



INSTALLATION INSTRUCTIONS

15CHPX SERIES UNITS

PACKAGED HEAT PUMPS (2-5 TONS)
506702-01 (38152A087)
06/11
Supersedes 11/10

TP Technical
Publications
Litho U.S.A.

**RETAIN THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

WARNING

If this unit is to be installed in a mobile or manufactured home application, the duct system must be sized to achieve static pressures within the manufacturer's guidelines. All other installation guidelines must also be followed. Failure to do so may result in equipment damage, personal injury and improper unit performance.

WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

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Shipping and Packing List

1 - Assembled packaged heat pump unit

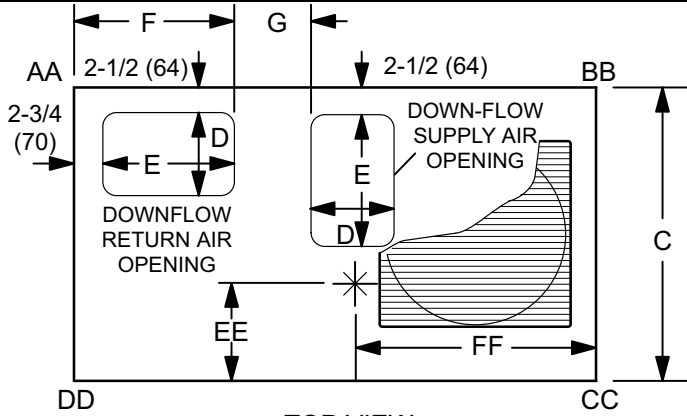
As soon as the unit is received, it should be inspected for possible damage during transit. If you find any damage, immediately contact the last carrier.

CAUTION

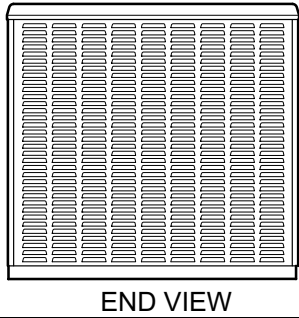
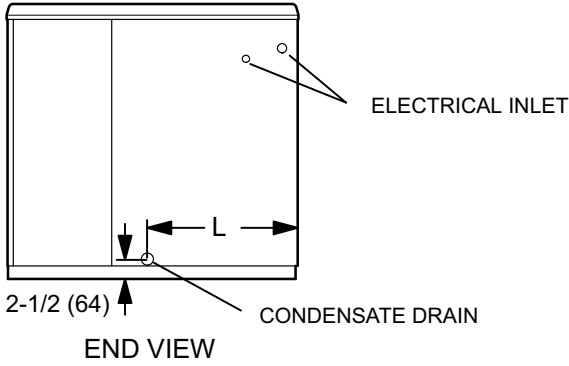
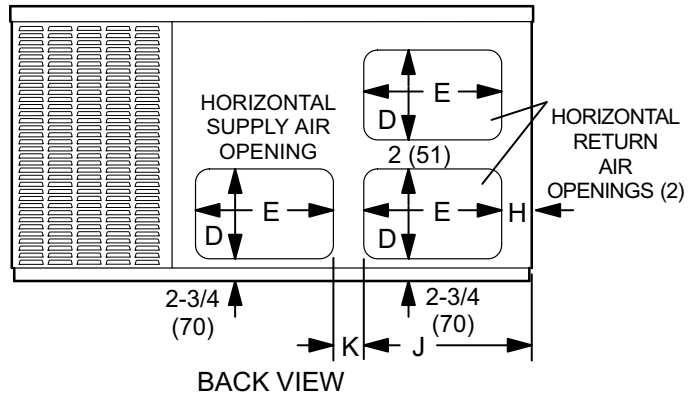
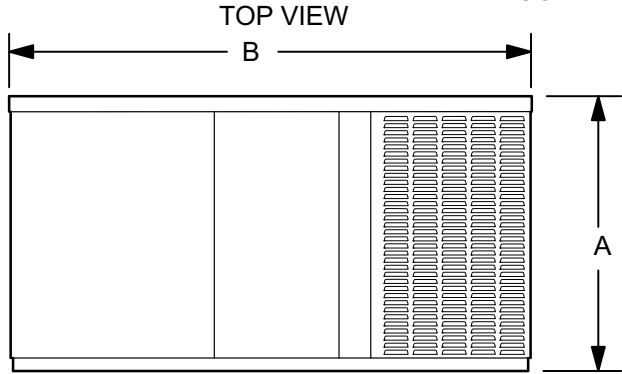
Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.



15CHPX Unit Dimensions - inches (mm)



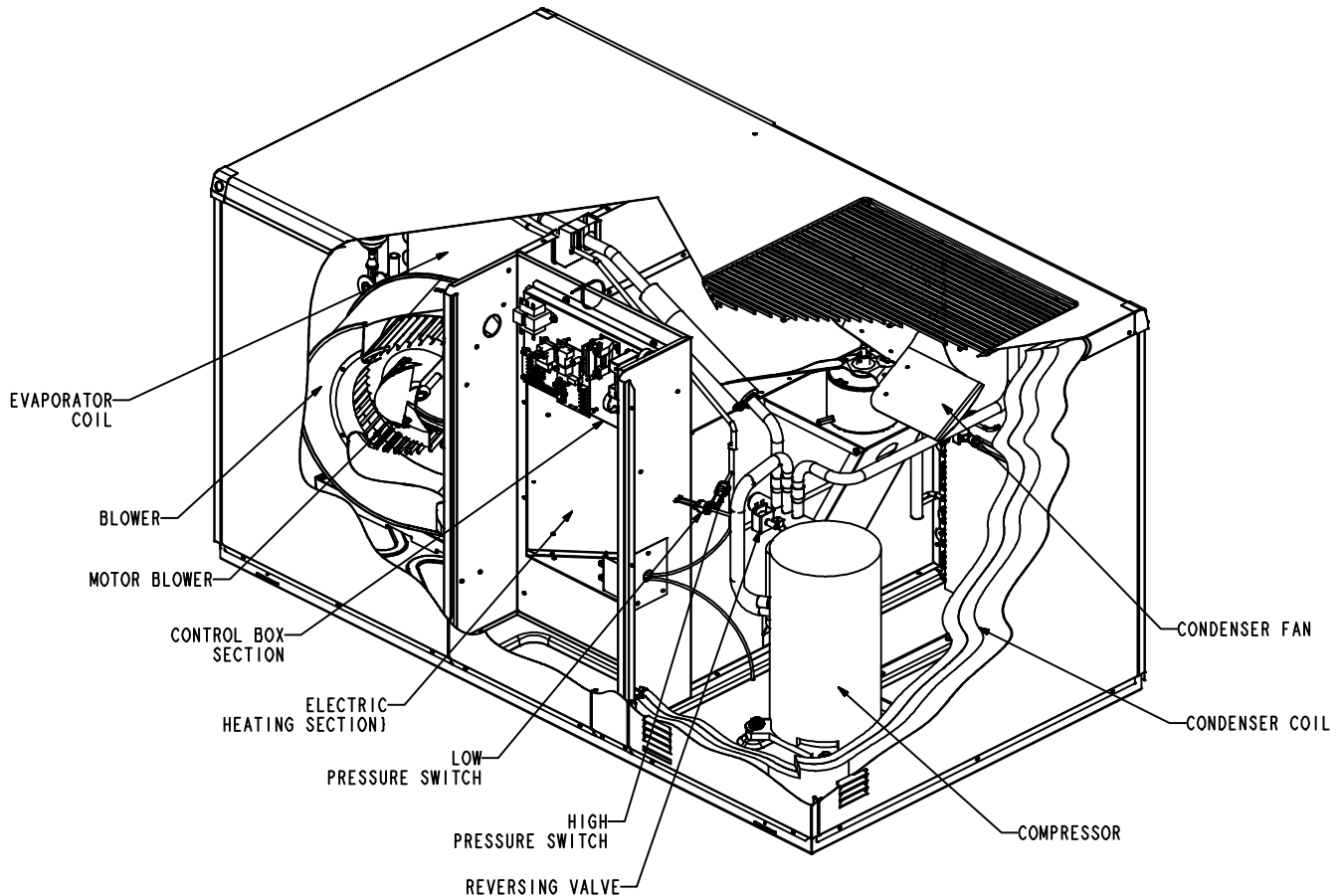
Model Number	Corner Weights				Center Of Gravity	
	AA lbs.	BB lbs.	CC lbs.	DD lbs.	EE in.	FF in.
15CHPXA-24	74	94	125	97	15.5	28.5
15CHPXA-30	74	94	125	97	15.5	28.5
15CHPXA-36	84	101	126	105	16	29.5
15CHPXA-42	108	136	176	140	20	33
15CHPXA-48	112	137	177	144	20	33.5
15CHPXA-60	117	143	184	151	20	33.5



