

**50XZ  
Single Packaged Heat Pump System  
with Puron® (R-410A) Refrigerant  
Single and Three Phase  
2-5 Nominal Tons (Sizes 024-060)**



Turn to the Experts.™

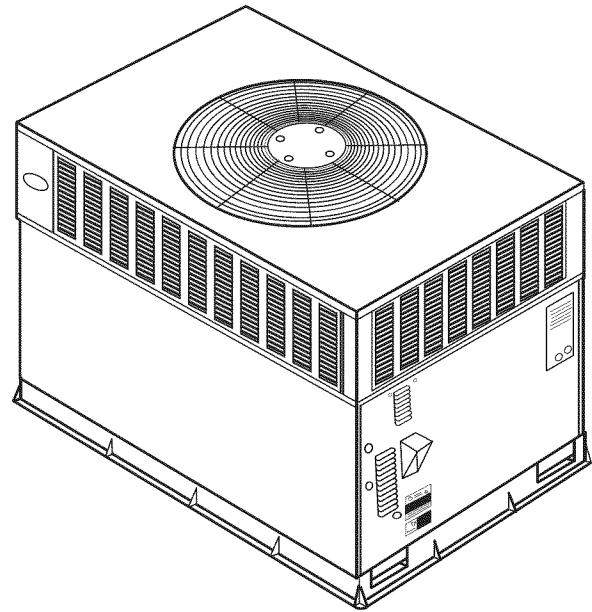
# Installation Instructions

**NOTE:** Read the entire instruction manual before starting the installation.

**NOTE:** Installer: Make sure the Owner's Manual and Service Instructions are left with the unit after installation.

## TABLE OF CONTENTS

	PAGE
SAFETY CONSIDERATIONS .....	1
INTRODUCTION .....	2
RECEIVING AND INSTALLATION .....	2-16
Check Equipment .....	2
Identify Unit .....	2
Inspect Shipment .....	2
Provide Unit Support .....	2
Roof Curb .....	2
Slab Mount .....	2
Ground Mount .....	2
Provide Clearances .....	2
Rig and Place Unit .....	2
Inspection .....	2
Installation .....	2
Select and Install Ductwork .....	5
Converting Horizontal Discharge Units to Downflow (VERTICAL) Discharge Units .....	7
Provide for Condensate Disposal .....	7
Install Electrical Connections .....	7
High-Voltage Connections .....	8
Routing Power Leads into Unit .....	8
Connecting Ground lead to Ground Lug .....	8
Routing Control Power Wires (24-v) .....	8
Easy Select™ .....	9
50XZ Sequence of Operation .....	15
Special Procedures for 208-V Operation .....	16
PRE-START-UP .....	16
START-UP .....	16-19
50XZ Start-Up .....	16
Check for Refrigerant Leaks .....	17
Start-Up Adjustments .....	17
Check Cooling & Heating Operation .....	17
Checking & Adjusting Refrigerant Charge .....	18
Refrigerant Charge .....	18
No Charge .....	18
Low Charge Cooling .....	18
To Use Cooling Charging Charts .....	18
Indoor Airflow & Airflow Adjustments .....	18
Defrost Control .....	19
Quiet Shift .....	19
Defrost .....	19
MAINTENANCE .....	20-25
Air Filter .....	20
Indoor Blower and Motor .....	20
Outdoor Coil, Indoor Coil, & Condensate Drain Pan .....	20
Outdoor Fan .....	23
Electrical Controls and Wiring .....	23
Refrigerant Circuit .....	23



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**Fig. 1 - Unit 50XZ**

Indoor Airflow .....	23
Metering Devices- TXV & AccuRater™ Piston .....	23
Pressure Switches .....	24
Loss of Charge Switch .....	24
High Pressure Switch .....	24
Copeland Scroll compressor (Puron Refrigerant) .....	24
Refrigerant System .....	24
Refrigerant .....	24
Compressor Oil .....	24
Servicing Systems on Roofs with Synthetic Materials .....	24
Liquid Line Filter Drier .....	25
Puron® (R-410A) Refrigerant Charging .....	25
System Information .....	25
Loss of Charge Switch .....	25
Check Defrost Thermostat .....	25
TROUBLESHOOTING .....	25
START-UP CHECKLIST .....	25


## SAFETY CONSIDERATIONS

Improper installation adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in

literature and attached to the unit. Consult local building codes, the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada refer to the current editions of the Canadian electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

50XZ

## **WARNING**

### **ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power switch if applicable.

## **WARNING**

### **FIRE, EXPLOSION, ELECTRICAL SHOCK AND CARBON MONOXIDE POISONING HAZARD**

Failure to follow this warning could result in personal injury, death or property damage.

A qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

## **INTRODUCTION**

The 50XZ heat pump is fully self-contained and designed for outdoor installation. (See Fig. 1) Standard units are shipped in a horizontal-discharge configuration for installation on a groundlevel slab. Standard units can be converted to downflow (vertical) discharge configurations for rooftop applications.

## **RECEIVING AND INSTALLATION**

### **Step 1 — Check Equipment**

#### **IDENTIFY UNIT**

The unit model number and serial number are stamped on the unit identification plate. Check this information against shipping papers.

#### **INSPECT SHIPMENT**

Inspect for shipping damage while unit is still on shipping pallet. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest equipment distributor if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

### **Step 2 — Provide Unit Support**

#### **ROOF CURB**

Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 5). Install insulation, cant strips, roofing, and flashing. Ductwork must be attached to curb.

**IMPORTANT:** The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing also can result in air leaks and poor unit performance.

Curb should be level to within 1/4 in. (3 m) (See Fig. 6). This is necessary for unit drain to function properly. Refer to accessory roof curb installation instructions for additional information as required.

#### **SLAB MOUNT**

Place the unit on a solid, level concrete pad that is a minimum of 4 in. (102 mm) thick with 2 in. (51 mm) above grade (See Fig. 7). The slab should extend approximately 2 in. (51 mm) beyond the casing on all 4 sides of the unit. Do not secure the unit to the slab except when required by local codes.

#### **GROUND MOUNT**

The unit may be installed either on a slab or placed directly on the ground if local codes permit. Place the unit on level ground prepared with gravel for condensate discharge.

### **Step 3 — Provide Clearances**

The required minimum service clearances are shown in Fig. 2 and 3. Adequate ventilation and outdoor air must be provided. The outdoor fan draws air through the outdoor coil and discharges it through the top fan grille. Be sure that the fan discharge does not recirculate to the outdoor coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 48 in. (1219 mm) above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in. (1219 mm)

**IMPORTANT:** Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units should be at least 4 in. (102 mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.

### **Step 4 — Rig and Place Unit**

Rigging and handling of this equipment can be hazardous for many reasons due to the installation location (roofs, elevated structures, etc.)

Only trained, qualified crane operators and ground support staff should handle and install this equipment.

When working with this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that might apply.

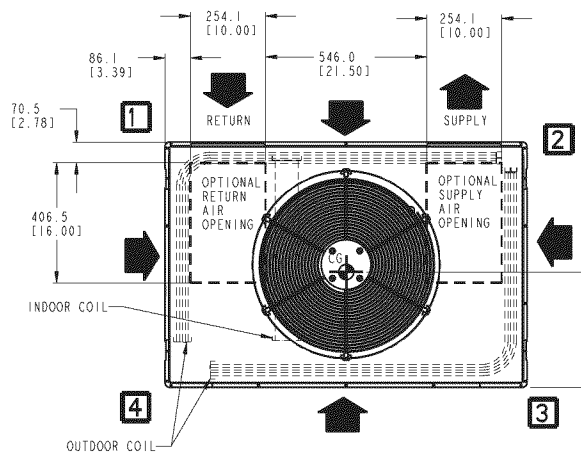
Follow all applicable safety codes. Wear safety shoes and work gloves.

#### **INSPECTION**

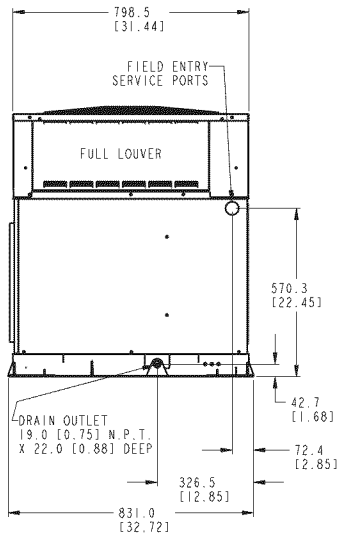
Prior to initial use, and at monthly intervals, all rigging brackets and straps should be visually inspected for any damage, evidence of wear, structural deformation, or cracks. Particular attention should be paid to excessive wear at hoist hooking points and load support areas. Brackets or straps showing any kind of wear in these areas must not be used and should be discarded.

#### **INSTALLATION**

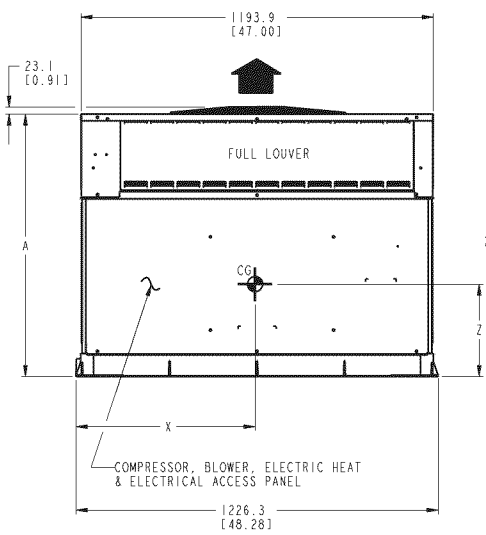
1. Remove unit from shipping carton. Leave top shipping skid on the unit as a spreader bar to prevent the rigging straps from damaging the unit. If the wood skid is not available, use a spreader bar of sufficient length to protect unit from damage.
2. Position the lifting bracket assembly around the base of the unit. Be sure the strap does not twist.



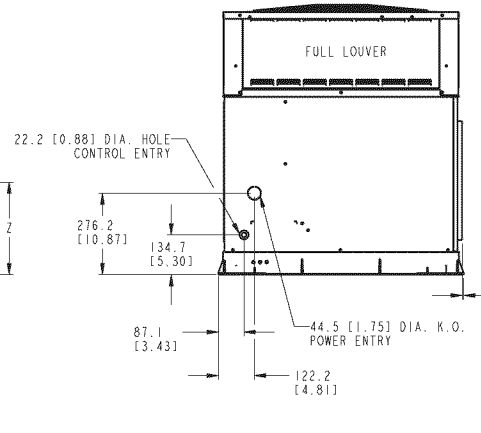
TOP VIEW



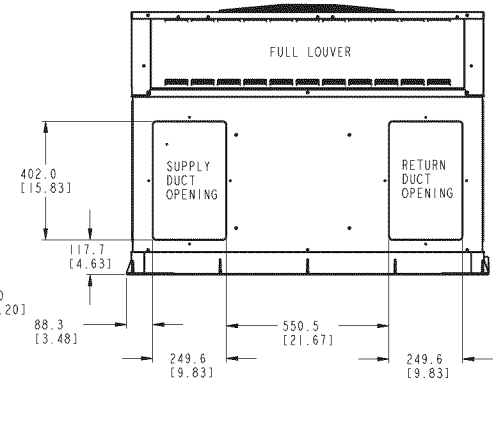
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		CENTER OF GRAVITY MM/IN			
		LBS.	KG.	"A"	X	Y	Z
50XZ024	208-230-1-60	320	145.1	940.3[37.02]	558.8[22.0]	368.3[14.5]	406.4[16.0]
50XZ030	208/230-1-60, 208/230-3-60	360	163.3	991.1[39.02]	558.8[22.0]	387.4[15.3]	447.0[17.6]
50XZ036	208/230-1-60, 208/230-3-60	403	182.8	1041.9[41.02]	508.0[20.0]	355.6[14.0]	447.0[17.6]

	CORNER WEIGHT LBS./KG.			
	"1"	"2"	"3"	"4"
024	58/26.3	54/24.5	75/34.1	133/60.4
030	69/31.3	57/25.9	86/39.0	148/67.2
036	83/37.7	62/28.1	96/43.6	162/73.5

**REQUIRED CLEARANCES TO COMBUSTIBLE MATL.**

	MILLIMETERS [IN]
TOP OF UNIT.....	355.6 [14.00]
DUCT SIDE OF UNIT.....	50.8 [2.00]
SIDE OPPOSITE DUCTS.....	355.6 [14.00]
BOTTOM OF UNIT.....	12.7 [0.50]
ELECTRIC HEAT PANEL.....	914.4 [36.00]

**NEC. REQUIRED CLEARANCES.**

	MILLIMETERS [IN]
BETWEEN UNITS, POWER ENTRY SIDE.....	1066.8 [42.00]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE.....	914.0 [36.00]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE.....	1066.8 [42.00]

**REQUIRED CLEARANCE FOR OPERATION AND SERVICING**

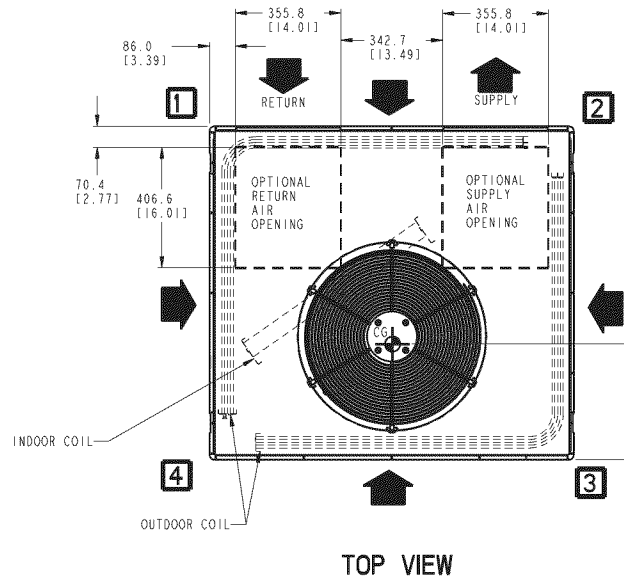
	MILLIMETERS [IN]
EVAP. COIL ACCESS SIDE.....	914.0 [36.00]
POWER ENTRY SIDE.....	914.0 [36.00]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP.....	914.0 [36.00]
SIDE OPPOSITE DUCTS.....	914.0 [36.00]
DUCT PANEL.....	304.8 [12.00]

