

INSTALLATION MANUAL

Single Package Air Conditioner/Electric Heat

Models: PCE6 Series

2 ton to 5 ton - 208/230 V - Single-Phase



Assembled at a facility with an ISO 9001:2015-certified Quality Management System

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Section I: General information

PCE units are factory assembled air conditioners designed for outdoor installation on a rooftop or a slab. Field installed electric heater accessories are available to provide electric heat.

The units are completely assembled on rigid, removable base rails. All piping, refrigerant charge, and electrical wiring is factory installed and tested. The units require only electric power and duct connections at the point of installation.

Section II: Safety



This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER**, **WARNING**, or **CAUTION**.

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

WARNING indicates a **potentially** hazardous situation, which, if not avoided, **could result in death or serious injury**.

CAUTION indicates a **potentially** hazardous situation, which, if not avoided **may result in minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

▲ WARNING

Improper installation may create a condition where the operation of the product could cause personal injury or property damage. Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Failure to carefully read and follow all instructions in this manual can result in furnace malfunction, death, personal injury, and/or property damage. Only a qualified contractor, installer, or service agency should install this product.

▲ CAUTION

This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes, including but not limited to building, electrical, and mechanical codes.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury. Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or the gas supplier.

⚠ CAUTION

This system uses R-410A refrigerant, which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers, and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.

Due to system pressure, moving parts, and electrical components, installation and servicing of air conditioning equipment can be hazardous. Only qualified, licensed service personnel must install, repair, or service this equipment. Unlicensed personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters.

Observe all precautions in the literature, labels, and tags accompanying the equipment when working on air conditioning equipment. Install this product in strict compliance with the installation instructions and any applicable local, state, and national codes, including but not limited to building, electrical, and mechanical codes.

Wear safety glasses and work gloves. Use quenching cloth and have a fire extinguisher available during brazing operations.

Inspection

On receiving a unit, inspect the unit for possible damage during transit. If damage is evident, note the extent of the damage on the carrier's freight bill. Make a separate request for inspection by the carrier's agent in writing.

Replacement parts

Contact your local Ducted Systems parts distribution center for authorized replacement parts.

Section III: Model number nomenclature

PCE	6	A	24		2		4	A
1	2	3	4	5	6	7	8	9
1. Model family PCG - packaged AC with gas heat PHG - packaged heat pump with gas heat PCE - packaged AC with electric heat PHE - packaged heat pump with electric heat					5. Gas heating input Btu/h x 1000 050 = 50,000 Btu/h input, blank = electric heat			
2. Nominal cooling efficiency 4 = standard efficiency, 6 = high efficiency					6. Voltage-phase-frequency 2 = 208/230-1-60, 3 = 208/230-3-60, 4 = 460-3-60			
3. Cabinet size A = small 35.75 x 51.25, B = large 45.75 x 51.25					7. NOx approval X = Low NOx, blank = not Low NOx			
4. Nominal air conditioning cooling capacity Btu/h x 1000 24 = 24,000 Btu/h, 30 = 30,000 Btu/h					8. Generation level 1 = first generation, 2 = second generation			
Example: PCE6A2424A is a packaged AC with electric heat, high efficiency, small cabinet, 2 ton, 208/230 V, single-phase model, fourth generation, original release.					9. Revision level A = original release, B = second release			

Section IV: Installation

Limitations

Install these units in accordance with the following national and local safety codes:

- National Electrical Code ANSI/NFPA No. 70 or Canadian Electrical Code Part 1, C22.1 (latest editions)
- Local plumbing and wastewater codes and other applicable local codes.

See Table 11 for unit physical data and Tables 6 to 8 for electrical data.

If it is necessary to add components to a unit to meet local codes, installation is done at the dealer's or customer's expense.

The size of the unit for proposed installation must be based on heat loss and heat gain calculations made in accordance with industry recognized procedures such as the Air Conditioning Contractors of America (Manual J).

Table 1: Unit limitations - PCE6

Model	Unit voltage	Unit limitations		
		Applied voltage		Outdoor DB temperature (°F)
		Minimum	Maximum	Maximum
All Models	208/230-1-60	187	252	125

Table 2: Application limitations

Packaged equipment series	Air temperature at outdoor coil (°F)		Air temperature at indoor coil (°F)	
	Minimum	Maximum	Minimum	Maximum
	DB cool	DB cool	WB cool	WB cool
PCE6	55	125	57	72

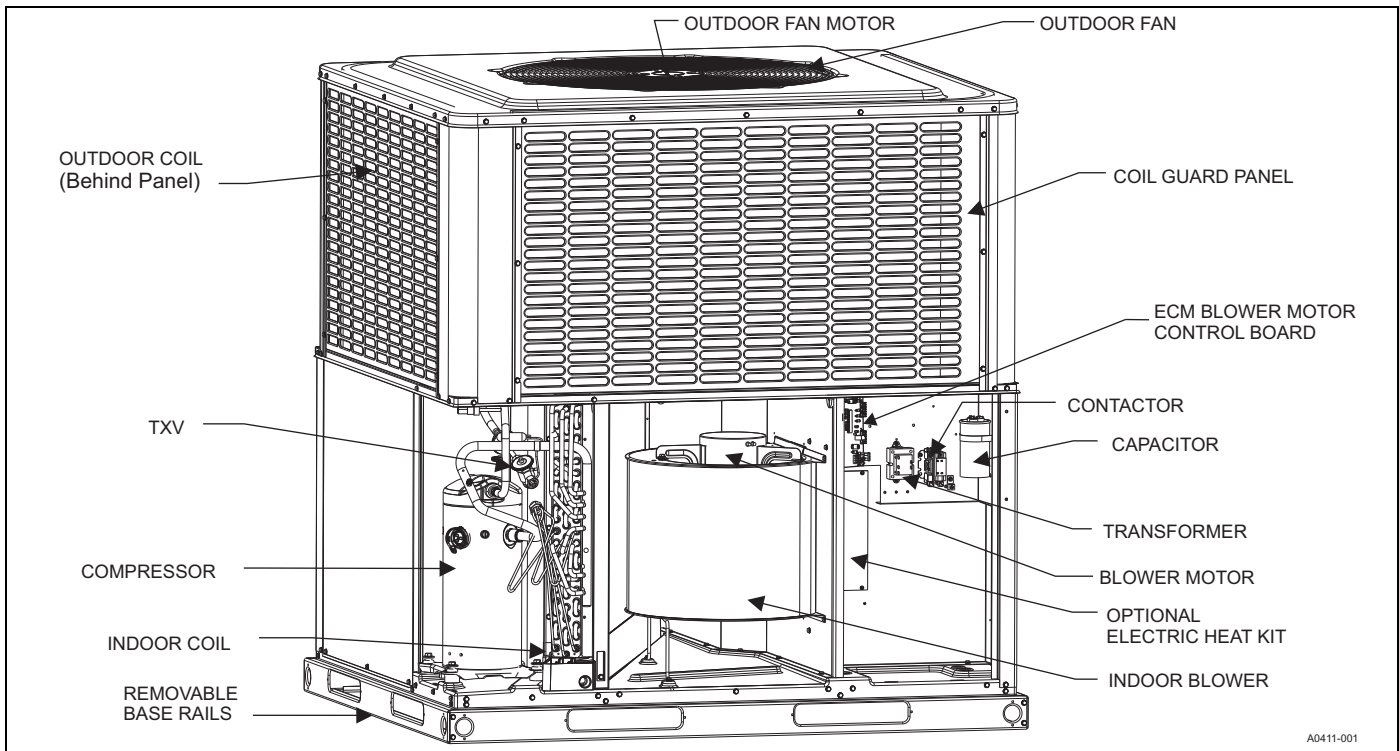


Figure 1: Component location

Location

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

- The unit is designed for **outdoor installation** only.
- Outdoor coils must have an unlimited supply of air. Where a choice of location is available, position the unit on either the north or east side of the building.
- The unit is suitable for mounting on a roof curb.

⚠ WARNING

Do not attach supply and return duct work to the bottom of the unit base pan as the drain pan could be compromised.

- For ground level installation, use a level pad or slab. The thickness and size of the pad or slab must meet local codes and support the weight of the unit. Do not tie the slab to the building foundation.
- Roof structures must be able to support the weight of the unit and its options/accessories. Install the unit on a solid, level roof curb or an appropriate angle iron frame.
- Maintain level tolerance to 1/8 in. across the entire width and length of the unit.

⚠ WARNING

Do not permit overhanging structures or shrubs to obstruct outdoor air discharge outlet.

Clearances

All units require certain clearances for proper operation and service. See Table 5 for the clearances required for construction, servicing, and proper unit operation.

Rigging and handling

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails.

Note: Use spreader bars whose length exceeds the largest dimension across the unit across the top of the unit.

⚠ CAUTION

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

Units can be moved or lifted with a forklift. Slotted openings in the base rails are provided for this purpose.

⚠ CAUTION

If a unit is to be installed on a roof curb other than a Ducted Systems roof curb, gasket or sealant must be applied to all surfaces that come in contact with the unit underside.

⚠ CAUTION

All panels must be secured in place when the unit is lifted. The outdoor coils should be protected from rigging cable damage with plywood or other suitable material.