Model No.	A		B		C		D		E		F	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
15CHPX-24 15CHPX-30 15CHPX-36	34-1/4	870	65-3/8	1661	36-1/2	927	11-1/4	286	17-1/4	438	20	508
15CHPX-42 15CHPX-48 15CHPX-60	38-1/4	972	75	1905	46	1168	11-1/4	286	19-1/4	489	22	559

Model No.	F		G		H		J		K		L	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
15CHPX-24 15CHPX-30 15CHPX-36	20	508	8-1/2	216	3	76	20-1/4	514	4-1/2	114	19	483
15CHPX-42 15CHPX-48 15CHPX-60	22	559	9-1/4	241	3-1/4	83	22-1/4	572	4	102	16-1/4	413

Parts Arrangement



General

These installation instructions are intended as a general guide only, for use by an experienced, qualified contractor. The 15CHPX units are single-package heat pump units designed for outdoor installation on a rooftop or a slab. The units are equipped with a transformer and blower control for applications which do not include electric heat. Electric heat sections are available for separate order.

The unit must be sized based on heat loss and heat gain calculations made according to the methods of the Air Conditioning Contractors of America (ACCA).

The units are shipped assembled. All piping, refrigerant charge, and electrical wiring are factory-installed and tested. The units require electric power, condensate drain and duct connections at the point of installation.

Use of this unit as a construction heater or air conditioner is not recommended during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

If this unit has been used for heating or cooling of buildings or structures under construction, the following conditions must be met or the warranty will be void:

- A room thermostat must control the unit. The use of fixed jumpers that will provide continuous heating or cooling is not allowed.
- A pre-filter must be installed at the entry to the return air duct.
- The return air duct must be provided and sealed to the unit.
- Return air temperature range between 55°F (13°C) and 80°F (27°C) must be maintained.
- Air filters must be replaced and pre-filter must be removed upon construction completion.
- The unit components, duct system, air filters and evaporator coil must be thoroughly cleaned following final construction clean-up.
- The unit operating conditions (including airflow, cooling operation, and heating operation) must be verified according to these installation instructions.

Requirements

These units must be installed in accordance with all applicable national and local safety codes.

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or customer's expense.

These units are design listed by UL in both the United States and Canada as follows:

- For use as a heat pump.
- For outdoor installation only.
- For installation on combustible material.

⚠ WARNING

Product contains fiberglass wool.

Disturbing the insulation in this product during installation, maintenance, or repair will expose you to fiberglass wool dust. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)

Fiberglass wool may also cause respiratory, skin, and eye irritation.

To reduce exposure to this substance or for further information, consult material safety data sheets available from OEM or contact your supervisor.

Location Selection

Use the following guidelines to select a suitable location for these units.

- 1 - Unit is designed for outdoor installation only. Unit must be installed so all electrical components are protected from water.
- 2 - Condenser coils must have an unlimited supply of air.
- 3 - For ground level installation, use a level pre-fabricated pad or use a level concrete slab with a minimum thickness of 4 inches. The length and width should be at least 6 inches greater than the unit base. Do not tie the slab to the building foundation.
- 4 - Maintain level within a tolerance of 1/4 inch maximum across the entire length or width of the unit.
- 5 - The unit foundation should be raised a minimum of 3" above finish grade. In areas which have prolonged periods of temperature below freezing and snowfall, elevate the unit above the average snow line. Take

care to allow free drainage of condensate from defrost cycles to prevent ice accumulation. Do not locate the unit near walkways to prevent the possible icing of surfaces due to defrost condensate.

Rigging and Setting Unit

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. An optional lifting lug kit (92M51) may be purchased separately for use in rigging the unit for lifting. Spreaders **MUST** be used across the top of the unit. Recommended spreader length: 2, 2-1/2, 3-ton units -- 44"; 3-1/2, 4, 5-ton units -- 54".

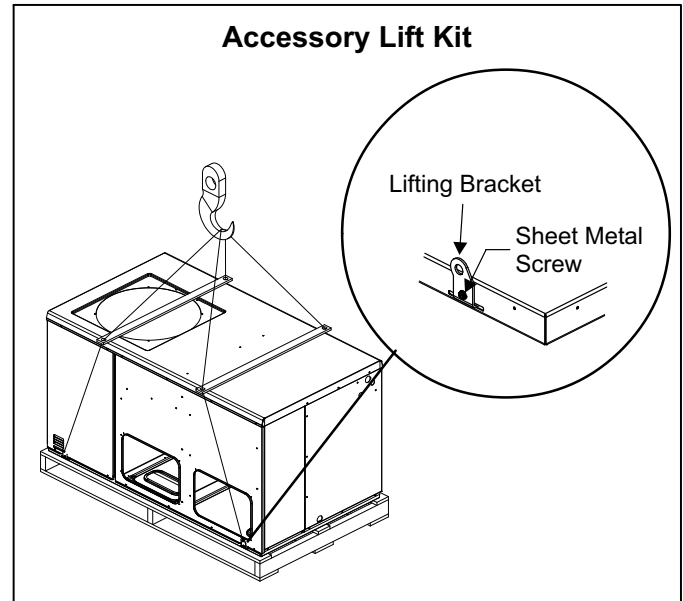


Figure 1

⚠ CAUTION

Before lifting a unit, make sure that the weight is distributed equally on the cables so that it will lift evenly.

Units may also be moved or lifted with a forklift while still in the factory supplied packaging.

NOTE - Length of forks must be a minimum of 42 inches.

Clearances

All units require certain clearances for proper operation and service. Refer to figure 2 for the clearances required for combustible construction, servicing, and proper unit operation.

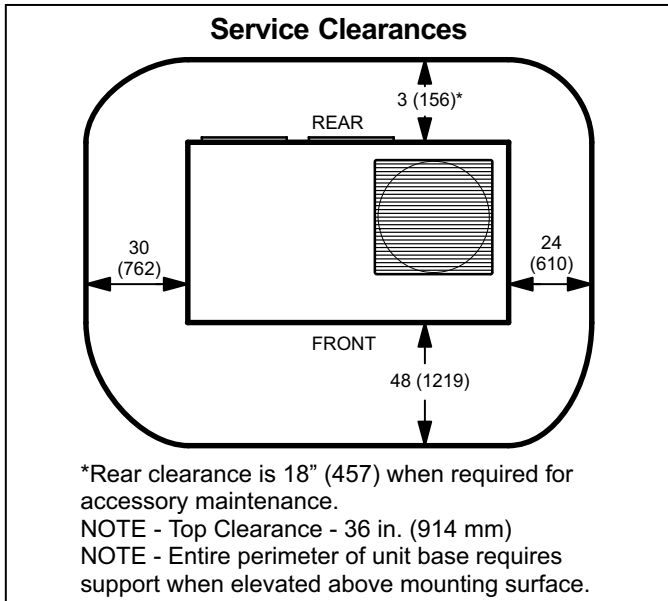


Figure 2

NOTE - Do not permit overhanging structures or shrubs to obstruct condenser air discharge outlet.