\*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [ ] ARE IN INCHES

Fig. 2 - 50XZ024-036 Unit Dimensions

50XZ500229	REV 2.0
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UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		UNIT HEIGHT "A"	CENTER OF GRAVITY MM/IN		
		LBS.	KG.		X	Y	Z
50XZ042	208-230-1-60, 208/230-3-60	454	206	1091.7[42.98]	495.3[19.5]	447.6[17.6]	457.2[18.0]
50XZ048	208-230-1-60, 208/230-3-60	479	217	1142.5[44.98]	495.3[19.5]	447.6[17.6]	457.2[18.0]
50XZ060	208-230-1-60, 208/230-3-60	499	226	1193.3[46.98]	533.4[21.0]	508.0[20.0]	442.0[17.6]

CORNER WEIGHT LBS./KG.				
	"1"	"2"	"3"	"4"
042	96/43.6	59/26.8	124/56.3	175/79.5
048	102/46.3	65/29.5	131/59.5	181/82.2
060	107/48.6	70/31.8	136/61.7	186/84.4

**REQUIRED CLEARANCES TO COMBUSTIBLE MATL.**

	MILLIMETERS [IN]
TOP OF UNIT.....	355.6 [14.00]
DUCT SIDE OF UNIT.....	50.8 [2.00]
SIDE OPPOSITE DUCTS.....	355.6 [14.00]
BOTTOM OF UNIT.....	12.7 [0.50]
ELECTRIC HEAT PANEL.....	914.4 [36.00]

**NEC. REQUIRED CLEARANCES.**

	MILLIMETERS [IN]
BETWEEN UNITS, POWER ENTRY SIDE.....	1066.8 [42.00]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE.....	914.0 [36.00]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE.....	1066.8 [42.00]

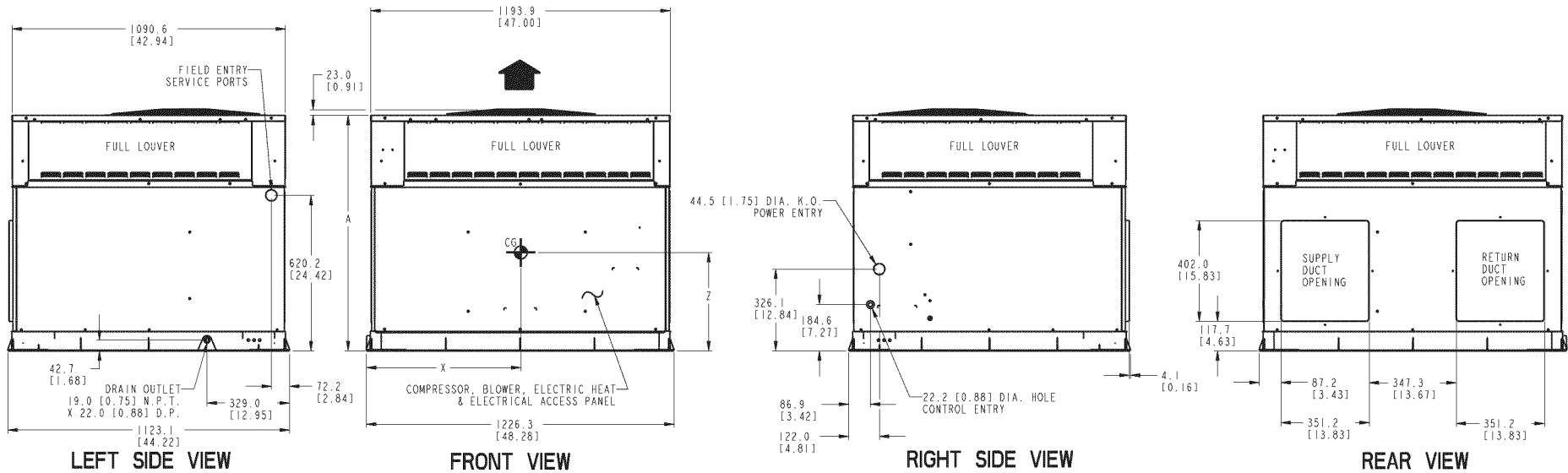
**REQUIRED CLEARANCE FOR OPERATION AND SERVICING**

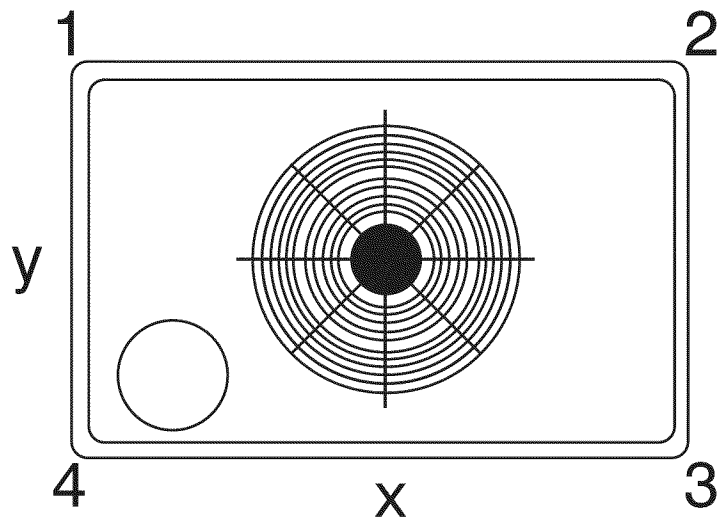
	MILLIMETERS [IN]
EVAP. COIL ACCESS SIDE.....	914.0 [36.00]
POWER ENTRY SIDE.....	914.0 [36.00]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP.....	914.0 [36.00]
SIDE OPPOSITE DUCTS.....	914.0 [36.00]
DUCT PANEL.....	304.8 [12.00]*

\*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [ ] ARE IN INCHES

Fig. 3 - 50XZ 042-060 Unit Dimensions





C00071

RIGGING WEIGHTS (SMALL CABINET)							RIGGING WEIGHTS (LARGE CABINET)						
Unit	024		030		036		Unit	042		048		060	
	lb	kg	lb	kg	lb	kg		lb	kg	lb	kg	lb	kg
Rigging Weight	331	150	371	168	414	188	Rigging Weight	469	213	494	224	499	226

Fig. 4 - Rigging Weights

3. Place each of the 4 metal lifting brackets into the rigging holds in the composite unit base.
4. Thread lifting bracket strapping around bottom perimeter of unit as follows:
  - a. Open lever of tension buckle (ratchet type).
  - b. Feed strapping through tension buckle as shown in Fig. 8.
  - c. Pull strapping through tension buckle unit taut.
  - d. Snap lever down to lock strap in tension buckle. To release strapping, squeeze safety latch, lift lever, and pull webbing outward.
5. Tighten the tension buckle until it is taut. Lifting brackets must be secure in the rigging holds.
6. Attach field-supplied clevis or hook of sufficient strength to hole in the lifting bracket. (See Fig. 9)
7. Attach the 2 safety straps directly to the clevis or hook at the 4 rigging brackets. DO NOT attach the safety straps to the lifting brackets (See Fig. 9).
8. Position lifting point directly over the unit's center of gravity.
9. Lift unit. When unit is directly over the roof curb, remove the 2 safety straps. Lower the equipment onto the roof curb.
10. After the unit is placed on the roof curb or mounting pad, remove the top crating. On 50XZ060 units only, 2 wire ties fastened to the outdoor coils and reversing valve/accumulator assembly must be cut. Remove the left and front louver panels and corner post to access wire ties. The wire tie to be cut on the left is located approximately 4 in. (102 mm) down the tube sheet. The wire tie to be cut on the right is located approximately 6 in. (152 mm) down the tube sheet.

### Step 5 — Select and Install Ductwork

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of non-residence type air conditioning and ventilating systems, NFPA 90A or residence-type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply-air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations. The unit has duct flanges on the supply- and return-air openings on the side of the unit.

When designing and installing ductwork, consider the following:

**▲ WARNING**

**PERSONAL INJURY HAZARD**

Failure to follow this warning could result in personal injury or death.

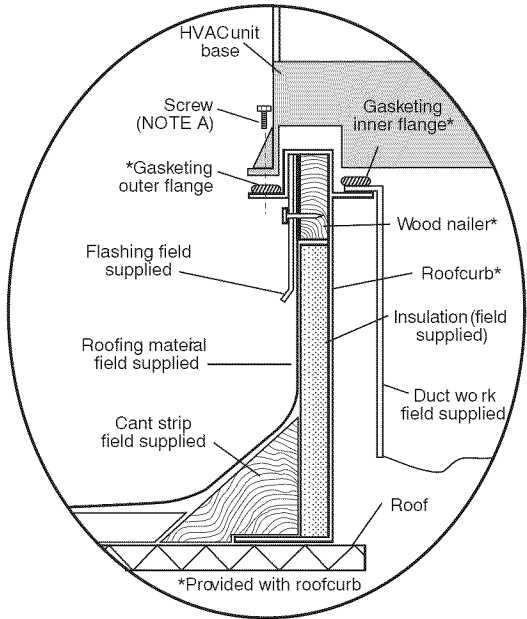
For vertical supply and return units, tools or parts could drop into ductwork. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Units with electric heaters require 90 degree elbow in supply duct.

1. All units should have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

**IMPORTANT:** Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weather tight and airtight seal. When electric heat is installed, use fireproof canvas (or similar heat resistant material) connector between ductwork and unit discharge connection. If flexible duct is used, insert a sheet metal sleeve inside duct. Heat resistant duct connector (or sheet metal sleeve) must extend 24-in. (610 mm) from electric heater element.

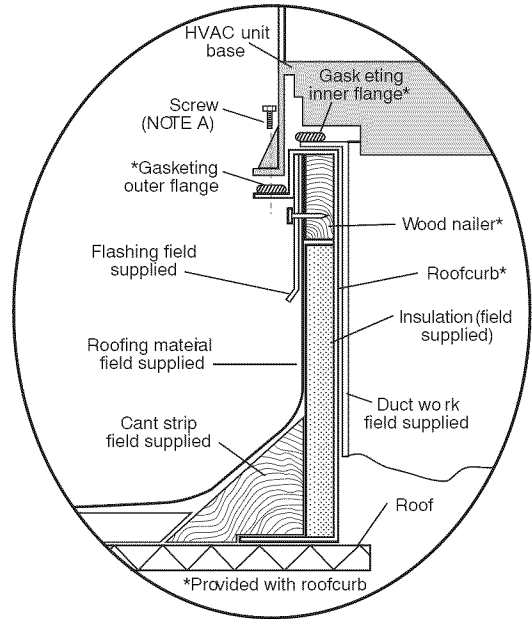
3. Size ductwork for cooling air quantity (cfm). The minimum air quantity for proper electric heater operation is listed in Table 2. Heater limit switches may trip at air quantities below those recommended.

50XZ



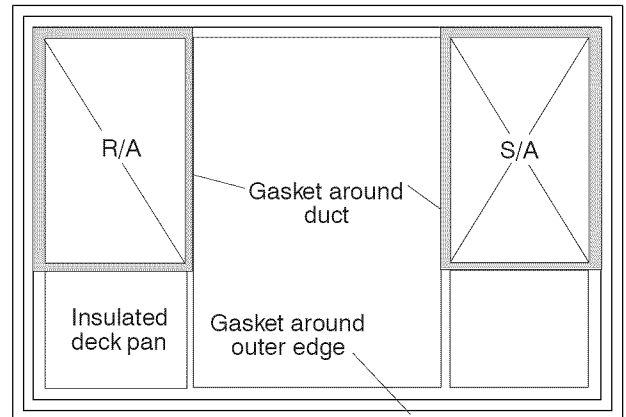
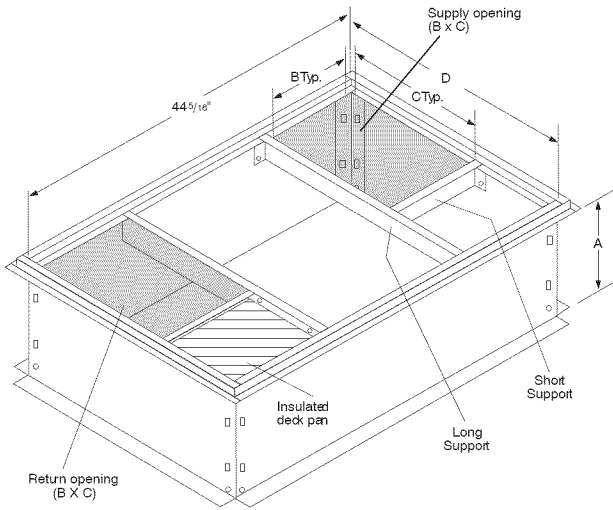
**Roof Curb for Small Cabinet**

Note A: When unit mounting screw is used, retainer bracket must also be used.



**Roof Curb for Large Cabinet**

Note A: When unit mounting screw is used, retainer bracket must also be used.



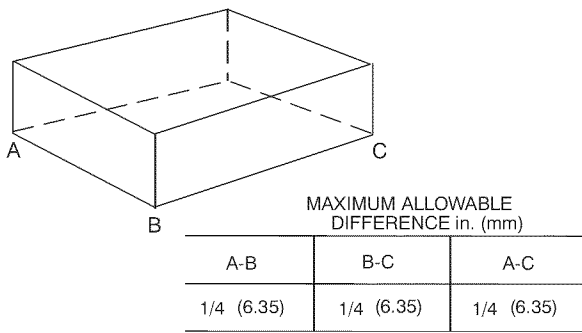
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UNIT SIZE	ODS CATALOG NUMBER	A IN. (MM)	B IN. (MM)	C IN. (MM)	D IN. (MM)
50XZ024-036	CPRFCURB006A00	8 (203)	11 (279)	16-1/2 (419)	28-3/4 (730)
	CPRFCURB007A00	14 (356)	11 (279)	16-1/2 (419)	28-3/4 (730)
50XZ042-060	CPRFCURB008A00	8 (203)	16-3/16 (411)	17-3/8 (441)	40-1/4 (1022)
	CPRFCURB009A00	14 (356)	16-3/16 (411)	17-3/8 (441)	40-1/4 (1022)

**NOTES:**

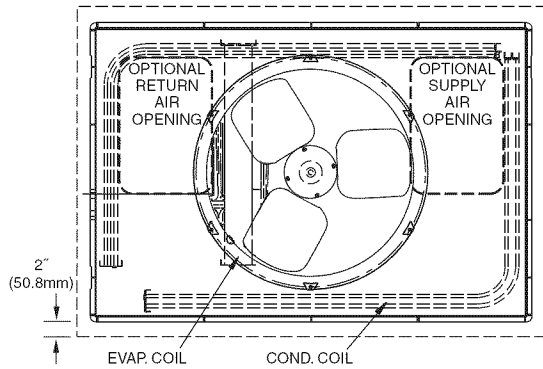
1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied, as required, to unit being installed.
5. Roof curb is made of 16-gauge steel.
6. Attach ductwork to curb (flanges of duct rest on curb).
7. Insulated panels: 1-in. (25 mm) thick fiberglass 1 lb (.45 kg) density.
8. When unit mounting screw is used (see Note A), a retainer bracket must be used as well. This bracket must also be used when required by code for hurricane or seismic conditions. This bracket is available through Micrometl.