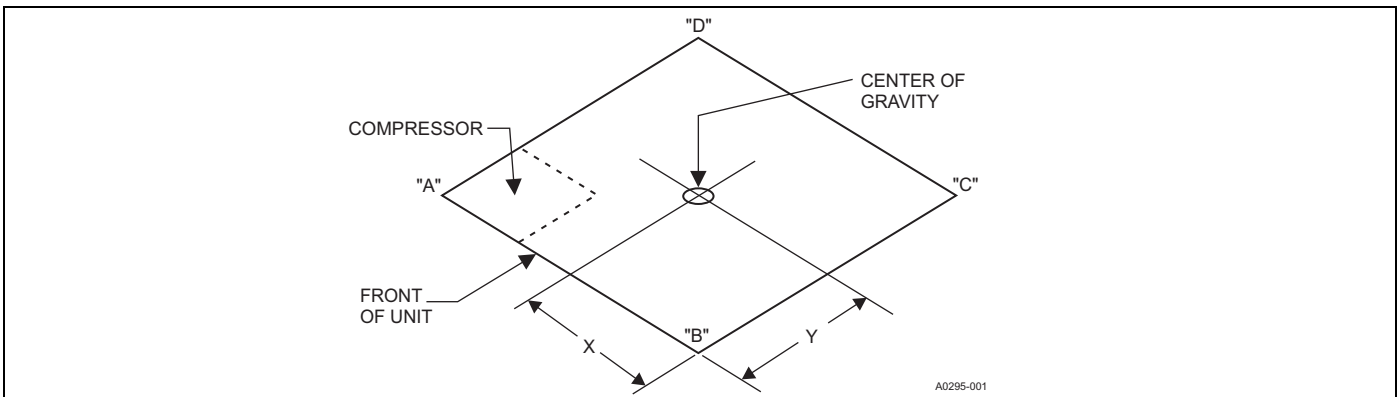


Figure 2: Unit four-point load weight

Table 3: Weights and dimensions

Model	Weight (lb)		Center of gravity		Four-point load location (lb)			
	Shipping	Operating	X	Y	A	B	C	D
PCE6A24	348	343	30	15	96	105	107	40
PCE6A36	466	461	32	13	167	131	130	38
PCE6B48	488	483	30	19	158	125	130	75
PCE6B60	505	500	30	20	157	134	140	74

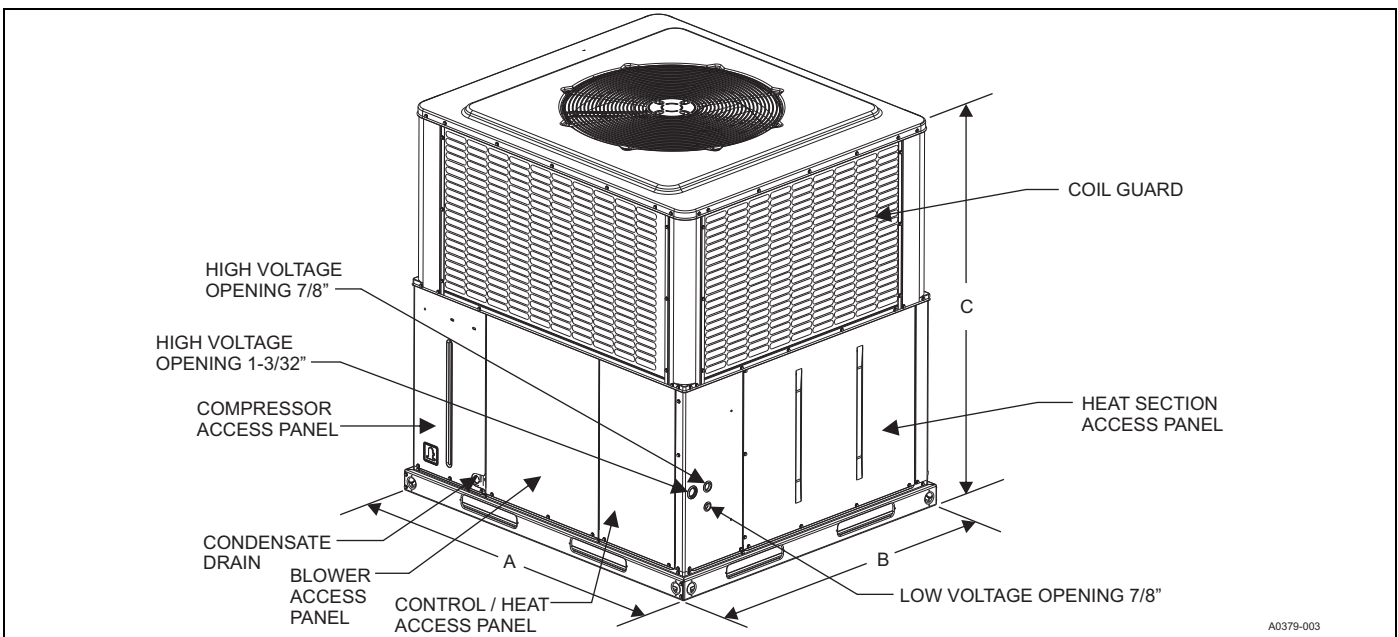


Figure 3: Unit dimensions

Table 4: Unit dimensions

Model	Dimensions (in.)		
	A	B	C
PCE6A24	51 1/4	35 3/4	44
PCE6A36	51 1/4	35 3/4	47
PCE6B48	51 1/4	45 3/4	47
PCE6B60	51 1/4	45 3/4	50

Table 5: Unit clearances

Direction	Distance (in.)	Direction	Distance (in.)
Top ¹	36	Right side	36
Side opposite ducts	36	Left side	24
Duct panel	0	Bottom ^{2,3}	1

- Provide a minimum clearance of 1 in. on all sides of the supply air duct for the first 3 ft of the duct for 20 kW and 25 kW heaters (0 in. thereafter). For all other heaters, make sure that there is 0 in. clearance on all sides for the entire length of the supply air duct.
 - Install units outdoors. Make sure that overhanging structures or shrubs do not obstruct the outdoor air discharge outlet.
 - You can install units on combustible materials made from wood or class A, B, or C roof covering materials if factory base rails are left in place as shipped.
- Note:** For units installed on a roof curb, you can reduce the minimum clearance between combustible roof curb material and the supply air duct from 1 in. to 1/2 in.

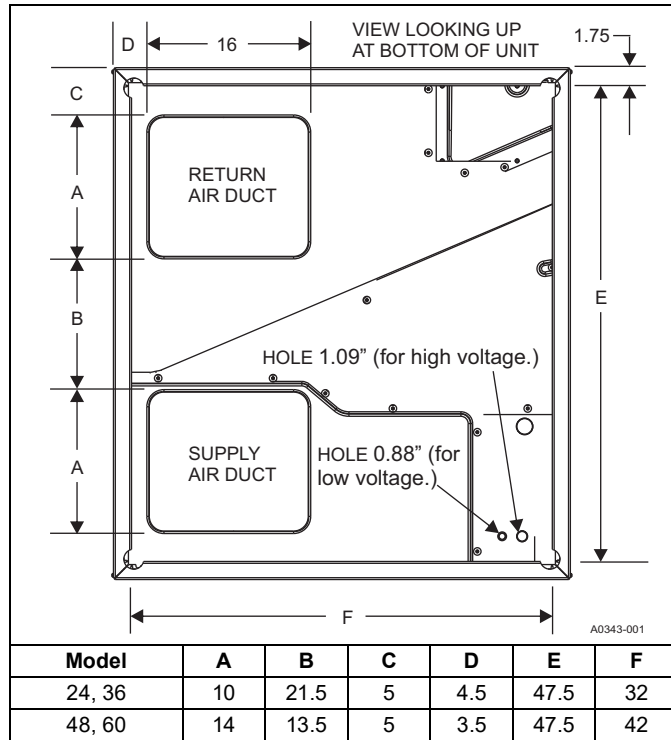


Figure 4: Bottom duct dimensions (in.)

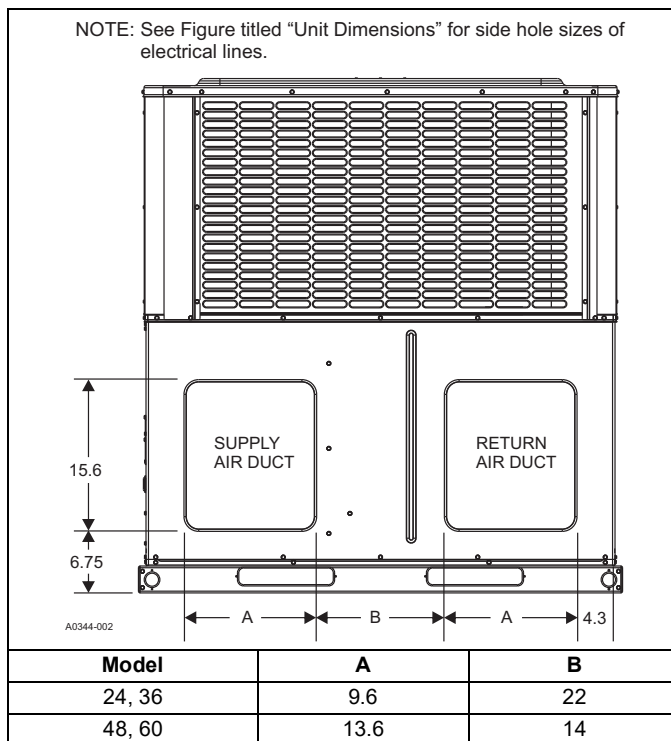


Figure 5: Rear duct dimensions (in.)

Ductwork

NOTICE

All units are shipped in the horizontal supply/return configuration. It is important to reduce the possibility of any air leakage through the bottom duct covers (resulting from cut, torn, or rolled gasket) due to improper handling or shipping processes. To ensure a good tight seal, it is recommended that silicone caulk and/or foil tape be applied along the cover edges.