In the U.S. units may be installed on combustible floors made from wood or class A, B, or C roof covering material. In Canada, units may be installed on combustible floors. Install the unit so that snow accumulation will not restrict the air flow. Allow a required minimum horizontal clearance of 4 feet from electric meters, gas meters, regulators and relief equipment. In addition to the above requirements, ensure that unwanted ice caused by condensate is not allowed to accumulate around the unit. Do not locate the unit on the side of the building where the prevailing winter winds could trap moisture, causing it to freeze on the walls or on overhangs (under eaves).

Existing Common Vent Systems

The 15CHPX packaged heat pump may replace an existing furnace which is being removed from a venting system commonly run with separate gas appliances. In this case, the existing vent system is likely to be too large to properly vent the remaining attached appliances.

Conduct the following test while each appliance is operating and the other appliances (which are not operating) remain connected to the common venting system. If the venting system has been installed improperly, you **must** correct the system as indicated in the general venting requirements section.

- 1 - Seal any unused openings in the common venting system.
- 2 - Inspect the venting system for proper size and horizontal pitch. Determine that there is no blockage, restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.
- 3 - Close all building doors and windows and all doors

between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

- 4 - Follow the lighting instructions. Turn on the appliance that is being inspected. Adjust the thermostat so that the appliance operates continuously.
- 5 - After the main burner has operated for 5 minutes, test for leaks of flue gases at the draft hood relief opening. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
- 6 - After determining that each appliance connected to the common venting system is venting properly, (step 3) return all doors, windows, exhaust fans, fireplace dampers, and any other gas-burning appliances to their previous mode of operation.
- 7 - If a venting problem is found during any of the preceding tests, the common venting system must be modified to correct the problem.

Resize the common venting system to the minimum vent pipe size determined by using the appropriate tables in Appendix G. (These are in the current standards of the National Fuel Gas Code ANSI-Z223.1/NFPA 54 in the USA, and the appropriate Category 1 Natural Gas and Propane appliances venting sizing tables in the current standards of the CSA B149 Natural Gas and Propane Installation Codes in Canada.)

Condensate Drain

The 15CHPX unit is equipped with a 3/4 inch FPT coupling for condensate line connection. Plumbing must conform to local codes. Use a sealing compound on male pipe threads.

The drain line must be properly trapped and routed to a suitable drain. See figure 3 for proper drain arrangement. The drain line must pitch to an open drain or pump a minimum of 1 inch per 10 feet to prevent clogging of the line. Seal around drain connection with suitable material to prevent air leakage into return air system.

Drain piping should not be smaller than drain connection at coil. An open vent in drain line will some times be required due to line length, friction and static pressure. Drains should be constructed in a manner to facilitate future cleaning.

NOTE - The condensate drain line MUST be trapped to provide proper drainage.

CAUTION

Condensate line connection must be hand-tightened. Do not use tools.

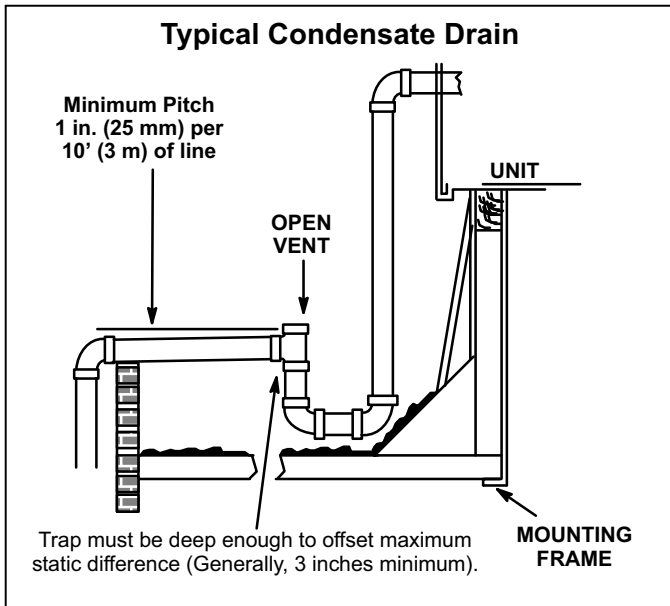


Figure 3

They should NOT be sized by simply matching the dimensions of the duct connections on the unit. Ducting installed outdoors MUST be insulated and waterproofed.

⚠ CAUTION

When fastening duct system to side duct flanges on unit, insert screws through duct flanges only. Do not insert screws through casing. Outdoor duct must be insulated and waterproofed.

The 15CHPX unit is shipped ready for horizontal air discharge (side duct connections). If bottom air discharge is desired, the covers must be removed from the supply and return air openings on the bottom of the unit and re-installed to cover the side openings.

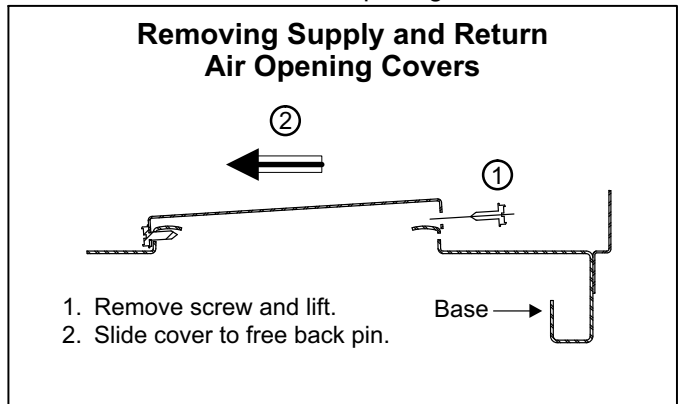


Figure 4

The upper return air opening cover must be removed when the PureAir® air purification system (PCO-20P) is being used. In PCO applications, both upper and lower return air openings must be covered by the return air plenum to ensure proper PCO operation. The upper return air opening is not required in horizontal applications when the PCO is not used.

Compressors

Units are shipped with the compressor mountings factory-adjusted and ready for operation.

⚠ CAUTION

Do not loosen compressor mounting bolts.

Electrical

All wiring should be done in accordance with the current National Electric Code ANSI/NFPA No. 70 in the United States. In Canada, wiring must be done in accordance with the current CSA C22.2 Part 1. Local codes may take precedence.

Use wiring with a temperature limitation of 75°C min.; run the 208 or 230 volt, 60 hertz electric power supply through a fused disconnect switch to control box of unit and connect as shown in the wiring diagram located on the inside of the control access panel. Refer to figure 5 for electrical access.

Filters

Filters are not factory-supplied with the unit; however, optional internally installed filter kits are available. Filter kit 92M54 is used with 2, 2-1/2 and 3-ton units. Filter kit 92M55 is used with 3-1/2, 4 and 5-ton units. The filter kits accommodate the use of 1", 2" or 4" filters. If the optional filter kit is not used, a filter must be field-installed.

Filters must always be installed ahead of evaporator coil and must be kept clean or replaced. Dirty filters will reduce the airflow of the unit. Filter sizes are shown in table 1.