**Fig. 5 - Roof Curb Dimensions**



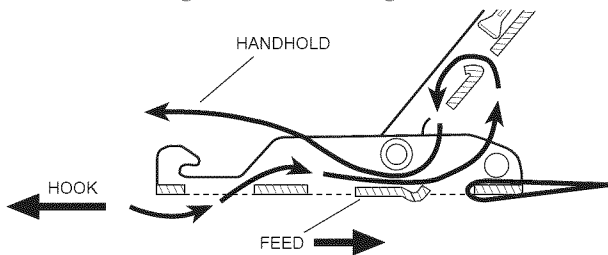
**Fig. 6 - Unit Leveling Tolerances**

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**Fig. 7 - Slab Mounting Detail**

A07926



**Fig. 8 - Threading Belt**

C09067

4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration-isolate duct openings in wall or roof according to good construction practices.

**CONVERTING HORIZONTAL DISCHARGE UNITS TO DOWNFLOW (VERTICAL) DISCHARGE UNITS**

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch.

1. Open all electrical disconnects before starting any service work.

2. Remove horizontal duct covers to access bottom return and supply knock out panels.
3. Use a screwdriver and hammer to remove the panels in the bottom of the unit base.

**NOTE:** These panels are held in place with tabs similar to an electrical knockout.

4. Reinstall the horizontal duct covers (Fig. 11) to block off the horizontal air openings.

**NOTE:** Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

**Step 6 — Provide for Condensate Disposal**

**NOTE:** Ensure that condensate-water disposal methods comply with local codes, restrictions, and practices.

The 50XZ units dispose of condensate through a 3/4 in. NPT female fitting that exits on the compressor end of the unit. Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field-supplied condensate trap at end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1 in. (25 mm) lower than the drain-pan condensate connection to prevent the pan from overflowing. Prime the trap with water. When using a gravel apron, make sure it slopes away from the unit.

If the installation requires draining the condensate water away from the unit, install a field-supplied 2 -in. trap at the condensate connection to ensure proper drainage. Condensate trap is available as an accessory or is field-supplied. Make sure that the outlet of the trap is at least 1 in. (25 mm) lower than the unit drain-pan condensate connection to prevent the pan from overflowing. Connect a drain trough using a minimum of field-supplied 3/4-in. PVC or field-supplied 3/4-in. copper pipe at outlet end of the 2-in. (51 mm) trap. (See Fig. 12) Do not undersize the tube. Pitch the drain trough downward at a slope of at least 1 in. (25 mm) every 10 ft (3 m) of horizontal run. Be sure to check the drain trough for leaks. Prime the trap at the beginning of the cooling season start-up.

**Step 7 — Install Electrical Connections**

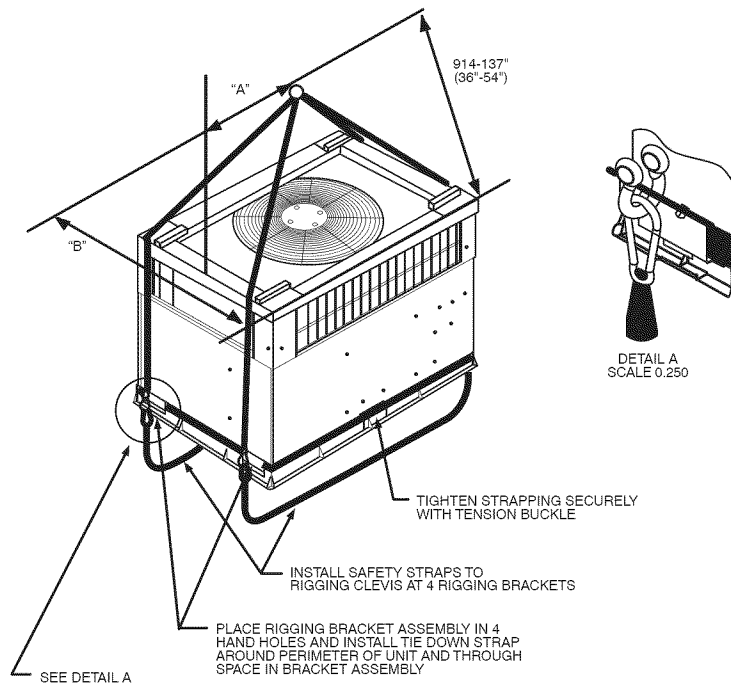
**⚠ CAUTION**

**UNIT COMPONENT DAMAGE HAZARD**

Failure to follow this caution could result in damage to the unit being installed.

1. Make all electrical connections in accordance with NEC ANSI/NFPA 70 (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only copper conductor for connections between field-supplied electrical disconnect switch and unit. **DO NOT USE ALUMINUM WIRE.**
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. On 3-phase units, ensure phases are balanced within 2 percent. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are in same conduit as high-voltage wires.
5. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

**50XZ**



C99075

UNIT 50XZ	A		B	
	in.	mm	in.	mm
024	19.0	482.6	18.25	463.6
030	19.0	482.6	18.25	463.6
036	20.0	508.0	19.0	482.6
042	20.0	508.0	21.25	539.8
048	20.0	508.0	21.25	539.8
060	21.0	533.4	20.0	508.0

**Fig. 9 - Suggested Rigging**

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury or death.

The unit cabinet must have an uninterrupted, unbroken electrical ground. This ground may consist of an electrical wire connected to the unit ground screw in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC, ANSI/NFPA 70 American National Standards Institute/National Fire Protection Association (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes.

**HIGH-VOLTAGE CONNECTIONS**

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from the unit. Refer to the unit rating plate, NEC and local codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing.

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole (See Fig. 2 and 3).

If the unit has an electric heater, a second disconnect may be required. Consult the Installation, Start-Up, and Service Instructions provided with the accessory for electrical service connections.

Operation of unit on improper line voltage constitutes abuse and may cause unit damage that could affect warranty.

**ROUTING POWER LEADS INTO UNIT**

Use only copper wire between disconnect and unit. The high-voltage leads should be in a conduit until they enter the duct panel; conduit termination at the duct panel must be watertight. Run the high-voltage leads through the power entry knockout on the power entry side panel. (See Fig. 2 and 3 for location and size) When the leads are inside the unit, run leads up the high-voltage raceway to the line wiring splice box (See Fig. 13 through 17). For singlephase units, connect leads to the black and yellow wires; for 3-phase units, connect the leads to the black, yellow, and blue wires.

**CONNECTING GROUND LEAD TO GROUND LUG**

Refer to Fig. 15 and 16. Connect the ground lead to the chassis using the ground lug in the wiring splice box.

**ROUTING CONTROL POWER WIRES (24-V)**

Form a drip-loop with the thermostat leads before routing them into the unit. Route the thermostat leads through grommeted, low-voltage hole provided in unit into unit control power splice box. (See Fig. 2 and 3) Connect thermostat leads to unit control power leads as shown in Fig. 15.

The unit transformer supplies 24-v power for complete system including accessory electrical heater. An automatic-reset circuit breaker (See Fig. 17) is provided in the 24-v circuit; see the caution label on the transformer or Fig. 18. Transformer is factory wired for 230-v operation. If supply voltage is 208-v, rewire transformer primary as described in Special Procedures for 208-v Operation section.



**Table 1 – Physical Data - Unit 50XZ**

UNIT SIZE	50XZ024	50XZ030	50XZ036	50XZ042	50XZ048	50XZ060
NOMINAL CAPACITY (ton)	2	2.5	3	3.5	4	5
SHIPPING WEIGHT (lb)	368	408	451	506	531	551
(kg)	167	185	205	230	241	250
COMPRESSOR QUANTITY	1					
TYPE	SCROLL COMPRESSOR					
REFRIGERANT	R-410A					
REFRIGERANT METERING DEVICE	Indoor-TXV Outdoor-Accurater					
Refrigerant (R-410A) Quantity (lb)	7.5	8.2	9.7	11.0	11.5	13.5
(kg)	3.4	3.7	4.4	5.0	5.2	6.1
METERING DEVICE ID	TXV	TXV	TXV	TXV	TXV	TXV
ORIFICE OD (in.) QTY	0.035 (2)	0.035 (2)	0.038 (2)	0.038 (2)	0.038 (Left OD Coil) 0.046 (Right OD Coil) (.97 Left OD Coil) (1.17 Right OD Coil)	0.042 (Left OD Coil) 0.052 (Right OD Coil) (1.07 Left OD Coil) (1.32 Right OD Coil)
(mm)	(.89)	(.89)	(.97)	(.97)		
OUTDOOR COIL						
Rows... Fins/in.	2...21	2...21	2...21	2...21	2...21	2...21
face area (sq. ft.)	12.3	12.0	13.6	15.4	17.4	19.3
OUTDOOR FAN						
Nominal Airflow (CFM)	2700	2700	2800	2800	3300	3300
Diameter (in.)	22	22	22	22	22	22
(mm)	559	559	559	559	559	559
Motor HP (RPM)	1/8 (825)	1/8 (825)	1/8 (825)	1/8 (825)	1/4 (1100)	1/4 (1100)
INDOOR COIL						
Rows... Fins/in.	3...15	3...15	4...15	3...15	4...15	4...15
face area (sq. ft.)	3.7	3.7	3.7	4.7	4.7	5.7
INDOOR BLOWER						
Nominal Airflow (CFM)	800	1000	1100	1400	1450	1750
Size (in.)	10x10	10x10	11x10	11x10	11x10	11x10
(mm)	254x254	254x254	279x254	279x254	279x254	279x254
Motor (HP)	1/2	1/2	3/4	3/4	3/4	1.0
HIGH-PRESSURE SWITCH (psig)	650±15					
Cutout	420±25					
Reset (Auto)						
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)	20±5					
Cutout	45±10					
Reset (Auto)						
RETURN-AIR FILTERS throwaway* (in.)	20x20x1		20x24x1		24x30x1	
(mm)	508x508x25		508x610x25		610x762x25	

\*Required filter sizes shown are based on the larger of the ARI (Air conditioning and Refrigeration Institute) rated cooling airflow or the heating airflow velocity of 300 ft/minute for throwaway type or 450 ft/minute for high-capacity type. Air filter pressure drop for non-standard filters must not exceed 0.08 in. wc.

**Table 2 – Minimum Airflow for Reliable Electric Heater Operation (Cfm)**

UNIT-50XZ	024	030	036	042	048	060
AIRFLOW	750	1025	1250	1400	1710	1800

**EASY SELECT™ - 50XZ**

**EASY SELECT CONFIGURATION TAPS FOR 50XZ**

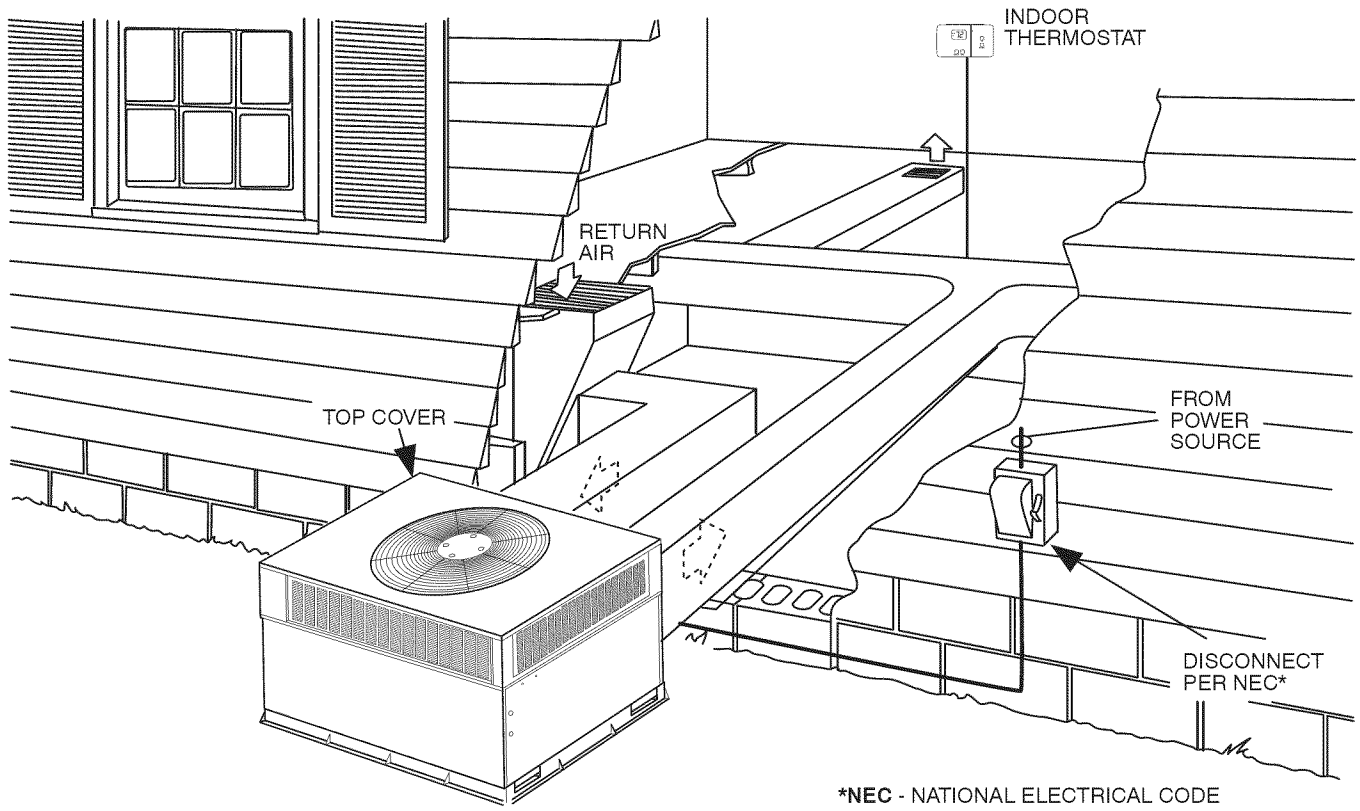
Easy Select taps are used by the installer to configure a system. The ECM motor uses the selected taps to modify its operation to a pre-programmed table of airflows. The unit must be configured to operate properly with system components with which it is installed. To successfully configure a basic system (see information printed on circuit board label located next to select pins), move the 6 select wires to the pins which match the components used.