These units are adaptable to downflow use. To convert to downflow, follow these steps:

- Remove the duct covers found in the bottom return and supply air duct openings. There are four screws securing each duct cover. Save these screws to use in Step 2.
- Install the duct covers removed in Step 1 to the rear supply and return air duct openings. Secure with the screws used in Step 1.
- Seal the duct covers with silicone caulk.

Design and size duct work according to the methods of the Air Conditioning Contractors of America (ACCA), as outlined in their Manual D.

Use a closed return duct system. This does not preclude use of economizers or ventilation air intake. It is best practice to use flexible duct connectors in the supply and return duct work to minimize the transmission of vibration and noise.

CAUTION

When fastening duct work to the side duct flanges on the unit, insert the screws through the duct flanges only. Do not insert the screws through the casing. Outdoor duct work must be insulated and water-proofed.

NOTICE

Be sure to note supply and return openings.

See Figure 4 and Figure 5 for information concerning rear and bottom supply and return air duct openings.

Filters

Correct filter size is very important. Always consider filter size, type, and pressure drop during duct system design.

Single-phase units are shipped without a filter or filter racks. It is the responsibility of the installer to secure a filter in the return air ductwork or install a filter or frame kit.

A filter rack and high velocity filters are standard on three-phase units.

Always use filters and keep filters clean. When filters become dirt laden, insufficient air is delivered by the blower, decreasing your unit's efficiency and increasing operating costs and wear-and-tear on the unit and controls.

Check filters monthly. This is especially important because the unit can be used for both heating and cooling.

Condensate drain

Install a condensate trap in the condensate drain. The plumbing must conform to local codes.

CAUTION

Hand tighten only.

Service access

Access to all serviceable components is provided at the following locations:

- Coil guards
- Unit top panel
- Corner posts
- Blower access panel
- Control access panel
- Indoor coil access panel
- Compressor access panel

See Figure 3 for the location of these access locations and see Table 5 for minimum clearances.

CAUTION

This system uses R-410A refrigerant, which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers, and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.

WARNING

Wear safety glasses and gloves when handling refrigerants. Failure to follow this warning can cause serious personal injury.

See Figure 13 for the R-410A Quick reference guide.

Thermostat

Locate the room thermostat on an inside wall approximately 60 in. above the floor where it is not subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Use sealant behind the thermostat to prevent air infiltration. Follow the manufacturer instructions enclosed with the thermostat for the general installation procedure. PCE6 models contain a multi-stage compressor, so use a multi-stage thermostat. Use color-coded insulated wires (minimum No. 18 AWG) to connect the thermostat to the unit. See Figure 6.

If a field supplied electric heat kit is installed, this unit requires the use of a 1 heat/2 cool (1H/2C) thermostat for correct operation. For units installed with 6HK heat kits of 13 kW and larger, use a 2H/2C thermostat. Do not use power stealing thermostats.

Power and control wiring

Field wiring to the unit must conform to provisions of the current NEC ANSI/NFPA No. 70 or CEC and/or local ordinances. The unit must be electrically grounded in accordance with local codes or, in their absence, with the NEC/CEC. Refer to the unit rating plate and see Table 1 for voltage tolerances that must be maintained at the compressor terminals during starting and running conditions.

Note: Provide the wiring entering the cabinet with mechanical strain relief.

A fused disconnect switch must be field provided for the unit. 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 service must be sized correctly to carry the load. Each unit must be wired with a separate branch circuit fed directly from the main distribution panel and correctly fused.

See Figures 6 to 8 for typical field wiring and refer to the appropriate unit wiring diagram for control circuit and wiring information.

The unit comes wired for 230 V power. If the supply power is 208 V, move wires connected to the control transformer 230 V tap to the 208 V tap.

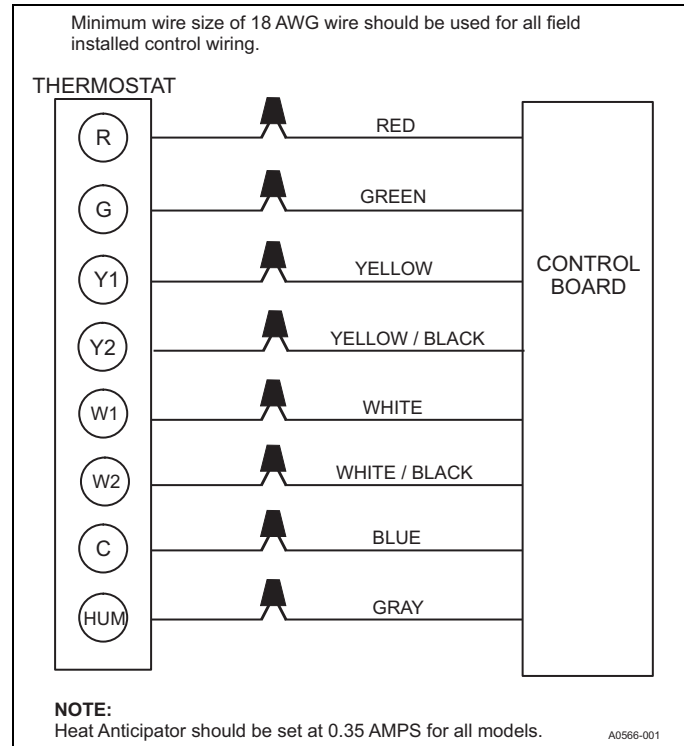


Figure 6: Typical field control wiring diagram for air conditioner models

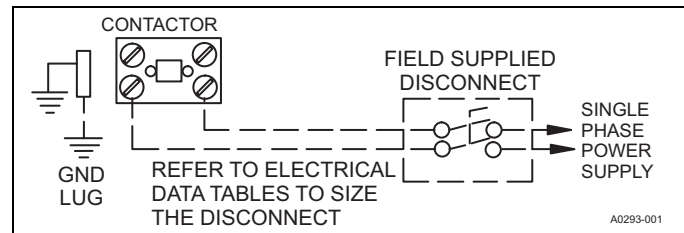


Figure 7: Typical field power wiring diagram

NOTICE

In some applications, the service disconnects on the electric heat kits must be rotated 180° so the up position of the disconnect is the ON position. This service disconnect orientation change is required by UL 1995, Article 26.19 (in reference to all circuit breakers).

Table 6: Electrical data for 208/230-1-60 single source power

Model	Compressor			OD fan motor FLA	Blower motor FLA	Electric heat option					MCA ¹ (A)		Max fuse ² or breaker ³ size		
	RLA	LRA	MCC			Heater kit ⁴	Heater (kW)		Stages	Heater (A)		208	230	208	230
				208	230		208	230							
PCE6A24	10.2	55.2	15.9	0.8	3.8	none	--	--	--	--	--	17.3	17.3	25	25
						6HK16500506	3.6	4.4	1	17.3	19.2	26.4	28.7	30	30
						6HK16500806	5.8	7.1	1	27.7	30.7	39.4	43.1	40	45
						6HK16501006	7.2	8.8	1	34.7	38.3	48.1	52.7	50	60
PCE6A36	14.2	78.1	22.1	1.7	3.8	none	--	--	--	--	--	23.2	23.2	35	35
						6HK16500506	3.6	4.4	1	17.3	19.2	26.4	28.7	35	35
						6HK16500806	5.8	7.1	1	27.7	30.7	39.4	43.1	40	45
						6HK16501006	7.2	8.8	1	34.7	38.3	48.1	52.7	50	60
PCE6B48	17.1	109.0	26.6	1.7	5.4	none	--	--	--	--	--	28.4	28.4	45	45
						6HK16500506	3.6	4.4	1	17.3	19.2	28.4	30.7	45	45
						6HK16500806	5.8	7.1	1	27.7	30.7	41.4	45.1	45	50
						6HK16501006	7.2	8.8	1	34.7	38.3	50.1	54.7	60	60
						6HK16501506	10.8	13.2	2	52.0	57.5	71.8	78.6	80	80
						6HK16502006	14.4	17.6	2	69.3	76.7	93.4	102.6	100	110
PCE6B60	23.5	118.0	36.6	1.7	7.0	none	--	--	--	--	--	38.0	38.0	60	60
						6HK16500506	3.6	4.4	1	17.3	19.2	38.0	38.0	60	60
						6HK16500806	5.8	7.1	1	27.7	30.7	43.4	47.1	60	60
						6HK16501006	7.2	8.8	1	34.7	38.3	52.1	56.7	60	60
						6HK16501506	10.8	13.2	2	52.0	57.5	73.8	80.6	80	90
						6HK16502006	14.4	17.6	2	69.3	76.7	95.4	104.6	100	110

1. Minimum Circuit Ampacity.
2. Maximum Overcurrent Protection per standard UL 1995.
3. Fuse or HACR circuit breaker is field installed.
4. Single-Point Connection Kit required.

