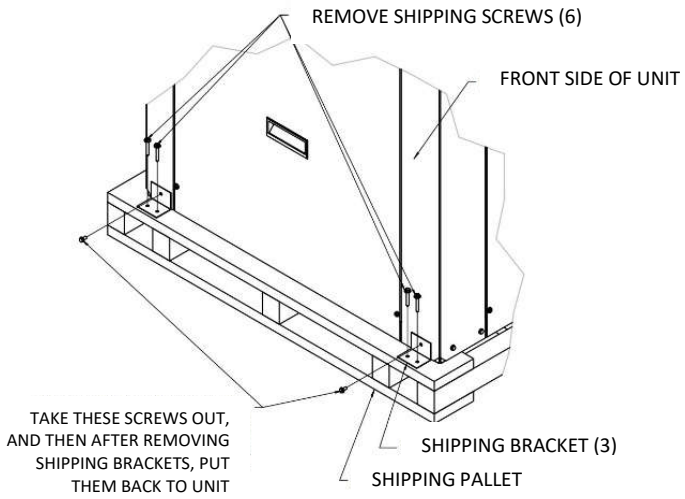


FIGURE 3 - Standard Packaging with Brackets – Front View

NOTE

Check the unit nameplate for correct voltage with the plans before installing the equipment.

Ensure that all electrical ground, connections are made in accordance with local code.

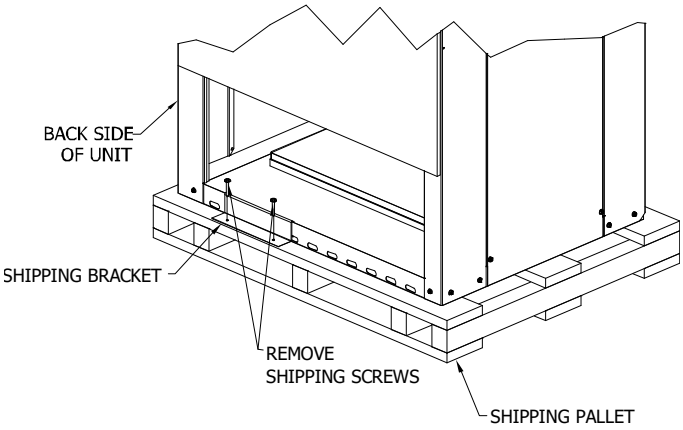


FIGURE 4 - Standard Packaging with Brackets – Back View

UNIT DIMENSIONAL DATA

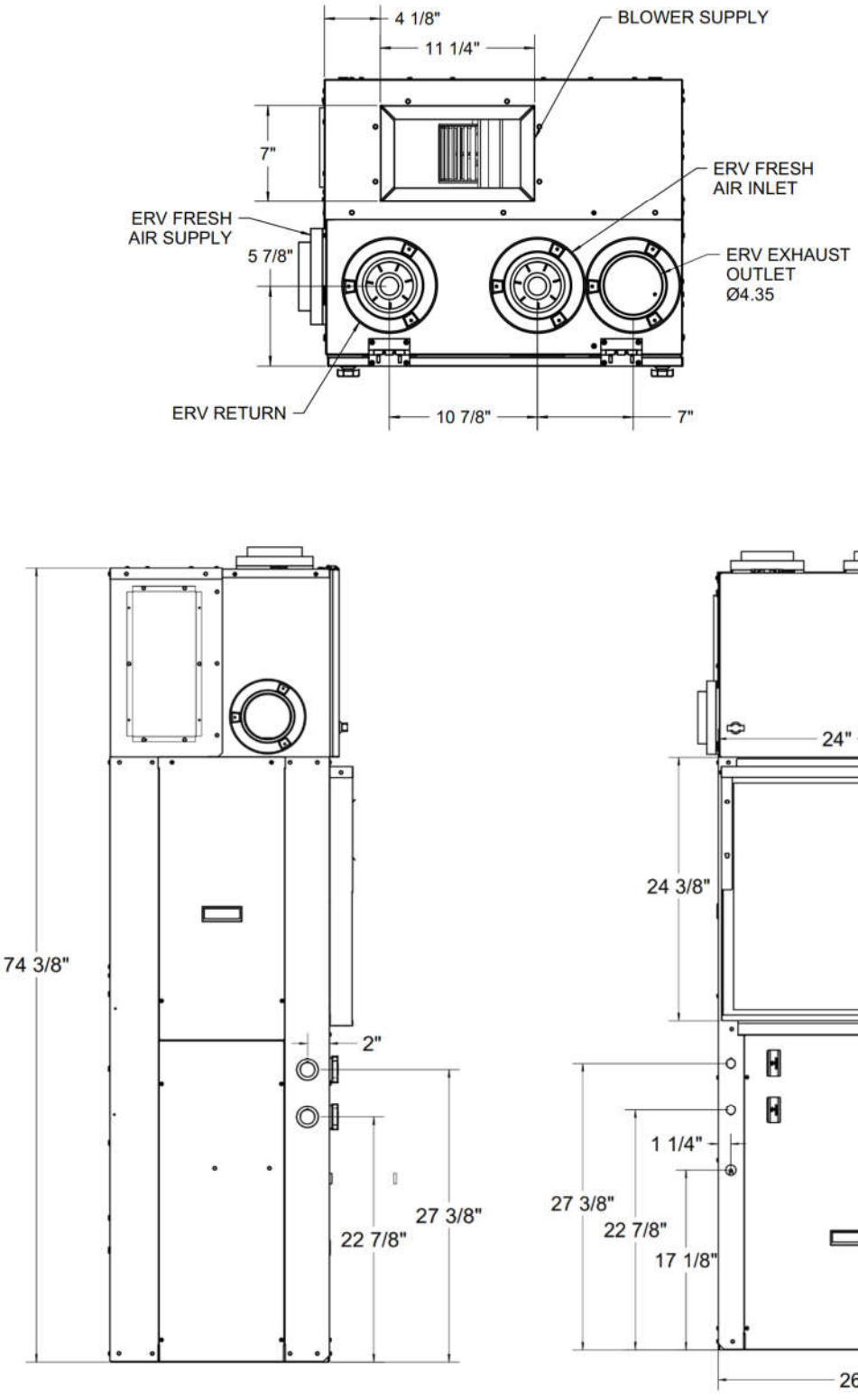


FIGURE 5 - Dimension

UNIT PHYSICAL DATA

PHYSICAL DATA			
FRESH-PAK Model	EHE182**C	EHE242**C	EHE302**C
Compressor (Quantity)	Scroll (1)		
Factory Charge (R410A) lb. [kg]	5.4 [2.5]	5.2 [2.36]	5.9 [2.67]
ID MOTOR			
Motor (Quantity)	1	1	1
Fan Motor Type	ECM	ECM	ECM
Motor HP	1/3	1/3	1/2
OD MOTOR			
Motor (Quantity)	1	1	1
Fan Motor Type	ECM	ECM	ECM
Motor HP	1/3	1/3	1/3
ID BLOWER			
Blowers (Quantity)	1	1	1
Blower Wheel Size (D x W) in. [cm]	10 x 4 [25.4 x 10.16]	10 x 4 [25.4 x 10.16]	10 x 4 [25.4 x 10.16]
EVAPORATOR COIL			
Dimensions (H x W) in. [cm]	23.1 x 22 [58.67 x 55.88]	23.1 x 22 [58.67 x 55.88]	23.1 x 22 [58.67 x 55.88]
Face Area ft^2 [m^2]	3.53 [0.33]	3.53 [0.33]	3.53 [0.33]
Rows	3	4	4
OD COIL			
Dimensions (H x W) in. [cm]	26 x 22.5 [66 x 57]	26 x 22.5 [66 x 57]	26 x 22.5 [66 x 57]
Face Area ft^2 [m^2]	4.1 [0.3762]	4.1 [0.3762]	4.1 [0.3762]
MISCELLANEOUS			
Throwaway Filter Dim. in. [cm]	24 x 24 [60.96 x 60.96]	24 x 24 [60.96 x 60.96]	24 x 24 [60.96 x 60.96]
Throwaway Filter Quantity	1	1	1
Operating Weight lb. [oz]	290 [4,640]	305 [5,040]	315 [5,040]
Packaged Weight lb. [oz]	[310 [4960]	325 [5,200]	335 [5,360]

Table 1 – Unit Physical Data

ELECTRICAL DATA

EPE LOW AMBIENT ELECTRICAL DATA (208/230-1PH-60Hz)																		
UNIT MODEL	BLOWER DATA		CONDENSER DATA				ELECTRIC HEAT		MIN. CIRCUIT AMPACITY				MAX. CIRCUIT PROTECTION				MIN VOLT.	MAX VOLT.
	Evaporator Motor		COMPRESSOR		CONDENSER MOTOR		kW		CKT1		CKT2		CKT1		CKT2			
	FLA	HP	RLA	LRA	FLA	HP	240V	208V	230V	208V	230V	208V	230V	208V	230V	208V		
EPE18205B*	2.8	1/3	9.00	56.00	2.8	1/3	5	3.75	18	17	26	23	25	25	30	25	197	252
EPE18207B*	2.8	1/3	9.00	56.00	2.8	1/3	7	5.25	18	17	36	32	25	25	40	35	197	252
EPE18210B*	4.1	1/2	9.00	56.00	2.8	1/3	9	6.75	19	18	47	41	25	25	50	45	197	252
EPE24205B*	2.8	1/3	10.70	55.00	2.8	1/3	5	3.75	20	19	26	23	25	25	30	25	197	252
EPE24207B*	2.8	1/3	10.70	55.00	2.8	1/3	7	5.25	20	19	36	32	25	25	40	35	197	252
EPE24210B*	4.1	1/2	10.70	55.00	2.8	1/3	9	6.75	21	20	47	41	30	30	50	45	197	252
EPE30205B*	2.8	1/3	10.70	65.00	2.8	1/3	5	3.75	20	19	26	23	25	25	30	25	197	252
EPE30207B*	2.8	1/3	10.70	65.00	2.8	1/3	7	5.25	20	19	36	32	25	25	40	35	197	252
EPE30210B*	4.1	1/2	10.70	65.00	2.8	1/3	9	6.75	21	20	47	41	30	30	50	45	197	252

Table 2– Unit Electrical Data Table

INSTALLATION

INSTALLATION PRECAUTIONS

CAUTION

Always wear all appropriate personal protection Equipment when installing and servicing units.

WARNING

Use multiple people to team lift when moving and installing these units.

Failure to properly lift units may result in personal injury or death.

CAUTION

Contact with metal edges and corners can result in personal injury. Protective gloves should be worn 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.
- Units must be installed level or angled toward the drain nipple to ensure proper drainage and operation.
- Be sure that the drain pan is free from foreign material prior to start up.

CAUTION

Components rotate at high speeds when the unit is in operation.

- Check filter media installation to ensure that it is installed correctly. Use the directional arrows or other information on the filter to determine the proper flow direction.
- Ensure air distribution system does not exceed the external static rating of the unit.

WARNING

When soldering and brazing, it is recommended that fire extinguishers be available. When soldering and brazing close to valves or sensitive components, heat shields or wet rags are required to prevent damage to the valves or components.

NOTE

Insulation is installed in the unit to provide a barrier between varying atmospheres outside and within the unit. If insulation is damaged condensation can occur and can lead to corrosion, component failure, and possible property damage.

Damaged insulation must be repaired prior to the operation of the unit. Insulation will lose its effectiveness and value when wet, torn, separated, and/or damaged.

CAUTION

When servicing this equipment, ensure that the reversing valve, expansion device, filter drier and other components are specifically designed for R-410A refrigerant.

ONLY USE service equipment specifically designated for use with R-410A.

WARNING

R-410A can become combustible if mixed with air at elevated temperature and/or pressure.

Failure to observe this warning may result in property damage, personal injury, or death.

INSTALLATION (continued)

UNIT LOCATION

This FRESH-PAK unit 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 factory approved wall sleeve must be used to install the FRESH-PAK unit.

The interior portion of the unit is surrounded by a closet with a rear access, refer to FIGURE 6 - Condo with FRESH-PAK on Exterior Wall. The vertical discharge allows for ducting to the top of the room for best air circulation and elimination of cold drafts on occupants. The exterior (grille side) of the unit must have no obstruction (trees, landscape material, etc.) within 30 in. [76.2 cm]. Refer to FIGURE 7 - Required Building Clearances

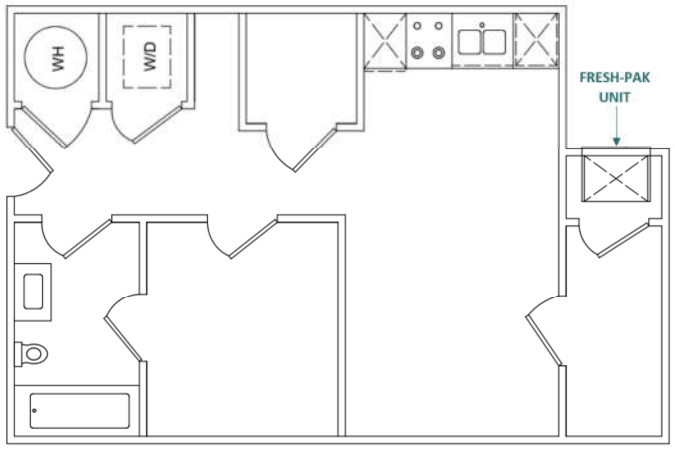


FIGURE 6 - Condo with FRESH-PAK on Exterior Wall

NOTE

Do not locate two units adjacent to each other on an inside corner or where they may exhaust into each other.

Provisions should be made to allow access to the indoor side of the unit for installation and inspection. The closet or access panel opening must be centered with the exterior wall opening and be at least 30 in. [76.2 cm] wide by 84 in. [213.36 cm] tall for all FRESH-PAK models.

12 in. [30.4 cm] (6 in. [15.24 cm] on sides without the ERV fresh air connection) of unobstructed clearance must be maintained around the FRESH-PAK chassis for adequate airflow to achieve optimum performance. These guidelines address minimum spacing requirements only. It is acceptable to go beyond these limits at any time. At least 29 in. [73.66 cm] of unobstructed space should be provided in front of the access door to permit removal of the unit, should repair and inspection be required.

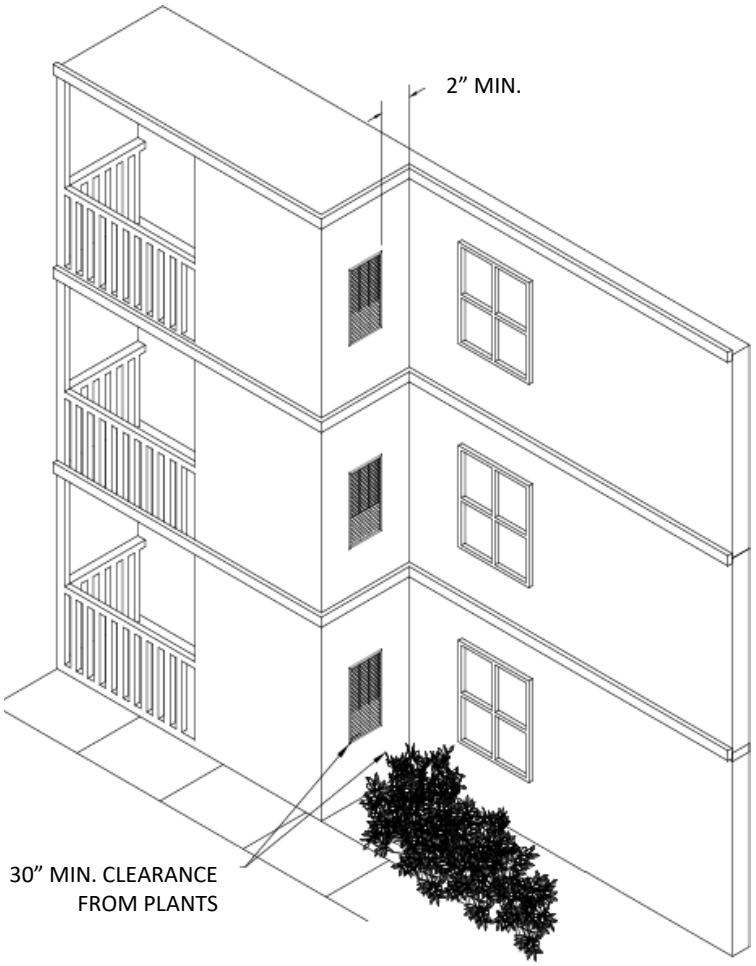


FIGURE 7 - Required Building Clearances

NOTE

The FRESH-PAK units are designed for quiet operation. However, all air conditioning equipment will transfer a level of noise to the conditioned space.

This should be considered when planning the location of the equipment.

NOTE

The Architectural Grille must be installed prior to the installation of the FRESH-PAK unit into the sleeve.

INSTALLATION (continued)

UNIT CLEARANCE REQUIREMENTS

Service clearance must be provided for future maintenance and service. A minimum of 29 in. [73.66 cm] open area must be left unobstructed in front of the access panels.

The louver side must be kept free from any obstructions to air flow. The unit must be installed at least 4 feet [1.22m] from electric meters, gas meters, regulators, and relief equipment.

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 3 - Clearance Requirements

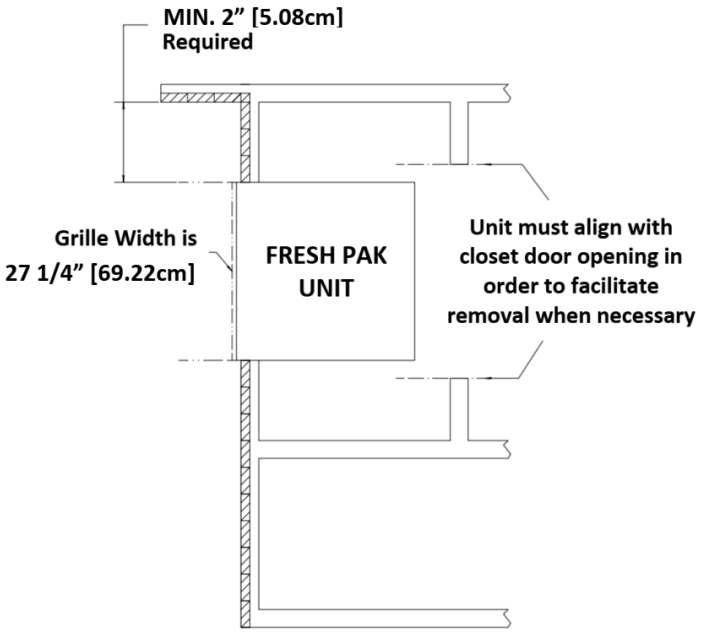


FIGURE 8 - Clearance Requirements

A unit installed in a garage must also be protected from damage by vehicles.