Table 1. Unit Filter Size

Unit Model	Filter Size	Filter Quantity
-24, -30, -36	20 in. X 25 in.	1
-42, -48, -60	16 in. X 25 in.	2

The Healthy Climate® PureAir® air purification system (PCO-20P) may be used with the 15CHPX units. PCO-20P unit (92M53) includes PCO, as well as components necessary when using the PCO with the 15CHPX unit. The PCO-20P can be used in horizontal air discharge applications only. When used, the PCO should be installed before the unit is set in place and before the duct connections are made.

Supply and Return Duct Connections

The duct system should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. It is recommended that supply and return duct connections at the unit be made with flexible joints.

The supply and return air duct systems should be designed for the CFM and static requirements of the job.

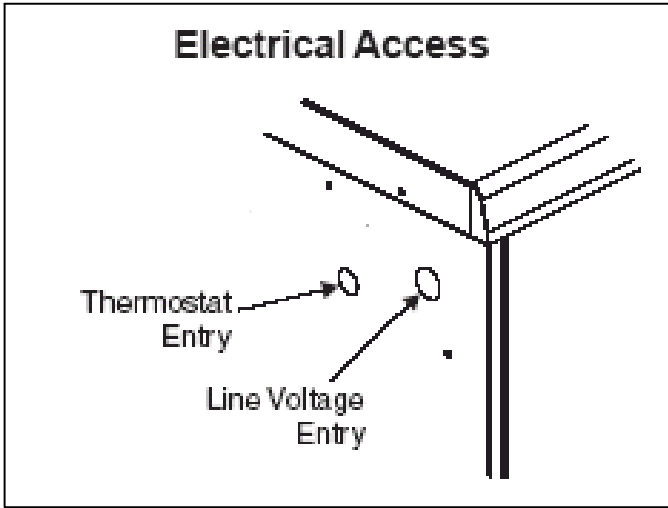


Figure 5

Unit must be electrically grounded in accordance with local codes or in the absence of local codes with the National Electric Code, ANSI/NFPA No. 70 (latest edition) or CSA C22.2 Part 1 (latest edition).

Power supply to the unit must be N.E.C. Class 1, and must comply with all applicable codes. A fused disconnect switch should be field provided for the unit. The switch must be separate from all other circuits. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical wiring must be sized to carry minimum circuit ampacity marked on the unit. **USE COPPER CONDUCTORS ONLY.** Each unit must be wired with a separate branch circuit and be properly fused.

⚠ WARNING

Unit is equipped with a single-pole contactor. Line voltage is present at all components when unit is not in operation. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies. Failure to disconnect all power supplies could result in personal injury or death.

⚠ CAUTION

When connecting electrical power and control wiring to the unit, waterproof type connectors **MUST** be used so that water or moisture cannot be drawn into the unit during normal operation.

⚠ WARNING

Unit must be grounded in accordance with national and local codes. Failure to ground unit properly can result in personal injury or death.

See figure 6 for typical field wiring connections and figure 7 for typical unit wiring diagram.

Optional Electric Heat

Optional electric heat is available and must be purchased separately. Install the electric heat section as outlined in the installation instructions packaged with the electric heat section.

Thermostat

The room thermostat should be located on an inside wall where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with thermostat for general installation procedure. Color coded insulated wires (# 18 AWG) should be used to connect thermostat to unit. Six wires are required for heat pump operation (including a common wire, if required by the thermostat).

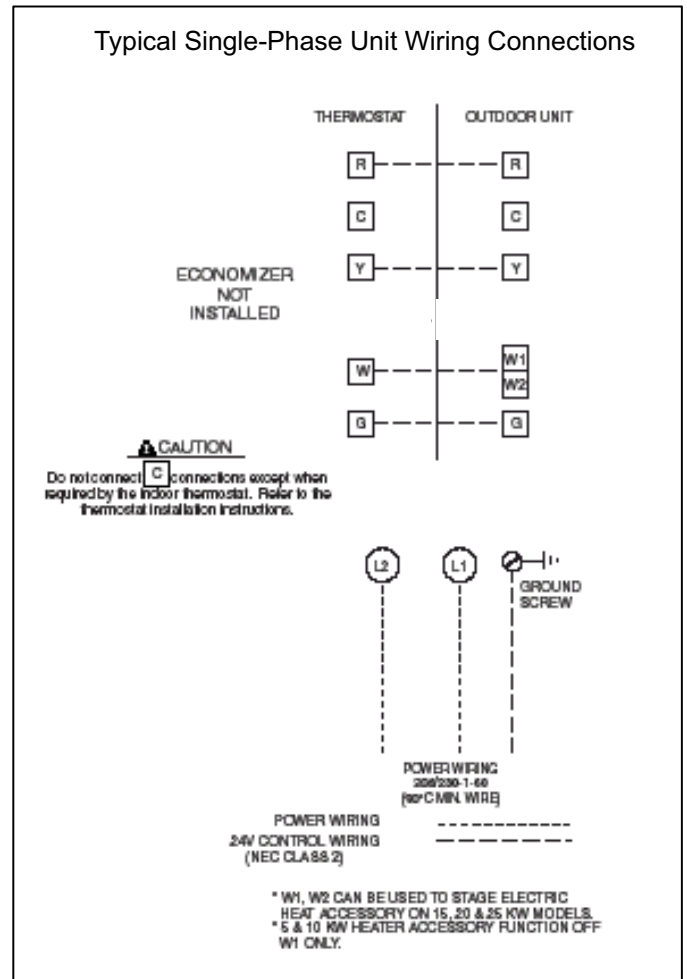


Figure 6

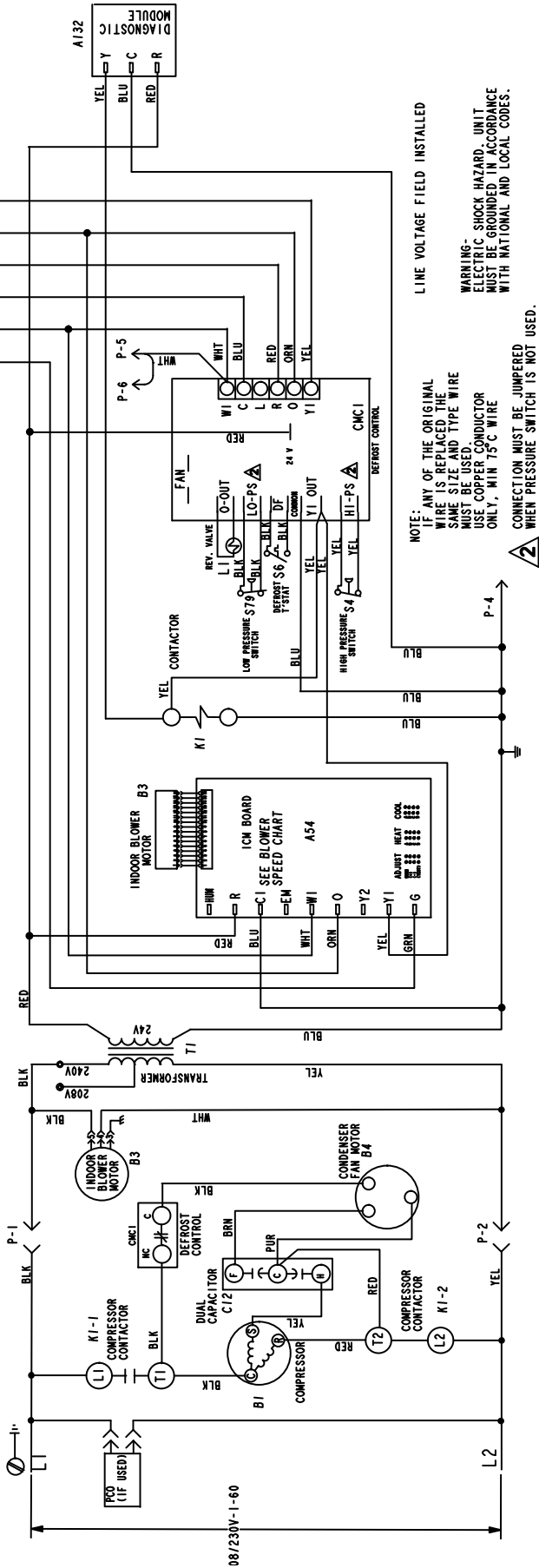
15CHPX Series Packaged Heat Pump Units Typical Wiring Diagram