Table 7: Electrical data for 208-1-60 multi source power

Model	Compressor			OD fan motor FLA	Blower motor FLA	Electric heat option				Multi-source							
	RLA	LRA	MCC			Heater kit	Heater (kW) 208	Stages	Heater (A) 208	208	208	208	208	208	208	208	208
				208	208												
Multi-source: compressor circuit and heat circuits						Multi-source: Circuit 1 compressor circuit Circuit 2 heat Circuit 3 heat Circuit 4 heat				MCA¹ (A)	Max fuse² or breaker³ size	MCA¹ (A)	Max fuse² or breaker³ size	MCA¹ (A)	Max fuse² or breaker³ size	MCA¹ (A)	Max fuse² or breaker³ size
										Circuit 1	Circuit 2		Circuit 3		Circuit 4		
PCE6A24	10.2	55.2	15.9	0.8	3.8	none	--	--	--	17.3	25	--	--	--	--	--	
						6HK(0,1)6500506	3.6	1	17.3	17.3	25	21.7	25	--	--	--	--
						6HK(0,1)6500806	5.8	1	27.7	17.3	25	34.7	35	--	--	--	--
						6HK(0,1)6501006	7.2	1	34.7	17.3	25	43.3	45	--	--	--	--
PCE6A36	14.2	78.1	22.1	1.7	3.8	none	--	--	--	23.2	35	--	--	--	--	--	
						6HK(0,1)6500506	3.6	1	17.3	23.2	35	21.7	25	--	--	--	--
						6HK(0,1)6500806	5.8	1	27.7	23.2	35	34.7	35	--	--	--	--
						6HK(0,1)6501006	7.2	1	34.7	23.2	35	43.3	45	--	--	--	--
						6HK16501506	10.8	2	52.0	23.2	35	21.7	25	43.3	45	--	--
6HK26501506	10.8	2	52.0	23.2	35	65.0	70	--	--	--	--						
PCE6B48	17.1	109.0	26.6	1.7	5.4	none	--	--	--	28.4	45	--	--	--	--	--	
						6HK(0,1)6500506	3.6	1	17.3	28.4	45	21.7	25	--	--	--	--
						6HK(0,1)6500806	5.8	1	27.7	28.4	45	34.7	35	--	--	--	--
						6HK(0,1)6501006	7.2	1	34.7	28.4	45	43.3	45	--	--	--	--
						6HK16501506	10.8	2	52.0	28.4	45	21.7	25	43.3	45	--	--
						6HK16502006	14.4	2	69.3	28.4	45	43.3	45	43.3	45	--	--
						6HK26501506	10.8	2	52.0	28.4	45	65.0	70	--	--	--	--
6HK26502006	14.4	2	69.3	28.4	45	86.7	90	--	--	--	--						

Table continued on next page

Table 7: Electrical data for 208-1-60 multi source power (Continued)

Model	Compressor			OD fan motor	Blower motor	Electric heat option				Multi-source							
	RLA	LRA	MCC	FLA	FLA	Heater kit	Heater (kW)	Stages	Heater (A)	208	208	208	208	208	208	208	
							208		208								
Multi-source: compressor circuit and heat circuits						Multi-source: Circuit 1 compressor circuit Circuit 2 heat Circuit 3 heat Circuit 4 heat				MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size
						Circuit 1		Circuit 2		Circuit 3		Circuit 4					
PCE6B60	23.5	118.0	36.6	1.7	7.0	none	--	--	--	38.0	60	--	--	--	--	--	
						6HK(0,1)6500506	3.6	1	17.3	38.0	60	21.7	25	--	--	--	--
						6HK(0,1)6500806	5.8	1	27.7	38.0	60	34.7	35	--	--	--	--
						6HK(0,1)6501006	7.2	1	34.7	38.0	60	43.3	45	--	--	--	--
						6HK16501506	10.8	2	52.0	38.0	60	21.7	25	43.3	45	--	--
						6HK16502006	14.4	2	69.3	38.0	60	43.3	45	43.3	45	--	--
						6HK16502506	18.0	2	86.7	38.0	60	43.3	45	43.3	45	21.7	25
						6HK26501506	10.8	2	52.0	38.0	60	65.0	70	--	--	--	--
						6HK26502006	14.4	2	69.3	38.0	60	86.7	90	--	--	--	--
6HK26502506	18.0	2	86.7	38.0	60	108.3	110	--	--	--	--						

1. MCA = Minimum Circuit Ampacity.
2. Maximum Overcurrent Protection per standard UL 1995.
3. Fuse or HACR circuit breaker is field installed.

Table 8: Electrical data for 230-1-60 multi source power

Model	Compressor			OD fan motor	Blower motor	Electric heat option				Multi-source							
	RLA	LRA	MCC	FLA	FLA	Heater kit	Heater (kW)	Stages	Heater (A)	230	230	230	230	230	230	230	
							230		230								
Multi-source: compressor circuit and heat circuits						Multi-source: Circuit 1 compressor circuit Circuit 2 heat Circuit 3 heat Circuit 4 heat				MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size	MCA ¹ (A)	Max fuse ² or breaker ³ size
						Circuit 1		Circuit 2		Circuit 3		Circuit 4					
PCE6A24	10.2	55.2	15.9	0.8	3.8	none	--	--	--	17.3	25	--	--	--	--	--	
						6HK(0,1)6500506	4.4	1	19.2	17.3	25	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	17.3	25	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	17.3	25	47.9	50	--	--	--	--
PCE6A36	14.2	78.1	22.1	1.7	3.8	none	--	--	--	23.2	35	--	--	--	--	--	
						6HK(0,1)6500506	4.4	1	19.2	23.2	35	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	23.2	35	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	23.2	35	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	23.2	35	24.0	25	47.9	50	--	--
						6HK26501506	13.2	2	57.5	23.2	35	71.9	80	--	--	--	--
PCE6B48	17.1	109.0	26.6	1.7	5.4	none	--	--	--	28.4	45	--	--	--	--	--	
						6HK(0,1)6500506	4.4	1	19.2	28.4	45	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	28.4	45	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	28.4	45	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	28.4	45	24.0	25	47.9	50	--	--
						6HK16502006	17.6	2	76.7	28.4	45	47.9	50	47.9	50	--	--
						6HK26501506	13.2	2	57.5	28.4	45	71.9	80	--	--	--	--
6HK26502006	17.6	2	76.7	28.4	45	95.8	100	--	--	--	--						
PCE6B60	23.5	118.0	36.6	1.7	7.0	none	--	--	--	38.0	60	--	--	--	--	--	
						6HK(0,1)6500506	4.4	1	19.2	38.0	60	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	38.0	60	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	38.0	60	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	38.0	60	24.0	25	47.9	50	--	--
						6HK16502006	17.6	2	76.7	38.0	60	47.9	50	47.9	50	--	--
						6HK16502506	22.0	2	95.8	38.0	60	47.9	50	47.9	50	24.0	25
						6HK26501506	13.2	2	57.5	38.0	60	71.9	80	--	--	--	--
						6HK26502006	17.6	2	76.7	38.0	60	95.8	100	--	--	--	--
6HK26502506	22.0	2	95.8	38.0	60	119.8	125	--	--	--	--						

1. MCA = Minimum Circuit Ampacity.
2. Maximum Overcurrent Protection per standard UL 1995.
3. Fuse or HACR circuit breaker is field installed.

SINGLE-POINT WIRING KITS

NOTE:

For single circuit heater kits, remove the wires for the second circuit from the single-point block.

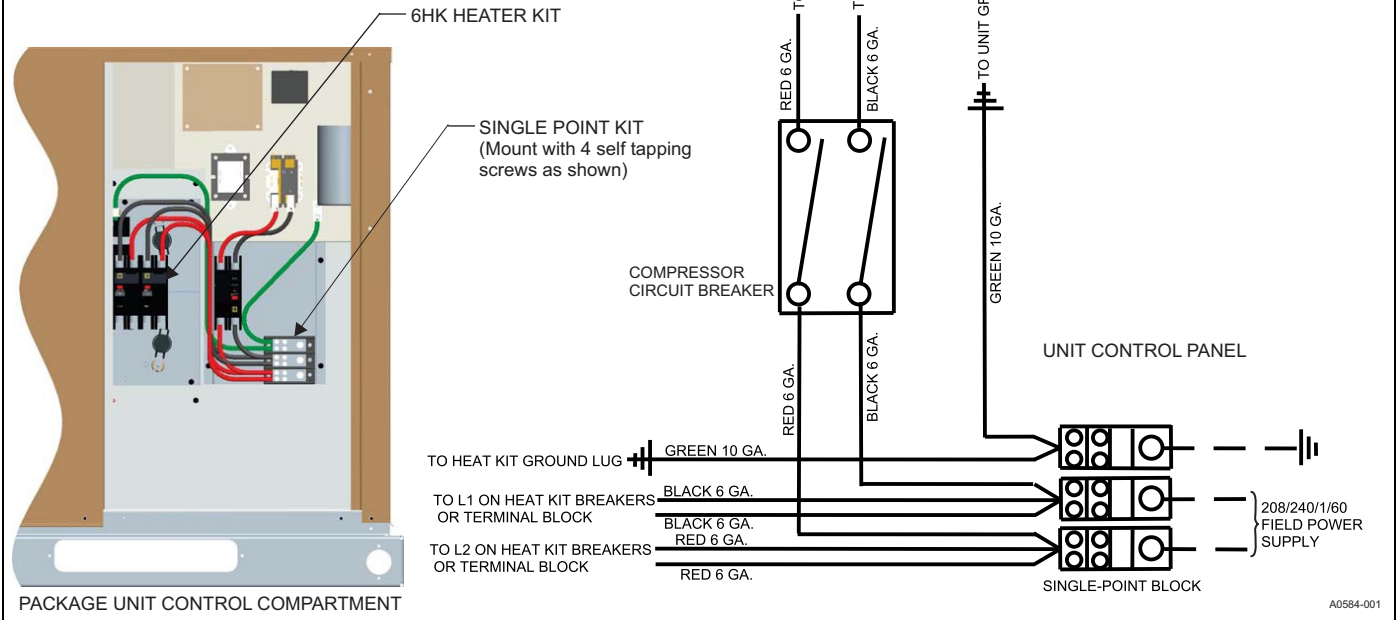


Figure 8: Single-point wiring kits

Table 9: Single-point wiring kit part numbers

Unit model number	Single-point kit part number	Breaker size (A)	Heat kit (kW)
PCE6A24	S1-2SPWK006	25	Up to 10
PCE6A36	S1-2SPWK002	35	Up to 15
PCE6B48	S1-2SPWK003	45	Up to 20
PCE6B60	S1-2SPWK005	60	Up to 20