- a. AUX HEAT kW/CFM-SELECT HEATER RANGE FOR SIZE OF ELECTRIC HEATER INSTALLED  
Installer must select the auxiliary heat airflow approved for application with kW size heater installed. If no heater is installed, this step can be skipped. Each select pin is marked with a range of heaters for which airflow

(also marked), is approved. For increased comfort, select the narrowest kW range matching the heater size, for example, 0-10 for 10-kW heater. This airflow must be greater than the minimum for CFM for electric heater application with the size system installed for safe and continuous operation. (See Tables 3, 4, 5, 6 & 7 for airflow delivery and minimum CFM.) Note that airflow marked is the airflow which will be supplied in emergency heat mode and heating mode on air conditioners when electric heat is the primary heating source. In heat pump heating mode when electric heaters are energized, the ECM will run the higher of heat pump heating airflow and electric heater airflow to ensure safe heater operation. The factory selection is the largest heater range approved (See Fig. 19, A as indicated).

**50XZ**

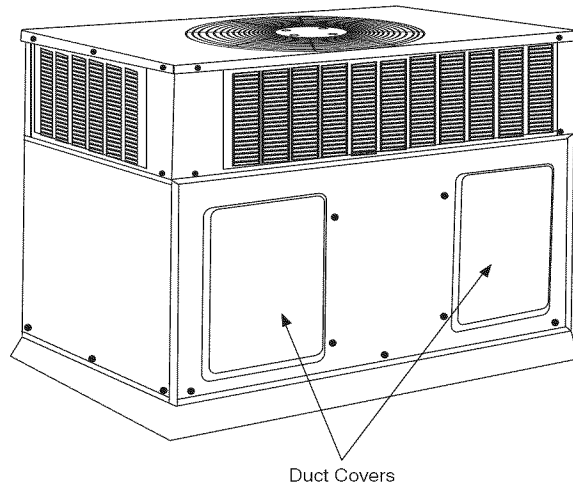
50XZ



\*NEC - NATIONAL ELECTRICAL CODE

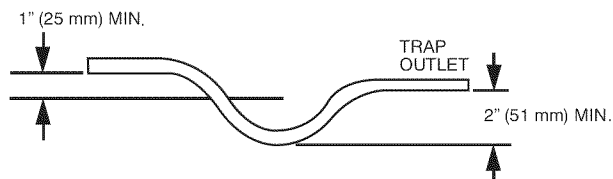
C00063

Fig. 10 - Typical Installation



C00092

Fig. 11 - 50XZ with Duct Covers On



A08001

Fig. 12 - Condensate Trap

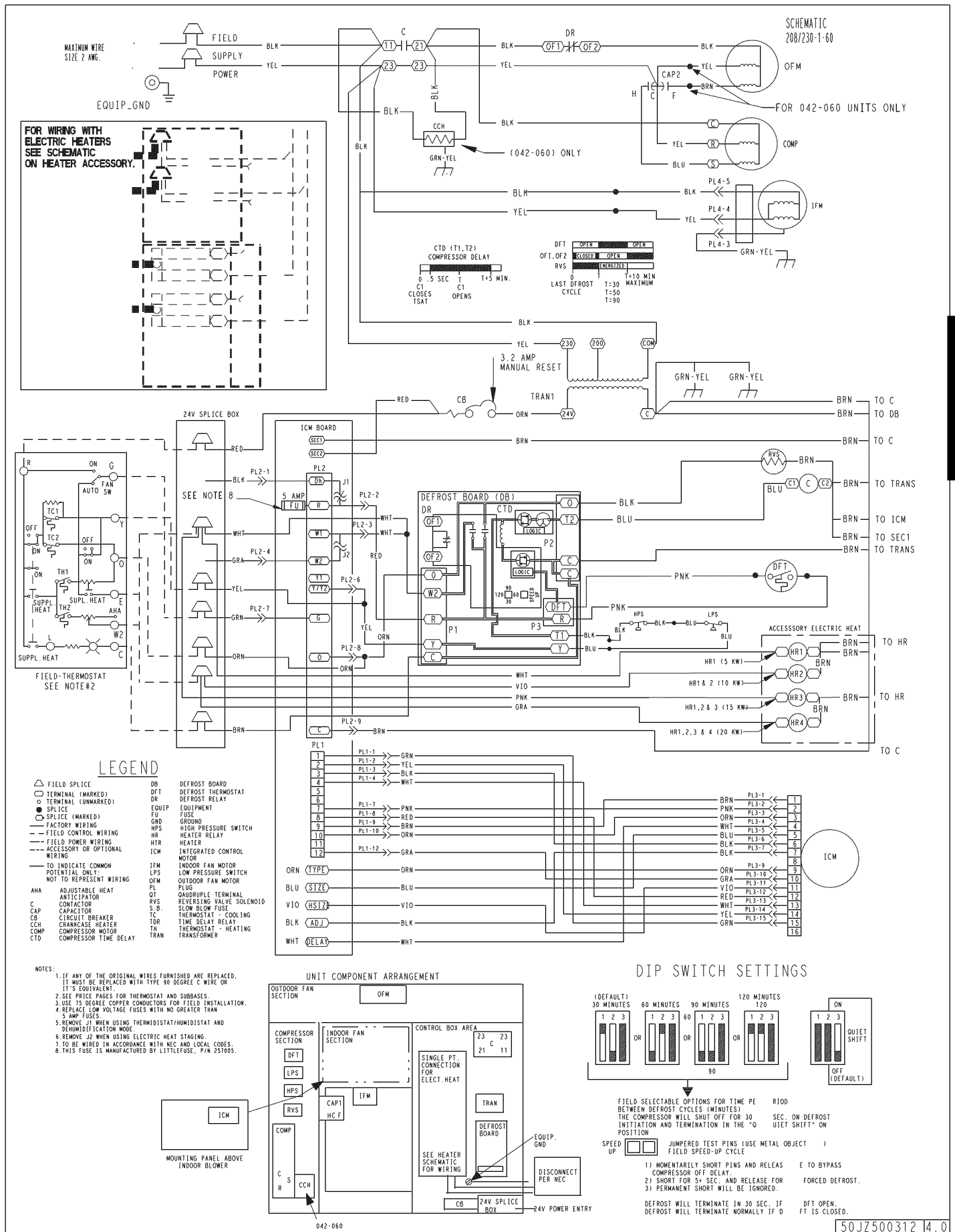


Fig. 13 - Wiring Schematics - 50XZ Single Phase

50XZ

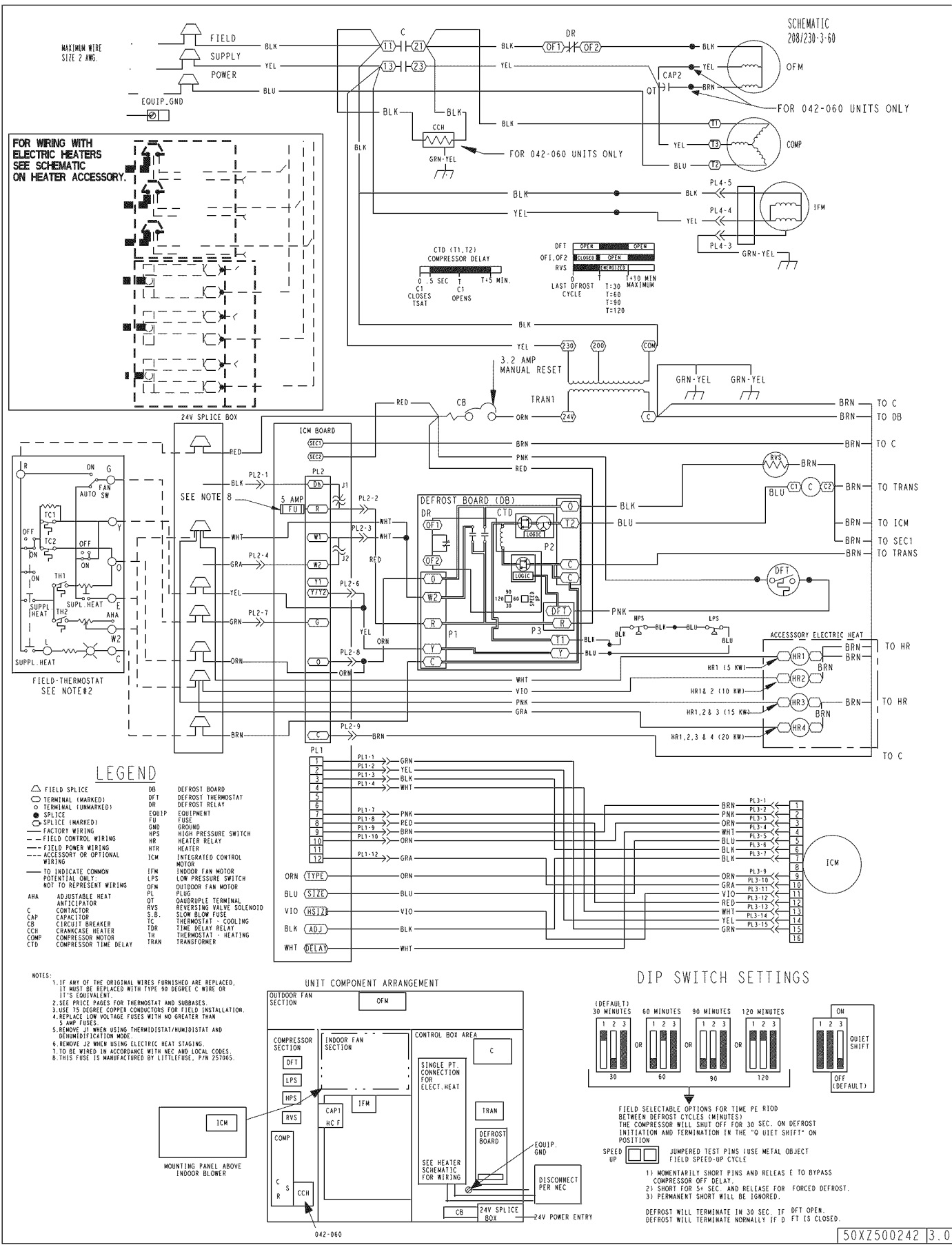
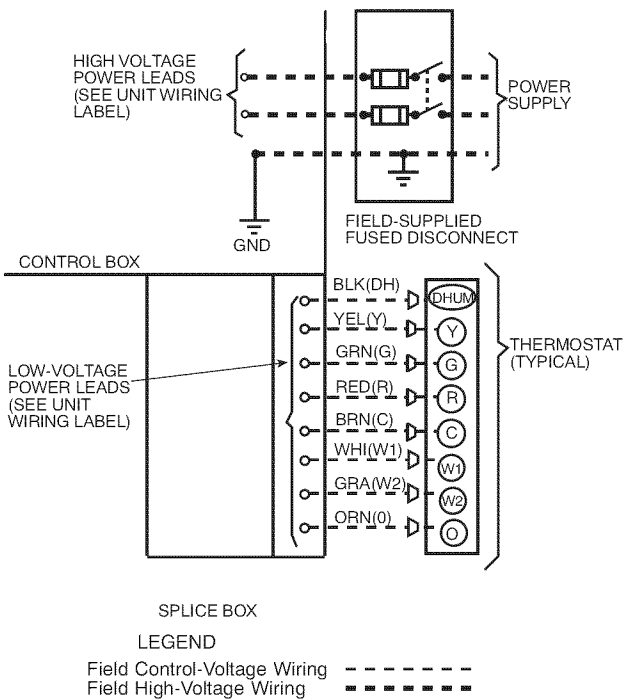
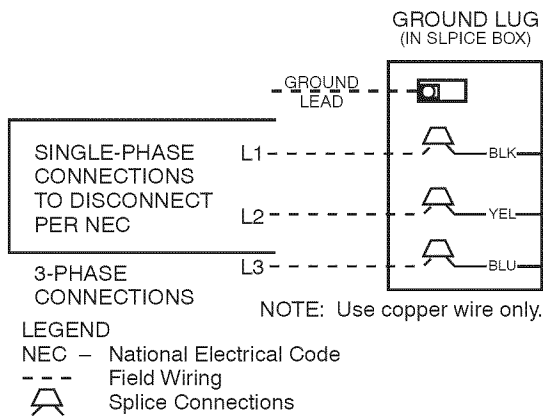


Fig. 14 - Wiring Schematics - 50XZ Three Phase



**Fig. 15 - High and Control Voltage Wiring Connections**

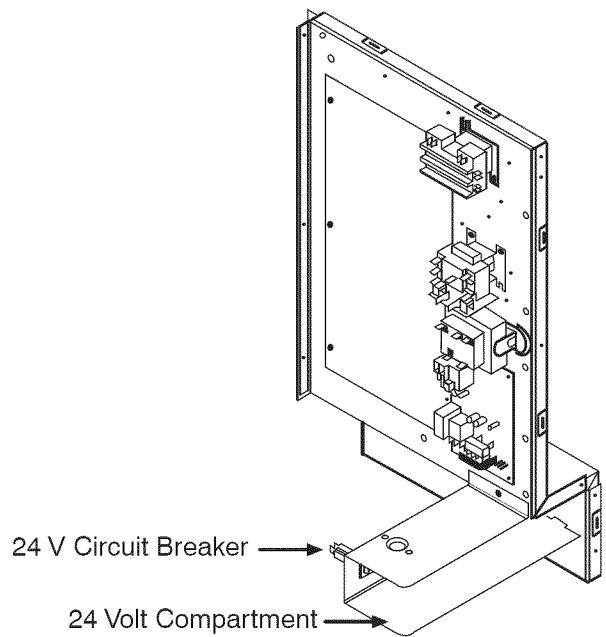
A08472



**Fig. 16 - Line Power Connections**

C99057

- b. **AC/HP SIZE-SELECT SYSTEM SIZE INSTALLED**  
The factory setting for air conditioner or heat pump size is the size which matches the model of packaged unit installed. Installer should verify air conditioner or heat pump size to ensure that airflow delivered falls within proper range for the size unit installed. This applies to all operational modes with the exception of electric heat modes (See Fig. 19, B as indicated).
- c. **SYSTEM TYPE-SELECT SYSTEM TYPE INSTALLED**  
The type of system will be factory selected (see below for details):
  - (1.) AC-Air conditioner
  - (2.) HP-COMFORT-Heat Pump Comfort provides approximately 315 CFM per ton for higher normal heating air delivery temperature and provides approximately 350 CFM per ton cooling airflow for good humidity removal.