BLOWER SPEED CHART	
UNIT	FACTORY SHIPPED SETTINGS
24	NORM B COOL
30	NORM A A
36	NORM A A
42	NORM C C
48	NORM B B
60	NORM A A

DIAGNOSTIC DISPLAY		
Description	DSG OPERATION	DSG RESET
No Power to Control	OFF	OFF
Normal Operation / Power to Control	Simultaneous Slow Flash	
Anti-Short Cycle Lockout	Alternates Slow Flash	
Low Pressure Switch Lockout	OFF	Slow Flash
High Pressure Switch Lockout	OFF	ON
High Pressure Switch Lockout	ON	OFF

Note: Because the Pressure Switches are monitored only when "Y1" (Input) is active, the code for pressure switch open will not be seen when "Y1" is off. Instead, the "Normal Operation" or "Anti-Short Cycle" code will be seen.
Also, when a pressure switch opens and causes a short cycle lockout, the pressure switch-open code will be seen until it closes, then the short cycle lockout code will flash unless it has already expired.

W1 & W2 CAN BE USED TO STAGE ELECTRIC HEAT ACCESSORIES TO 6 PIN MODELS.
7, 5 & LOW HEATER ACCESSORIES FUNCTION OFF W1 ONLY.



NOTE: ANY OF THE ORIGINAL WIRE IS REPLACED THE SAME SIZE AND TYPE WIRE MUST BE USED. USE COPPER CONDUCTOR ONLY, MIN 18 AWG WIRE.
CONNECTION MUST BE JUMPED WHEN PRESSURE SWITCH IS NOT USED.

LINE VOLTAGE FIELD INSTALLED
WARNING - ELECTRIC SHOCK HAZARD. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

Blower Control (A54)

WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

15CHPX units are equipped with a variable speed motor that is capable of maintaining a specified CFM throughout the external static range. A particular CFM can be obtained by positioning jumpers (**COOL**, **HEAT**, and **ADJUST**) on the blower control board. The HEAT and COOL jumpers are labeled A, B, C and D. Each of the numbers corresponds with an air volume (CFM) setting. The **ADJUST** jumper is labeled Test, -, +, and Norm. The + and - pin settings are used to add or subtract a percentage of the CFM selected. The Test jumper is used to operate the motor in the test mode. See figure 8.

Factory settings for the blower speed jumpers are given in the wiring diagram in figure 7. Figure 8 shows the blower control board. Use tables 2, 3 and 4 to determine the correct air volume for operation in heat and cool mode.

The **CFM** LED located on the blower control flashes one time per 100 cfm to indicate selected blower speed. For example, if the unit is operating at 1000 CFM, **CFM** LED will flash 10 times. If the CFM is 1150, **CFM** LED will flash 11 full times plus one fast or half flash.

At times the light may appear to flicker or glow. This takes place when the control is communicating with the motor between cycles. This is normal operation.

Read through the jumper settings section before adjusting the jumper to obtain the appropriate blower speed.

To change jumper positions, gently pull the jumper off the pins and place it on the desired set of pins. The following section outlines the different jumper selections available and conditions associated with each one. Refer to figure 8.

After the CFM for each application has been determined, the jumper settings must be adjusted to reflect those given in tables 2, 3 and 4. From the tables, determine which row most closely matches the desired CFM. Once a specific row has been chosen (+, NORMAL, or -), CFM volumes from other rows cannot be used. Below are descriptions of the jumper selections.

The variable speed motor slowly ramps up to and down from the selected air flow during both cooling and heating demand. This minimizes noise and eliminates the initial blast of air when the blower is initially energized.

ADJUST

The **ADJUST** pins allow the motor to run at normal speed, approximately 15 percent higher, or approximately 15 percent lower than normal speed. Tables 2, 3 and 4 give three rows (+, NORMAL, and -) with their respective CFM volumes. Notice that the normal adjustment setting for cool speed position D in table 2 is 900 CFM. The + adjustment setting for that position is 1035 CFM and for the - adjustment setting is 765 CFM. After the adjustment setting has been determined, choose the remaining speed settings from those offered in the table in that row.

The TEST pin is available to bypass the blower control and run the motor at approximately 70 percent to make sure that the motor is operational. This is used mainly in troubleshooting. The G terminal must be energized for the motor to run.

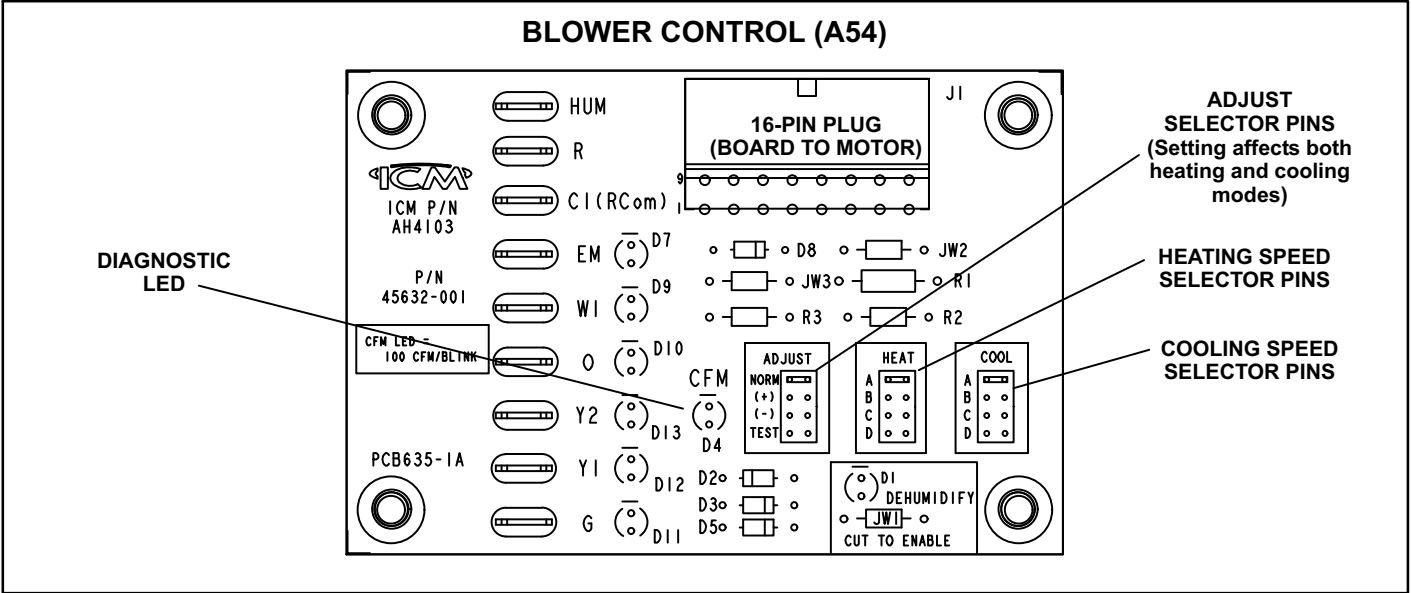


Figure 8

COOL

The **COOL** jumper is used to determine the CFM during cooling operation. This jumper selection is activated for cooling when Y1 is energized.