Table 10: Electric heat blower off delay

Model ID	Blower off delay in seconds
PCE6A24	0
PCE6A36	60
PCE6B48	110
PCE6B60	110

Table 11: Physical data

Nominal tonnage	Models			
	PCE6A24	PCE6A36	PCE6B48	PCE6B60
	2.0	3.0	4.0	5.0
Refrigerant information				
Refrigerant type	R-410A	R-410A	R-410A	R-410A
Refrigerant charge (lb-oz)	4-4	7-2	7-14	10-2
Dimensions (in.)				
Length	51 1/4	51 1/4	51 1/4	51 1/4
Width	35 3/4	35 3/4	45 3/4	45 3/4
Height	44	47	47	50
Operating weight (lb)	343	461	483	500
Compressors				
Type	Scroll	Scroll	Scroll	Scroll
Stages	2	2	2	2
Outdoor coil data				
Face area (ft ²)	12.3	15.3	17.5	21.1
Rows	1	2	2	2
Fins per inch	22	22	22	22
Tube diameter (mm)	7	7	7	7
Circuitry type	Straight	Interlaced	Interlaced	Interlaced
Indoor coil data				
Face area (ft ²)	4.6	4.6	6.2	6.2
Rows	2	3	3	4
Fins per inch	16	16	16	16
Tube diameter (in.)	3/8	3/8	3/8	3/8
Circuitry type	Interlaced	Interlaced	Interlaced	Interlaced
Refrigerant control	TXV	TXV	TXV	TXV
Outdoor fan data				
Fan diameter (in.)	24	24	26	26
Type	Prop	Prop	Prop	Prop
Drive type	Direct	Direct	Direct	Direct
Number of speeds	1	1	1	1
Motor HP each	1/8	1/3	1/3	1/3
RPM	790	850	850	850
Nominal total CFM	2400	2400	3200	3200
Direct drive indoor blower data				
Blower size (in.)	11 x 8	11 x 10	11 x 10	11 x 10
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Motor HP each	1/2	1/2	3/4	1
RPM	1400 maximum	1400 maximum	1400 maximum	1400 maximum
Frame size	48	48	48	48
Filters				
Filter size	A	A	B	B
Quantity - size	Field-supplied external filters must be sized so as not to exceed 300 fpm air velocity through disposable filters. For internal filter use, a filter rack kit is available. Refer to the instructions supplied with the kit for replacement filter sizes. Filter sizes: A = 20 in. x 20 in., B = 20 in. x 30 in.			

Compressors

The compressor used in this product is specifically designed to operate with R-410A refrigerant and cannot be interchanged with a different type of compressor. Compressors used in PCE6 models contain two internal bypass ports, which enable the compressor to operate at 67% part load capacity.

⚠ CAUTION

This system uses R-410A refrigerant, which operates at higher pressures than R-22. No other refrigerant may be used in this system.

The compressor uses polyolester (POE) oil, Mobil 3MA POE. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oil can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. If the refrigerant circuit is opened, take all necessary precautions to avoid exposure of the oil to the atmosphere.

⚠ CAUTION

Do not leave the system open to the atmosphere. Unit damage could occur due to moisture being absorbed by the POE oil in the system. This type of oil is highly susceptible to moisture absorption

POE compressor lubricants are known to cause long-term damage to some synthetic roofing materials.

⚠ CAUTION

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 precautions to protect roofing.

Procedures that risk oil leakage include, but are not limited to the following:

- Replacing the compressor
- Repairing refrigerant leaks
- Replacing refrigerant components, for example, filter drier, pressure switch, metering device, or coil

⚠ CAUTION

Do not loosen compressor mounting bolts.

Units are shipped with compressor mountings, which are factory adjusted and ready for operation.

Section V: Airflow performance

Table 12: Airflow performance - side duct application

Model	Jumper position		External static pressure (in. W.C.)									
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
			SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
PCE6A24	High cool	A	1010	980	950	920	890	850	810	770	720	670
		B	930	900	870	840	800	760	720	650	610	570
		C	820	790	750	710	670	610	570	510	470	430
		D	660	620	580	520	470	420	370	320	270	220
	Low cool	A	750	710	680	630	580	510	470	420	380	340
		B	690	660	620	570	520	460	410	360	310	270
		C	580	550	500	440	390	350	290	240	180	130
		D	470	440	400	350	310	280	230	190	140	100
	Heat	A	1040	1010	980	940	910	880	840	800	760	700
		B	970	940	910	880	840	800	760	710	670	620
		C	910	870	840	810	770	730	680	620	570	540
		D	840	800	770	730	680	630	590	530	490	450
PCE6A36	High cool	A	1600	1570	1530	1490	1460	1420	1380	1340	1280	1220
		B	1470	1430	1400	1360	1320	1280	1240	1190	1140	1100
		C	1330	1290	1260	1220	1180	1130	1080	1020	980	930
		D	1150	1110	1070	1020	970	910	860	820	770	730
	Low cool	A	1030	980	930	880	820	770	710	670	630	580
		B	940	890	840	770	720	670	620	570	530	480
		C	860	810	730	680	630	580	530	470	420	370
		D	780	720	630	590	530	480	430	370	300	250
	Heat	A	1360	1330	1290	1250	1210	1160	1110	1060	1020	970
		B	1260	1220	1180	1140	1100	1050	990	950	900	850
		C	1150	1110	1070	1020	970	910	860	820	770	730
		D	1030	980	930	880	820	770	710	670	630	580

See notes at end of table on next page.

Table 12: Airflow performance - side duct application (Continued)

Model	Jumper position		External static pressure (in. W.C.)									
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
			SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
PCE6B48	High cool	A	1870	1830	1790	1750	1720	1680	1630	1590	1550	1520
		B	1730	1690	1650	1610	1570	1540	1490	1450	1410	1360
		C	1610	1570	1530	1490	1450	1400	1360	1320	1280	1220
		D	1390	1340	1300	1250	1200	1150	1100	1050	990	920
	Low cool	A	1330	1280	1240	1190	1140	1090	1030	980	920	850
		B	1270	1220	1180	1120	1070	1020	960	900	850	770
		C	1190	1130	1080	1030	970	910	840	790	730	660
		D	1010	940	880	820	750	680	610	550	440	410
	Heat	A	1760	1720	1680	1640	1610	1570	1520	1480	1440	1390
		B	1630	1590	1540	1510	1460	1420	1380	1330	1300	1240
		C	1480	1440	1390	1350	1300	1260	1210	1170	1110	1050
		D	1310	1260	1220	1170	1120	1060	1010	950	900	830
PCE6B60	High cool	A	2140	2100	2070	2040	2000	1960	1920	1890	1850	1820
		B	1980	1950	1920	1880	1840	1810	1770	1730	1690	1650
		C	1880	1850	1810	1770	1740	1700	1660	1630	1590	1550
		D	1700	1670	1630	1590	1550	1520	1480	1440	1410	1370
	Low cool	A	1500	1460	1420	1380	1330	1300	1260	1210	1170	1120
		B	1450	1400	1360	1310	1270	1230	1180	1130	1080	1030
		C	1410	1360	1320	1270	1220	1190	1130	1080	1030	970
		D	1250	1200	1150	1100	1040	990	930	880	810	760
	Heat	A	1960	1930	1890	1850	1820	1790	1740	1700	1660	1630
		B	1850	1820	1790	1750	1710	1670	1630	1600	1560	1520
		C	1740	1710	1670	1630	1600	1560	1520	1490	1450	1410
		D	1610	1570	1540	1500	1450	1420	1380	1340	1300	1260

Notes:

Airflow tested with dry coil conditions, without air filters, at 230 V.

Applications above 0.8 in. W.C. external static pressure are not recommended.

Brushless DC high-efficiency enhanced ECM blower motor is used for all indoor blower assemblies.

Minimal variations in airflow performance data result from operating at 208 V. The data in the table can be used in those cases.

Minimal variations in airflow performance data result from using downflow duct applications. The data in the table can be used in those cases.

Heating applications are tested at 0.50 in. W.C. external static pressure, and cooling applications are tested at 0.30 in. W.C. external static pressure per standards.

Table 13: Electric heat performance data

Heater models ^{1,2}	Nominal kW at 240 V	Total heat				kW staging			
		kW		MBH		W1 only		W1 + W2	
		208 V	230 V	208 V	230 V	208 V	230 V	208 V	230 V
6HK(0,1)6500506	4.8	3.6	4.4	12.3	15.0	3.6	4.4	3.6	4.4
6HK(0,1)6500806	7.7	5.8	7.1	19.7	24.1	5.8	7.1	5.8	7.1
6HK(0,1)6501006	9.6	7.2	8.8	24.6	30.1	7.2	8.8	7.2	8.8
6HK(1,2)6501506	14.4	10.8	13.2	36.9	45.1	3.6	4.4	10.8	13.2
6HK(1,2)6502006	19.2	14.4	17.6	49.2	60.2	7.2	8.8	14.4	17.6
6HK(1,2)6502506	24.0	18.0	22.0	61.5	75.2	7.2	8.8	18.0	22.0

1. (0,1): 0 = no service disconnect or 1 = with service disconnect.

2. (1,2): 1 = with service disconnect, no breaker jumper bar or 2 = with service disconnect and breaker jumper bar.