**Fig. 17 - Control Wiring Plate**

C99070

- (3.) HP-EFF (Factory Selected for 50XZ)- Heat Pump Efficiency provides same airflow for heating and cooling modes to increase overall HP efficiency; approximately 350 CFM per ton.
- d. **AC/HP CFM ADJUST-SELECT NOMINAL, LOW, OR HIGH AIRFLOW**  
The AC/HP CFM Adjust select is factory set to the High-Hi (NOM for 060) tap. The CFM Adjust selections NOM/LO will regulate airflow supplied for all operational modes, except non-heat pump heating modes. HI provides 15 percent airflow over nominal unit size selected and LO provides 10 percent airflow below nominal unit size selected. CFM Adjust selection options are provided to adjust airflow supplied to meet individual installation needs for such things as noise, comfort, and humidity removal (See Fig. 19, D as indicated).
- e. **ON/OFF DELAY-SELECT DESIRED TIME DELAY PROFILE**  
Four motor operation delay profiles are provided to customize and enhance system operation (See Fig. 19, E as indicated).  
Selection options are:
  - (1.) The standard 90 sec off delay (Factory Setting) at 100 percent airflow in cooling or heat pump heating mode.
  - (2.) A 30 sec cooling delay with no airflow, 90 sec off delay at 100 percent airflow profile is used when it is desirable to allow system coils time to heat-up/cooldown in conjunction with the airflow in cooling or heat pump heating mode.
  - (3.) A no delay option used for servicing unit or when a thermostat is utilized to perform delay functions.
  - (4.) ENH, enhanced selection, provides a 30 sec cooling on delay with no airflow, plus 150 sec at 70 percent airflow and no off delay for added comfort. This will minimize cold blow in heat pump operation and could enhance system efficiency.
- f. **CONTINUOUS FAN—SELECT DESIRED FAN SPEED WHEN THERMOSTAT IS SET ON CONTINUOUS FAN**

**50XZ**

- (1.) LO speed—Factory setting, 50 percent cooling mode airflow.
- (2.) MED speed—Move connector to MED, 65 percent cooling mode airflow.
- (3.) HI speed—Move connector to HI, 100 percent cooling mode airflow (See Fig. 19, F as indicated).

**g. LOW-VOLTAGE CIRCUIT FUSING AND REFERENCE**

The low-voltage circuit is fused by a board-mounted 5-amp automotive fuse placed in series with the transformer SEC2 and the R circuit. The C circuit of the transformer is referenced to chassis ground through a printed circuit run at SEC1 connected to metal standoff marked with ground symbol.

**h. BASIC UNIT CONFIGURATION**

The following basic configuration of the indoor motor will provide ARI rated performance of the System. This BASIC CONFIGURATION should be used when the rated ARI performance is required, or if system enhancements such as super dehumidify are not needed.

- (1.) AUX HEAT kW/CFM—Select the heater range for the size of electric heater installed (skip this step if no heater is installed).
- (2.) AC/HP SIZE—Factory selected to match system size installed, please verify.
- (3.) SYSTEM TYPE—Factory selected HP-EFF (for unit 50XZ).
- (4.) AC/HP CFM ADJUST—Select HIGH for 042 & 048, NOM for 036 & 060, and LO for 024 & 030.
- (5.) ON/OFF DELAY—Select 0/90 profile.
- (6.) CONTINUOUS FAN—Select desired fan speed when thermostat is set to continuous fan.

**i. COMFORT OPTIONS—SUPER DEHUMIDIFY (See Quick Reference Guide)**

The Super Dehumidify option is possible when this unit is installed with a field supplied Thermidstat control (Super Dehumidify does not require an outdoor temperature sensor). The following configuration is recommended for maximum cooling/dehumidifying comfort: This configuration will improve the comfort provided by the air conditioning system if more humidity removal is desired. While providing this improved comfort, the system will operate efficiently, but not at the published HSPF or ARI SEER efficiency. The following system configuration is recommended for maximum heating and cooling/dehumidifying comfort (See Fig. 19-21).

- (1.) AUX HEAT kW/CFM—Select the narrowest heater range to match size of electric heater installed (skip this step if no heater is installed).
- (2.) AC/HP Size—Factory selected to match system size installed, please verify.
- (3.) SYSTEM TYPE—Select system type HP-COMFORT (for heat pump system) or AC (for air conditioner system).
- (4.) AC/HP CFM ADJUST—Select NOM (Lo for 060).
- (5.) ON/OFF DELAY—Select ENH profile.
- (6.) CONTINUOUS FAN—Select desired fan speed when thermostat is set to continuous fan.
- (7.) DEHUMIDIFY MODE—Remove J1 jumper to activate.
- (8.) LOW VOLTAGE CONNECTIONS—Make connections as shown in ELECTRICAL CONNECTIONS section.

**TRANSFORMER CONTAINS A MANUAL  
RESET OVERCURRENT PROTECTOR**

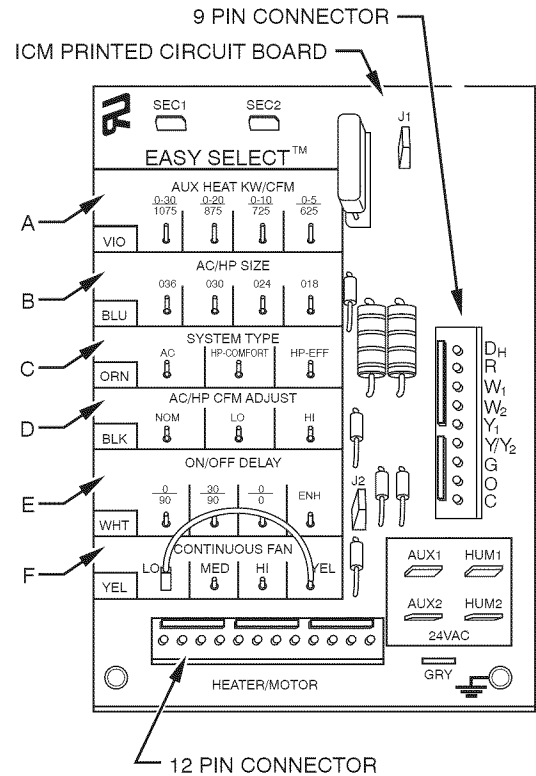
**IT WILL NOT AUTOMATICALLY RESET**

**DISCONNECT POWER PRIOR TO  
SERVICING**

**THIS COMPARTMENT MUST BE CLOSED  
EXCEPT WHEN SERVICING**

C99058

**Fig. 18 - Transformer Label**



C01033

**Fig. 19 - Detail of SPP Printed-Circuit Board**

- (9.) CONFIGURE THERMIDSTAT™ (or capable zoning system)—Following its installation instructions for Super Dehumidify and Super Comfort Heat operation.

This configuration provides the following comfort enhancements:

- a. A 30 sec blower on delay with 150 sec at 70 percent airflow to allow the indoor coil to warm up or cool down before the blower is asked to deliver 100 percent airflow reducing the cold blow sensation at start up in heating and allowing the indoor coil to more quickly reach wet coil operating conditions in cooling.
- b. A no blower off delay eliminates cold blow which may be associated with running the blower after shut down of the compressor and avoids reevaporation of condensed moisture after cooling/dehumidifying operation.
- c. Lower airflow while the compressor is running to reduce draft effects and increase heating air temperature and improved humidity control during cooling operation.

## ACCESSORY INSTALLATION

- a. **ACCESSORY ELECTRIC HEATERS**  
Electric heaters may be installed with the 50XZ units per instructions supplied with electric heater package. See unit rating plate for factory-approved electric heater kits.
- b. **AUXILIARY TERMINALS**  
The AUX and HUM terminals on the Easy Select Board are tied directly to the G terminal, and provide a 24-v. signal whenever the G terminal is energized (See Fig. 19). During Super dehumidify mode, the G signal is not present and the auxiliary terminals are not energized. If the installation includes the use of the operating mode, do not use these terminals to control accessories. See Electronic Air Cleaner and Humidifier sections for further information.
- c. **ELECTRONIC AIR CLEANER CONNECTIONS**  
The AUX1 and AUX2 terminals are not always energized during blower operations, as described above. When using an electronic air cleaner with the unit, use Airflow Sensor (See Air Cleaner Price Pages for Part Number). The airflow sensor turns on electronic air cleaner when the blower is operating.
- d. **HUMIDIFIER/HUMIDISTAT CONNECTIONS**  
Easy Select™ Board terminals HUM1 and HUM2 are provided for direct connection to the low-voltage control of a humidifier through a standard humidistat (See Fig. 19-21). These terminals are energized with 24-v. when G thermostat signal is present. (See Fig. 19-21). Alternately, the 24-v. signal may be sourced from the W and C circuit board connections. When using a Thermidistat™ Control, Zone Comfort Plus or Comfort Zone II, the 24-v. signal may be sourced directly from the Thermidistat™ HUM terminal.

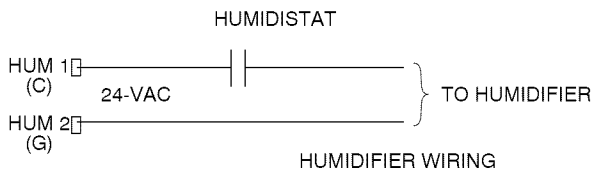


Fig. 20 - Humidifier Wiring for 50XZ

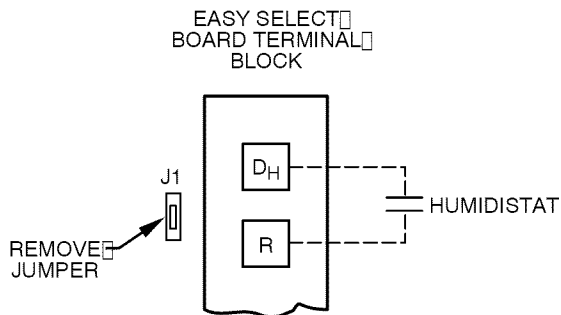


Fig. 21 - Humidistat Wiring for De-Humidify Mode for 50XZ

- e. **DEHUMIDIFY CAPABILITY WITH STANDARD HUMIDISTAT CONNECTION**  
Latent capacities for these units are better than average systems. If increased latent capacity is an application requirement, the circuit board provides connection terminals for use of a standard humidistat. The unit will detect the humidistat contacts opening on increasing humidity and reduce its airflow to approximately 80 percent of nominal cooling mode airflow. This reduction will increase the system latent capacity until the humidity falls to a level which causes the humidistat to

close its contacts. When the contacts close, the airflow will return to 100 percent of selected cooling airflow. To activate this mode, remove jumper J1 and wire in a standard humidistat (See Fig. 19-21).

### f. DEHUMIDIFY AND SUPER DEHUMIDIFY CAPABILITIES

These models are capable of responding to a signal from indoor system control (thermostat, Thermidistat, zoning control) to operate in comfort control modes such as Super Dehumidify Mode. Consult literature provided with indoor system control to determine if these operating modes are available, and to see control set up instructions. No special setup or wiring of unit is required.

## 50XZ SEQUENCE OF OPERATION

- a. **CONTINUOUS FAN**  
(1.) Thermostat closes circuit R to G-The Blower runs at continuous fan airflow.
- b. **COOLING MODE-LOW HUMIDITY**  
(1.) If indoor temperature is above temperature set point and humidity is below humidity set point, thermostat closes circuits R to G, R to Y/Y2 and R to O-The unit delivers cooling airflow.
- c. **COOLING MODE-DEHUMIDIFICATION**  
(1.) If indoor temperature is above temperature set point and humidity is above humidity set point, thermostat or Thermidistat closes circuits R to G, R to O, and R to Y/Y2 and humidistat or Thermidistat opens R to DH-The unit delivers airflow which is approximately 80 percent of the nominal cooling airflow to increase the latent capacity of the system.
- d. **COOLING MODE-SUPER DEHUMIDIFY OPERATION** (see quick reference guide)

**NOTE:** The indoor control used, such as a Thermidistat, must be capable of providing Super Dehumidify operation mode and control must be configured as outlined in its installation instructions. Consult indoor control literature to determine if control is capable of providing Super Dehumidify inputs and for configuration instruction.

- (1.) If the indoor temperature is below the temperature set point and the humidity is above the humidity set point, the Thermidistat closes circuit R to O, opens circuits R to DH and R to G, and cycles circuit R to Y/Y2. If circuit R to G is closed (24-v.), the motor will deliver airflow at the full cooling or cooling plus dehumidify mode requested value. If circuit R to G is open (0-v.) for super dehumidify mode, the motor delivers reduced airflow to maximize the humidity removal of the system while minimizing over cooling.
- e. **ELECTRIC HEATING MODE**  
(1.) Thermostat closes circuit R to W/W1, or W2-The unit delivers the selected electric heat airflow. There are no on or off delays.
- f. **HEAT PUMP HEATING MODE**  
(1.) Thermostat closes circuits R to G and R to Y/Y2-The unit delivers selected heat pump heating airflow.
- g. **HEAT PUMP HEATING WITH AUXILIARY ELECTRIC HEAT**  
(1.) Thermostat closes circuits R to G, R to Y/Y2 and R to W/W1 or W2 (and R to O in the case of defrost).  
In the event that electric heating is called for by the thermostat while the heat pump is also operating in

either heating or defrost modes, the motor will modify its airflow output, if necessary, to provide an airflow which is defined as safe for the operation of the electric heater during heat pump operation. That airflow is the greater of the heat pump heating airflow and the electric heater only airflow.

#### h. HEATING MODE-SUPER COMFORT HEAT OPERATION

**NOTE:** The indoor control used, such as a Thermidistat, must be capable of providing Super Comfort Heat operation mode and control must be configured as outlined in its installation instructions. The system must be installed with appropriate outdoor temperature sensor. Consult indoor control literature to determine if control is capable and for configuration instructions. Consult indoor control instructions and sensor instructions for sensor installation details.

If the outdoor temperature is in the range of 12°F to 40°F (-11°C to 4°C), the Thermidistat closes circuit R to Y/Y2 and opens circuit R to G. If circuit R to G is closed (24-v.), the motor will deliver airflow at the full heating requested value. If circuit R to G is open (0-v.) for maximum heating comfort, the motor delivers reduced airflow to maximize the temperature and minimize the draft effect of the heated air leaving the unit.

#### SPECIAL PROCEDURES FOR 208-V OPERATION

1. Be sure unit disconnect switch is open.
2. Disconnect the yellow primary lead (w 110) from the transformer. See unit wiring label. (See Fig. 13 or 14 and 17.)
3. Connect the yellow primary lead (w110) to the transformer terminal labeled 200-v.