The blower motor runs at 80 percent of the selected air flow for the first 7-1/2 minutes of each cooling demand. This feature allows for greater humidity removal and saves energy.

In the cooling mode, the blower control delays blower operation for 5 seconds after the compressor starts. The blower continues to operate for 90 seconds after the compressor is de-energized.

HEAT

The **HEAT** jumper is used to determine CFM during backup electric heat operation only. These jumper selections are activated only when W is energized.

In the backup heat mode, the blower continues to operate for 2 minutes after the heating demand is satisfied.

NOTE - Due to the nature of electric heat, CFM settings are limited.

CONTINUOUS FAN

When the thermostat is set for “Continuous Fan” operation and there is no demand for heating or cooling, the blower control will provide 50 percent of the **COOL** CFM selected.

NOTE - With the proper thermostat and subbase, continuous blower operation is possible by closing the R to G circuit. Cooling blower delay is also functional in this mode.

DEHUMIDIFICATION

The blower control includes an HUM terminal which provides for connection of a humidistat. The JV1 resistor on the blower control must be cut to activate the HUM terminal. The humidistat must be wired to open on humidity rise. When the dehumidification circuit is used, the variable speed motor will reduce the selected air flow rate by 25 percent when humidity levels are high. An LED (D1) lights when the blower is operating in the dehumidification mode.

Table 2
15CHPX-24, 15CHPX-30 Blower Performance
0 through 0.80 in. w.g. (0 through 200 Pa) External Static Pressure Range

“ADJUST” Jumper Setting	Jumper Speed Positions																					
	“COOL” Speed				“HEAT” Speed				“CONTINUOUS FAN” Speed													
	A	B	C	D	A	B	C	D	A	B	C	D										
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s						
+	1150	545	920	435	690	325	1035	490	1150	545	1150	545	1150	545	575	270	460	215	345	165	520	245
NORM	1000	470	800	380	600	285	900	425	1000	470	1000	470	1000	470	500	235	400	190	300	140	450	210
-	850	400	680	320	510	240	765	360	1000	470	1000	470	1000	470	425	200	340	160	300	140	385	180

Table 3
15CHPX-36 Blower Performance
0 through 0.80 in. w.g. (0 through 200 Pa) External Static Pressure Range

“ADJUST” Jumper Setting	Jumper Speed Positions																							
	“COOL” Speed				“HEAT” Speed				“CONTINUOUS FAN” Speed															
	A	B	C	D	A	B	C	D	A	B	C	D												
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s						
+	1380	650	1150	545	920	435	1265	575	1380	650	1380	650	1150	545	1150	545	690	325	575	270	460	215	635	300
NORM	1200	565	1000	470	800	380	1100	520	1200	565	1200	565	1000	470	1000	470	600	285	500	235	400	190	550	260
-	1020	480	850	400	680	320	935	440	1200	565	1200	565	1000	470	1000	470	510	240	425	200	350	165	470	220

Table 4
15CHPX-42, 15CHPX-48, 15CHPX-60, Blower Performance
0 through 0.80 in. w.g. (0 through 200 Pa) External Static Pressure Range

“ADJUST” Jumper Setting	Jumper Speed Positions																					
	“COOL” Speed				“HEAT” Speed				“CONTINUOUS FAN” Speed													
	A	B	C	D	A	B	C	D	A	B	C	D										
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s				
+	2070	975	1840	870	1610	760	1380	650	1610	760	1610	760	1610	760	1035	490	920	435	805	380	690	325
NORM	1800	850	1600	755	1400	660	1200	565	1400	660	1400	660	1400	660	900	425	800	380	700	330	600	285
-	1530	720	1360	640	1190	560	1020	480	1400	660	1400	660	1400	660	765	360	680	320	595	280	510	240

Defrost System

15CHPX units are equipped with a defrost control that includes the combined functions of time/temperature defrost control, defrost relay, diagnostic LEDs and a low voltage terminal strip. See figure 9.

The control provides automatic switching from normal heating operation to defrost mode and back. During the compressor cycle (call for defrost), the control accumulates compressor run time at 30, 60 or 90-minute field-adjustable intervals. If the defrost thermostat is closed when the selected compressor run time interval ends, the defrost relay is energized and the defrost begins.

The **defrost timing jumper** is factory-installed to provide a 60-minute defrost interval. If the timing selector jumper is not in place, the control defaults to a 90-minute defrost interval. The maximum defrost period is 14 minutes and is not adjustable. See figure 9 for the location of the defrost interval timing pins.

A **test option** is provided for troubleshooting. The test mode may be started any time the unit is in the heating mode and the defrost thermostat is closed or jumpered. If the jumper is in the TEST position at power up, the control will ignore the test pins. When the jumper is placed across the TEST pins for 2 seconds, the control will enter the defrost mode. If the jumper is removed before an additional 5-second period has elapsed (7 seconds total), the unit will remain in defrost mode until the defrost thermostat opens or 14 minutes have passed. If the jumper is not removed until after the additional 5-second period has elapsed, the defrost will terminate and the test option will not function again until the jumper is removed and reapplied.

The defrost control includes a **compressor delay** function which cycles the compressor off for 30 seconds while going into and coming out of the defrost cycle. This function is activated when the jumper is removed from the compressor delay pins.

NOTE -- The 30-second compressor delay is not functional when the TEST pins are jumpered.

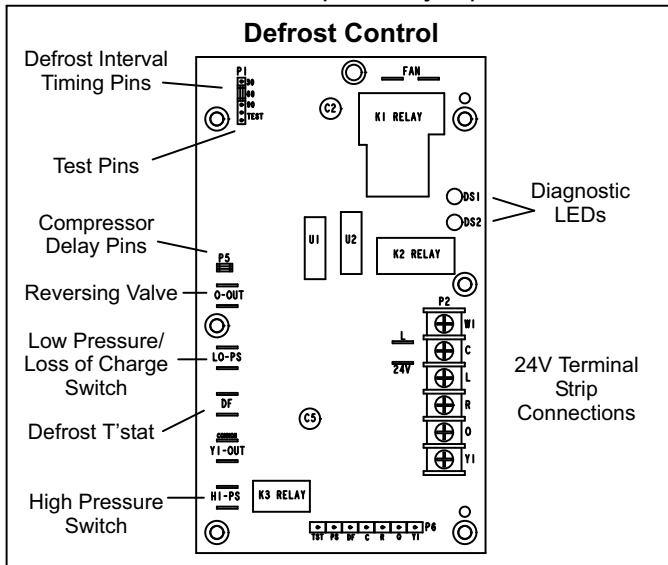


Figure 9

The **defrost thermostat** is located on the liquid line between the check/expansion valve and the distributor. When the defrost thermostat senses a liquid line temperature of 42°F or cooler, the thermostat contacts close and send a signal to the defrost control board to begin the defrost timing. The defrost thermostat also terminates the defrost when the liquid line temperature warms to 70°F.

The defrost control includes **HI-PS and LO-PS terminals** to receive signals from the unit high pressure switch and loss of charge switch.

During a single demand cycle, the defrost control locks out compressor operation after the fifth time that the circuit is interrupted by any pressure switch wired to the control board. In addition, the diagnostic LEDs indicate a locked-out pressure switch after the fifth open pressure switch occurrence. Compressor operation remains locked out until power to the board is interrupted, then re-established, or until the jumper is applied to the TEST pins for 0.5 seconds.

NOTE -- The defrost control ignores input from the loss of charge switch terminals as follows:

During the test mode;

During the defrost cycle;

During the 90-second start-up period;

During the first 90 seconds following a reversing valve switch between the heating and cooling modes.