WALL SLEEVE INSTALLATION

Refer to installation instruction packed with the wall sleeve to assemble and mount into the wall. Before unit installation, verify that sleeve components are not damaged and that the drain line is unobstructed free of leaks.

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. Securely fasten the Architectural louver to the front of the sleeve using the supplied hardware.

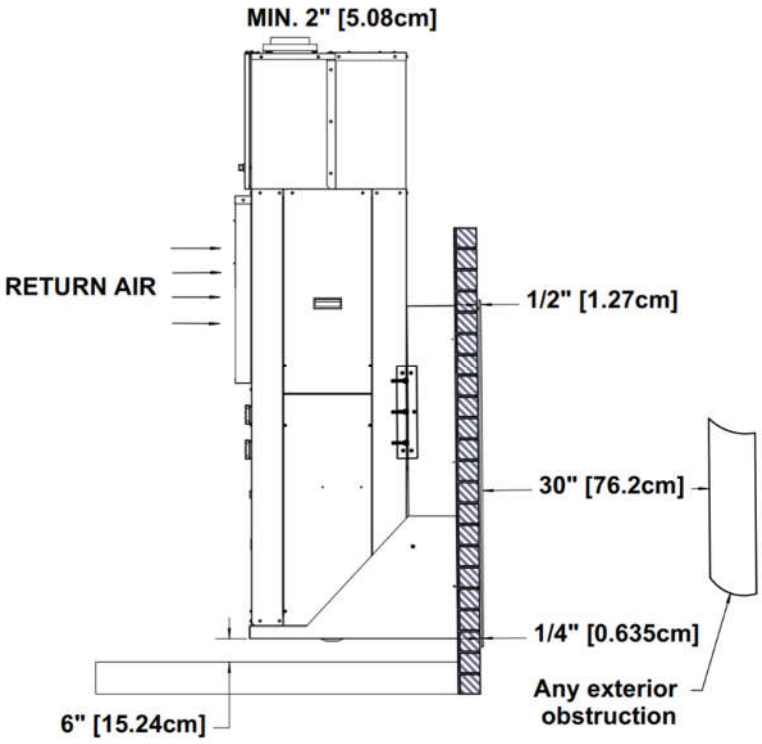


FIGURE 9 - Wall Sleeve Mounting

IMPORTANT

After sleeve installation, ensure that the gap in-between the wall and seal is insulated and is in contact with the sleeve sides.

IMPORTANT

Apply a high grade non-hardening sealant approved for exterior at the following locations to prevent air and water from migrating inside:

1. Between edge of the sleeve and the structure
2. On the inside/outside walls.

INSTALLATION (continued)

WALL SLEEVE INSTALLATION CONTINUED

REAR INSTALLATION & DIMENSIONS

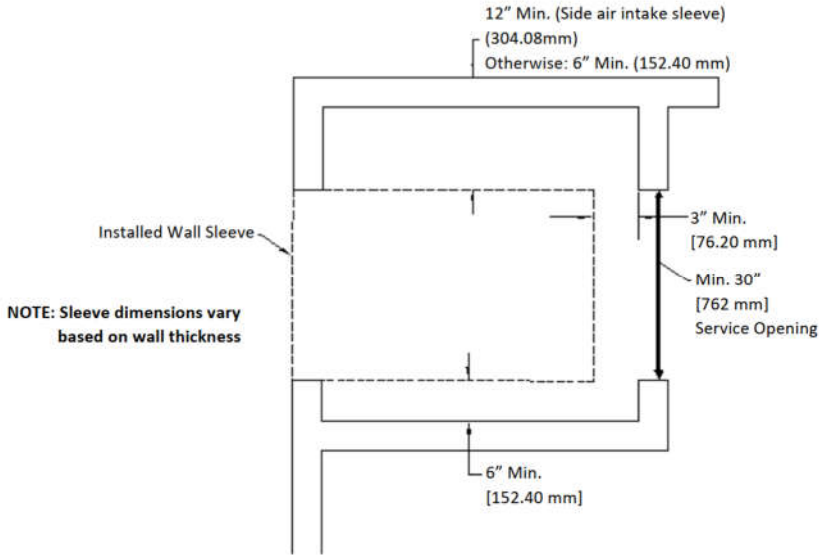


FIGURE 10 - Rear Installation

- Sleeve rough-in opening is 43-1/2 in. (H) [110.49 cm] x 26-3/4 in. (W) [67.94 cm].
- Bottom of opening should be approximately 6 in. [15.24 cm] above the floor.
- Minimum of 12 in. [30.4 cm] clearance required for side air intake sleeve installation.
- Minimum of 6 in. [15.24 cm] clearance is required on the ERV fresh air (supply air) side.
- Minimum of 3 in. [7.62 cm] of clearance is required on all sides, except ERV fresh air (supply air) side, of the FRESH-PAK unit. See -FIGURE 10- Rear Installation.

NOTE

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

NOTE

DO NOT install 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.

IMPORTANT

Units are **ONLY** intended for indoor installation applications.

INSTALLATION (continued)

PACKAGED UNIT INSTALLATION

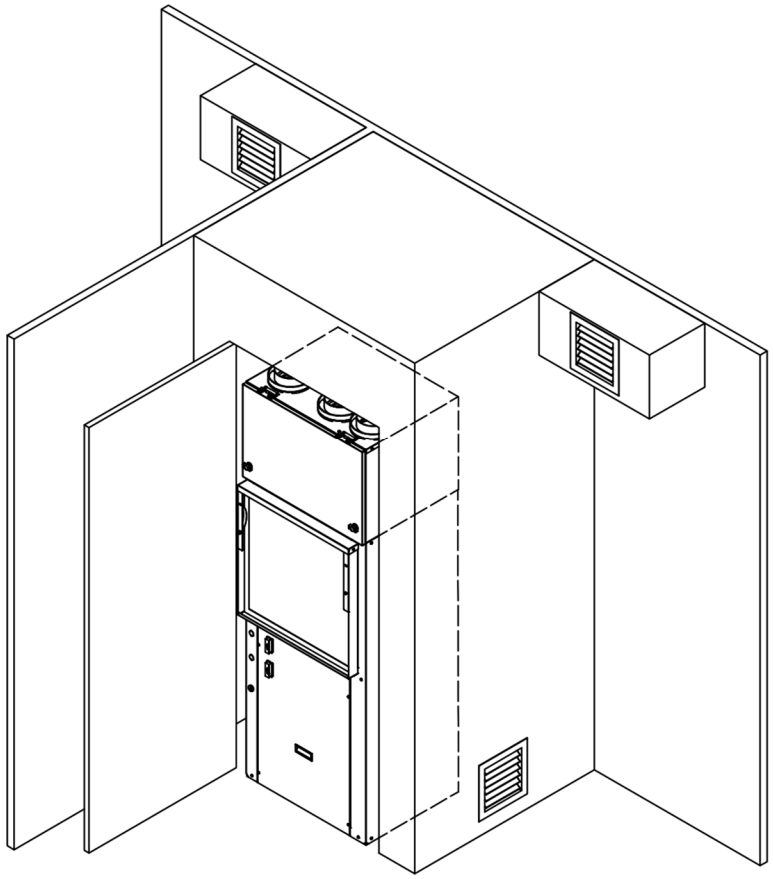


FIGURE 11 - FRESH-PAK Unit Installation

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. All units are designed for indoor use only, and are agency listed for installation with clearances specified in **Table 3- Clearance Requirements.** This includes the cabinet, discharge plenum and connecting ducts.

NOTE

Check nameplate voltage, amperage and fuse size to ensure the proper power supply.

INSTALLATION (continued)

PACKAGED UNIT INSTALLATION

1. Remove the two 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 FRESH-PAK unit. The supply flanges are shipped in a flat configuration. The discharge duct flanges must be bent up at a 90° angle for installation

2. Ensure that properly sized ductwork is in place to mate to the connections on the FRESH-PAK.
3. Before setting unit into closet, remove upper side access panel and inspect the evaporator blower to ensure that the wheel turns freely without rubbing on the housing.

NOTE

Remove the Styrofoam shipping block supporting the blower assembly.

4. Replace upper access doors prior to completing installation.
5. Remove the disconnect and the rear access door to get to the loose items described in the packaging list. Check all electrical connections and check the condenser fan to see if it turns freely.
6. Remove the 4 ERV duct collars from inside the cabinet.
7. Attach unit mounting brackets (2) as shown in **FIGURE 12 - Mounting Brackets Installation.**

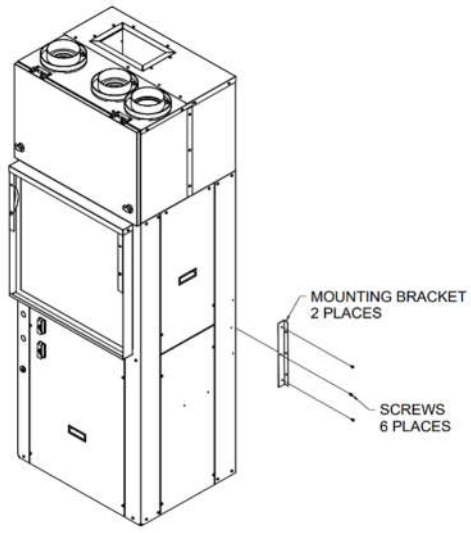


FIGURE 12 - Mounting Brackets Installation

8. Ensure that the wall sleeve is installed squarely and is secured before installing the unit.

IMPORTANT

After removing the construction debris guard, check the bottom of the sleeve pan to ensure that it is sloped toward the building exterior. Ensure that the bottom of the pan and drain are clear of obstruction and are operational.

NOTE

Inspect the sleeve seal, which is supplied with the sleeve, to ensure that it is properly secured and aligned. Use a high-grade non-hardening sealant to close any gaps that may exist between the seal and the wall of the sleeve.

9. After the seal is inspected, lift the unit onto the base of the sleeve and slide the unit forward to engage the seal. The unit uses locking brackets with weld studs. Align the unit to the bracket on the sleeve. Tighten down the unit until there is a tight seal with the sleeve. See **FIGURE 13 - Wall Sleeve Seal**.

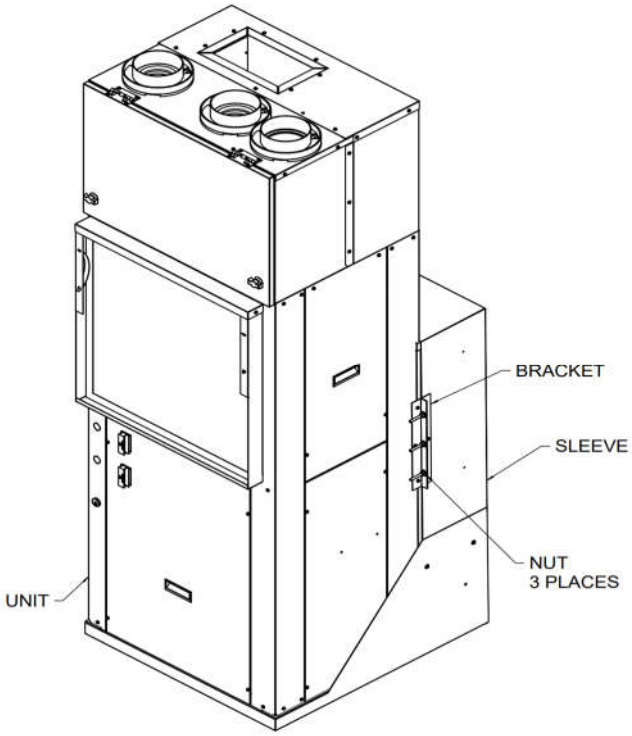


FIGURE 13 - Wall Sleeve Seal

10. Check that the unit is completely seated on all four sides against the wall sleeve seals.

CAUTION

If unit is not sealed properly, water and/or outside air will infiltrate the closet which may cause improper unit operation and can cause damage to the unit and/or property.

INSTALLATION (continued)

DUCTWORK

Discharge ductwork is normally used with these units. When return air ductwork is required, the unit is supplied with 2 in. [5.08 cm] thick filter rack/duct collar for connection of return air ductwork. All ductwork must be installed in accordance with National Fire Protection Assoc. Codes 90A and 90B.

Supply and Return ducts must be sized properly as to not exceed static pressure capabilities of the unit. Ducts should be adequately insulated to prevent condensation and to minimize heat loss. A flexible connector is recommended for supply air connections on metal duct systems.

DISCHARGE DUCTING

All Ductwork must conform to industry standards of good practice as described in ASHRAE System Guide. The transition piece from the unit discharge to the duct distribution system must not have an angle greater than 30° or severe loss of air performance can result.

Do not connect the full duct size to the unit discharge collar without using a transition piece down to the size of the unit discharge collar. With metal material, the sides of the elbow and entire branch duct should be internally lined with acoustic insulation for sound attenuation.

The ductwork should be configured such that there is no line of sight between the unit discharge and the distribution diffusers.

NOTE

Follow the filter rack kit instructions & recommendations for installation.

RETURN AIR DUCTING

Return air duct can be brought in through a wall grille and then to the unit. The return duct system will normally consist of flexible connector at the unit and a trunk duct to the return air grille. With metal duct material, the return air duct should be internally lined with acoustic insulation for sound attenuation.
A 2 in. [5.08 cm] air duct collar flange is included on the filter rack for ducted return air application. A flexible duct collar can then be attached between a duct transition and the return air ductwork. The return air duct transition must be the same size as the return air coil face area. See FIGURE 14 - *Ductwork*. Be sure to allow for proper clearance to allow for filter change outs.

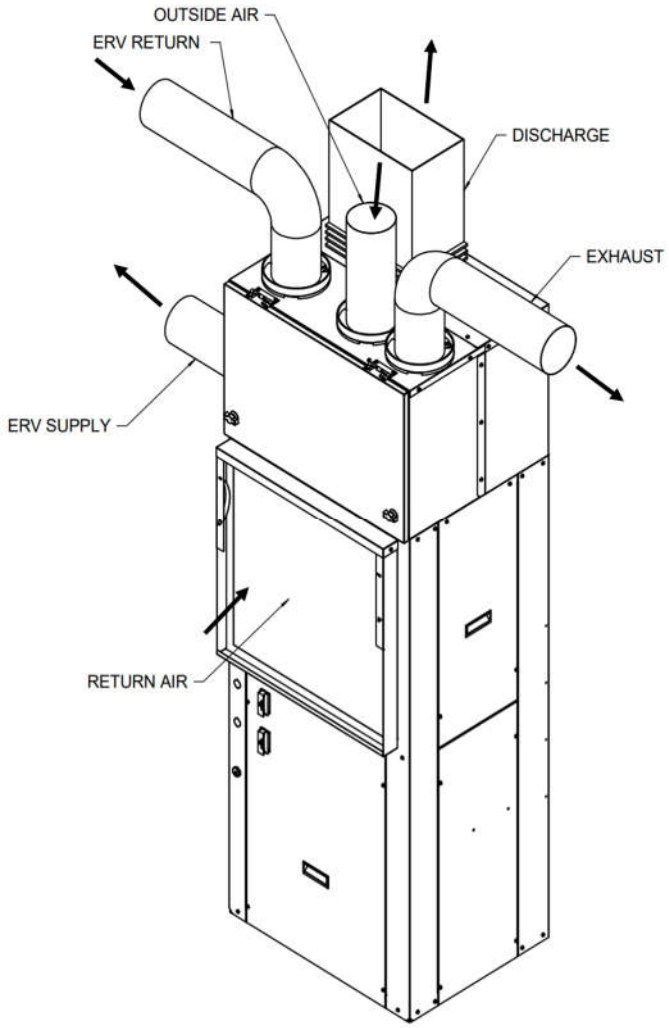
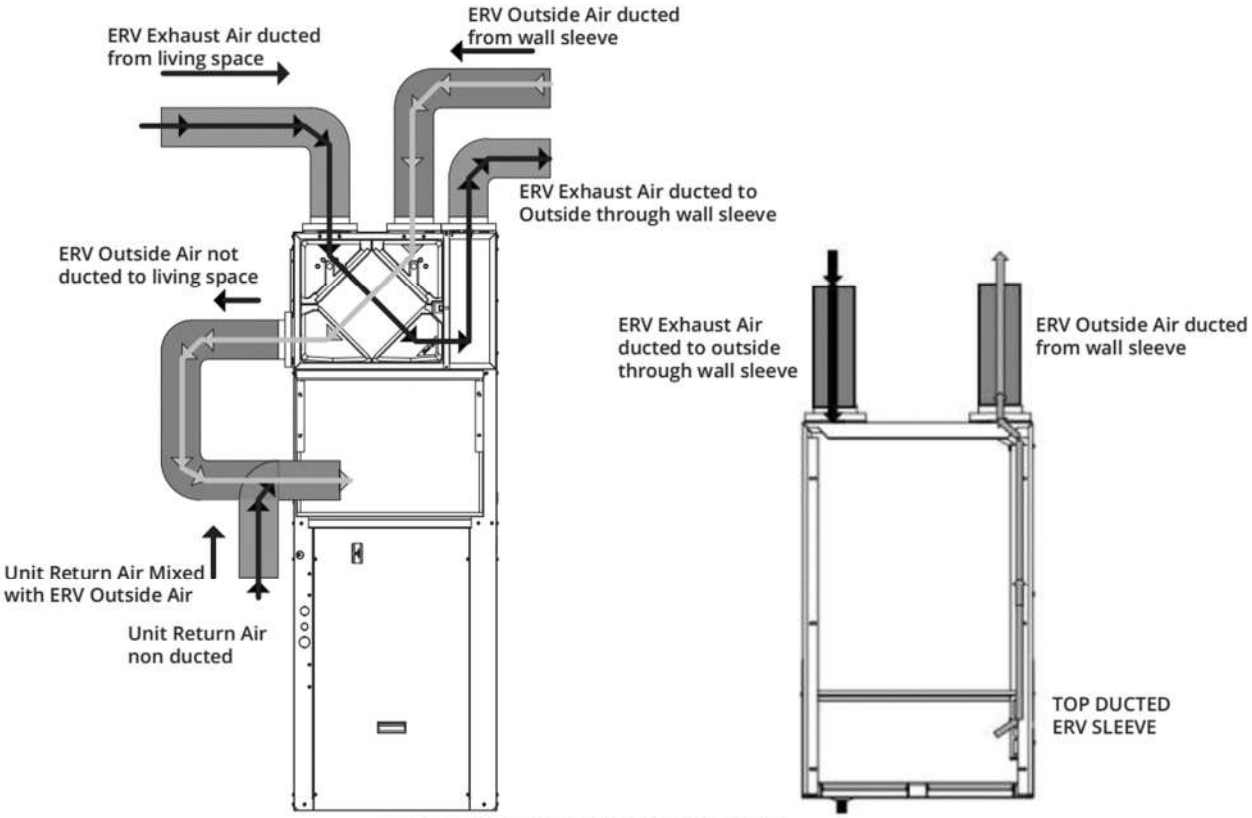