#### PRE-START-UP

### **⚠ WARNING**

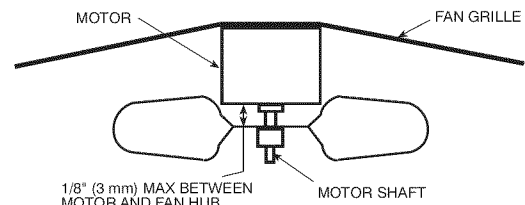
#### **FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury, death or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected and tagged.
4. Relieve and recover all refrigerant from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
  - a. Shut off electrical power to unit and install lockout tag.
  - b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
  - c. Cut component connecting tubing with tubing cutter and remove component from unit.
  - d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Use the Start-Up Checklist supplied at the end of this book and proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
  - a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
  - b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following Check for Refrigerant Leaks section.
  - c. Inspect all field and factory-wiring connections. Be sure that connections are completed and tight.
  - d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
  - a. Make sure that outdoor-fan blade is correctly positioned in fan orifice.
  - b. Make sure that air filter(s) is in place.
  - c. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
  - d. Make sure that on the 060 size, only the 2 wire ties fastened to the outdoor coils and reversing valve/accumulator have been removed.
  - e. Make sure that all tools and miscellaneous loose parts have been removed.
5. Compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts.
6. Each unit system has 2 Schrader-type ports, one low-side Schrader fitting located on the suction line, and one high-side Schrader fitting located on the compressor discharge line. Be sure that caps on the ports are tight.



A08474

**Fig. 22 - Fan Blade Clearance**

#### **Step 1 — Start-Up**

#### **CHECKING COOLING AND HEATING CONTROL OPERATION**

Start and check the unit for proper control operation as follows:

- (1.) Place room thermostat SYSTEM switch or MODE control in OFF position. Observe that blower motor starts when FAN mode is placed in FAN ON position and shuts down according to time delay selected on the Easy Select board (See Easy Select Section) when FAN MODE switch is placed in AUTO position.
- (2.) Thermostat:
 

When the room temperature rises to a point that is slightly above the cooling control setting of the thermostat, the thermostat completes the circuit between thermostat terminal R to terminals Y, O and G. These completed circuits through the thermostat connect contactor coil (C) (through unit



wire Y) and ECM board (through unit wire G) across the 24-v. secondary of transformer (TRAN). Thermostat or Thermostat and Humidistat: When the room temperature rises to a point that is slightly above the cooling control setting of the thermostat, the thermostat completes the circuit between thermostat terminal R to terminals Y, O, DH, and G. These completed circuits through the thermostat connect contactor coil (C) (through unit wire Y) and ECM board (through unit wire G) across the 24-v. secondary of transformer (TRANS).

- (3.) Place system switch or MODE control in HEAT position. Set control above room temperature. Observe that compressor, outdoor fan, and indoor blower motors start. Observe that heating cycle shuts down according to time delay selected on the Easy Select board (See Easy Select Section) when control setting is satisfied.
- (4.) When using an automatic changeover room thermostat place both SYSTEM or MODE control and FAN mode switches in AUTO positions. Observe that unit operates in Cooling mode when temperature control is set to "call for Cooling" (below room temperature), and unit operates in Heating mode when temperature control is set to "call for Heating" (above room temperature).

**NOTE:** Once the compressor has started and then has stopped, it should not be started again until 5 minutes have elapsed. The cooling cycle remains "on" until the room temperature drops to point that is slightly below the cooling control setting of the room thermostat. At this point, the thermostat "breaks" the circuit between thermostat terminal R to terminals Y and G. These open circuits de-energize contactor coil C and ECM board. The condenser and compressor motors stop. After the time delay setting selected on the Easy Select board (See Easy Select Section), the blower motor stops. The unit is in a "standby" condition, waiting for the next "call for cooling" from the room thermostat. The 5 minute compressor delay also applies to heat pump heating mode.

## Step 2 — Check for Refrigerant Leaks

Locate and repair refrigerant leaks and charge the unit as follows:

1. Use both high- and low-pressure ports to relieve system pressure and reclaim remaining refrigerant.
2. Repair leak following accepted practices.

**NOTE:** Install a bi-flow filter drier whenever the system has been opened for repair.

3. Check system for leaks using an approved method.
4. Evacuate refrigerant system and reclaim refrigerant if no additional leaks are found.
5. Charge unit with R-410A refrigerant, using a volumetric charging cylinder or accurate scale. Refer to unit rating plate for required charge.

## Step 3 — Start-Up Adjustments

Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the unit in Cooling mode when the outdoor temperature is below 40°F (4°C) (unless accessory low-ambient kit is installed). Do not rapid-cycle the compressor. Allow 5 min. between "on" cycles to prevent compressor damage.

## CHECKING COOLING AND HEATING CONTROL OPERATION

Start and check the unit for proper control operation as follows:

1. Place room thermostat SYSTEM switch or MODE control in OFF position. Observe that blower motor starts when FAN mode is placed in FAN ON position and shuts down within 60 sec (030-060 size) or 30 sec (024 size) when FAN MODE switch is placed in AUTO position.
2. Place system switch or MODE control in HEAT position. Set control above room temperature. Observe that compressor, outdoor fan, and indoor blower motors start. Observe that heating cycle shuts down when control setting is satisfied.

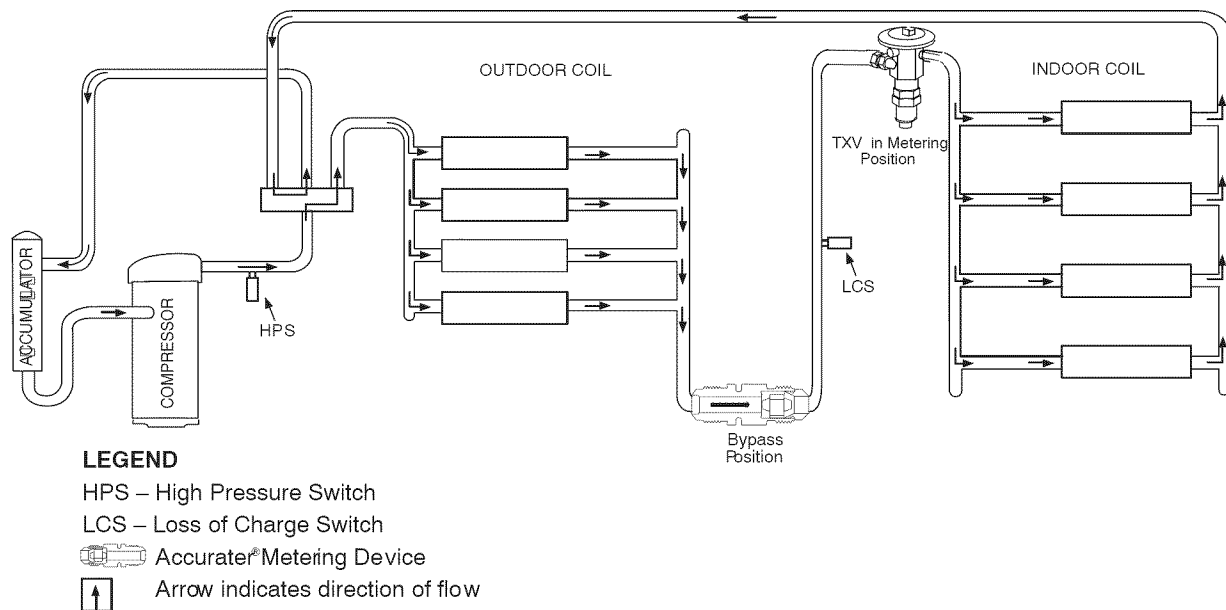


Fig. 23 - Typical Heat Pump Operation, Cooling Mode

- When using an automatic changeover room thermostat, place both SYSTEM or MODE control and FAN mode switches in AUTO positions. Observe that unit operates in Cooling mode when temperature control is set to "call for Cooling" (below room temperature), and unit operates in Heating mode when temperature control is set to "call for Heating" (above room temperature).

**IMPORTANT:** Three-phase, scroll compressors are direction oriented. Unit must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, the difference between compressor suction and discharge pressures may be zero.

**CHECKING AND ADJUSTING REFRIGERANT CHARGE**

The refrigerant system is fully charged with R-410A refrigerant and is tested and factory sealed.

**NOTE:** Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-410A charge. The charging label and the tables shown refer to system temperatures and pressures in Cooling mode, only. A refrigerant charging label is attached to the outside of the service access door. If charge level is suspect in Heating mode, reclaim all refrigerant and charge to nameplate amount. (This information may be obtained from the physical data table also.)

**IMPORTANT:** When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

**REFRIGERANT CHARGE**

The amount of refrigerant charge is listed on the unit nameplate and/or the physical data table. Refer to the Refrigeration Service Techniques Manual, Refrigerants Section.

**NO CHARGE**

Check for leak. Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to system data plate).

**LOW CHARGE COOLING**

Use Cooling Charging Chart (Fig. 26). Vary refrigerant until the conditions of the chart are met. Note that charging charts are different from type normally used. Charts are based on charging the units to correct subcooling for the various operating conditions. Accurate pressure gauge and temperature sensing devices are required. Connect the pressure gauge to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that the outdoor ambient does not affect the reading. Indoor air CFM must be within the normal operating range of the unit.

**TO USE COOLING CHARGING CHARTS**

Take the liquid line temperature and read the manifold pressure gauges. Refer to the chart to determine what the liquid line temperature should be.

**NOTE:** If the problem causing the inaccurate readings is a refrigerant leak, refer to Check for Refrigerant Leaks section.

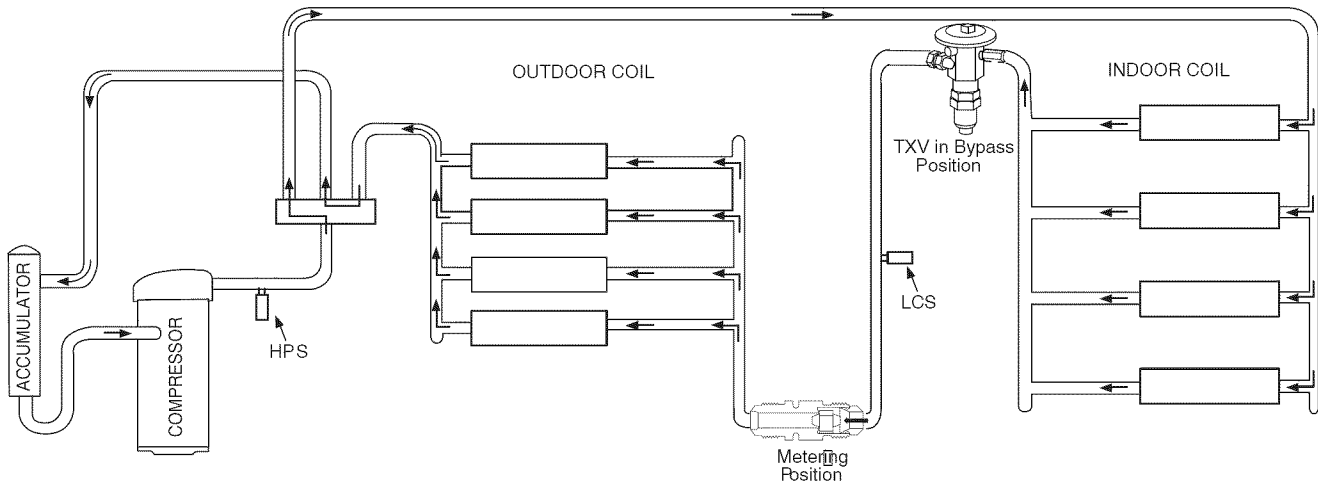
**INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS**

**▲ WARNING**

**PERSONAL INJURY AND UNIT DAMAGE HAZARD**

Failure to follow this warning could result in personal injury or death and possible unit component damage.

The heating and cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity. For units with optional electric heat, the airflow must not be reduced below the levels stated in Table 2.



**LEGEND**

- HPS – High Pressure Switch
- LCS – Loss of Charge Switch
- Accurater® Metering Device
- Arrow indicates direction of flow

**Fig. 24 - Typical Heat Pump Operation, Heating Mode**

Tables 3 & 4 show both heating and cooling airflows. Refer to these tables to determine the airflow for the system being installed.

**NOTE:** Be sure that all supply-and return-air grilles are open, free from obstructions, and adjusted properly.

Airflow can be changed by changing the set up pins on the Easy Select board.

Unit 50XZ utilizes state of the art ECM (Electronic Computed Motor) ID Blower Motors.

## Step 4 — Defrost Control

### QUIET SHIFT

Quiet Shift is a field-selectable defrost mode, which will eliminate occasional noise that could be heard at the start of defrost cycle and restarting of heating cycle. It is selected by placing DIP switch 3 (on defrost board) in ON position.

When Quiet Shift switch is placed in ON position, and a defrost is initiated, the following sequence of operation will occur. Reversing valve will energize, outdoor fan will turn off, compressor will turn off for 30 sec and then turn back on to complete defrost. At the start of heating after conclusion of defrost reversing valve will de-energize, compressor will turn off for another 30 sec, and the outdoor fan will stay off for 40 sec, before starting in the Heating mode.

### DEFROST

The defrost control is a time/temperature control which includes a field-selectable time period (DIP switch 1 and 2 on the board) between defrost cycles of 30, 60, 90, or 120 minutes (factory set at 30 minutes). To initiate a forced defrost, two options are available depending on the status of the defrost thermostat.

If defrost thermostat is closed, speedup pins (J1) must be shorted by placing a flat head screw driver in between for 5 sec and releasing, to observe a complete defrost cycle. When the Quiet Shift switch is selected, compressor will be turned off for two 30 sec intervals during this complete defrost cycle, as explained previously. When Quiet Shift switch is in factory default OFF position, a normal and complete defrost cycle will be observed.

If defrost thermostat is in open position, and speedup pins are shorted (with a flat head screw driver) for 5 sec and released, a short defrost cycle will be observed (actual length is dependent upon the selected Quiet Shift position). When Quiet Shift switch is in ON position, the length of defrost is 1 minute (30 sec compressor off period followed by 30 sec of defrost with compressor operation). On return to heating operation, compressor will again turn off for an additional 30 sec and the outdoor fan for 40 sec. When the Quiet Shift is in OFF position, only a brief 30 sec. cycle will be observed.