EXCEPTION -- If the TEST pins are jumpered and the 5-minute delay is being bypassed, the LO-PS terminal signal is not ignored during the 90-second start-up period.

The defrost control includes two diagnostic LEDs. LED codes indicate operating status. The diagnostics codes are given in table 5.

Table 5. Defrost Control Diagnostic LEDs

Mode	Green LED (DS2)	Red LED (DS1)
No power to board	OFF	OFF
Normal Operation / Power to Board	Simultaneous Slow Flash	
Anti-Short Cycle Lockout	Alternating Slow Flash	
Loss of Charge Pressure Switch Fault	OFF	Slow Flash
Loss of Charge Pressure Switch Lockout	OFF	ON
High Pressure Switch Fault	Slow Flash	OFF
High Pressure Switch Lockout	ON	OFF

Table 6. System Operation Monitor LED Troubleshooting Codes

Status LED Condition	Status LED Description	Status LED Troubleshooting Information
Green “Power” LED ON	Module has power	24VAC control power is present at the module terminal.
Green “Power” LED OFF	Module not powering up	Determine/verify that both R and C module terminals are connected and voltage is present at both terminals.
Red “Trip” LED ON	System and compressor check out OK Thermostat demand signal Y1 is present, but compressor not running	<ol style="list-style-type: none"> 1. Verify Y terminal is connected to 24VAC at contactor coil. 2. Verify voltage at contactor coil falls below 0.5VAC when off. 3. Verify 24VAC is present across Y and C when thermostat demand signal is present; if not present, R and C wires are reversed. 1. Compressor protector is open. 2. Outdoor unit power disconnect is open. 3. Compressor circuit breaker or fuse(s) is open. 4. Broken wire or connector is not making contact. 5. Low pressure switch open if present in the system. 6. Compressor contactor has failed to close.
Red “Trip” & Yellow “Alert” LEDs Flashing	Simultaneous flashing.	Indicates that the control circuit voltage is too low for operation.
Yellow “Alert” Flash Code 1*	Long Run Time - Compressor is running extremely long run cycles	<ol style="list-style-type: none"> 1. Low refrigerant charge. 2. Evaporator blower is not running. 3. Evaporator coil is frozen. 4. Faulty metering device. 5. Condenser coil is dirty. 6. Liquid line restriction (filter drier blocked if present). 7. Thermostat is malfunctioning.
Yellow “Alert” Flash Code 2*	System Pressure Trip - Discharge or suction pressure out of limits or compressor overloaded	<ol style="list-style-type: none"> 1. High head pressure. 2. Condenser coil poor air circulation (dirty, blocked, damaged). 3. Condenser fan is not running. 4. Return air duct has substantial leakage. 5. If low pressure switch is present, see Flash Code 1 info.
Yellow “Alert” Flash Code 3*	Short Cycling - Compressor is running only briefly	<ol style="list-style-type: none"> 1. Thermostat demand signal is intermittent. 2. Time delay relay or control is defective. 3. If high pressure switch is present, see Flash Code 2 info. 4. If low pressure switch is present, see Flash Code 1 info.
Yellow “Alert” Flash Code 4*	Locked Rotor	<ol style="list-style-type: none"> 1. Run capacitor has failed. 2. Low line voltage (contact utility). 3. Excessive liquid refrigerant in the compressor. 4. Compressor bearings are seized.
Yellow “Alert” Flash Code 5*	Open Circuit	<ol style="list-style-type: none"> 1. Outdoor unit power disconnect is open. 2. Unit circuit breaker or fuse(s) is open. 3. Unit contactor has failed to close. 4. High pressure switch is open and requires manual reset. 5. Open circuit in compressor supply wiring or connections. 6. Unusually long compressor protector reset time due to extreme ambient temperature. 7. Compressor windings are damaged.
Yellow “Alert” Flash Code 6*	Open Start Circuit - Current only in run circuit	<ol style="list-style-type: none"> 1. Run capacitor has failed. 2. Open circuit in compressor start wiring or connections. 3. Compressor start winding is damaged.
Yellow “Alert” Flash Code 7*	Open Run Circuit - Current only in start circuit	<ol style="list-style-type: none"> 1. Open circuit in compressor start wiring or connections. 2. Compressor start winding is damaged.
Yellow “Alert” Flash Code 8*	Welded Contactor - Compressor always runs	<ol style="list-style-type: none"> 1. Compressor contactor failed to open. 2. Thermostat demand signal not connected to module.
Yellow “Alert” Flash Code 9*	Low Voltage - Control circuit <17VAC	<ol style="list-style-type: none"> 1. Control circuit transformer is overloaded. 2. Low line voltage (contact utility).

*Flash code number corresponds to a number of LED flashes, followed by a pause, and then repeated. Reset ALERT flash code by removing 24VAC power from monitor; last code will display for 1 minute after monitor is powered on.

System Operation Monitor (LSOM)

The system operation monitor (A132) detects the most common fault conditions in the air conditioning system. When an abnormal condition is detected, the module communicates the specific condition through its ALERT and TRIP lights. The module is capable of detecting both mechanical and electrical system problems. See figure 10 for the system operation monitor.

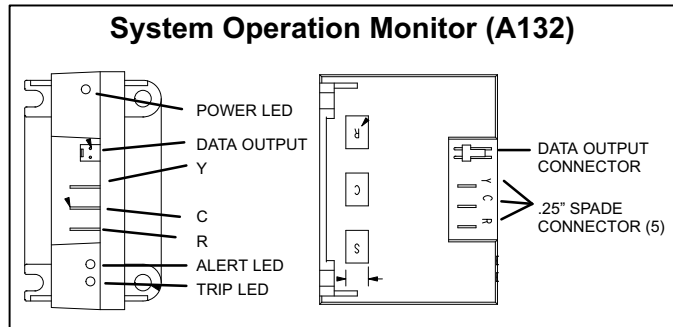


Figure 10

⚠ IMPORTANT

This monitor does not provide safety protection. The monitor is a monitoring device only and cannot control or shut down other devices.

LSOM LED Functions

Power LED (green) -- Voltage within the range of 19-28VAC is present at the system monitor power connection.

Alert LED (yellow) -- Communicates an abnormal system condition through a unique flash code. The alert LED flashes a number of times consecutively; then pauses; then repeats the process. This consecutive flashing corresponds with a particular abnormal condition.

Trip LED (red) -- Indicates a demand signal from the thermostat; but detects no current to the compressor.

Flash code number -- Corresponds to a number of LED flashes, followed by a pause, and then repeated.

Trip and Alert LEDs flashing simultaneously -- Indicates that the control circuit voltage is too low for operation.

Reset ALERT flash code by removing 24VAC power from monitor. Last ALERT flash code will display for 1 minute after monitor is powered on.

LSOM codes are given in table 6.

Unit Start-Up and Operation

Each 15CHPX packaged heat pump is factory-charged with R-410A refrigerant. The compressor is hermetically sealed, internally sprung and base-mounted with rubber-insulated hold-down bolts.

Pre-Start Check List:

- 1 - Make sure refrigerant lines do not rub against the cabinet or each other.
- 2 - Inspect all electrical wiring, both factory- and field-installed, for loose connections.
- 3 - Check voltage at the disconnect switch. Voltage must be within the range listed on the unit nameplate. If not, consult power company and have voltage condition corrected before starting unit.
- 4 - Recheck voltage with unit running. If power is not within the range listed on the unit nameplate, stop the unit and consult the power company. Check unit amperage. Refer to unit nameplate for correct running amps.
- 5 - Make sure filter is in place before unit start-up.