Table 14: Additional static resistance

Size (ton)	CFM	Wet indoor coil	Economizer ¹	Filter/frame kit
24 (2.0)	500	0.01	0.00	0.01
	600	0.01	0.00	0.02
	700	0.01	0.00	0.04
	800	0.02	0.01	0.06
	900	0.03	0.01	0.08
	1000	0.04	0.01	0.10
	1100	0.05	0.01	0.13
	1200	0.06	0.02	0.16
36 (3.0)	700	0.01	0.00	0.04
	800	0.02	0.01	0.06
	900	0.03	0.01	0.08
	1000	0.04	0.01	0.10
	1100	0.05	0.01	0.13
	1200	0.06	0.02	0.16
	1300	0.07	0.03	0.17
48 (4.0)	1100	0.02	0.02	0.04
	1200	0.03	0.02	0.04
	1300	0.04	0.02	0.05
	1400	0.05	0.03	0.05
	1500	0.06	0.04	0.06
	1600	0.07	0.04	0.07
	1700	0.07	0.04	0.08
	1800	0.08	0.04	0.09
	1900	0.09	0.05	0.10
60 (5.0)	1100	0.02	0.02	0.04
	1200	0.03	0.02	0.04
	1300	0.04	0.02	0.05
	1400	0.05	0.03	0.05
	1500	0.06	0.04	0.06
	1600	0.07	0.04	0.07
	1700	0.07	0.04	0.08
	1800	0.08	0.04	0.09
	1900	0.09	0.05	0.10
	2000	0.09	0.05	0.11

1. The pressure drop through the economizer is greater for 100% outdoor air than for 100% return air. If the resistance of the return air duct is less than 0.25 IWG, the unit delivers less CFM during full economizer operation.

Note: Filter pressure drop based on standard filter media tested at velocities not to exceed 300 ft/min.

Section VI: Operation

PCE6 models contain a multi-stage compressor, so use a multi-stage thermostat.

Cooling sequence of operation

- On a call for cooling, the wall thermostat sends a 24 V Y signal to the unit. The unit contactor closes, which energizes the outdoor fan and the compressor. The indoor blower control board sends a signal to the indoor blower motor, which runs at the selected LOW COOL cooling speed. A 24 V signal from the room thermostat to the unit Y2 input operates the compressor at full capacity, and the indoor blower control board operates the indoor blower at the HIGH COOL speed. The unit does not operate on a second-stage cooling call without a call on the first-stage Y1 input.
- When the demand for cooling is satisfied, the wall thermostat removes the 24 V Y signal from the unit. The contactor opens, and the outdoor fan and compressor stop. The indoor blower control board continues to operate the indoor blower for 60 s after the cooling signal is removed.

Dehumidification/humidity switch input

This model unit features a built-in dehumidification feature for advanced dehumidification during cooling operation. The unit indoor blower control is designed to work with a humidity control that closes when the humidity is below the setpoint. The control is open when the humidity is above the setpoint. This humidity control may be referred to as a humidistat or dehumidistat.

To use this feature, the control HUM STAT jumper must be set to YES and a humidistat must be connected from the low-voltage R and HUM color-coded leads. During cooling operation, if the humidity level is above the humidistat setpoint, the indoor blower speed is reduced by approximately 15%.

Safety controls

⚠ WARNING

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 other than those procedures recommended in this installation manual. Failure to heed this warning could result in serious injury and possible damage to this equipment.

The control circuit includes the following safety controls:

- High-pressure switch** - This switch protects against excessive discharge pressures.
- Loss of charge switch** - This switch protects against loss of charge due to a leak in the system.

The high-pressure switch and the loss of charge switch are specifically designed to operate with R-410A systems. Do not use R-22 pressure switches as replacements for R-410A pressure switches.

Indoor circulating blower

When the thermostat calls for FAN, the thermostat terminal G is energized, signaling the indoor blower control board to operate the indoor circulating blower to run continuously. The indoor circulating blower airflow is approximately 63% of the HIGH COOL airflow selected on the indoor blower control board.

If a call for COOL occurs on Y1, the indoor blower runs at the LOW COOL speed based on the COOL jumper setting. If a call for COOL is present on Y1+Y2, the indoor blower runs at the HIGH COOL speed based on the COOL jumper setting.

If a call for HEAT occurs on W1 or W1+W2, the indoor circulating blower runs at the HEAT speed based on the HEAT jumper setting.

When the thermostat ends the call for FAN, the thermostat terminal G is de-energized, and the indoor blower control board stops the indoor circulating blower operation.

Delay profiles

The Delay profiles for each Delay jumper setting are shown in Table 15.

The levels shown in the Pre-run, Short-run, and Run periods are a percentage of the blower speed corresponding to the thermostat call.

The Post-Run and Off Delay levels are derived from the level of the previous state, not the blower speed corresponding to the thermostat call.

If in Delay Profile B and in the Short-Run Period (82% of capacity), and the thermostat call is removed, this causes the control to enter the Post-Run state. The Post-Run state level for Delay Profile B is 100% of the previous level, so the level during the Post-Run state is 82%.

Table 15: Delay profile descriptions

Delay profile	Period	Cooling	
		Level%	Time in state (min)
A	Pre-run	Bypass	Bypass
	Short-run	Bypass	Bypass
	Run	100	No Limit
	Post-run*	100	1
	Off delay*	Bypass	Bypass
B	Pre-run	50	2
	Short-run	82	5
	Run	100	No Limit
	Post-run*	100	1
	Off delay*	Bypass	Bypass
C	Pre-run	Bypass	Bypass
	Short-run	Bypass	Bypass
	Run	100	No Limit
	Post-run*	100	1
	Off delay*	50	1
D	Pre-run	Bypass	Bypass
	Short-run	63	1.55
	Run	100	No Limit
	Post-run*	100	1
	Off delay*	63	0.5

Heating sequence of operation

Note: This section applies to units with an optional electric heat kit.

- On a call for heating, the wall thermostat sends a 24 V W signal to W1 on the unit. The indoor blower then runs at the selected heating speed. The 24 V signal also goes to the sequencer(s) or relays in the electric heat kit and turns on the electric heating elements. All 6HK heat kits that are 13 kW and higher require the use of a multi-stage thermostat. All 6HK heat kits that are 10 kW and lower only need an input on the W1 connection.
- When the demand for heating is removed, the wall thermostat removes the W signal. When the 24 V signal is removed from the electric heat kit, the heating elements turn off. The indoor blower continues to run until the electric heat blower off time delay expires. This function is built into the indoor blower control board.
- See Table 10 for blower off delay times.

Electric heat limit switch operation

The 6HK single-phase heat kits use a normally closed line voltage limit switch and a normally closed fusible link. If the fusible link opens, it must be replaced with the appropriate OEM part and the cause must be investigated and corrected.

Table 16: Thermostat signals

Signal	State	Board function
G	On	Indoor blower instant on
	Off	Indoor blower off
W1	On	Indoor blower instant on Electric heat first stage on (if so equipped)
	Off	Electric heat first stage off (if so equipped) Indoor blower off after off delay
G and W1	On	Indoor blower instant on in heating speed Electric heat first stage on (if so equipped)
	W Off	Electric heat first stage off (if so equipped) Indoor blower switches to continuous fan speed
G and Y1	On	Outdoor fan instant on
		Indoor blower instant on in LOW cooling speed Compressor on
	Y1 Off	Compressor instant off
		Outdoor fan instant off Indoor blower switches to continuous fan speed after 60 s
	G and Y1 Off	Compressor instant off
		Outdoor fan instant off Indoor blower off after 60-s delay

Table 17: Minimum blower speed for electric heat

Model	Heater (kW)					
	5	8	10	15	20	25
PCE6A24	D (LO)	C (ML)	C (ML)	—	—	—
PCE6A36	D (LO)	C (ML)	C (ML)	A (HI)	—	—
PCE6B48	D (LO)	D (LO)	D (LO)	C (ML)	B (MH)	—
PCE6B60	D (LO)	D (LO)	C (ML)	D (LO)	B (MH)	A (HI)