50XZ

**Table 3 – 50XZ Cooling & Heating Dry Coil ECM Airflow  
Small Cabinet**

UNIT SIZE	CFM ADJUST PIN SELECT	LO PIN			NOM PIN			HI PIN		
	EXTERNAL STATIC PRESSURE RANGE (in. wc)	0.0–0.39	0.4–0.69	0.7–1.0	0.0–0.39	0.4–0.69	0.7–1.0	0.0–0.39	0.4–0.69	0.7–1.0
024	COOLING*	800	725	–	885	805	730	990	930	855
	COOLING DEHUMIDIFY	715	670	–	715	695	645	795	775	745
	HEAT PUMP COMFORT	720	660	–	790	745	685	890	850	785
030	COOLING*	1010	920	825	1105	1030	930	1255	1160	1050
	COOLING DEHUMIDIFY	890	845	795	890	865	825	1010	980	925
	HEAT PUMP COMFORT	945	850	765	1020	965	895	1140	1105	995
036	COOLING*	1110	1025	970	1235	1175	1115	1400	1355	1280
	COOLING DEHUMIDIFY	990	960	910	990	975	940	1125	1110	1085
	HEAT PUMP COMFORT	1035	975	910	1160	1080	1020	1305	1275	1220

\*Heat Pump Efficiency and Cooling pin selections deliver equal airflow

**Table 4 – 50XZ Cooling & Heating Dry Coil ECM Airflow  
Large Cabinet**

UNIT SIZE	CFM ADJUST PIN SELECT	LO PIN	NOM PIN	HI PIN
	EXTERNAL STATIC PRESSURE RANGE (in. wc)	0.1–1.0	0.1–1.0	0.1–1.0
042	COOLING*	1100	1225	1410
	COOLING DEHUMIDIFY	980	980	1125
	HEAT PUMP COMFORT	990	1100	1265
048	COOLING*	1260	1400	1610
	COOLING DEHUMIDIFY	1120	1120	1290
	HEAT PUMP COMFORT	1135	1260	1450
060	COOLING*	1575	1750	2010
	COOLING DEHUMIDIFY	1400	1400	1610
	HEAT PUMP COMFORT	1415	1575	1810

\*Heat Pump Efficiency and Cooling pin selections deliver equal airflow

**Table 5 – ECM Wet Coil Pressure Drop (in. wc)**

UNIT SIZE	STANDARD CFM (SCFM)															
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
024	0.005	0.007	0.010	0.012	0.015	–	–	–	–	–	–	–	–	–	–	–
030	–	0.007	0.010	0.012	0.015	0.018	0.021	0.024	–	–	–	–	–	–	–	–
036	–	–	–	0.019	0.023	0.027	0.032	0.037	0.042	0.047	–	–	–	–	–	–
042	–	–	–	–	0.014	0.017	0.020	0.024	0.027	0.031	0.035	0.039	0.043	–	–	–
048	–	–	–	–	–	–	0.027	0.032	0.036	0.041	0.046	0.052	0.057	0.063	0.068	–
060	–	–	–	–	–	–	–	–	–	0.029	0.032	0.036	0.040	0.045	0.049	0.053

If it is desirable to observe a complete defrost in warmer weather, the defrost thermostat must be closed as follows.

1. Turn off power to outdoor unit.
2. Disconnect outdoor fan motor lead from OF2 on control board. (See Fig. 27) Tape to prevent grounding.
3. Restart unit in Heating mode, allowing frost to accumulate on outdoor coil.
4. After a few minutes in Heating mode, liquid line temperature should drop below closing point of defrost thermostat (approximately 30°F) (-1°C).

**NOTE:** Unit will remain in defrost until defrost thermostat reopens at approximately 80°F (27°C) coil temperature at liquid line or remainder of defrost cycle time.

5. Turn off power to outdoor and reconnect fan motor lead to OF2 on control board after above forced defrost cycle.

## MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This heat pump unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 8.

**NOTE:** TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

### ⚠ WARNING

#### PERSONAL INJURY AND UNIT DAMAGE HAZARD

Failure to follow this warning could result in personal injury or death and unit component damage.

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the Owner's Manual.

### ⚠ WARNING

#### ELECTRICAL SHOCK HAZARD

Failure to follow these warnings could result in personal injury or death:

1. Turn off electrical power to the unit before performing any maintenance or service on this unit.
2. Use extreme caution when removing panels and parts.
3. Never place anything combustible either on or in contact with the unit.

### ⚠ CAUTION

#### UNIT OPERATION HAZARD

Failure to follow this caution may result in improper operation.

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.

3. Inspect blower motor and wheel for cleanliness each cooling season. Clean when necessary.

4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.

## Step 1 — Air Filter

**IMPORTANT:** Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season and twice during the heating season, or whenever the filter becomes clogged with dust and lint.

## Step 2 — Indoor Blower and Motor

**NOTE:** All motors are prelubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

### ⚠ WARNING

#### ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect and tag electrical power to the unit before cleaning and lubricating the blower motor and wheel.

## Step 3 — Outdoor Coil, Indoor Coil, and Condensate Drain Pan

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each year.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent-and-water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain trough is restricted, clear it with a plumbers snake or similar probe device.

**Table 6 – Filter Pressure Drop Table (in. wc)**

FILTER SIZE	CFM																		
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
20X20X1 508X508X25	0.05	0.07	0.08	0.10	0.12	0.13	0.14	0.15	—	—	—	—	—	—	—	—	—	—	—
20X24X1 508x610x25	—	—	—	—	0.09	0.10	0.11	0.13	0.14	0.15	0.16	—	—	—	—	—	—	—	—
24X30X1 610x762x25	—	—	—	—	—	—	—	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18

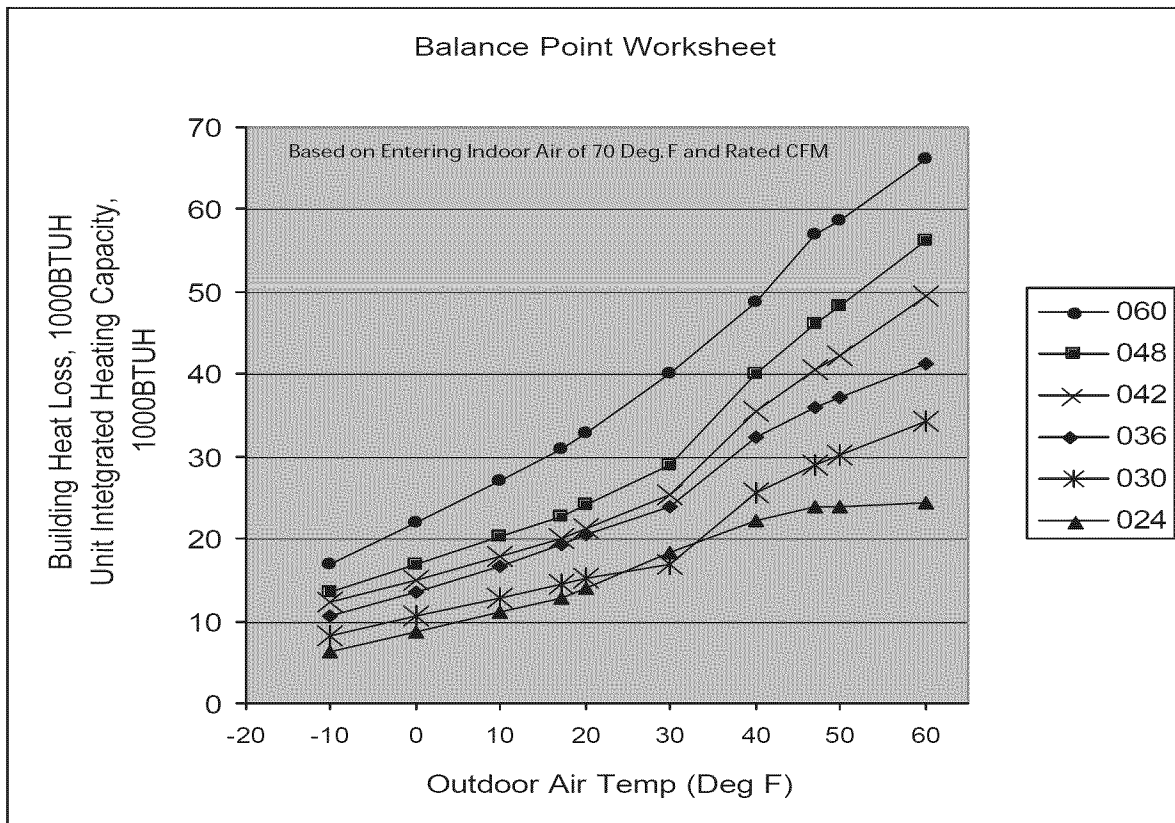
**Table 7 – Electric Heat Pressure Drop Table  
Small Cabinet: 024-036 cfm**

	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
<b>5kw</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07
<b>7.5 kw</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.07	0.09
<b>10 kw</b>	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07	0.09	0.10	0.11
<b>15 kw</b>	0.00	0.00	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18
<b>20 kw</b>	0.00	0.00	0.02	0.04	0.06	0.08	0.09	0.11	0.13	0.15	0.17	0.19

**Electric Heat Pressure Drop Table (in. wc)  
Large Cabinet 042-060 cfm**

	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500
<b>5kw</b>	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12
<b>7.5 kw</b>	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
<b>10 kw</b>	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
<b>15 kw</b>	0.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
<b>20 kw</b>	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16

**50XZ**



**Fig. 25 - 50XZ Balance Point Worksheet**

C03008

50XZ

Required Subcooling of F (oC)						Required Liquid Line Temperature for a Specific Subcooling (R-410A)											
Model Size	Outdoor Ambient Temperature					Pressure (psig)	Required Subcooling (°F)					Pressure (kPa)	Required Subcooling (°C)				
	75 (24)	82 (28)	85 (29)	95 (35)	105 (41)		5	10	15	20	25		3	6	8	11	14
024	10.3 (5.7)	9.8 (5.4)	9.4 (5.2)	9 (5)	8.6 (4.7)	189	61	56	51	46	41	1303	16	13	11	8	5
030	9.3 (5.2)	8.8 (4.9)	8.6 (4.8)	7.8 (4.3)	7 (3.9)	196	63	58	53	48	43	1351	17	15	12	9	6
036	17.6 (9.8)	16.8 (9.3)	16.5 (9.2)	15.4 (8.6)	14.3 (7.9)	203	66	61	56	51	46	1399	19	16	13	10	8
042	12.8 (7.1)	12.7 (7.1)	12.7 (7.1)	12.6 (7)	12.6 (7)	210	68	63	58	53	48	1448	20	17	14	11	9
048	17.5 (9.7)	16.9 (9.4)	16.6 (9.2)	15.7 (8.7)	14.8 (8.2)	217	70	65	60	55	50	1496	21	18	15	13	10
060	13.7 (7.6)	13 (7.2)	13 (7.2)	14.5 (8.1)	11.5 (6.4)	224	72	67	62	57	52	1544	22	19	16	14	11
<b>Charging Procedure</b>						231	74	69	64	59	54	1593	23	20	18	15	12
1- Measure Discharge line pressure by attaching a gauge to the service port.						238	76	71	66	61	56	1641	24	21	19	16	13
2- Measure the Liquid line temperature by attaching a temperature sensing device to it.						245	77	72	67	62	57	1689	25	22	20	17	14
3- Insulate the temperature sensing device so that the Outdoor Ambient doesn't affect the reading.						252	79	74	69	64	59	1737	26	23	21	18	15
4- Refer to the required Subcooling in the table based on the model size and the Outdoor Ambient temperature.						260	81	76	71	66	61	1792	27	25	22	19	16
5- Interpolate if the Outdoor ambient temperature lies in between the table values. Extrapolate if the temperature lies beyond the table range.						268	83	78	73	68	63	1848	29	26	23	20	17
6- Find the Pressure Value in the table corresponding to the the measured Pressure of the Compressor Discharge line.						276	85	80	75	70	65	1903	30	27	24	21	19
7- Read across from the Pressure reading to obtain the Liquid line temperature for a required Subcooling						284	87	82	77	72	67	1958	31	28	25	22	20
8- Add Charge if the measured temperature is higher than the table value.						292	89	84	79	74	69	2013	32	29	26	23	21
						300	91	86	81	76	71	2068	33	30	27	24	22
						309	93	88	83	78	73	2130	34	31	28	26	23
						318	95	90	85	80	75	2192	35	32	29	27	24
						327	97	92	87	82	77	2254	36	33	31	28	25
						336	99	94	89	84	79	2316	37	34	32	29	26
						345	101	96	91	86	81	2378	38	35	33	30	27
						354	103	98	93	88	83	2440	39	36	34	31	28
						364	105	100	95	90	85	2509	40	38	35	32	29
						374	107	102	97	92	87	2578	41	39	36	33	30
						384	108	103	98	93	88	2647	42	40	37	34	31
						394	110	105	100	95	90	2716	44	41	38	35	32
						404	112	107	102	97	92	2785	45	42	39	36	33
						414	114	109	104	99	94	2854	46	43	40	37	34
						424	116	111	106	101	96	2923	47	44	41	38	35
						434	118	113	108	103	98	2992	48	45	42	39	36
						444	119	114	109	104	99	3061	48	46	43	40	37
						454	121	116	111	106	101	3130	49	47	44	41	38
						464	123	118	113	108	103	3199	50	48	45	42	39
						474	124	119	114	109	104	3268	51	48	46	43	40
						484	126	121	116	111	106	3337	52	49	47	44	41
						494	127	122	117	112	107	3406	53	50	47	45	42
						504	129	124	119	114	109	3475	54	51	48	46	43
						514	131	126	121	116	111	3544	55	52	49	46	44
						524	132	127	122	117	112	3612	56	53	50	47	45
						534	134	129	124	119	114	3681	56	54	51	48	45

Fig. 26 - Cooling Charging Table-Subcooling

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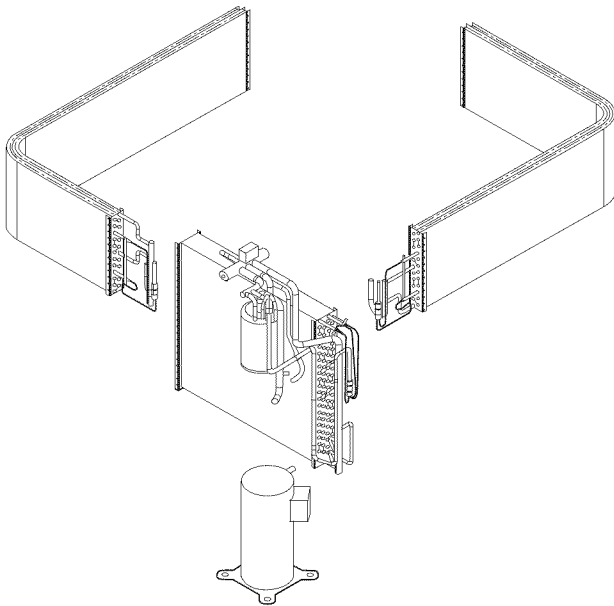


Fig. 28 - Refrigerant Circuit

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### Step 9 — Pressure Switches

Pressure switches are protective devices wired into control circuit (low voltage). They shut off compressor if abnormally high or low pressures are present in the refrigeration circuit. These pressure switches are specifically designed to operate with Puron (R-410A) systems. R-22 pressure switches must not be used as replacements for the Puron (R-410A) system.

### Step 10 — Loss of Charge Switch

This switch is located on the liquid line and protects against low suction pressures caused by such events as loss of charge, low airflow across indoor coil, dirty filters, etc. It opens on a pressure drop at about 20 psig. If system pressure is above this, switch should be closed. To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohm meter leads across switch. You should have continuity on a good switch.

**NOTE:** Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read 0 psig. Never open system without breaking vacuum with dry nitrogen.