Cooling Sequence of Operation

When the thermostat calls for cooling, the "O" circuit is energized to activate the reversing valve. The "R" to "Y" circuit is closed to energize the compressor contactor. The contactor brings on both the compressor and outdoor fan. The thermostat also closes the "R" to "G" circuit to energize the circulating air blower. When the cooling demand is satisfied, the thermostat opens the circuits, as well as the compressor contactor. The compressor and outdoor fan immediately stop. The circulating air blower continues operating through a 90-second delay.

Unit compressors have internal protection. If there is an abnormal rise in the compressor temperature, the protector will open and the compressor will stop.

Heating Sequence of Operation

When the thermostat calls for heating, the "R" to "Y" circuit is closed to energize the compressor contactor. The contactor brings on both the compressor and outdoor fan. The reversing valve is not energized in the heating mode. The thermostat also closes the "R" to "G" circuit to energize the circulating air blower. When the heating demand is satisfied, the thermostat opens these circuits, as well as the compressor contactor. The compressor and outdoor fan immediately stop. The circulating air blower continues operating through a 90-second delay.

System Performance

This self-contained system has been factory-charged for optimal performance. If performance is questionable, use the following procedure to check the system.

Ensure that unit has been installed per these instructions and that line voltage and air flow are both correct. Check subcooling values by measuring pressure at the liquid line service port. Measure liquid line temperature within 2 inches of the service port connection to its main tube.

If measured subcooling deviates from values given in table 7 by more than 2°, check internal seals, service panels and duct system for air leaks, as well as restrictions. Also check blower speed settings.

Make all necessary adjustments. If unit performance remains questionable, recover unit refrigerant charge, evacuate to 500 Microns and weigh in refrigerant to match value given on unit nameplate. It is critical to use exact required charge.

Failure to follow this instruction will compromise system performance. If unit performance is still questionable, check for blocked coil or circuits, malfunctioning metering devices or other system component problems.

Table 7. Subcooling Values

Unit Model No.	Cooling Mode F°@ 82°F outdoor temp. 80°F db/ 67°F wb indoor temp.	Heating Mode °F @ 47°F outdoor temp. 70°F indoor temp.
15CHPX-24	10	12
15CHPX-30	10	23
15CHPX-36	10	15
15CHPX-42	7	30
15CHPX-48	7	28
15CHPX-60	6	25

Tables 8 and 9 may be used as a general guide for checking system performance. The tables should not be used for charging the unit. Variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system.

Used carefully, these tables could serve as a useful service guide. Cooling mode data is based on 80°F dry bulb / 67°F wet bulb return air. Heating mode data is based on 70°F return air. Allow unit operation to stabilize before taking pressure readings.

Table 8. Cooling Mode -- Normal Operating Pressures

80°F db / 67°F wb RETURN AIR		Air Temperature Entering Outdoor Coil (°F)											
UNIT	PRESSURE	65	70	75	80	82	85	90	95	100	105	110	115
15CHPX-24	Suction	143	144	146	147	148	149	150	152	153	154	156	157
15CHPX-30		140	141	142	144	144	145	146	147	149	150	152	153
15CHPX-36		142	143	144	145	145	146	146	147	148	149	150	151
15CHPX-42		135	136	138	139	140	141	143	144	147	149	151	154
15CHPX-48		142	143	145	146	147	148	149	151	152	153	155	156
15CHPX-60		133	135	137	138	139	139	140	140	141	142	144	146
15CHPX-24		Liquid	222	244	265	288	297	311	333	354	379	397	424
15CHPX-30	229		251	273	295	304	318	341	361	387	406	434	457
15CHPX-36	246		269	291	314	323	337	360	382	407	426	454	478
15CHPX-42	231		251	271	291	299	313	335	351	380	398	425	448
15CHPX-48	236		259	282	305	314	328	351	374	397	415	443	466
15CHPX-60	247		274	301	328	339	350	369	377	402	422	456	485

Table 9. Heating Mode -- Normal Operating Pressures

70°F RETURN AIR		Air Temperature Entering Outdoor Coil (°F)												
UNIT	PRESSURE	0	5	10	15	20	25	30	35	40	45	50	55	60
15CHPX-24	Suction	37	44	52	62	66	74	81	88	96	106	110	118	125
15CHPX-30		32	40	47	58	63	70	78	86	93	104	109	116	124
15CHPX-36		32	39	47	57	61	69	76	83	91	101	105	113	120
15CHPX-42		33	41	49	60	65	73	80	88	96	107	112	120	127
15CHPX-48		32	39	47	57	62	69	77	84	92	102	107	114	122
15CHPX-60		40	44	49	54	59	65	72	79	86	95	102	111	122
15CHPX-24		Liquid	283	291	300	312	317	326	335	343	352	364	369	378
15CHPX-30	273		281	290	301	306	314	322	330	339	350	355	363	371
15CHPX-36	259		266	273	283	287	294	302	309	316	326	330	337	345
15CHPX-42	300		309	319	332	338	347	357	366	376	389	395	404	414
15CHPX-48	279		284	291	302	307	314	322	330	337	348	353	360	368
15CHPX-60	285		290	295	300	306	313	320	328	336	345	354	365	375

Condenser Fan Clearances

The top of the condenser fan should be 1-1/2 inches from the bottom of the top grille. This dimension should be checked and the fan should be adjusted accordingly any time servicing of the outdoor fan system is required.

Maintenance

Once a year this equipment should be serviced by a qualified technician. Service should include cleaning of outdoor coil and motors, as well as system operation check. In addition, equipment should be checked periodically during the year sure that it remains clear of shrubbery and debris and to make sure that filters are clean.

Coil

Dirt and debris should not be allowed to accumulate on the coil surfaces or other parts in the air conditioning circuit. Cleaning should be performed as often as necessary. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure the power to unit is shut off prior to cleaning.

NOTE - Care should be used when cleaning the coil so that the coil fins are not damaged.

Do not permit the condenser air discharge to be obstructed by overhanging structures or shrubs.

Motors

The indoor and outdoor fan motors are permanently lubricated and require no further lubrication. Motors should be cleaned yearly to prevent the accumulation of dust and dirt on the windings or motor exterior.

Filters

Filters are field-supplied and installed. Inspect the filter once a month. Replace disposable filters or clean permanent-type filters as necessary. Dirty filters are the most common cause of inadequate heating or cooling performance. Replace existing filter with a filter of like type and size. DO NOT replace a permanent-type filter with a disposable filter. Install new/clean filters with the arrows on the edge pointing in the direction of airflow.

Planned Service

You should expect a service technician to check the following items during an annual inspection. Power to the unit must be shut off for the service technician's safety.

- Fresh air grilles and louvers Must be open and unobstructed to provide air.
- Unit appearance must be inspected for rust, dirt, signs of water, burnt or damaged wires, or components. A good coat of auto wax can extend the appearance.
- Blower access door must be properly in place.
- Return air duct must be properly attached and provide an air seal to the unit.
- Operating performance — Unit must be observed during operation to monitor proper performance of the unit and the vent system.

Problems detected during the inspection may make it necessary to temporarily shut down the unit until the items can be repaired or replaced.

Pay attention to your unit. Situations can arise between annual unit inspections that may result in unsafe operation.

Accessories

The following repair parts are available from your local dealer. When ordering parts, include the complete model number and serial number which are printed on the unit rating plate. All service must be performed by a licensed professional installer (or equivalent) or service agency.

Accessories	
Description	Catalog Number
Filter kit (2-ton to 3-ton capacity units)	92M54
Filter kit (3-1/2-ton to 5-ton capacity units)	92M55
PCO 20-28	X8787
Installation hardware kit for PCO 20-28	Y0629