FIGURE 14 - Ductwork

ERV AIR DUCTING

The ERV module requires fresh/exhaust air ducted from/to outside the building and return air ducted from the occupied space. The ERV supply can be discharged into the open return of the closet. If the unit return air is ducted, the ERV supply air must be ducted into the return as well for proper ventilation and filtration. For examples on ducting the ERV air flow, refer to FIGURE 15 – ERV AIRFLOW PATHS



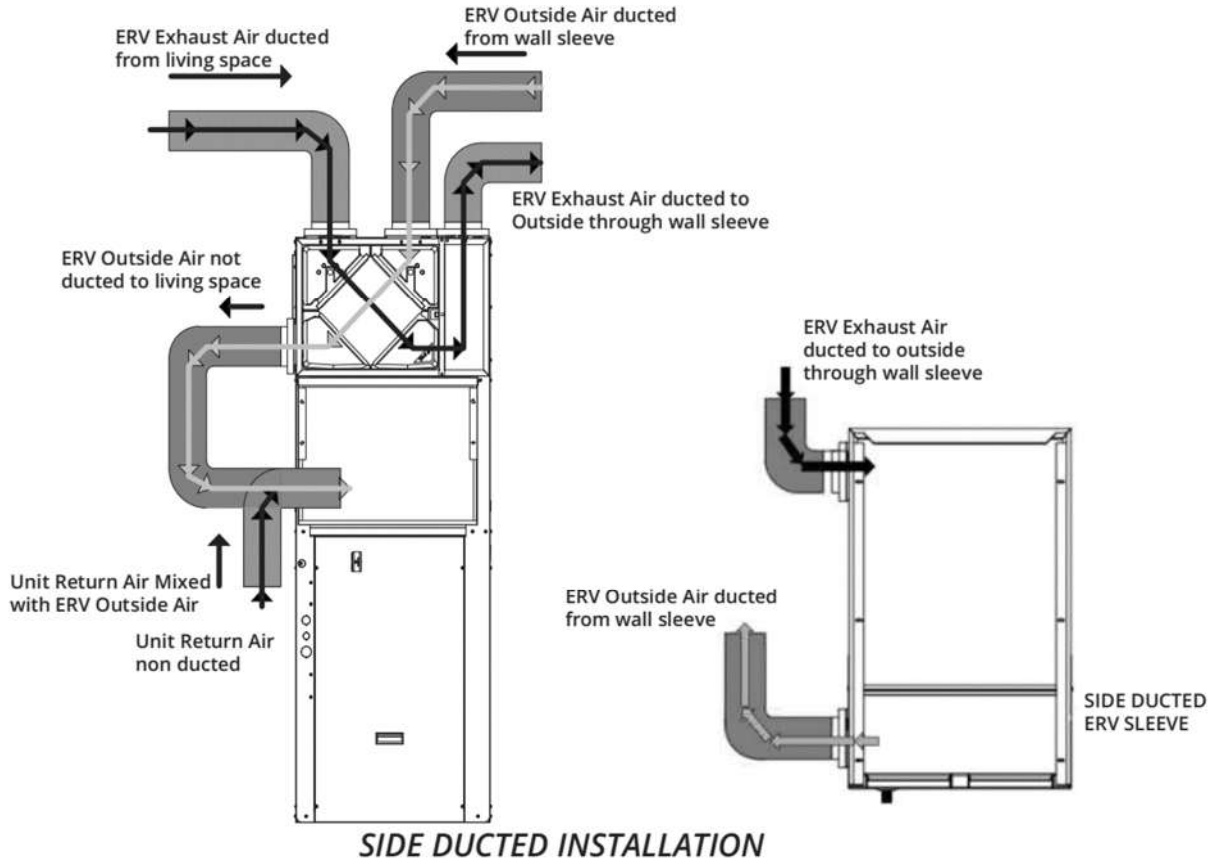


FIGURE 15-ERV AIRFLOW PATHS

INSTALLATION (continued)

CONDENSATE DRAIN

The FRESH-PAK is designed so that the wall sleeve is the principle drain pan. Drain tubing is factory installed which drains evaporator condensate though the bottom of the unit which then is allowed to drain into the wall sleeve pan.

Condensate drain lines must be installed with adequate slope to ensure positive drainage. Prior to unit installation ensure that the drain is unobstructed and leak free.

CAUTION

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

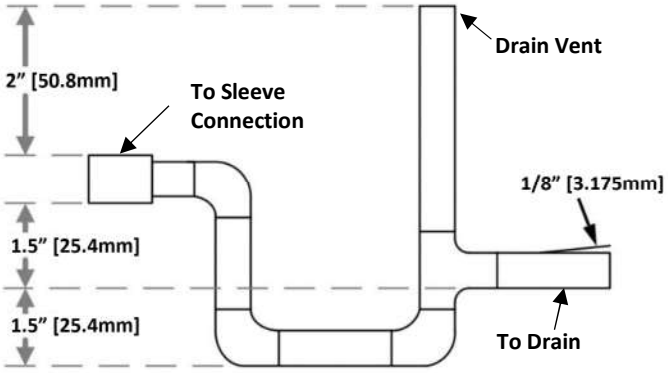


FIGURE 16 - Condensate Drain

NOTE

While preparing unit for installation, ensure that the drain tubing from the evaporator is securely attached to the copper nipple in the pan under the compressor. The wall sleeve has a 3/4in. NPT nipple located in the bottom for connection to a drain (FIGURE 16 - Condensate Drain). A trap is required in the condensate drain line from the wall sleeve to prevent sewer gas from escaping into the room.

NOTE

For low ambient applications, it is highly recommended to insulate the condensate drain piping on the exterior of the unit.

AIR FILTER

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

1. Use the factory supplied filter kit which attaches to the inlet of the evaporator.
2. Use the filter kit supplied with the access panel which accepts an 24 in. [60.96 cm] x 24 in. [60.96 cm] x 1 in. [2.54 cm] (or 2 in. [5.08 cm]) throwaway type of filter.
3. Any field installation of an air filter, means must be provided, for use of a disposable filter which is no smaller than the face area of the evaporator coil.

CAUTION

DO NOT operate this equipment without an air filter.

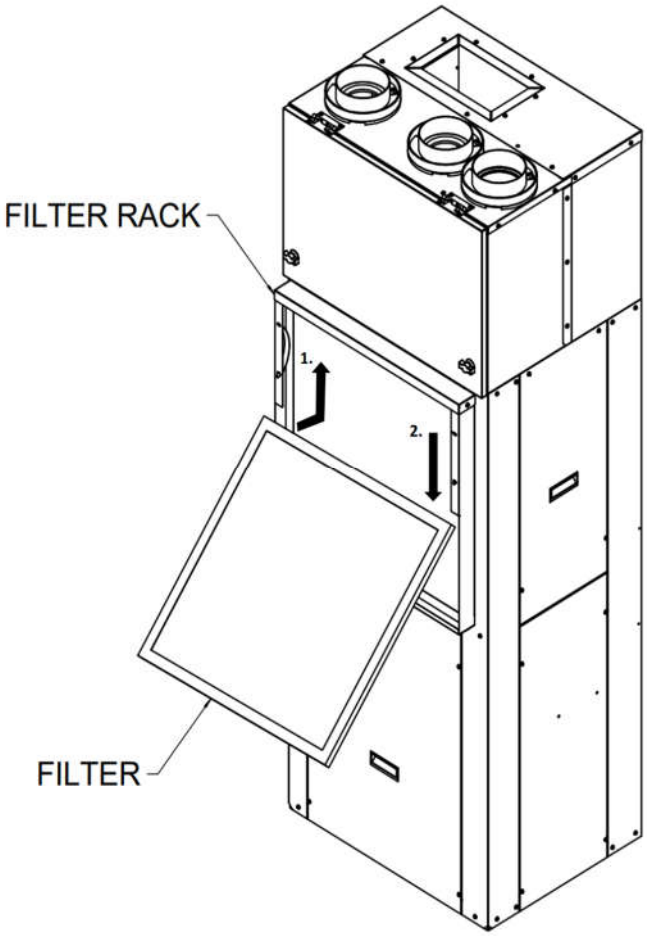


Figure 17- Air Filter

ELECTRICAL

HIGH VOLTAGE

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.

WARNING

ELECTRIC SHOCK HAZARD

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

NOTE: There may be multiple 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 personal injury or death.

Units are provided with a class 2 transformer for 24VAC 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 properly ground the unit may result in personal injury or death.

CAUTION

Any device that has been furnished by the factory for field installation must be wired in strict accordance with the associated wiring diagram. Failure to properly wire the unit may damage components and void warranties.

208 VOLT OPERATION

All 208-240 Volt units are factory wired for 240 Volt operation. For 208 Volt operation, moving, changing, or rewiring the line voltage tap on the 24 Volt control transformer is required. See note on unit wiring diagram for instructions.

LOW VOLTAGE

THERMOSTAT

A 24 VAC Ventilation thermostat is required to operate the FRESH-PAK unit (**FIGURE 18 - Ventilation Thermostat Connections**). A minimum 24 VAC Heat Pump Thermostat is required with a fan signal (G) in all operating Modes (**FIGURE 19 - Non-Ventilation Thermostat Connections**). Thermostat connections and functions are as follows:

THERMOSTAT CONNECTIONS KEY		
LETTER	COLOR	DESCRIPTION
C	BROWN	Transformer 24VAC Common
R	RED	Transformer 24VAC Hot
G	GREEN	Evaporator Blower
U	BLUE	ERV Comfort Common
Y	YELLOW	Compressor Contactor
AUX	WHITE	Auxiliary Heating
E	VIOLET	Emergency Heating
O	ORANGE	Reversing Valve (energized in cooling)

Table 4 - Thermostat Connections Key

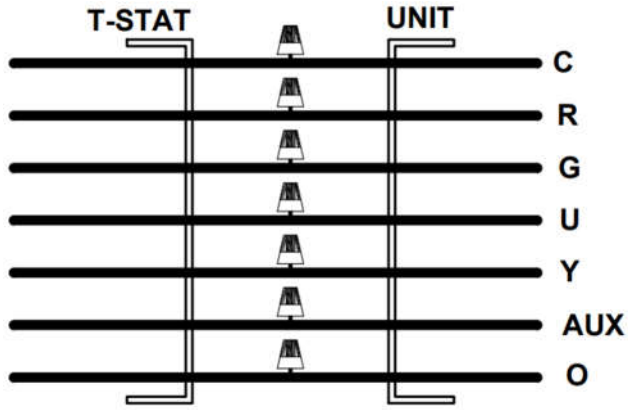


FIGURE 18 - Ventilation Thermostat Connections

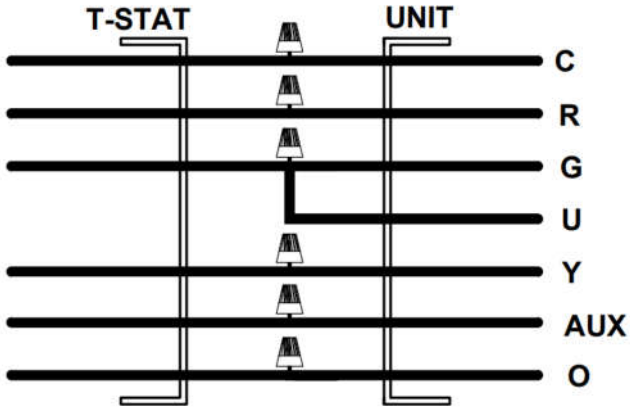


FIGURE 19 - Non-Ventilation Thermostat Connections

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. bit. Install supplied anchors and secure plate to the wall. Thermostat wire must be 18 AWC wire.

CONTROLS

ECO SEQUENCE OF OPERATIONS – COOL MODE

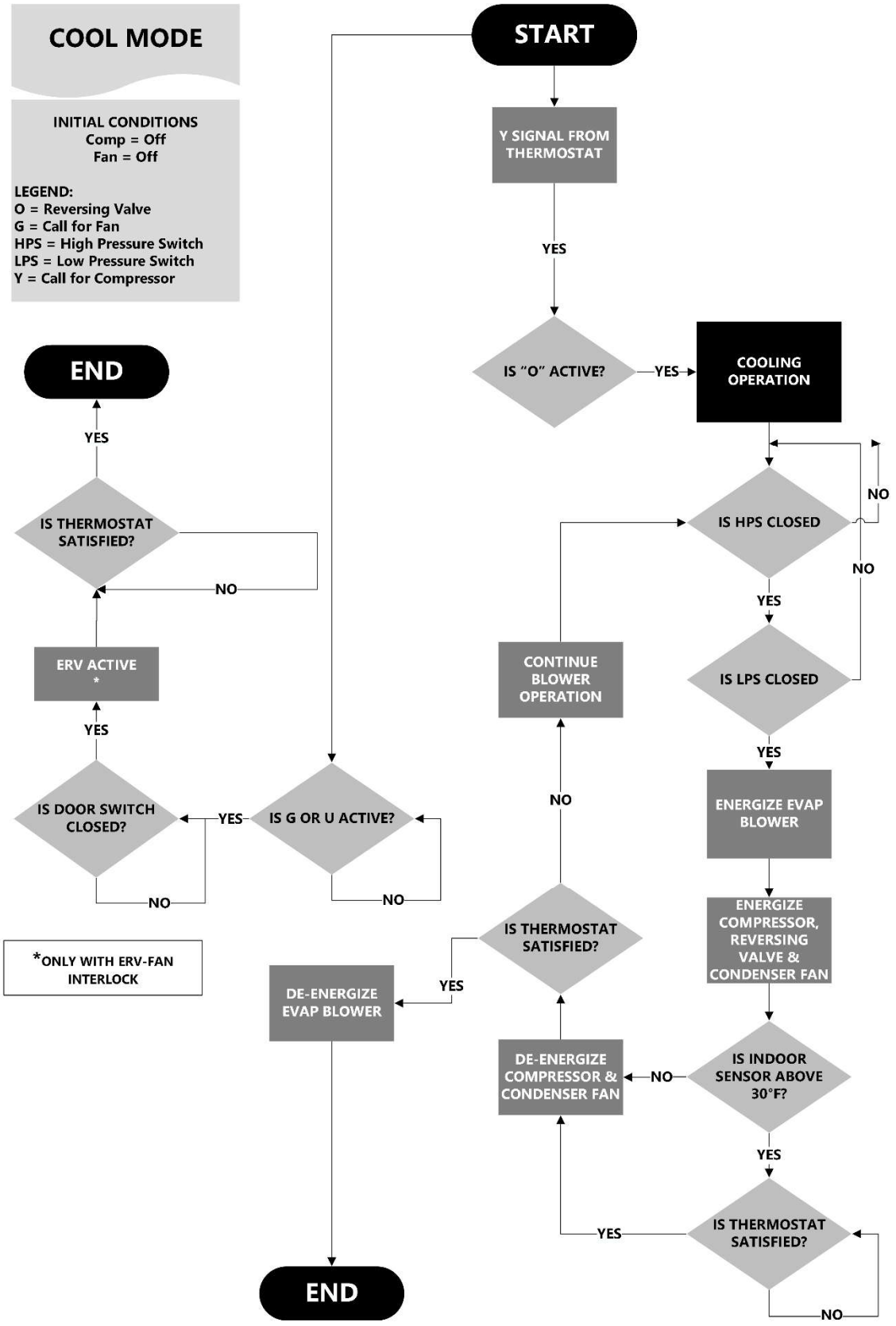


FIGURE 20 - ECO Sequence of Operations - Cool Mode

CONTROLS (continued)

ECO SEQUENCE OF OPERATIONS - HEAT MODE

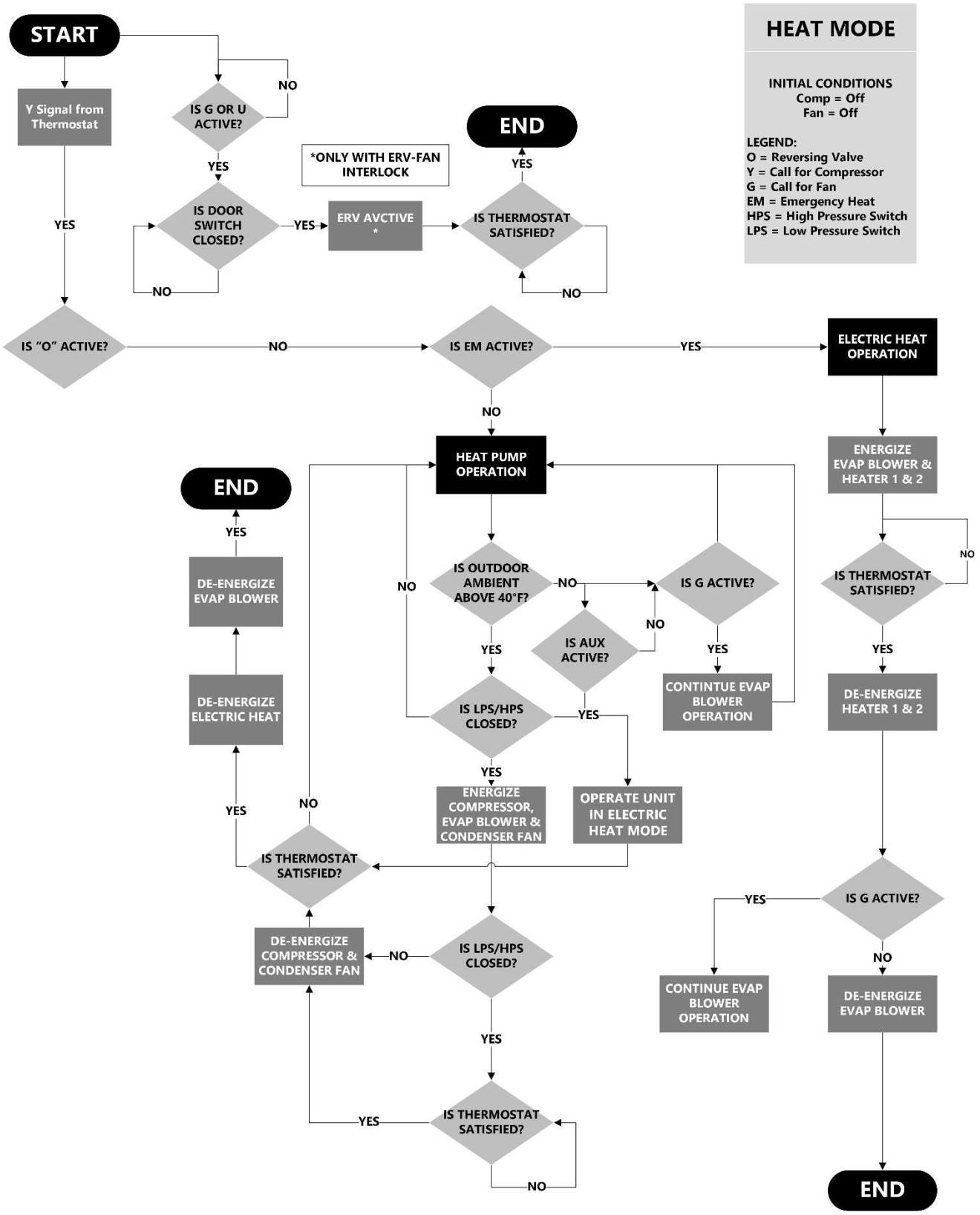


FIGURE 21 - ECO Sequence of Operations - Heat Mode

CONTROLS (continued)

ECO SERIES CONTROL MODULE

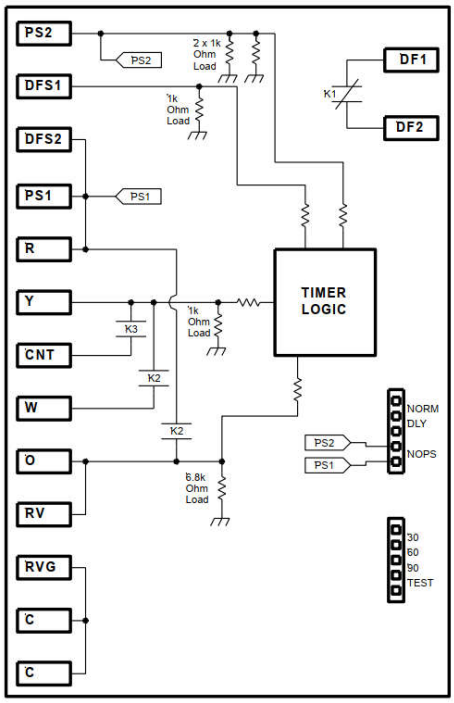


FIGURE 22 - ECO Series Control Module

POWER-UP

When power is first applied to the control, the board will enter a 5 minute random start delay before allowing normal operation of system ouputs.
The defrost timers are reset to the beginning of the interval between defrost cycles and the short cycle timer is cleared.