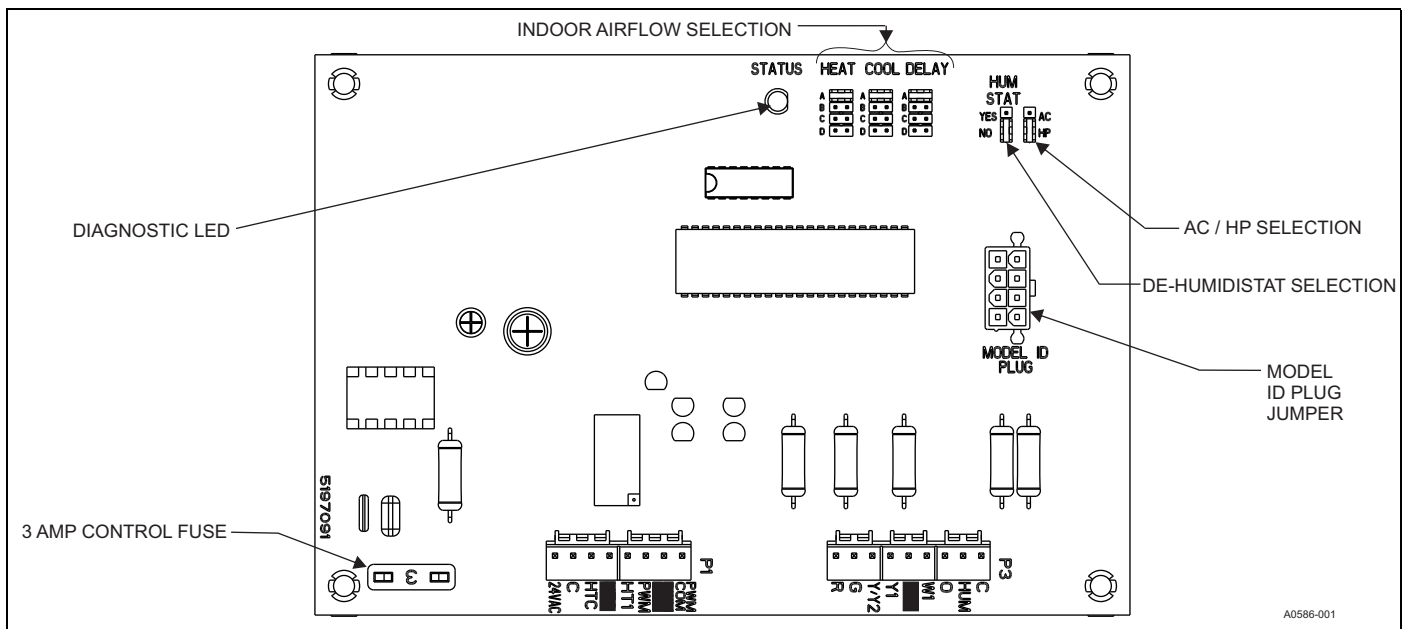


Figure 9: Indoor blower control

Table 18: Enhanced ECM indoor blower control board fault codes

Flashes	Fault condition
LED Off	No power to control
LED On	Internal control failure
Slow red	Control normal operation
Rapid red	Factory test mode
7 Red	Call for heat and cool at the same time
8 Red	Model ID plug not inserted
9 Red	Internal fault self corrected, attempting normal operation

Charging

To check or adjust the unit charge, follow these steps:

1. Connect a temperature probe to the compressor discharge line approximately 6 in. away from the compressor shell.
2. Connect a high side refrigerant pressure gauge to the unit discharge pressure port.
3. Record the discharge line temperature and discharge pressure. Using an R-410A temperature pressure chart, convert the gauge pressure to saturation temperature. The difference between discharge saturation temperature and discharge line temperature is discharge superheat.
4. Obtain an entering indoor wet bulb temperature reading.
5. Compare the readings taken to the unit charging chart.

Starting up the unit

1. Check the electrical supply voltage being supplied. Make sure that it is within the specified range on the unit data plate.
2. Make sure all electrical connections are tight.
3. If the unit is connected to 208 V supply power, wire the control transformer accordingly.
4. Turn on the electrical power to the unit.
5. Set the room thermostat to the COOL position and set the temperature setting on the thermostat lower than the room temperature to create a call for cooling.
6. Measure the total external static pressure and set the blower motor cooling speed appropriately per the airflow performance table.
7. If an optional electric heat kit is installed, make sure the heat blower speed is set at or above the required speed. See Table 17.
8. Make sure that all the unit panels are in place and secured, and that an air filter is installed.

Measuring external static pressure

1. Measure the supply air static pressure and record this positive number.
2. Measure the return air static pressure and record this negative number.
3. Treat the negative number as a positive and add the two numbers together. This is the total external static pressure.

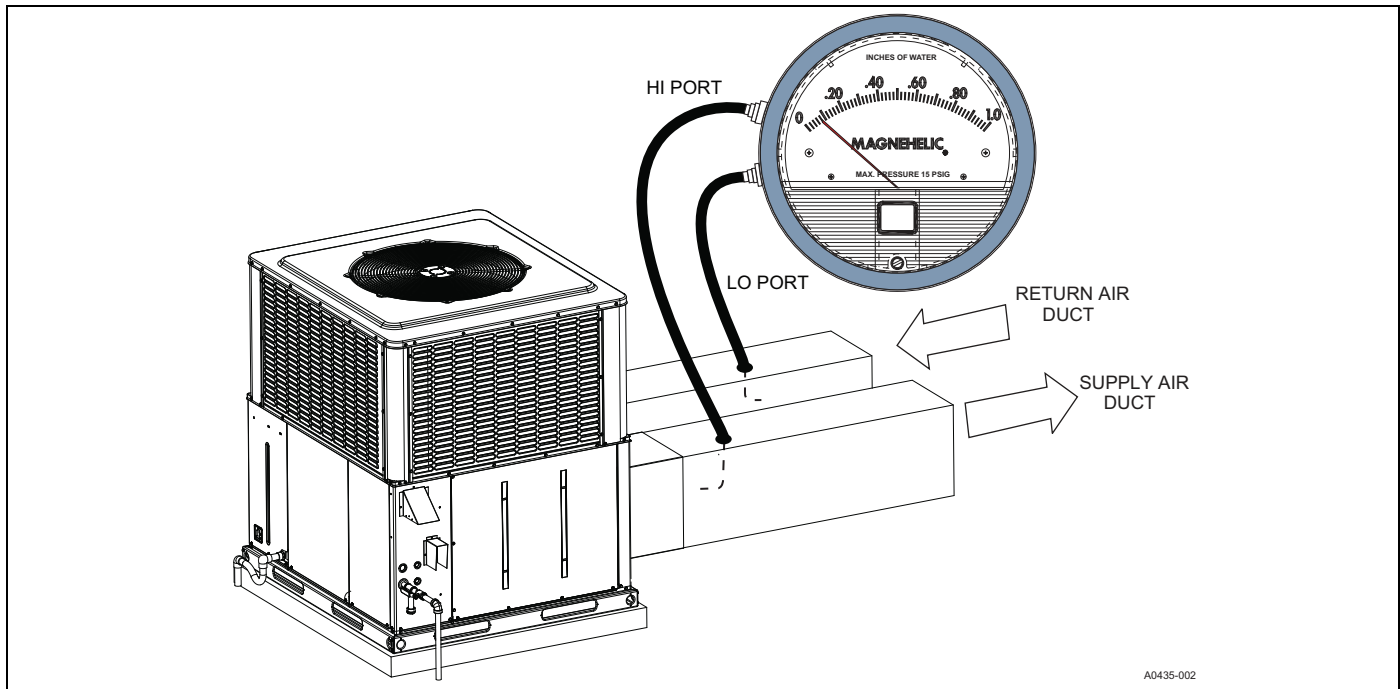


Figure 10: Measuring external static pressure

Section VII: Maintenance

Normal maintenance

⚠ WARNING

Prior to any of the following maintenance procedures, shut off all power to the unit, to avoid personal injury.

Periodic maintenance consists of changing or cleaning filters and general cleaning of the outdoor coil.

Filters

Inspect filters once a month. Replace disposable filters or clean permanent filters as necessary.

Note: Do not replace permanent filters with disposable filters.

Motors

The indoor blower motor and outdoor fan motor are permanently lubricated and require no maintenance.

Outdoor coil

Do not allow dirt to accumulate on the outdoor coil surface or other parts in the air circuit. Clean as often as necessary to keep the coil clean. If using water to clean the coil, make sure that the power to the unit is shut off before cleaning.

NOTICE

Do not use a pressure washer as coil fin damage will occur.

⚠ CAUTION

Exercise care when cleaning the coil so that the coil fins are not damaged. Do not permit the hot outdoor air discharge outlet to be obstructed by overhanging structures or shrubs.

Troubleshooting

⚠ WARNING

Troubleshooting of components necessarily requires opening the electrical control box with the power connected to the unit. Use extreme care when working with live circuit! Check the unit nameplate for the correct range before making any connections with line terminals.

⚠ CAUTION

The wire number or color and terminal designations referred to may vary. Check the wiring label inside the control box access panel for the correct wiring.