### Step 11 — High-Pressure Switch

The high-pressure switch is located in the discharge line and protects against excessive condenser coil pressure. It opens at 650 psig.

High pressure may be caused by a dirty outdoor coil, failed fan motor, or outdoor air recirculation.

To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohm meter leads across switch. You should have continuity on a good switch.

### Step 12 — Copeland Scroll Compressor (Puron Refrigerant)

The compressor used in this product is specifically designed to operate with Puron (R-410A) refrigerant and cannot be interchanged.

#### ⚠ WARNING

##### EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death or property damage.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerant and oils.

The scroll compressor pumps refrigerant throughout the system by the interaction of a stationary and an orbiting scroll. The scroll compressor has no dynamic suction or discharge valves, and it is more tolerant of stresses caused by debris, liquid slugging, and flooded starts. The compressor is equipped with an anti-rotational device and an internal pressure relief port. The anti-rotational device prevents the scroll from turning backwards and replaces the need for a cycle protector. The pressure relief port is a safety device, designed to protect against extreme high pressure. The relief port has an operating range between 550 and 625 psig differential pressure.

### Step 13 — Refrigerant System

This step covers the refrigerant system of the 50XZ, including the compressor oil needed, servicing systems on roofs containing synthetic materials, the filter drier and refrigerant charging.

#### REFRIGERANT

#### ⚠ WARNING

##### PROPERTY HAZARD OR PERSONAL INJURY HAZARD

Failure to follow this warning could result in property damage or personal injury or death.

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure consult the equipment manufacturer.

#### COMPRESSOR OIL

The Copeland scroll compressor uses 3MAF POE oil. If additional oil is needed, use Uniqema RL32-3MAF. If this oil is not available, use Copeland Ultra 32 CC or Mobil Arctic EAL22 CC. This oil is extremely hygroscopic, meaning it absorbs water readily. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oils can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

#### SERVICING SYSTEMS ON ROOFS WITH SYNTHETIC MATERIALS

POE (polyolester) compressor lubricants are known to cause long term damage to some synthetic roofing materials. Exposure, even if immediately cleaned up, may cause embrittlement (leading to cracking) to occur in one year or more. When performing any service that may risk exposure of compressor oil to the roof, take appropriate precautions to protect roofing. Procedures which risk oil leakage include, but are not limited to, compressor replacement, repairing refrigerant leaks, replacing refrigerant components such as filter drier, pressure switch, metering device, coil, accumulator, or reversing valve.



### **Synthetic Roof Precautionary Procedure**

1. Cover extended roof working area with an impermeable polyethylene (plastic) drip cloth or tarp. Cover an approximate 10 X 10 ft (3 X 3 m) area.
2. Cover area in front of the unit service panel with a terry cloth shop towel to absorb lubricant spills and prevent run-offs, and protect drop cloth from tears caused by tools or components.
3. Place terry cloth shop towel inside unit immediately under component(s) to be serviced and prevent lubricant run-offs through the louvered openings in the unit base.
4. Perform required service.
5. Remove and dispose of any oil contaminated material per local codes.

### **LIQUID LINE FILTER DRIER**

The biflow filter drier is specifically designed to operate with Puron. Use only factory-authorized components. Filter drier must be replaced whenever the refrigerant system is opened. When removing a filter drier, use a tubing cutter to cut the drier from the system. Do not unsweat a filter drier from the system. Heat from unsweating will release moisture and contaminants from drier into system.

### **PURON (R-410A) REFRIGERANT CHARGING**

Refer to unit information plate and charging chart. Some R-410A refrigerant cylinders contain a dip tube to allow liquid refrigerant to flow from cylinder in upright position. For cylinders equipped with a dip tube, charge Puron units with cylinder in upright position and a commercial metering device in manifold hose. Charge refrigerant into suction-line.

### **Step 14 — System Information**

#### **LOSS OF CHARGE SWITCH**

The loss of charge switch is a protective device wired into control circuit (low voltage). It shuts off the compressor if abnormally low pressures are present in the refrigeration circuit.

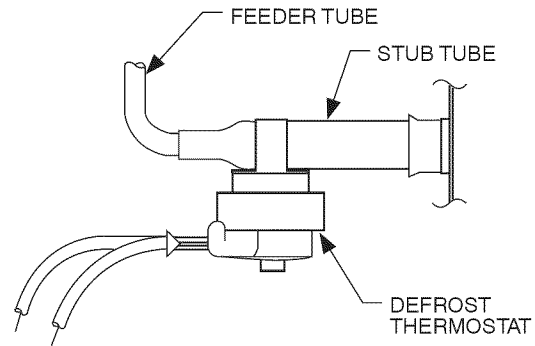
**NOTE:** Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read 0 psig. Never open system without breaking vacuum with dry nitrogen.

### **CHECK DEFROST THERMOSTAT**

There is a liquid header with a brass distributor and feeder tube going into outdoor coil. At the end of 1 of the feeder tubes, there is a 3/8-in. OD stub tube approximately 3 in. (76 mm) long. (See Fig. 29). The defrost thermostat should be located on stub tube. Note that there is only 1 stub tube used with liquid header, and on most units it is the bottom circuit.

The defrost thermostat signals heat pump that conditions are right for defrost or that conditions have changed to terminate defrost. It is a thermally actuated switch clamped to outdoor coil to sense its temperature. Normal temperature range is closed at  $30^{\circ} \pm 3^{\circ}\text{F}$  ( $-1^{\circ}\text{C} \pm 1.7^{\circ}\text{C}$ ) and open at  $80^{\circ} \pm 5^{\circ}\text{F}$  ( $27^{\circ}\text{C} \pm 2.8^{\circ}\text{C}$ ).

**NOTE:** The defrost thermostat must be located on the liquid side of the outdoor coil on the bottom circuit and as close to the coil as possible.



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**Fig. 29 - Defrost Thermostat**

### **TROUBLESHOOTING**

Refer to the Cooling and Heating Troubleshooting Chart (Table 8) for troubleshooting information.

### **START-UP CHECKLIST**

Use the Start-Up Checklist.

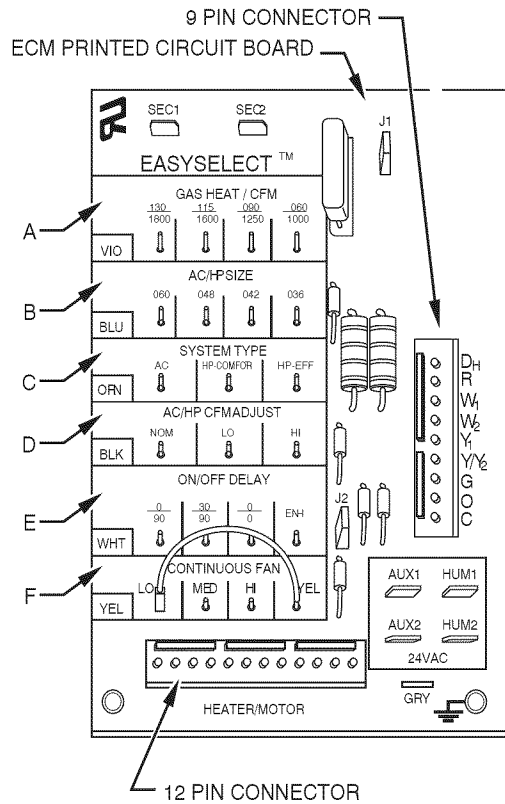
**PURON® (R-410A) QUICK REFERENCE GUIDE**

- Puron refrigerant operates at 50-70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with Puron
- Puron refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400 or DOT BW400.
- Puron systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose when charging into suction line with compressor operating
- Manifold sets should be 700 psig high side and 180 psig low side with 550 psig low-side retard.
- Use hoses with 700 psig service pressure rating.
- Leak detectors should be designed to detect HFC refrigerant.
- Puron, as with other HFCs, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- Do not use liquid-line filter driers with rated working pressures less than 600 psig.
- Do not leave Puron suction line filter driers in line longer than 72 hours.
- Do not install a suction-line filter drier in liquid line.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- POE oils may cause damage to certain plastics and roofing materials.
- Wrap all filter driers and service valves with wet cloth when brazing.
- A factory approved liquid-line filter drier is required on every unit.
- Do NOT use an R-22 TXV.
- If indoor unit is equipped with an R-22 TXV or piston metering device, it must be changed to a hard shutoff Puron TXV.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, recover refrigerant, evacuate then break vacuum with dry nitrogen and replace filter driers. Evacuate to 500 microns prior to recharging.
- Do not vent Puron into the atmosphere.
- Do not use capillary tube coils.
- Observe all **warnings**, **cautions**, and **bold** text.
- All indoor coils must be installed with a hard shutoff Puron TXV metering device.

# QUICK REFERENCE GUIDE

## SET-UP INSTRUCTIONS FOR EASY SELECT BOARD (SUPER HUMIDITY CONTROL IN COOLING)

### EASY SELECT BOARD



1. Configuration Taps  
(See Installation Instructions, for detailed description)
  - A. HEAT RANGE - Set for gas heat size (EX: 090 for unit 048090---)□
  - B. AC/HP SIZE - Set for size of outdoor unit (Cooling Size)
  - C. SYSTEM TYPE - Select "AC" for Gas Package Units□
  - D. AC/HP CFM ADJUST - Select "NOM"
  - E. ON/OFF DELAY - Do not use "ENH" for this unit
  - F. CONTINUOUS FAN - Select desired speed
2. Remove Jumper J1 to activate all dehumidify modes
3. Complete wiring and install outdoor temperature □ sensor according to Installation Instructions

### THERMIDISTAT CONTROL SETTINGS

1. Set "DIP Switches" - Set the dip switches (back of □ Thermidistat Control Board) appropriately for specific □ system being installed.
2. Thermidistat Control Configurations  
(See Thermidistat Control Installation Instructions for detailed description)□
  - \* Option 5 (Variable Speed Indoor Motor) - Set to ON
  - \* Option 7 (Super Dehumidify) - Set to ON
  - \* Option 17 - Select Programmable or non-programmable mode.
3. Set desired humidity level on front of Thermidistat (50 to 55 % RH recommended). For dehumidification in cooling, both "dhu" and "cool" must be displayed.

50XZ

**Table 8 – Troubleshooting Chart**

SYMPTOM	CAUSE	REMEDY
<b>Compressor and condenser fan will not start.</b>	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective contactor, transformer, or high-pressure, loss-of-charge or low-pressure switch	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
<b>Compressor will not start but condenser fan runs</b>	Thermostat setting too high	Lower thermostat setting below room temperature
	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
<b>Three-phase scroll compressor makes excessive noise, and there may be a low pressure differential.</b>	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing the 3-phase power leads to the unit. Shut down unit to allow pressures to equalize.
<b>Compressor cycles (other than normally satisfying thermostat).</b>	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to capacities shown on rating plate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace
	Defective thermostat	Replace thermostat
	Faulty condenser-fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
<b>Compressor operates continuously</b>	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat set too low	Reset thermostat
	Low refrigerant charge	Locate leak, repair, and recharge
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser coil dirty or restricted	Clean coil or remove restriction
<b>Excessive head pressure</b>	Dirty air filter	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct
<b>Head pressure too low</b>	Low refrigerant charge	Check for leaks, repair, and recharge.
	Restriction in liquid tube	Remove restriction
<b>Excessive suction pressure</b>	High heat load	Check for source and eliminate
	Refrigerant overcharged	Recover excess refrigerant
<b>Suction pressure too low</b>	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks, repair and recharge
	Metering device or low side restricted	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity Check filter—replace if necessary
	Temperature too low in conditioned area	Reset thermostat
	Outdoor ambient below 55°F (12.7°C)	Install low-ambient kit
	Filter drier restricted	Replace filter

50XZ

# START-UP CHECKLIST

(Remove and Store in Job File)

## I. Preliminary Information

MODEL NO.: \_\_\_\_\_  
 SERIAL NO.: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 TECHNICIAN: \_\_\_\_\_

## II. PRE-START-UP (Insert check mark in box as each item is completed)

- VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- REMOVE ALL SHIPPING HOLD DOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS
- CHECK ALL ELECTRICAL CONNECTIONS AND TERMINAL FOR TIGHTNESS
- CHECK THAT INDOOR (EVAPORATOR) AIR FILTER IS CLEAN AND IN PLACE
- VERIFY THAT UNIT INSTALLATION IS LEVEL
- CHECK FAN WHEEL, AND PROPELLER FOR LOCATIONS IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- MAKE SURE THAT - (If Applicable) ON 060 SIZE PURON HEAT PUMP ONLY, THE TWO WIRE TIES FASTEN TO THE OUTDOOR COILS AND REVERSING VALVE/ACCUMULATOR HAVE BEEN REMOVED

## III. START-UP

### ELECTRICAL

SUPPLY VOLTAGE \_\_\_\_\_  
 COMPRESSOR AMPS \_\_\_\_\_  
 INDOOR (EVAPORATOR) FAN AMPS \_\_\_\_\_

### TEMPERATURES

OUTDOOR (CONDENSER) AIR TEMPERATURE \_\_\_\_\_ DB  
 RETURN-AIR TEMPERATURE \_\_\_\_\_ DB \_\_\_\_\_ WB  
 COOLING SUPPLY AIR \_\_\_\_\_ DB \_\_\_\_\_ WB  
 HEAT PUMP SUPPLY AIR \_\_\_\_\_  
 ELECTRIC HEAT SUPPLY AIR \_\_\_\_\_

### PRESSURES

REFRIGERANT SUCTION \_\_\_\_\_ PSIG SUCTION LINE TEMP\* \_\_\_\_\_  
 REFRIGERANT DISCHARGE \_\_\_\_\_ PSIG DISCHARGE TEMP† \_\_\_\_\_

- VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

\*Measured at suction inlet to compressor.

†Measured at liquid line leaving condenser.

## IV. EASY SELECT SETTINGS

FULL UNIT MODEL NUMBER: \_\_\_\_\_  
 ENTER AVAILABLE HEAT SETTINGS \_\_\_\_\_  
 ENTER AVAILABLE AIRFLOW HEAT AIR PIN CONNECTION SETTING \_\_\_\_\_  
 TYPE PIN CONNECTION SETTING \_\_\_\_\_  
 ADJUST PIN CONNECTION SETTING \_\_\_\_\_  
 (0/0 or 0/90 for gas/electric models)  
 CONTINUOUS FAN PIN CONNECTION SETTING \_\_\_\_\_

EASY SELECT			
Heat Settings			
AC HP Size			
System Type			
AC	HP-Comfort	HP EFF	
AC/HP CFM Adjust			
Norm	Lo	Hi	
On/Off Delay			
0/90	30/90	0/0	ENH
Continuous Fan			
Lo	Med	Hi	

50XZ