FIELD TEST MODE

Test mode is recognized when the .025” pin header "TEST" pins are shorted together for more than 1 second. Test mode is exited when the short is removed from the "TEST" pins. The control automatically cancels the test mode if the "TEST" pins remain shorted together for more than 5 minutes.
The test mode operates the same as normal operation except for all operations are executed at 120 times the normal speed.

REVERSING VALVE OPERATION

The reversing valve will be energized in cooling mode in the presence of an “O” call. The reversing valve will be de-energized in heating mode in absence of the “O” call.

ANTI-SHORT CYCLE DELAY

The anti-short cycle timer prevents the compressor from being re-started unless it has been off for at least 3 minutes. The restart delay timer is activated on power-up and whenever the compressor is turned off. If the thermostat calls for compressor (“Y” energized) before the timer has expired, the control keeps the compressor off until the timer expires. If the thermostat calls for compressor (”Y” energized) on after the timer has expired, the control immediately turns on the compressor.

POWER INTERRUPTIONS

If the power to the control is interrupted for less than 20 milliseconds, the control shall resume operation at the same point in the timing cycle. The control shall not change modes of operation due to a power interruption of less than 20 milliseconds. Relays may temporarily drop out during the power interruption. Power interruptions over 20 to 50 milliseconds are to reset the short cycle timer. If the compressor was energized, it de-energizes for the short cycle time period. Defrost timing is not to be affected below 100mS.

CONTROLS (continued)

COOLING OPERATION

STEADY STATE COOLING

If the control recognizes cooling mode (“Y” and “O” energized), the reversing valve energizes when the thermostat energizes the "O" terminal through the physical connection of the control, and the compressor will energize after the short cycle period. The reversing valve is immediately de-energized when "O" is deenergized (unless in defrost).

The control ignores the defrost sensor and keeps the defrost interval timers cleared while "O" is energized. The control ignores the pressure switch input for the first 3 minutes after the compressor is energized

HEATING OPERATION

FIRST STAGE HEATING

The control recognizes heating mode when a call for heat is made (“Y” input is energized). When the 3 minute short cycle time has been satisfied, the control energizes the compressor. The control ignores the pressure switch input for the first 3 minutes after the compressor is energized.

INTERVAL BETWEEN DEFROSTS

When the defrost switch is open or the thermostat is in cooling mode ("O" energized) the defrost interval timers remain reset at zero and the control is not in defrost. If the defrost switch opens or the thermostat has a call for cool mode before a defrost cycle initiates, the defrost interval timer is cleared.

When the defrost switch is closed and the thermostat "O" is de-energized, a timer on the control accumulates compressor run time. When the compressor run time reaches the selected defrost interval time (30, 60, or 90 minutes), the control places the heat pump in defrost. The “Y” input may cycle on and off during the accumulation time without resetting the accumulation timer.

If the shorting jumper that selects the defrost interval time is not present, a default of 90 minutes will be selected

DEFROST CYCLE

While in defrost, the control de-energizes the outdoor fan, energizes the reversing valve and auxiliary heat outputs. A timer on the control accumulates defrost compressor run time.

If the indoor thermostat is satisfied (“Y” de-energizes), the compressor, reversing valve, and auxiliary heat de-energize and the fan re-energizes, suspending the defrost mode until the compressor is re-energized. When the compressor is re-energized, the defrost mode is resumed at the same point, unless the defrost switch has opened, or the thermostat “O” has been energized.

The control ignores the pressure switch input for the first 3 minutes of defrost. If the control has been in defrost past the initial 3 minutes, and the pressure switch opens, the compressor, reversing valve, and auxiliary heat de-energize and the fan re-energizes. The short cycle timer resets and the defrost timer holds the value of defrost time. After the pressure switch re-closes and the short cycle period is over, the control will re-energize the compressor, reversing valve, and auxiliary heat and de-energize the fan. The control will then continue to run the defrost mode from the time left on the defrost timer.

If compressor delay ("DLY") operation is selected, when the defrost mode is initiated, the compressor is de-energized for 10 seconds starting when the reversing valve and auxiliary heat are energized.

DEFROST TERMINATION

The control terminates defrost when the defrost switch opens or the control finishes the 10 minutes of defrost time. The control immediately de-energizes the auxiliary heat, the reversing valve, and energizes the outdoor fan. The control resets the defrost interval timer. The compressor may still run depending upon the current call from the thermostat.

The control ignores the pressure switch input for the first 3 minutes after defrost is terminated.

If compressor delay ("DLY") operation is selected, when the defrost mode is terminated, the compressor is de-energized for 10 seconds starting when the reversing valve and auxiliary heat are de-energized input.

CONTROLS (continued)

CONTINUOUS FAN OPERATION

If no other thermostat inputs are present, the low-speed evaporator fan output will be energized when the “G” thermostat input is active. If either of the “Y”, “AUX” OR “E” inputs are present, the operation of the evaporator fan will be based upon those inputs, and the “G” thermostat input will be ignored. In the case of the “E” input interrupting the compressor operation, the emergency heat will continue to operate until the thermostat is no longer calling for heat.

AUXILIARY HEATING OPERATION

THERMOSTAT CALL FOR AUXILIARY HEAT

Depending on the thermostat control, the thermostat may energize both “Y” and “AUX” during low ambient heat operation to provide additional system heat. During this time both the compressor and electric heat will operate together and the system will energize the high fan speed. A heating lockout switch will prevent the electric heat stages from operating at outdoor temperatures above 40°F.

CONTROLS (continued)

ERV CONTROL MODULE (OPTIONAL)

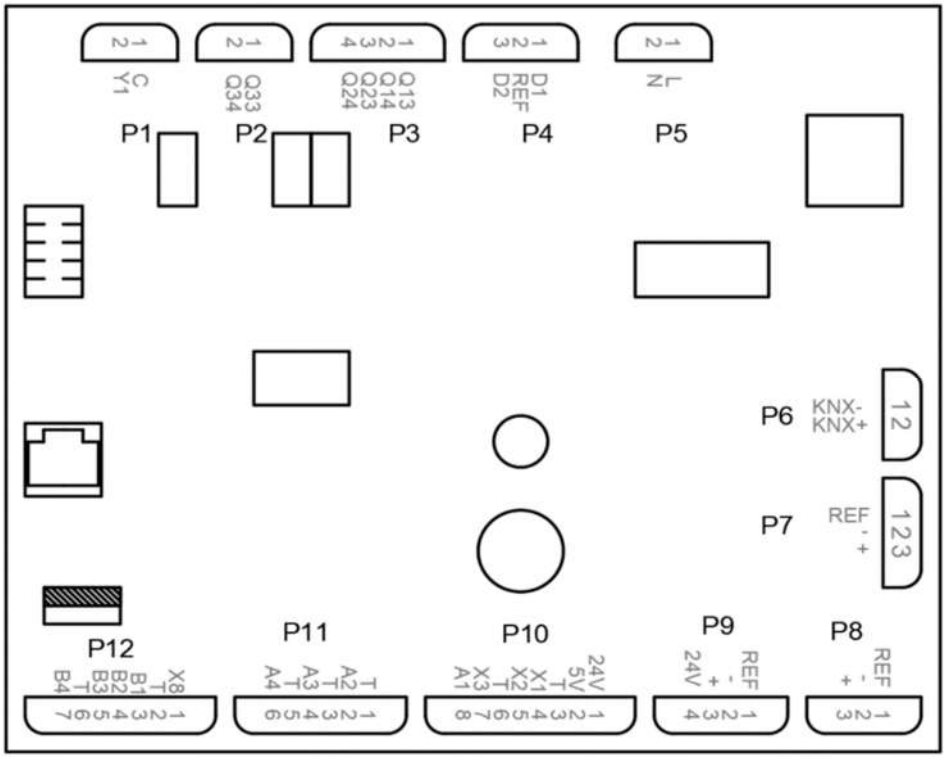


FIGURE 23 - ERV Control Module

ERV CONTROL MODULE KEY		
INTERFACE	TYPE	NOTE
B1, B2, B3, B4	Analog Input 1: Resistor NTC10k	AI
X1, X2	Analog Input 1: Measuring 0---10V 2) Tacho pulse (max. 300Hz)	AI
X3	Analog / Digital (Binary) Input 1: Measuring 0---10V 2: Potential free contact (NO or NC)	AI, BI
A1, A2, A3, A4	Analog Output 1: Signal 0---10V	AO
X8	Analog / Digital (Binary) Input 1: Resistor NTC10K 2: Potential free contact (NO or NC)	AI, BI
D1, D2	Digital (Binary) input 1: Potential free contact (NO or NC)	BI
Q1, Q2, Q3	Relay (Binary) Output 1: Potential free contact (NO)	BO
Y1	Digital (Binary) / Analog Output triac VAC 1: Signal On/Off 2: Signal PWN (constant period)	BO, AO

Table 5 - ERV Control MODULE KEY

NOTE

TO MAKE ERV CONTROL CHANGES:

CONNECT EITHER OPTIONAL WIFI KIT OR BACNET COMMUNICATION TO THE ERV.

CONTROLS (continued)

ERV DEFAULT CONFIGURATION

The controller's I/O are pre-configured for the following applications:

- Supply exhaust fan speed control
- Outside air damper control (on off)
- Contact input for rapid ventilation (Fan boost) and occupied operating mode
- Common alarm output

DEFAULT ERV CONFIGURATION				
PIN	DESCRIPTION	BACNET OBJECT	SIGNAL TYPE	NOTE
B1	Outside air temperature	TOa	NTC10k	
B2	Supply air temperature	TSu	NTC10k	
B3	Exhaust air temperature	TEh	NTC10k	
B4	Extract air temperature	TEx	NTC10k	
D1	Rapid ventilation input	RpdVntIn	Contact	NO
D2	Input room operating mode Comfort	OpModRin	Contact	NO
X1	Supply air fan speed feedback pulse	FanSuSpdFb	0---30 Hz	
X2	Exhaust air fan speed feedback pulse	FanEhSpdFb	0---30 Hz	
X3*	None	-	-	
X8*	None	-	-	
Q1*	None	-	-	
Q2	None	-	-	
Q3	Outside air damper command	DmpOaCmd	Relay	
A1	Supply air fan speed	FanSuSpd	0---10V	
A2	Exhaust air fan speed	FanEhSpd	0---10V	
A3	Mixing air damper position	MADmpPos	0---10V	
A4	Outside air damper position	OADmpPos	0---10V	
Y1	None	-	-	
*Not active from the factory will require field configuration				

Table 6 - Default ERV Configuration

ERV Modes of Operation				
OPERATING MODE	CATEGORY	OPERATING VIA	DURATION	ACTIVATION SIGNAL
Protection	Off mode	APP, DI	Permanent	
Unoccupied	Normal or away mode	APP, POS8, DI	Permanent or TSP	
Economy	Normal mode	APP, POS8, DI	Permanent or TSP	
Comfort	Normal or Home mode	APP, POS8, DI	Permanent or TSP	
Fan boost (Rapid ventilation)	Temporary mode	APP, POS8, DI	Temporary	Continuous or pulse signal (Duration can be parameterized)

Table 7 - ERV Modes of Operation

CONTROLS (continued)

ERV DEFAULT CONFIGURATION

OPERATING MODE CATEGORIES

The following selectable operating modes belong to operating mode categories.

NORMAL MODES

The normal modes Unoccupied, Economy, and Comfort are the main operating modes that can be applied for a constant and, if desired, infinite time. For each one, certain settings are defined, which sensibly apply to the corresponding state of the system.

- Unoccupied - the building is unoccupied and the system is operated with the most essential settings needed.
- Economy - The building is occupied, but the system is operated with economical, energy efficient settings
- Comfort - The building is occupied and the system is operated according to the needs of the user.

TEMPORARY MODES

The modes Fan Boost, is a temporary mode that can only be activated for a certain, settable time. The temporary mode is activated either via POS8.44X0 or configured digital input as an impulse button or, when pressed longer, as an “egg timer”.

Once activated, they override all normal operating mode and for the set time, the dedicated settings for the temporary mode apply, which mostly concerns the fan speed.

SIGNAL FOR FAN BOOST

If the duration of the signal is <5 seconds:

- The Signal is interpreted as an impulse: The temporary mode is started and only stopped when the timer has expired.

If the duration of the signal is >5 seconds:

- The signal is interpreted as an “egg timer”: Temporary modes is started when the signal is activated and stopped when the signal is inactive.

OFF MODE

The operating mode Protection switches the system into a form of “Off” mode in which the fans no longer run. However, the system is not switched off completely, individual pumps can continue to operate and the frost protection strategy continues to run for as long as has been set. The Protection mode can only be set in the configuration and cannot be set by the end user themselves (neither via app nor POS8.44x0).

OPERATING MODE SETTING

The settings for the operating modes define the specific settings for the supply and exhaust fans for all operating modes and for the speed and flow control strategies. These settings are configured by the installer. The end user has no option to change the values for the operating modes.

For Comfort, Economy, and Unoccupied modes, dedicated settings for temperature can be defined. The temporary operating modes Fan Boost, In-room-sensor, have no dedicated temperature settings. For these modes, the settings of Comfort mode apply.

FAN SPEED CONTROL

Supply fan and exhaust fan set points have defined setting for each operating mode level. Individual percentage value is used between 0---100%. These settings only define the fan speed used in various operating modes and they have no effect on other functions like de-icing.

During active temperature control, values set here are used as maximum speed (80%). Depending on deviations to set point, temperature control can freely increase/decrease the speed of both fans simultaneously with symmetrical control signal which then keeps the set supply/exhaust ratio in every situation.

FAN BOOST

The Fan Boost mode can be activated as a temporary mode to temporarily increase ventilation, e.g., after a bath or in a sauna. In this case, Fan boost is activated directly and kept active until the set time has elapsed. The Fan boost mode uses the fan speeds defined for the Comfort operating mode.

PASSIVE HEAT EXCHANGER, UNCONTROLLED (PLTHEXG22Y)

The purpose of energy recovery is to absorb heat/cold from the exhaust air and transfer it back to the supply air side. The control of the energy recovery is not possible, the ERC always works with maximum capacity. With this solution, the outside air cannot be used for heating or cooling even if the outside air is closer to the set point than the exhaust air (e.g., in rooms with a high internal load or when heating up after cold nights.)

CONTROLS (continued)

C DE-ICING (PASSIVE, UNCONTROLLED)

Passive Energy Recovery units are basically just heat exchangers. They receive warm and humid air on one side and cold on the other which will eventually cumulate ice on the surfaces when the conditions are suitable for that. Passive element usually starts to accumulate ice close to 32° F [0° C].

ERV DEFAULT CONFIGURATION

DETECTING ICE ON THE HEAT EXCHANGER OR IN THE DUCT WORK

Detecting ice on the heat exchanger or in the ductwork is possible.

- With exhaust air temperature sensor TE_h. This is not a real indication, but an expectation that ice is expected to build up.
    - Deicing with TE_h sensor starts with TE_h is below the limit.
    - The end of the de-icing phase cannot be detected and is estimated via timer.
- With outside air sensor TO_a. This is used when no exhaust air sensors are available. It is also only an expectation that ice has built up.
    - De-icing with TO_a sensor starts when the TO_a is below the limit.
    - The end of the de-icing phase cannot be detected as is estimated via timer.

DE-ICING THE HEAT EXCHANGER

De-icing is possible by:

- Reducing the supply fan speed, so that the load of cold air incoming is reduced, increasing the exhaust air temperature.
- Preheating the outside air, increasing the exhaust air temperature.

DE-ICING MODES

The de-icing mode can be configured as:

- No De-icing
- Reduce fan speed
- Increase preheating
- Reduce fan speed and increase preheating

Deicing with fan speed is running in parallel or with 2-stage, see below.

TIME BASED DE-ICING STARTED BY TEh OR TOa

The sensor is not suitable for detecting the end of the de-icing phase. Therefore, a fixed de-icing time is used. After de-icing is finished, an off time is started until the next de-icing phase can be started again. The duration of the off time depends on the measured temperature at the start of the de-icing phase. De-icing time, maximum off time with assigned temperature and minimum off time with assigned temperature can be configured.

DE-ICING WITH REDUCED FAN SPEED STARTED BY TEh OR TOa

The temperatures have 2 adjustable limits. The limit SpTDeicFan (stage 2) starts de-icing with the fan speed. During deicing, fan speed for supply fan and exhaust fan are reduced to configurable values. For faster de-icing, it is possible to set supply fan speed set point even to 0%. In this case electric heaters in the supply air are blocked.

ERC SUPERVISION (PASSIVE, UNCONTROLLED)

A mechanical failure on the ERV (heat exchanger dirty etc.) can be detected via the efficiency of the heat exchanger. Therefore, the temperature difference between extract air / room air and exhaust air is used. When the difference drops below set value and stays below during set delay time, alarm is generated. Detection function is active only when temperature difference between outside air and extract air is more than set limit. When extract air temperature and exhaust air temperature are not available, the supervision of the ERV is not possible.

PRIORITY LIST

Different functions require priorities over the other functions so that logical/critical operation can be guaranteed.

- Safety functions (field configured)
    - Off by smoke detector, emergency, supply air temperature or extract air temperature
    - Off by fire damper closed
    - Purge or smoke extract by smoke detector
- Protection functions
    - A-Alarms for plant protection
    - ERC de-icing function
- Switch or push-button operations
    - Rapid ventilation mode (Configured B1, POS8)
    - Comfort mode (Conf. B1), Fireplace (Conf. B1), Off mode (Conf. B1), Eco mode (Conf. B1)
    - Maintenance function
- User operation
    - Present / Away button
    - Manual operation
- Automatic Function
    - Scheduler operation mode

CONTROLS (continued)

ERV DEFAULT CONFIGURATION

OUTSIDE AIR DAMPERS (DMPSHOFFOA11Y)

When ventilation is active the outside air dampers are always open. Damper(s) are controlled open/close from one binary output. Delay time for outside air damper opening can be defined to secure that damper is fully open before fans are started.

STARTUP / SHUT-DOWN SEQUENCE

For safe and optimum operation of the ventilation unit, special switch-on and switch-off sequences are used to switch the ventilation off and on again. The ventilation unit is normally not "switched off", but can be switched off for maintenance work or in emergency situations. This can be done by opening the ERV maintenance panel releasing the door switch signal or by powering down whole FRESH-PAK system. The start –up sequence is used every time except in emergency situations. The start-up sequence applies also for fire damper test function which is performed automatically.

STARTUP SEQUENCES

1. Start is initiated.
2. Only after power return. Delay time step 2 (to secure startup time for valves, fire dampers and ERC)
3. If available open the outside air dampers. Delay time step 3 (to secure dampers fully open). If damper output cannot be switched, an A-Alarm is activated, the startup process is stopped.
4. ERC ramps up to maximum speed. Heat exchangers bypass closes. Exhaust fan starts and ramps up to comfort mode speed. If exhaust fan speed is monitored, and the feedback signals is not received within the delay time, an A-Alarm is activated, the starting process is stopped. Delay time step 5 (to secure "heating up" of heat exchanger)
5. Supply fan starts and ramps up to "unoccupied" mode speed Delay time step 6. If supply fan speed is monitored, and the feedback signal is not received within the delay time, and A-Alarm is activated, the starting process is stopped.
6. Both fans ramp to required operating mode speed. Delay time step 6 preparing for normal operation.
7. Normal operating mode is started.

SHUTDOWN SEQUENCES

Executed after normal operation or if startup is interrupted after step 4 is finished. Shutdown sequence is not used in emergency situations.

1. Shutdown is initiated.
2. Both fans ramp down to stop.
3. Close the outside air dampers, same time as in start-up step 5.
4. Plant is "Off".

NOTE

The ERV portion of the FRESH-PAK can be switched off using the BACnet. The stop sequence is executed by activating the input PrtOpModRln or the BACnet object PitShD. These functions override all other influences except the emergency control and protection control.

ERV ALARM FUNCTIONS

GENERAL

The application uses 2 different alarm classes:

An **A-Alarm** indicated as important and urgent situation. IF an A-Alarm is triggered, the unit shuts down. An **A-Alarm** must be acknowledged and can only be reset after cause of alarm is eliminated.

A **B-Alarm** indicates a less urgent maintenance incident and during active B-Alarm, the unit runs either normally or is still in acceptable conditions to run (without major problems).

The installer can configure alarm for certain errors and can chose between A-Alarm, B-Alarm or no alarm. Alarms must be acknowledged and as soon as the cause for each alarm is eliminated, normal operation is resumed. If one or more reasons still exist, acknowledgement does not rest that specific alarm and operation might not continue normally. All alarms are shown with a time stamp and entry to nonvolatile storage for each "change of state". Five different alarm state are used in the application and they are valid for both A and B-alarms. These different states are meant to give additional information for different users and different situations. Relay operation is depending on actual configuration.

NOTE

See Troubleshooting section for additional alarm details.

For more information on ERV Alarm Function please see the **TROUBLESHOOTING** Section.

CONTROLS (continued)

BLOWER SPEED CONTROL

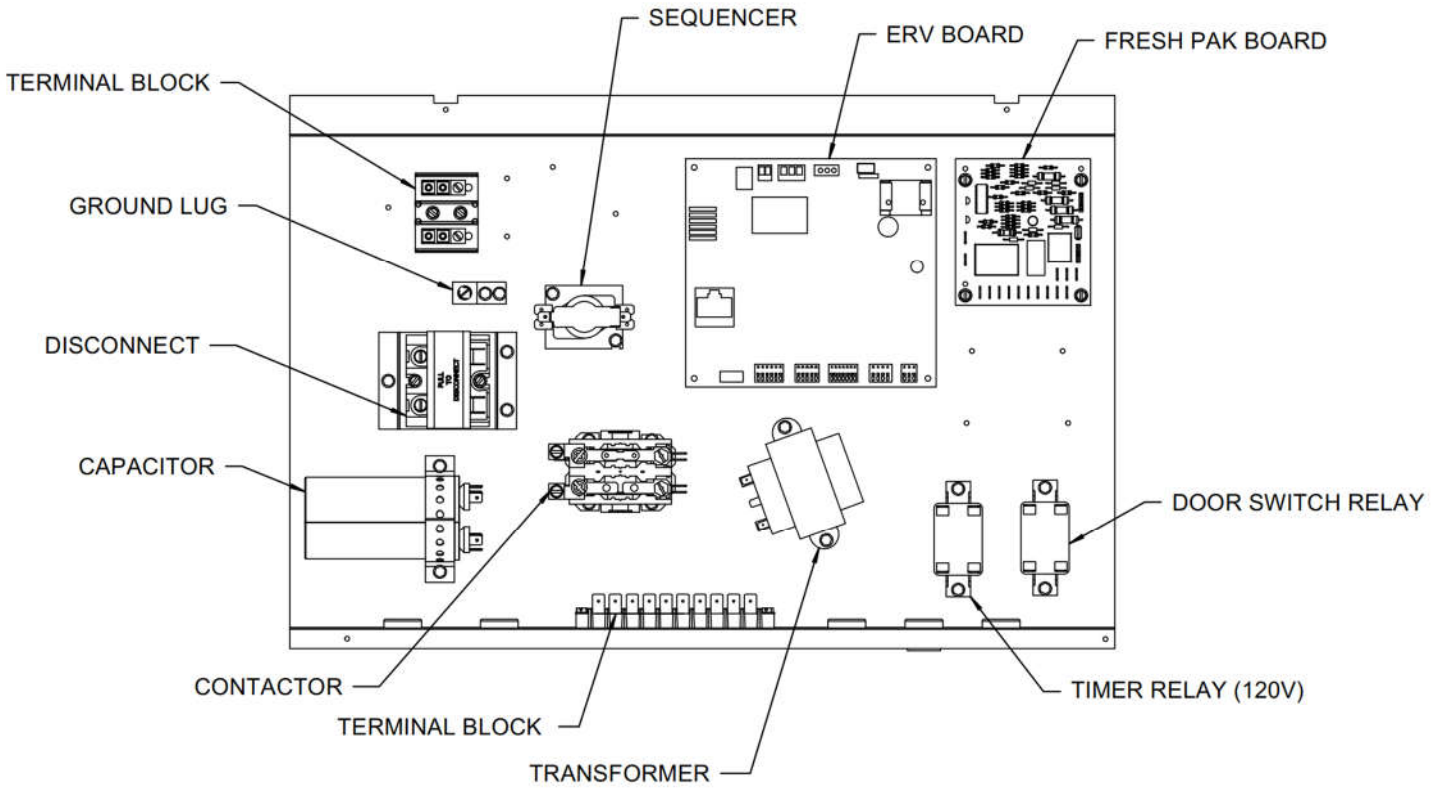


FIGURE 24 - Control Box Detail

FRESH-PAK units are equipped with a direct drive ECM blower motor. See the **BLOWER DATA** section for airflow at different external static pressure. Select the motor speed according to the airflow and external static pressure. See wiring diagram located on unit.

For FRESH-PAK models, the default motor tap selections can be changed by directly changing the speed tap at the motor terminal.

WARNING

ELECTRIC SHOCK HAZARD

High efficiency brushless DC motors are wired with power applied at all times, see illustration above.
Low voltage thermostat demand and board algorithms will control its use.

BLOWER DATA

EPE BLOWER DATA-18K											
MODEL NUMBER	Motor Speed Tap	CFM vs EXTERNAL STATIC PRESSURE (IWC)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
EPE18 5KW	T1 (G)	385	343	311	282	254	224	-	-	-	-
	T2 (Y1)	706	664	631	602	574	544	512	481	453	434
	T3 (Y2 HS)	788	746	714	685	657	627	595	564	536	517
	T4 (AUX)	768	726	694	665	637	607	575	543	516	497
	T5 (AUX HS)	882	840	808	779	751	721	689	658	630	611
EPE18 7KW	T1 (G)	385	343	311	282	254	224	-	-	-	-
	T2 (Y1)	706	664	631	602	574	544	512	481	453	434
	T3 (Y2 HS)	788	746	714	685	657	627	595	564	536	517
	T4 (AUX)	909	867	834	805	777	747	715	684	656	637
	T5 (AUX HS)	1020	978	945	916	888	858	826	795	767	748
EPE18 10KW	T1 (G)	507	478	447	416	387	361	336	314	292	268
	T2 (Y1)	698	669	638	608	579	552	528	505	483	459
	T3 (Y2 HS)	1014	985	954	923	894	868	843	821	799	775
	T4 (AUX)	11093	1064	1033	1002	973	946	922	900	877	854
	T5 (AUX HS)	1208	1179	1148	1117	1088	1061	1037	1015	992	969

Table 8 - EPE BLOWER DATA-18K

*HS Denotes High Static Appliations

EPE BLOWER DATA-24K											
MODEL NUMBER	Motor Speed Tap	CFM vs EXTERNAL STATIC PRESSURE (IWC)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
EPE24 5KW	T1 (G)	385	343	311	282	254	224	-	-	-	-
	T2 (Y1)	882	840	808	779	751	721	689	658	630	611
	T3 (Y2 HS)	982	940	907	879	850	820	789	757	729	711
	T4 (AUX)	882	840	808	779	751	721	689	658	630	611
	T5 (AUX HS)	1005	963	930	902	873	843	811	780	752	733
EPE24 7KW	T1 (G)	385	343	311	282	254	224	-	-	-	-
	T2 (Y1)	882	840	808	779	751	721	689	658	630	611
	T3 (Y2 HS)	982	940	907	879	850	820	789	757	729	711
	T4 (AUX)	1012	970	938	909	881	851	819	787	760	741
	T5 (Defrost)	1143	1100	1068	1039	1011	981	949	918	890	871
EPE24 10KW	T1 (G)	507	478	447	416	387	361	336	314	292	268
	T2 (Y1)	868	838	807	777	748	721	697	674	652	628
	T3 (Y2 HS)	1037	1008	977	946	917	891	866	844	822	798
	T4 (AUX)	1227	1198	1167	1136	1108	1081	1057	1034	1012	988
	T5 (AUX HS)	1315	1286	1255	1224	1195	1168	1144	1122	1099	1076

Table 9 - EPE BLOWER DATA-24K

*HS Denotes High Static Appliations

EPE BLOWER DATA-30K											
MODEL NUMBER	Motor Speed Tap	CFM vs EXTERNAL STATIC PRESSURE (IWC)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
EPE30 5KW	T1 (G)	510	468	435	407	378	348	317	285	257	238
	T2 (Y1)	1041	999	967	938	910	880	848	816	789	770
	T3 (Y2 HS)	1143	1100	1068	1039	1011	981	949	918	890	871
	T4 (AUX)	942	900	868	839	810	780	749	717	689	671
	T5 (AUX HS)	1062	1020	988	959	931	901	869	838	810	791
EPE30 7KW	T1 (G)	510	468	435	407	378	348	317	285	257	238
	T2 (Y1)	1041	999	967	938	910	880	848	816	789	770
	T3 (Y2 HS)	1143	1100	1068	1039	1011	981	949	918	890	871
	T4 (AUX)	1076	1034	1002	973	944	914	883	851	823	805
	T5 (AUX HS)	1143	1100	1068	1039	1011	981	949	918	890	871
EPE30 10KW	T1 (G)	507	478	447	416	387	361	336	314	292	268
	T2 (Y1)	1037	1008	977	946	917	891	866	844	822	798
	T3 (Y2 HS)	1125	1096	1065	1035	1006	979	955	932	910	886
	T4 (AUX)	1273	1244	1213	1183	1154	1127	1103	1080	1058	1034
	T5 (AUX HS)	1397	1367	1336	1306	1277	1250	1226	1203	1181	1157

Table 10 - EPE BLOWER DATA-30K

*HS Denotes High Static Appliations

FIELD ERV ACCESSORIES

FIELD ERV ACCESSORIES CONNECTIONS

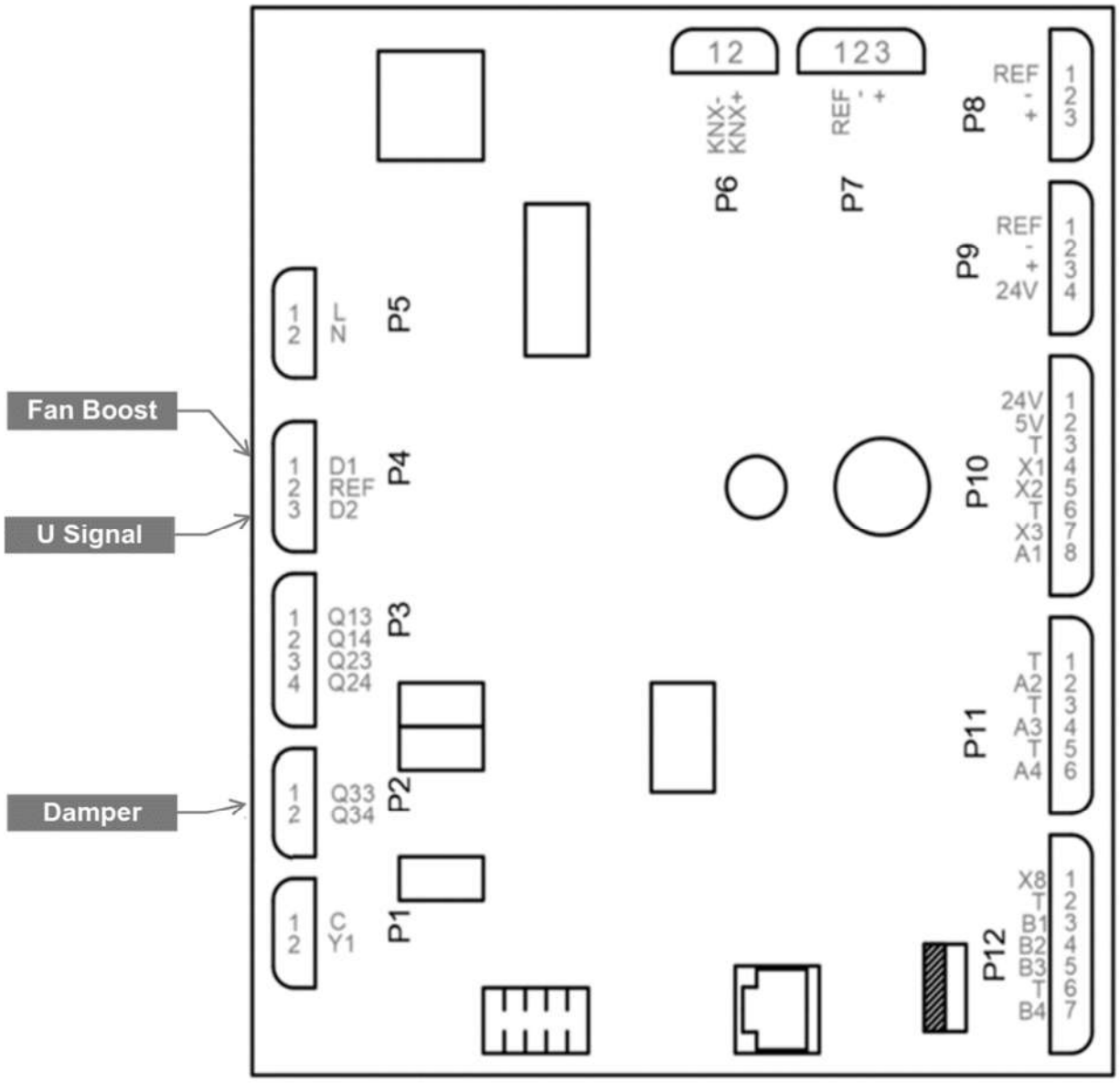


FIGURE 25 - Field ERV Accessories Connections

FIELD ERV ACCESSORIES

INSTALLATION

IMPORTANT

Installation must be Manufacturer Approved.

OUTSIDE AIR DAMPER

The FRESH-PAK ERV control allows for the addition of a motorized outside air damper. This is to help prevent any back draft air from entering the space while the ERV is not operating.

NOTE

Damper must be 24V and normally closed.

1. Power down FRESH-PAK unit.
2. Attach 24V lead to Q34 (See **FIGURE 26 - Outside Air Damper Connection**) on the ERV control board.
3. Connect the Com lead of the damper to a chassis ground of the FRESH-PAK unit.
4. Power on the FRESH-PAK unit.
5. Once the ERV restarts (about 1-2 minute delay), verify that the damper opens.

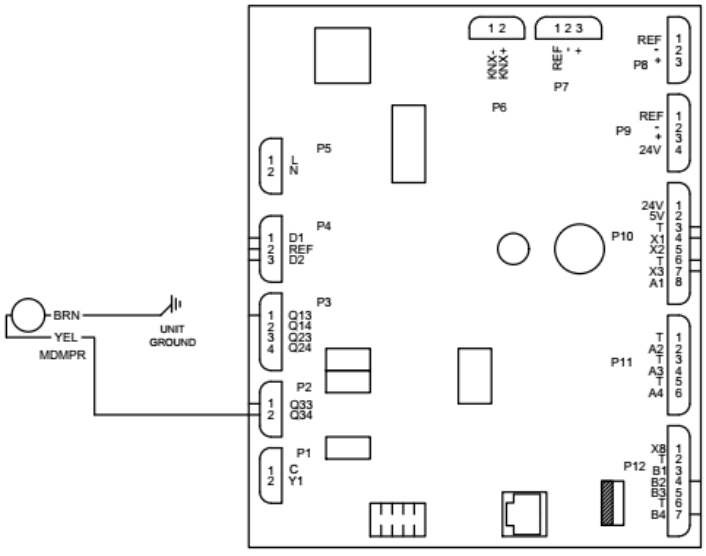


FIGURE 26 - Outside Air Damper Connection

BOOST TIMER

The FRESH-PAK ERV controller has the flexibility to work with many different wall mounted boost timers (egg timer). For typical analog (rotary style) timers follow Version 1 installation method. For digital (120V wall style) follow Version 2 installation.

VERSION 1 (ANALOG)

1. Power down FRESH-PAK unit.
2. Find the 120V relay in the FRESH-PAK control box. Refer to the applicable wiring diagram Remove the 24V leads from the relay.
3. Connect the transformer side 24V lead to the LINE side of you timer switch.
4. Connect the LOAD side of the timer switch to the D1 terminal wire [See **FIGURE 27 - Version 1 (Egg Timer/Analog Connection)**].
5. Reenergize the FRESH-PAK unit.
6. Once the ERV restarts (about 1-2 minutes) activate the timer and confirm the ERV fans go to high speed “Comfort Mode”.

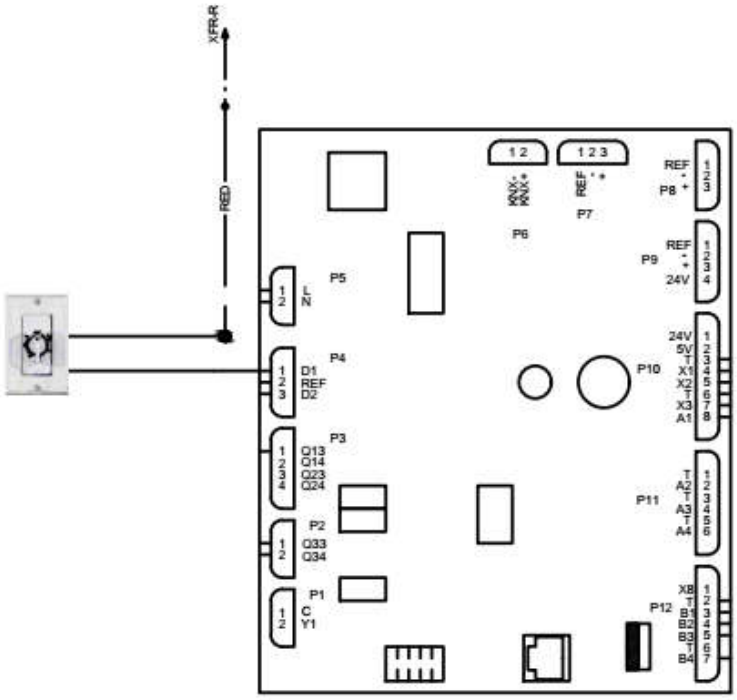


FIGURE 27 - Version 1 (Egg Timer/Analog Connection)

FIELD ERV ACCESSORIES (continued)

VERSION 2 (DIGITAL)

1. Power down FRESH-PAK unit.
2. Refer to the Installation instructions provided with the 120V digital timer switch. The switch will require its own 120v power source.
3. Find the 120V relay in the FRESH-PAK control box. Refer to the applicable wiring diagram.
4. Connect the R connection of the timer switch to the 120V pole on the relay.
5. Connect the NEUTRAL side of the timer switch to the remaining pole on the 120V relay (
6. FIGURE 28 - Version 2 (120V Digital Timer *Connection)*).
7. Reenergize the FRESH-PAK unit.
8. Once the ERV restarts (about 1-2 minutes) activate the timer and confirm the ERV fans go

CO2/Humidity Sensor

1. Power down FRESH-PAK unit.
2. Refer to the Installation instructions provided with the 24V Sensor.
3. For sensors with 0-10V PWM fan control use connection A shown in **Figure 29 – Humidity/CO2 Sensor.** For 24V relay activation of fans use the B connections. Insert sensor wires into specified terminals. **DO NOT REMOVE ANY EXISTING WIRES FROM ERV CONTROLLER**
4. Connect the 24V power for the sensor to the R terminal and the 24V Common to the C terminal of the thermostat
5. Reenergize the FRESH-PAK unit.
6. Once the ERV restarts (about 1-2 minutes) Test the sensor to ensure fan operation.

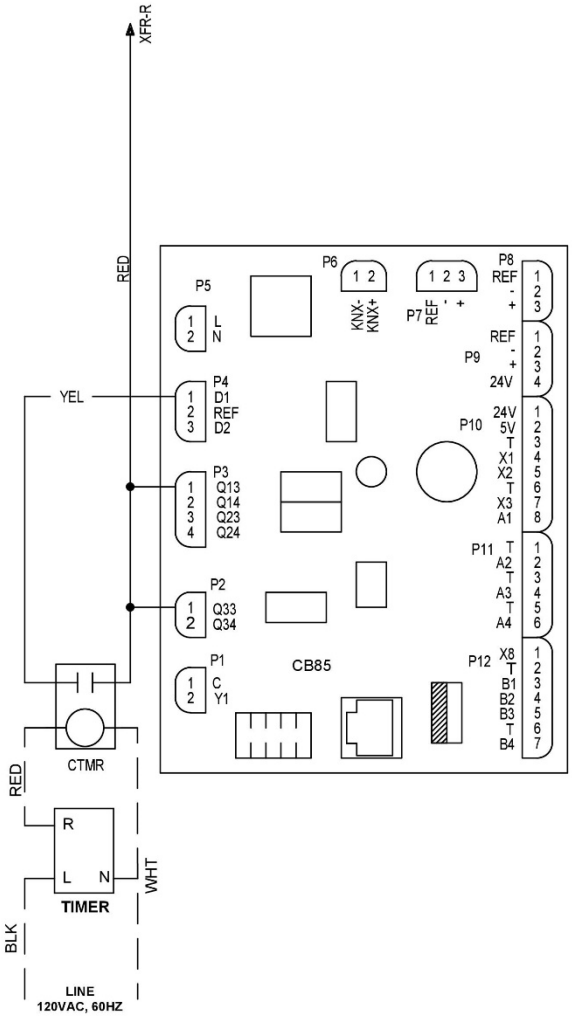


FIGURE 28 - Version 2 (120V Digital Timer Connection)

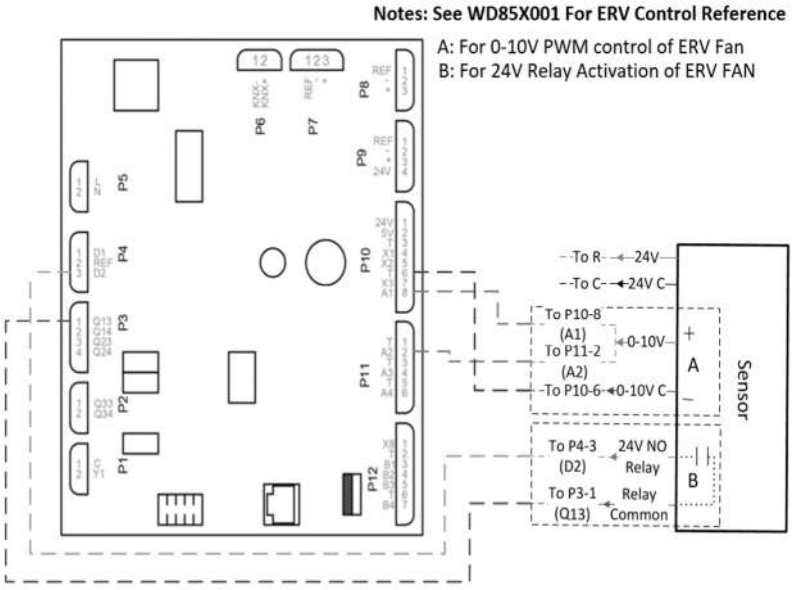


Figure 29 – Humidity/CO2 Sensor

LOCATION OF MAJOR COMPONENTS

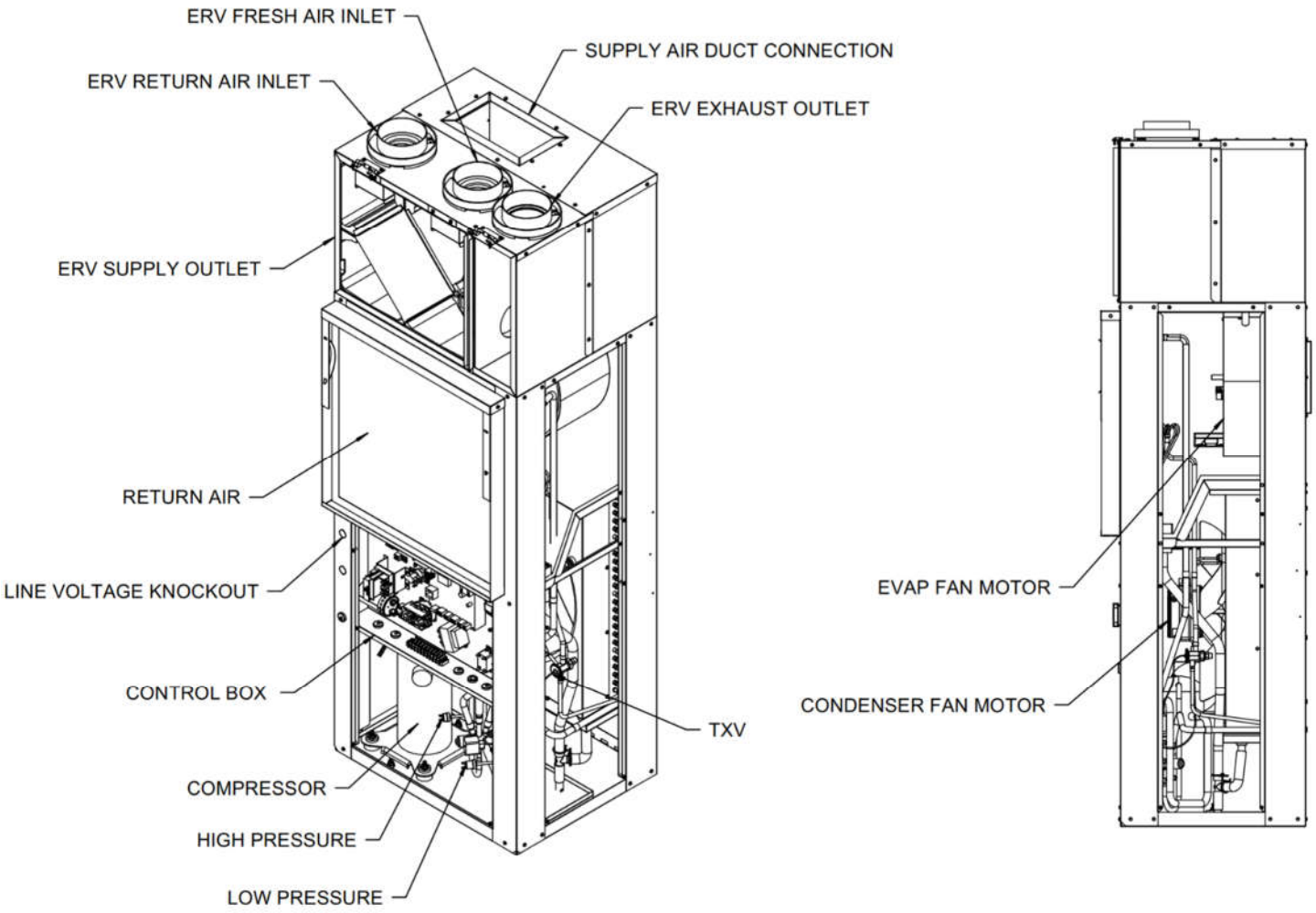


FIGURE 30 - Location of Major Components

WIRING DIAGRAMS

WD85X001 ERV WIRING DIAGRAM

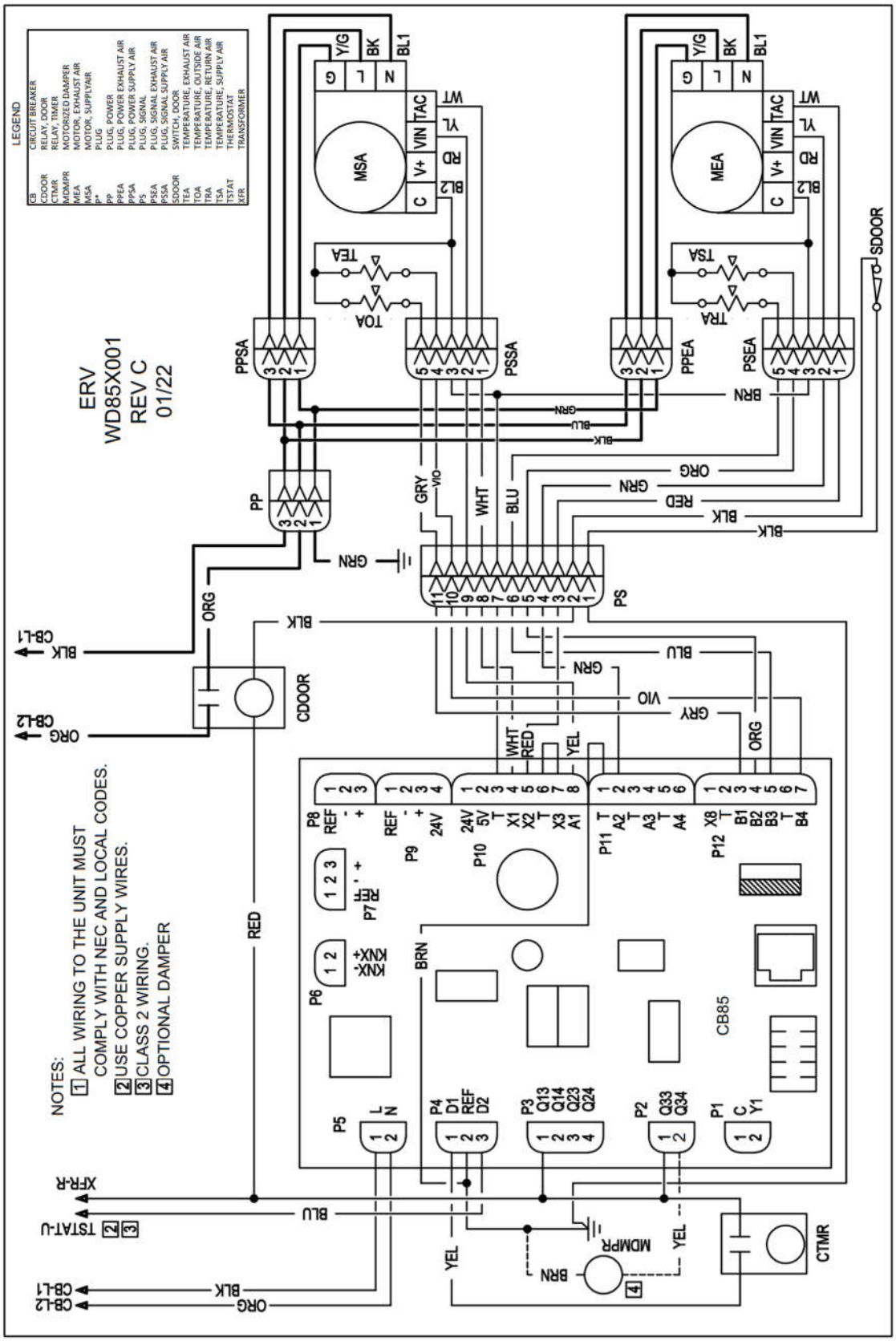


FIGURE 31 – WD85X001 ERV Wire Diagram

WIRING DIAGRAMS (continued)

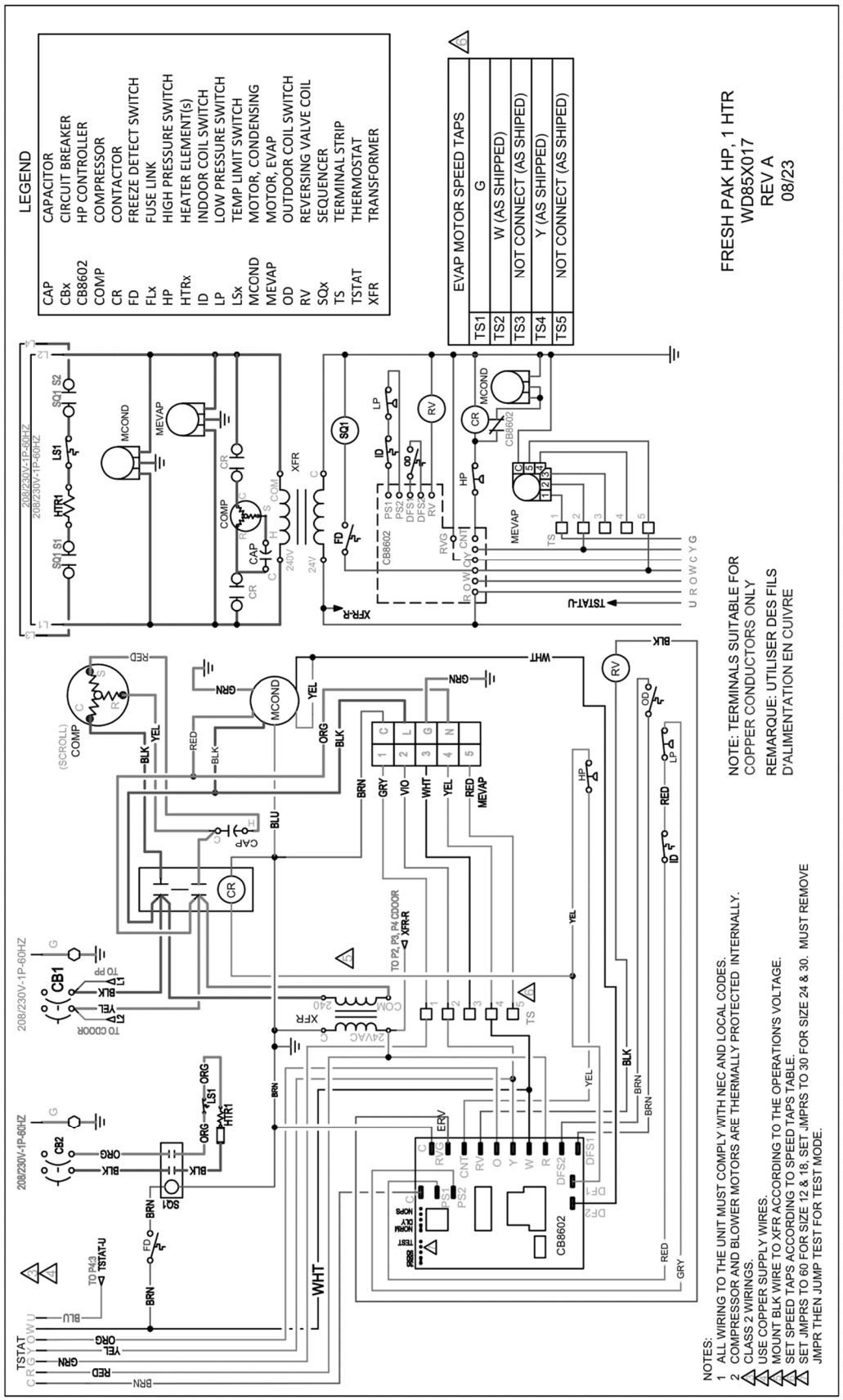


FIGURE 31 - WD85X017 Wiring Diagram (5KW EPE)

WIRING DIAGRAMS (continued)

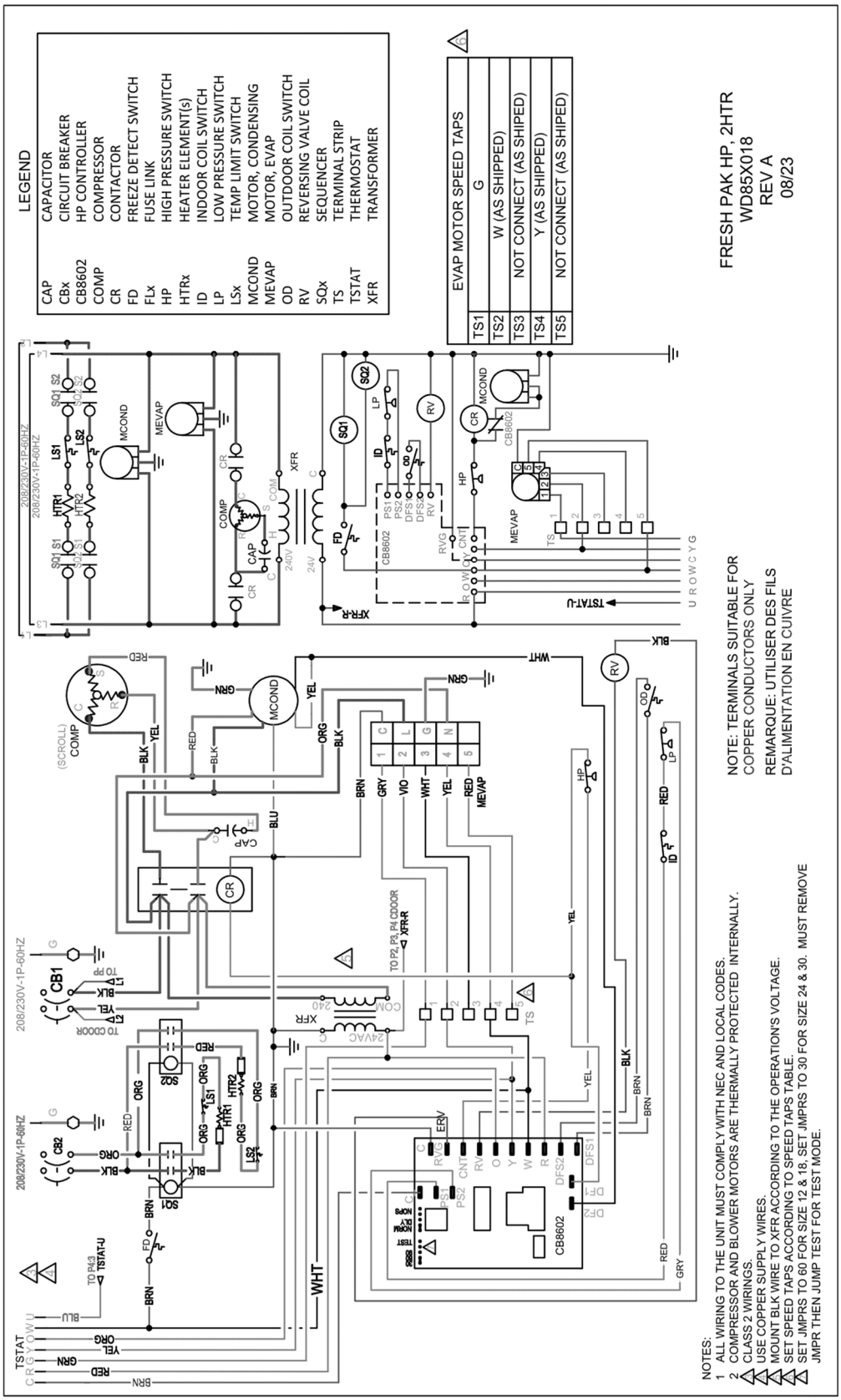


FIGURE 32 - WD85X018 Wiring Diagram (7KW-10KW EPE)

CIRCUIT SCHEMATIC

HEAT PUMP

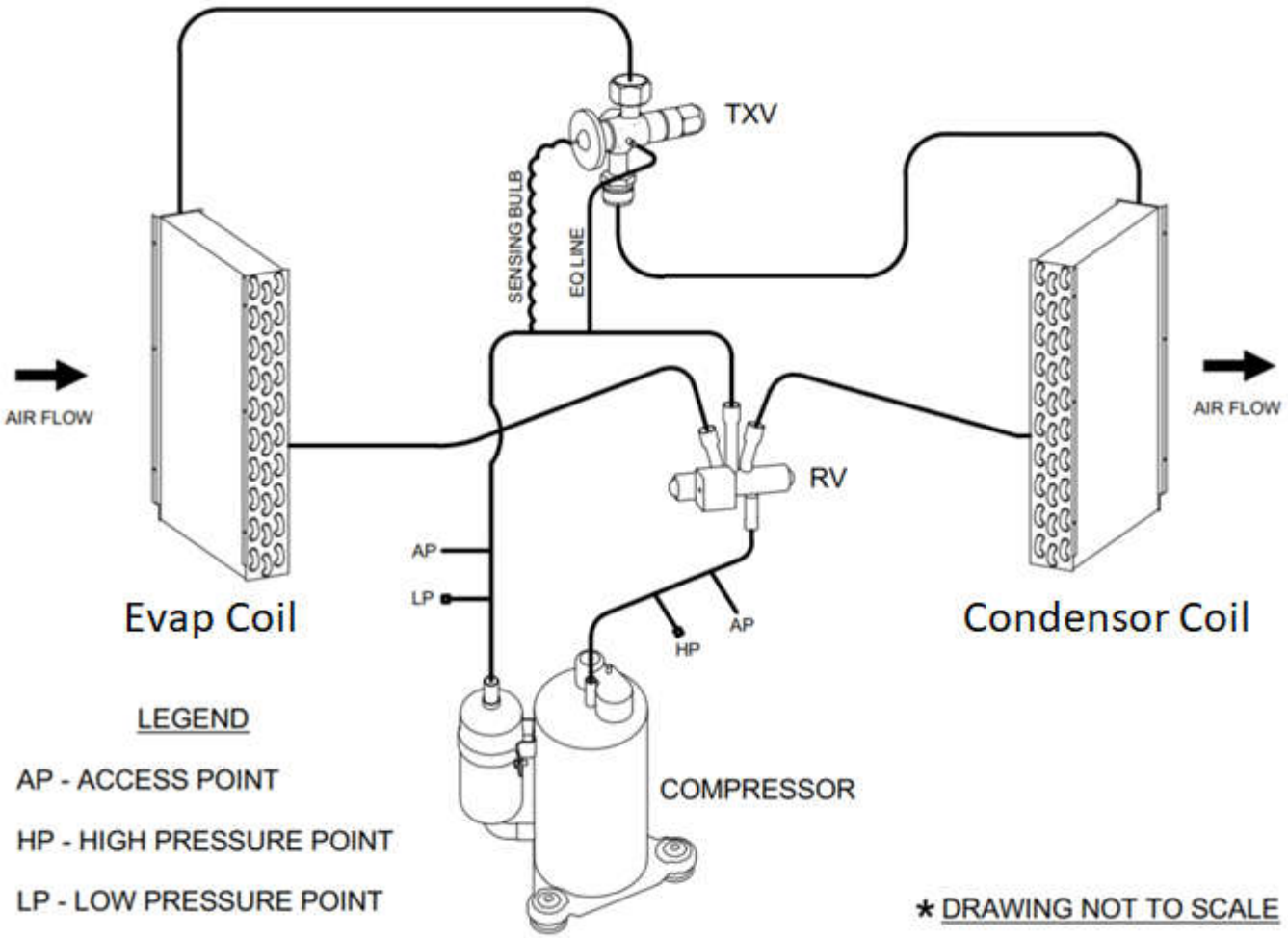


FIGURE 33 - Circuit Schematic (Heat Pump)

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.

WARNING

Electrically ground the unit by connecting ground wire to ground lug. Failure to properly ground the unit may result in personal injury or death.

CAUTION

Wire any field installed device such as a fan switch or thermostat furnished by the factory in strict accordance with the wiring diagram supplied with the unit. Failure to properly wire the unit could result in damage to components and will void all warranties.

PRIOR TO THE STARTUP OF THE UNIT

1. Ensure supply voltage matches nameplate data.
2. Ensure the unit is properly grounded
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. Ensure that all air has been vented from the water coil.
10. Verify that all electrical connections are tight and secure.
11. Check the electrical overcurrent protection and wiring for the correct size.
12. Verify that the low voltage wiring between the thermostat and the unit matches the wiring diagram.
13. Check condensate overflow sensor for proper operation and adjust position if required.

FRESH PAK HEAT PUMP UNITS

1. Set thermostat system switch to “OFF” position and fan switch to “Auto” position. Apply power to the FRESH-PAK Unit.
2. Set fan switch to “On”, indoor blower should operate.
3. Return fan switch to “Auto”, indoor blower should de-energize.
4. Set system switch to “Cool” and lower the thermostat set point to coldest setting. The compressor should energize as well as the outdoor fan and indoor blower.
5. Return thermostat set-point to a temperature warmer than room temperature and the compressor, indoor and outdoor fan should de-energize.

NOTE

The FRESH-PAK employs a compressor short cycle delay (approx. 5 minutes) which will not allow the compressor to immediately restart following shut down. Additional delays may be experienced if using an electronic digital thermostat.

6. Move system switch to “Heat: and raise thermostat to a set point slightly higher than room temperature (less than 2 degrees). The compressor, outdoor fan and indoor blower should energize.
7. Raise set point to more than 2 degrees and the electric heaters should also energize.

NOTE

The Freshpak Low Ambient heat pumps DO NOT have a low ambient cut-off switch.

WARNING

FRESH-PAK Heat Pump units operate with the reversing valve energized in the COOLING mode. The thermostat must be wired or configured accordingly or the unit will not operate properly.

STARTUP & PERFORMANCE CHECKLIST INSTRUCTIONS:

The warranty may be void unless it is completed and returned to the warrantor. If the unit is not installed properly the warranty will be void as the manufacturer will not be held accountable for problems that stem from improper installation.

TROUBLESHOOTING

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.
	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 (reversing valve energized). Set unit to "HEAT" and the highest temperature setting, the unit should run in the heating mode. If neither the blower nor compressor run in all three cases, the thermostat could be mis-wired or faulty. To determine mis-wired or faulty thermostat verify 24 volts is available on the condenser section low voltage terminal strip between "R" and "C", "Y" and "C", and "B" and "C". If blower does not operate, verify 24 colts between terminals "G" and "C" in the air handler. Replace the thermostat if defective.
BLOWER OPERATES BUT COMPRESSOR DOES NOT RUN	Thermostat	Check setting, calibration and wiring.
	Wiring	Check for loose or broken wires at compressor, capacitor or contractor.
	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 burnout, install new filter dryer.
	Compressor windings open	After compressor has cooled, check continuity of compressor windings. If the windings are open, replace the compressor.
UNIT OFF ON HIGH PRESSURE CONTROL	Discharge pressure too high	In "COOLING" mode: Lack of or inadequate air flow. Entering air temperature too warm. Blower inoperative, clogged filter or restriction in ductwork. In "HEATING" mode: Lack of or inadequate airflow. Entering air temperature too cold. Blower inoperative, clogged filter or restriction in ductwork.
	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.
UNIT OFF ON LOW PRESSURE CONTROL	Suction Pressure too low	In "COOLING" mode: Lack of or inadequate air flow. Entering air temperature too cold. Blower inoperative, clogged filter or restriction in ductwork. In "HEATING" mode: Lack of or inadequate airflow. Entering air temperature too warm. Blower inoperative, clogged filter or restriction in ductwork.
	Refrigerant charge	The unit is low on refrigerant. Check for refrigerant leak, repair, evacuate and recharge with factory recommended charge.
	Low pressure switch	Check for defective or improperly calibrated low-pressure switch.
UNIT SHORT CYCLES	Unit oversized	Recalculate heating and cooling loads.
	Thermostat	Thermostat installed near a supply air register, relocate thermostat. Check heat anticipator.
	Wiring and controls	Loose connections in the wiring or a defective compressor contactor.

Table 11 - Troubleshooting Table (1 of 2)

TROUBLESHOOTING (continued)

PROBLEM	POSSIBLE CAUSE	CHECKS & CORRECTIONS
INSUFFICIENT COOLING OR HEATING	Unit undersized	Recalculate heating and cooling loads. If not excessive, possibly adding insulation will rectify the situation.
	Loss of conditioned air by leaks	Check for leaks in ductwork or introduction of ambient air through doors or windows.
	Airflow	Lack of adequate airflow or improper distribution of air. Replace dirty air filter.
	Refrigerant charge	Low on refrigerant charge causing inefficient operation.
	Compressor	Check for defective compressor. If discharge is too low and suction pressure is too high, compressor is not pumping properly. Replace compressor.
	Reversing valve	Defective reversing valve creating bypass of refrigerant from discharge to suction side of compressor. Discharge is too low and suction is too high. Replace reversing valve.
	Operating pressures	Compare unit operating pressures to the pressure / temperature chart for the unit.
	Refrigerant metering device	Check for possible restriction or defect. Replace if necessary.
	Moisture, non-condensable	The refrigerant system may be contaminated with moisture or non-condensable. Reclaim refrigerant, evacuate and recharge with factory recommended charge.

Table 12 - Troubleshooting Table (2 of 2)

ERV ALARM CODES

ALARM CODES (ERV)		
STATE	SITUATION	ALARM RELAY
Normal	Everything works normally	Open
Alarm, unacknowledged	Problem detected by controller and alarm activated	Closed
Alarm, acknowledged	Problem still existing, service man acknowledged the active alarm	Open
Normal, acknowledged	Problem fixed / eliminated, alarm is acknowledged For A-Alarm: Reset pending to unlock unit For B-Alarm: Works normal.	Open
Normal, unacknowledged	Problem fixed / eliminated, but alarm is not acknowledged	Closed

Table 13 - Alarm Codes (ERV)

A-ALARMS

In the case of critical A-Alarms, the application operation is locked in shut down mode until the alarm is acknowledged and reset.

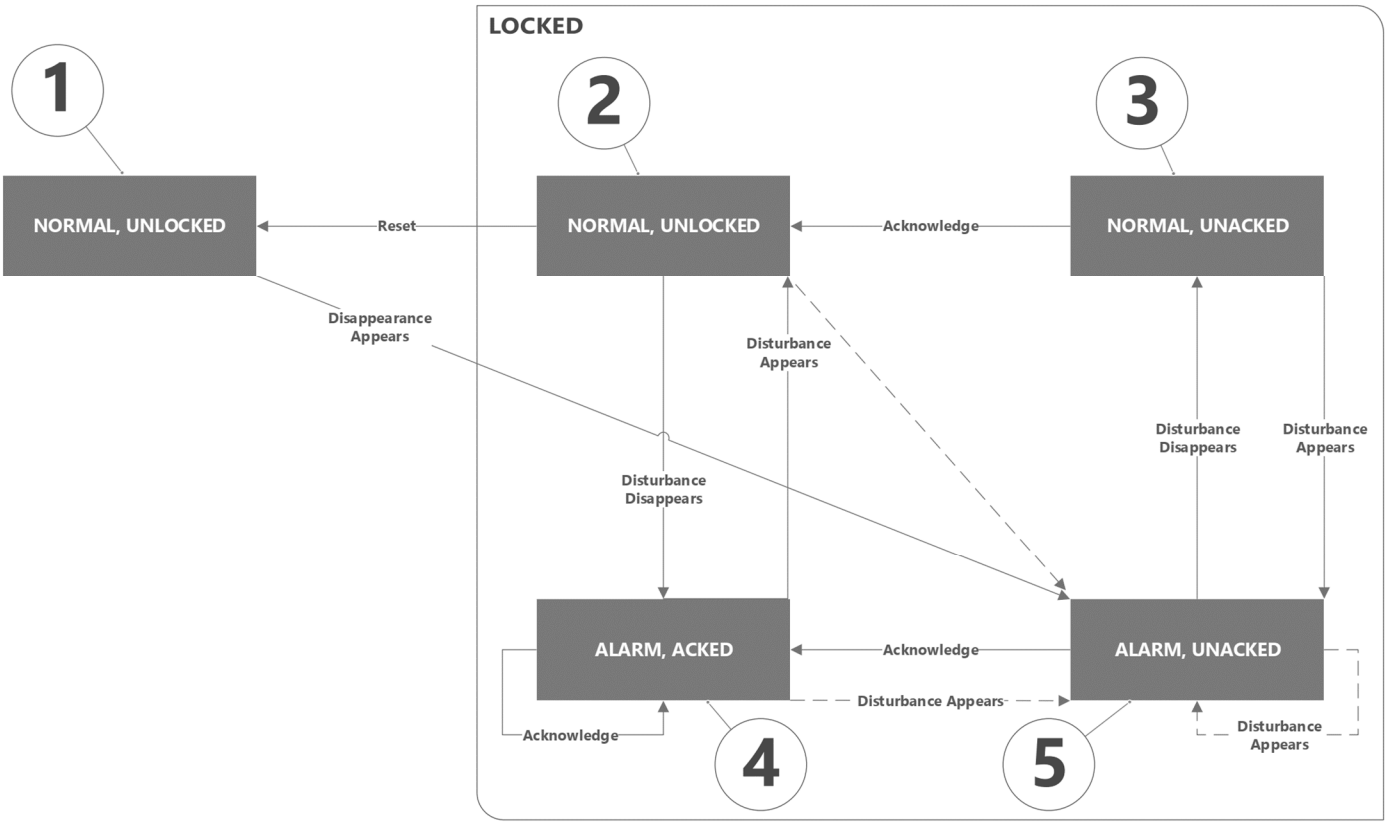


Figure 34 - A-Alarms Application Operation Key

A-ALARMS APPLICATIONS OPERATION KEY			
	ALARM	LOCKED	UNACKNOWLEDGED
1	0	0	0
2	0	1	0
3	0	1	1
4	1	1	0
5	1	1	1

Table 14 - A-Alarms Application Operation Key

ERV ALARM CODES (continued)

B-ALARMS

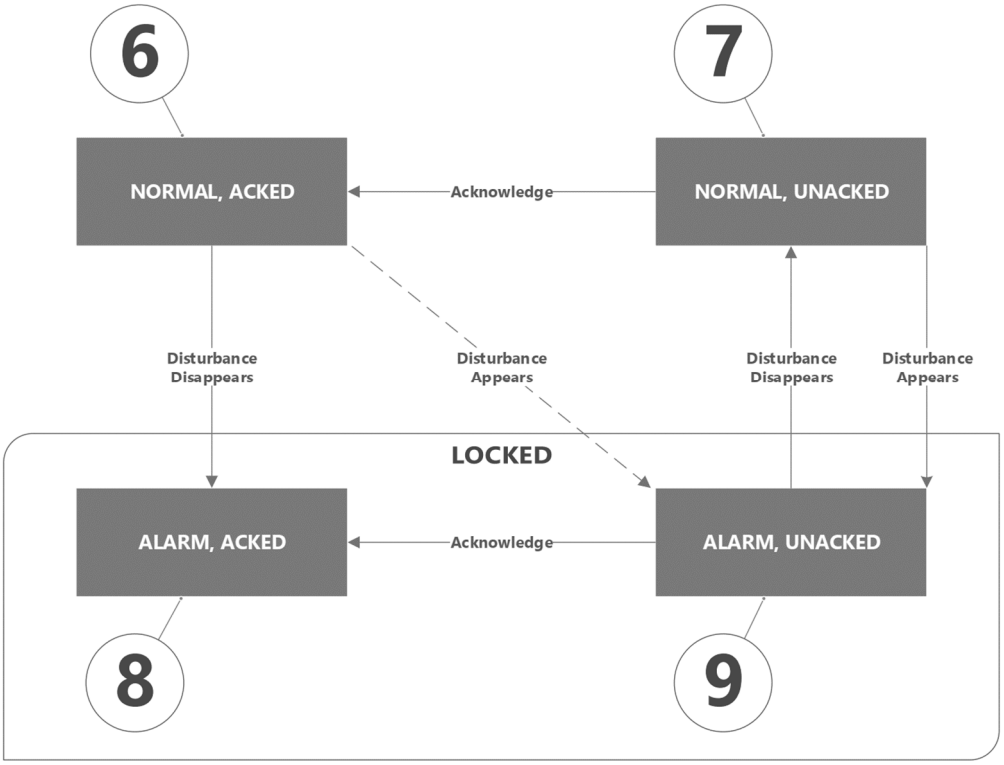


FIGURE 35 - B-Alarms Application Operation Key

B-ALARMS APPLICATIONS OPERATION KEY			
	ALARM	LOCKED	UNACKNOWLEDGED
1	0	0	0
2	0	1	0
3	0	1	1
4	1	1	0
5	1	1	1

Table 15 - B-Alarms Application Operation Key

ERV ALARM CODES (continued)

AVAILABLE PARAMETERS

AVAILABLE PARAMETERS			
ACKNOWLEDGE AND RESET	**BACNET OBJECT**	**R/RW**	**NOTE**
A-Alarm acknowledgement	AalmAck MVAL,137	RW	1: Ready 2: Acknowledge 3: Reset Automatic return to 1
B-Alarm acknowledgement	BalmAck MVAL,133	RW	1: Ready 2: Acknowledge Automatic return to 1
A-ALARMS	**BACNET OBJECT**	**R/RW**	**NOTE**
A-Alarm state	AalmSta MVAL, 135	R	1: Acknowledged, unlocked 2: Unacknowledged 3: Reset Automatic return to 1
A-Alarm indication	Aalmlnd MVAL, 136	R	1: Normal 2: Alarm
A-Alarm code	AalmCode AVAL, 49	R	0…9999
B-ALARMS	**BACNET OBJECT**	**R/RW**	**NOTE**
B-Alarm state	BalmSta MVAL, 132	R	1: Acknowledged, unlocked 2: Unacknowledged 3: Reset Automatic return to 1
B-Alarm indication	Balmlnd MVAL, 131	R	1: Normal 2: Alarm
B-Alarm code	BalmCode AVAL, 43	R	0…9999
ALARM CLASS SETTINGS	**BACNET OBJECT**	**R/RW**	**NOTE**
Alarm configuration for outside air temperature	AlmCnfTOa MVAL,141	RW	1: A-Alarm 2: B-Alarm
Alarm configuration for heat exchanger	AlmCnfHExg MVAL,348	RW	1: A-Alarm 2: B-Alarm 3: None
Alarm configuration for all fan errors (Feedback fault, error signal or Modbus interrupted)	AlmCnfFanFb MVAI,349	RW	1: A-Alarm 2: B-Alarm 3: None (No fan error supervision. – Do not use “None for Modbus fans)

Table 16 - Available Parameters

Error codes are divided in different groups for easier recognition of the alarm source. Those groups are identified in the table below.

ERROR CODES	
ERROR CODE	ERROR SOURCE
1000---1999	Hardware related errors
2000---2999	Application related errors
3000---3999	Communication errors
9000---9999	3rd party related errors

Table 17 - Error Codes

ERV ALARM CODES (continued)

CODE RANGES – HARDWARE

CODE RANGES – HARDWARE						
CODE	ALARM CLASS	NAME/DESCRIPTION	SOURCE	PLANT LOCK	BACNET OBJECT/COMMENT	INFLUENCE OF ALARM
1001	A	Supply air temperature, Sensor fault	System	Stop	TSu	Shutdown AHU
1002	A/B	Exhaust air temperature, sensor fault	System	Run	TEh, Active only if sensor available	Shutdown AHU/ No Heat exchanger supervision possible
1003	B	Extract air temperature, sensor fault	System	Run	TEx, Active only if sensor available	Fallback to room temperature control or supply air control
1004	A/B	Outside air temperature sensor fault	System	Conf.	TOa	Shutdown AHU / fallback to default
1005	A	Frost protection temperature for heating coil, sensor fault	System	Stop	TFrPrtHcl Active only if HclHw selected	Shutdown AHU, Frost protection mode
1006	B	Relative humidity for extract air, sensor fault	System	Run	HuRelEx, Active only if sensor available	Stop Humidity control if all sensors fail
1009	A	Fire damper position, feedback fault	Process	Stop	FdpFb, Active only if Fdp selected. Plausibility check of fire damper position feedback	Shutdown AHU
1012	B	Room Temperature, sensor fault	System	Run	TR with POS8/QMX3	Fallback to extract temperature control or supply air control
1013	B	Room air quality, sensor fault	System	Run	AQualR with QMX3 or PmR	Stop air quality control if all sensors fail
1014	B	Extract air quality, sensor fault	System	Run	PmR or AQualR, Particulate matters, Air quality	Stop control if all sensors fail
1017	B	Room air humidity, sensor fault	System	Run	HuRelR, Active only if sensor available	Stop Humidity control if all sensors fail
1018	A/B	Supply air temp. after preheating coil, sensor fault	System	Run	TSuAfPreHcl, Active only if sensor available	Shutdown AHU / Shutdown electric preheating coil, fallback value for heat exchanger efficiency
1019	B	Flow temperature preheating coil, sensor fault	System	Run	TFlPreHcl, Active only if sensor available	Fallback to default value
1020	B	Air filter, dirty	Process	Run	Operating hour of air filter exceeds limit or delta P, active only if FilA selected	No reaction
1021	B	Supply air temperature after heat exchanger, sensor fault	System	Run	TsuAfHExg, Active only if sensor available	Fallback value for Hexg efficiency calculation
1031	A/B/n	Heat Exchanger fault	Process	Run	RotHExgFlt or HExgCdnMon	Shutdown AHU / Bypass or shutdown HExg / no reaction
1037	A/B/n	Supply air fan fault	Process	Conf.	FanSuSpdFb, FanSuFlt Check of fan speed feedback or fault signal	Shutdown AHU / No reaction / No reaction
1038	A/B/n	Exhaust air fan fault	Process	Conf.	FanSuSpdFb, FanSuFlt Check of fan speed feedback or fault signal	Shutdown AHU / No reaction / No reaction
2001	A	Emergency off	Process	Stop	EngOff (BI)	AHU off
2002	A	Smoke detector	Process	Stop	Smext (BI)	Smoke extract mode
2004	A	Fire Alarm	Process	Stop	Supply (TSu) or extract (TEx) air temperature exceeds max limit	Shutdown extract mode
2005	B	Supply air temperature, exceeds operating limits	Process	Stop	Supply air temperature (TSu) exceeds min/max limits	No reaction
2012	A	Preheating coil, over temperature	Process	Stop	PreHclOvrTDet, active only if PreHclEl selected	Shutdown AHU
2013	A	Outside air damper stops air flow	Process	Stop		Shutdown AHU
2017	A/B/n	Heat exchanger efficiency supervision	Process	Conf.	Plausibility check of air temperatures	Shutdown AHU / Bypass or shutdown / no reaction

Table 18 - Code Ranges - Hardware

ERV ALARM CODES (continued)

CODE RANGES – COMMUNICATION

CODE RANGES – HARDWARE						
CODE	ALARM CLASS	NAME/DESCRIPTION	SOURCE	PLANT LOCK	BACNET OBJECT/COMMENT	INFLUENCE OF ALARM
3005	B	I/O extension module, Modbus communication fault	System	Run	POS9 active only if device configured	Same reaction as for each connection input
3011	B	Duct pressure sensor, Modbus communication error	System	Run	QBM, Active only if device configured	Fallback to linear Fan speed
3012	A/B	Supply air fan, Modbus communication fault	System	Conf.	Active only if Modbus fan configured	A: Shutdown AHU / B: No reaction Reaction of fan based on fan device configuration
3101	B	Room sensor, KNX PL-Link communication error	System	Run	Common fault for all PL-Link room devices: POS8.4420/4440, QMX3.P30/P40/P70 Active only if device configured	

Table 19 - Code Ranges - Hardware

MAINTENANCE & SERVICE

PREVENTIVE MAINTENANCE

To achieve maximum performance and service life of equipment, a formal schedule of regular maintenance should be established and adhered to.
Failure to establish and perform preventative maintenance program can void the manufacturers warranty.

If servicing or major repairs are required, the complete unit can be removed as follows:

1. Disconnect the electrical power circuit supplying the unit.
2. Remove line and low voltage wiring from unit,
3. Remove rear access panel.
4. Remove supply duct from top of unit.
5. Slide unit back out of sleeve.
6. Unit may be removed from closet.

To reinstall unit, use the installation procedure outlined above.

WARNING

It is a violation of federal law 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.

The refrigerant system contained in the unit 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 contact with sharp metal edges, moving parts, and hot or cold surfaces.

FAN

The fan should be inspected and cleaned annually in conjunction with maintenance of the motor and bearings. It is important to keep the fan section and motor clean and free from obstruction to prevent imbalance, vibration, and improper operation.

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.
VERIFY THAT POWER IS DISCONNECTED BEFORE SERVICING.

FILTER

The air filter and ERV filters 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.

ERV CORE

The Energy Recovery plate heat exchanger (CORE), should be inspected at least two (2) times a year. The CORE should be removed and cleaned as needed at least once (1) per year. The CORE can be cleaned with light air pressure or with a mild detergent and water solution. Be sure that the CORE is completely dry before reinserting it back into the ERV.

ERV INSULATION

The ERV interior should be inspected with the CORE (2 times a year). Check and clean the cabinet interior of all dirt and debris.

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.

MAINTENANCE UPDATES

Check regularly for a current copy of the maintenance program log which can be found at under “product information”.

UNIT PERFORMANCE

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

UNIT LOCKOUT

Air flow problems could cause periodic lockouts. The lockout (shutdown) of the units is a normal protective result. Check for airflow rates (may be caused by dirty filter) and air temperatures.

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.

PERFORMANCE TABLES

ERV EFFECTIVENESS TABLE							
SUPPLY TEMPERATURE		RELATIVE HUMIDITY	SUPPLY AIR FLOW		RECOVERY		
					SENSIBLE	LATENT	TOTAL
°C	°F	RH %	L/s	CFM	Effectiveness %		
25	13	80	47	100	62.4	41.9	54.7
0	32	80	23	50	70.7	53.6	65
0	32	80	37	80	65.4	46	59
0	32	80	56	120	59.7	38.5	52.7
-25	-13	80	47	100	65.4	41.9	56.2

Table 20 - ERV Effectiveness

VENTILATION PERFORMANCE					
EXTERNAL STATIC PRESSURE		SUPPLY AIR FLOW		EXHAUST AIR FLOW	
Pa	in. W.C.	L/s	CFM	L/s	CFM
25	0.1	60	123	60	126
50	0.2	56	120	56	120
75	0.3	55	116	55	116
100	0.4	52	109	52	109
125	0.5	49	104	49	104
150	0.6	47	100	47	100
175	0.7	46	97	46	97
200	0.8	41	88	41	88
225	0.9	37	79	37	79
250	1	34	72	34	72

Table 21 - Ventilation Performance

SUPPORT MATERIAL

ASHRAE 62.2 VENTILATION STANDARD TABLES

ASHRAE 62.2 CFM Sizing Chart					
FLOOR AREA	NUMBER OF BEDROOMS / CFM				
	0-1	2-3	4-5	6-7	>7
< 1500	30	45	60	75	90
1501 – 3000	45	60	75	90	105
3001 – 4500	60	75	90	105	120
4501 – 6000	75	90	105	120	135
6001 – 7500	90	105	120	135	150
> 7500	105	120	135	150	165
ANSI/ASHRAE STANDARD 62.2-2010 – Ventilation Air Requirements; values in cfm. The above chart outlines the minimum requirements for continuous ventilation.					

Table 22 - ASHRAE 62.2 CFM Sizing Chart

ROOM COUNT CALCULATION METHOD TABLE				
LIVING SPACE	NUMBER OF ROOMS	X CFM (or L/s)	=	CFM Required
Master Bedroom		x 20 cfm (for 10 L/s)	=	
Basement		x 20 cfm (for 10 L/s)	=	
Single Bedroom		x 10 cfm (for 5 L/s)	=	
Living Room		x 10 cfm (for 5 L/s)	=	
Dining Room		x 10 cfm (for 5 L/s)	=	
Family Room		x 10 cfm (for 5 L/s)	=	
Recreation Room		x 10 cfm (for 5 L/s)	=	
Other		x 10 cfm (for 5 L/s)	=	
Kitchen		x 10 cfm (for 5 L/s)	=	
Bathroom		x 10 cfm (for 5 L/s)	=	
Laundry Room		x 10 cfm (for 5 L/s)	=	
Utility Room		x 10 cfm (for 5 L/s)	=	
		TOTAL VENTILATION REQUIREMENT	=	

Table 23 - Room Count Calculation Method Table

STARTUP & PERFORMANCE CHECKLIST INSTRUCTIONS

ecoseries FRESH-PAK

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 _____ Compressor Amps _____

Running Voltage L1-L2 _____ Blower Amps _____

Secondary Voltage _____ Condenser Fan Amps _____

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

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

*With thermostat calling.

AMPERAGE – ERV MOTORS

Intake Motor: Nominal HP

Rated Amps _____

Running Amps _____

Exhaust Motor: Nominal HP

Rated Amps _____

Running Amps _____

AIRFLOW

Intake Design CFM	Exhaust Design CFM
Pressure Drop _____	Pressure Drop _____
Calculated CFM _____	Calculated CFM _____
Amb db Temp _____	Amb db Temp _____
Return Air db Temp* _____	Return Air db Temp* _____
Tempered Air db Temp* _____	Tempered Air db Temp* _____

*Measure after 15 minutes of run time

TEMPERATURES

Outdoor Air Temperature _____ DB _____ WB

Return Air Temperature _____ DB _____ WB

Cooling Supply Air Temperature _____ DB _____ WB

Heating Supply Air Temperature _____ DB _____ WB

DOCUMENT #: _____

FIGURE 36 - Startup & Performance Checklist (1 of 2)

STARTUP & PERFORMANCE CHECKLIST (continued)

eco series FRESH-PAK

UNIT OPERATION

HEATING MODE

1 INDOOR BLOWER AMPS _____

2 TEMPERATURE RISE

Supply Duct Temperature _____
Return Duct Temperature − _____
Temperature Rise = _____

3 TOTAL EXTERNAL STATIC

Supply Duct Temperature _____
Return Duct Temperature + _____
Temperature Rise = _____

4 CONDENSATE LINE

☐ Leak Free

COOLING MODE

5 INDOOR BLOWER AMPS _____

6 TEMPERATURE DROP

Return Duct Temperature _____
Supply Duct Temperature − _____
Temperature Drop = _____

7 TOTAL EXTERNAL STATIC

Supply External Static _____
Return External Static + _____
Total External Static = _____

8 DRAIN LINE

☐ Leak Free

9 THERMOSTAT

☐ Adjusted & Programmed
☐ Explained Operation to Owner

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 that stem from improper installation.

FIGURE 37 - Startup & Performance Checklist (2 of 2)

NOTES

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