Section VIII: Typical wiring diagrams

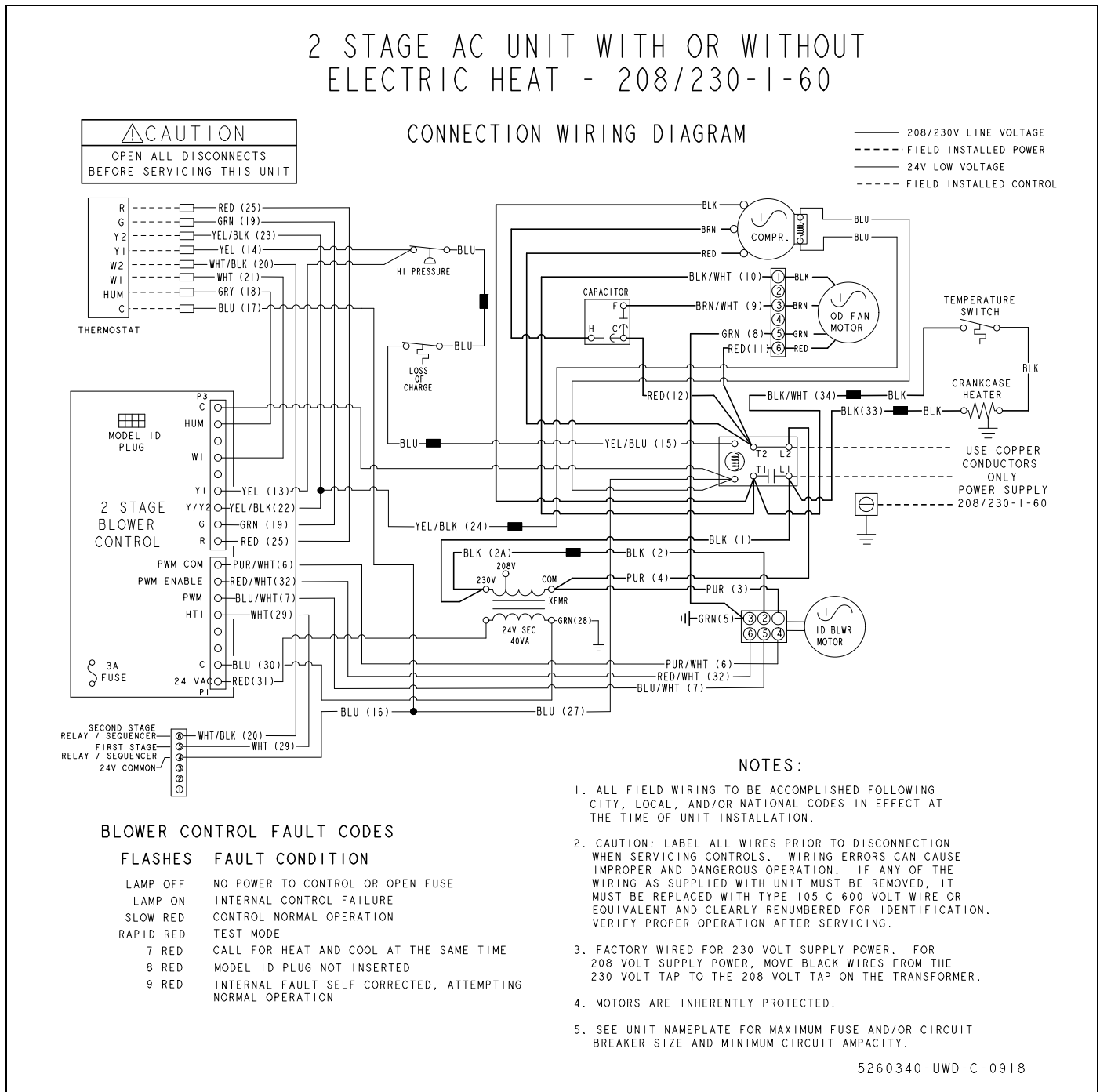


Figure 11: Connection wiring diagram

2 STAGE AC UNIT WITH OR WITHOUT ELECTRIC HEAT - 208/230-1-60

LADDER WIRING DIAGRAM

CAUTION
OPEN ALL DISCONNECTS
BEFORE SERVICING THIS UNIT

—— 208/230V LINE VOLTAGE
- - - - FIELD INSTALLED POWER
—— 24V LOW VOLTAGE
- - - - FIELD INSTALLED CONTROL

NOTES:

1. ALL FIELD WIRING TO BE ACCOMPLISHED FOLLOWING CITY, LOCAL, AND/OR NATIONAL CODES IN EFFECT AT THE TIME OF UNIT INSTALLATION.
2. CAUTION: LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. IF ANY OF THE WIRING AS SUPPLIED WITH UNIT MUST BE REMOVED, IT MUST BE REPLACED WITH TYPE 105 C 600 VOLT WIRE OR EQUIVALENT AND CLEARLY RENUMBERED FOR IDENTIFICATION. VERIFY PROPER OPERATION AFTER SERVICING.
3. FACTORY WIRED FOR 230 VOLT SUPPLY POWER. FOR 208 VOLT SUPPLY POWER, MOVE BLACK WIRES FROM THE 230 VOLT TAP TO THE 208 VOLT TAP ON THE TRANSFORMER.
4. MOTORS ARE INHERENTLY PROTECTED.
5. SEE UNIT NAMEPLATE FOR MAXIMUM FUSE AND/OR CIRCUIT BREAKER SIZE AND MINIMUM CIRCUIT AMPACITY.

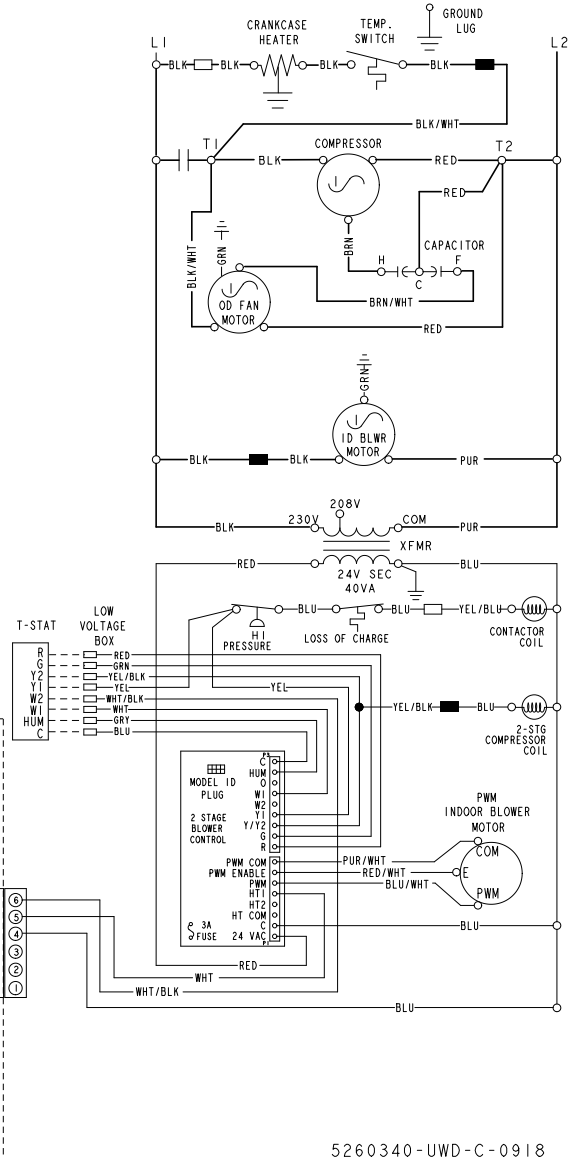
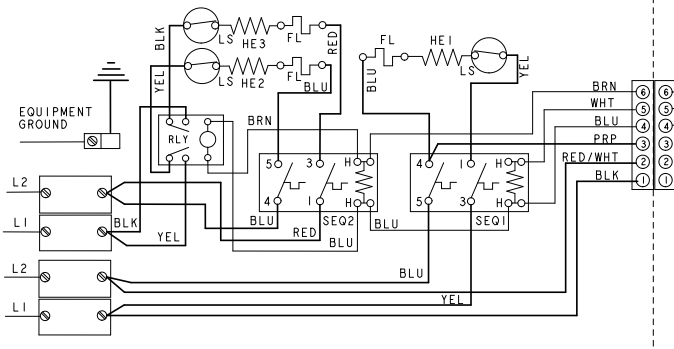
BLOWER CONTROL FAULT CODES

FLASHES FAULT CONDITION

- | | |
|-----------|--|
| LAMP OFF | NO POWER TO CONTROL OR OPEN FUSE |
| LAMP ON | INTERNAL CONTROL FAILURE |
| SLOW RED | CONTROL NORMAL OPERATION |
| RAPID RED | TEST MODE |
| 7 RED | CALL FOR HEAT AND COOL AT THE SAME TIME |
| 8 RED | MODEL ID PLUG NOT INSERTED |
| 9 RED | INTERNAL FAULT SELF CORRECTED, ATTEMPTING NORMAL OPERATION |

WIRING DIAGRAM FOR HEATER KITS:
6HK#6501306
6HK#6501506

OPTIONAL ELECTRIC HEATER ACCESSORY
SEE HEATER WIRING DIAGRAM FOR ALTERNATE HEATER ACCESSORY KITS.



5260340-UWD-C-0918

Figure 12: Ladder wiring diagram

R-410A QUICK REFERENCE GUIDE

Refer to Installation Instructions for specific installation requirements

- R-410A refrigerant operates at 50 - 70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400, or DOT BW400.
- Recovery equipment must be rated for R-410A.
- **DO NOT** use R-410A service equipment on R-22 systems. All hoses, gages, recovery cylinders, charging cylinders and recovery equipment must be dedicated for use on R-410A systems only.
- Manifold sets must be at least 700 psig high side, and 180 psig low side, with 550 psig retard.
- All hoses must have a service pressure rating of 800 psig.
- Leak detectors must be designed to detect HFC refrigerants.
- Systems must be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose.
- R-410A can only be used with POE type oils.
- POE type oils rapidly absorb moisture from the atmosphere.
- Vacuum pumps will **not** remove moisture from R-410A refrigerant oils.
- **Do not** use liquid line driers with a rated working pressure rating less than 600 psig.
- **Do not** install suction line driers in the liquid line.
- A liquid line drier is required on every unit.
- **Do not** use a R-22 TXV. If a TXV is to be used, it must be a R-410A TXV.
- Never open system to atmosphere when under a vacuum.
- If system must be opened for service, evacuate system then break the vacuum with dry nitrogen and replace all filter driers.

Figure 13: R-410A quick reference guide

Third-Party Trademarks: For information about third-party trademarks, refer to the relevant company websites.

NOTES

Section IX: Start-up sheet**Residential Package Unit Cooling With Electric Heat Start-Up Sheet**

Proper start-up is critical to customer comfort and equipment longevity

Start-Up Date	<input type="text"/>	Company Name	<input type="text"/>	Start-Up Technician	<input type="text"/>
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Owner Information

Name	<input type="text"/>	Address	<input type="text"/>	Daytime Phone	<input type="text"/>
City	<input type="text"/>	State or Province	<input type="text"/>	Zip or Postal Code	<input type="text"/>

Equipment Data

Unit Model #	<input type="text"/>	Unit Serial #	<input type="text"/>
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General Information (Check all that apply)

<input type="radio"/> Residential	<input type="radio"/> New Construction	<input type="radio"/> Roof level	<input type="radio"/> Down flow
<input type="radio"/> Commercial	<input type="radio"/> Retrofit	<input type="radio"/> Grade level	<input type="radio"/> Side flow

Unit Location and Connections (Check all that apply)

<input type="checkbox"/> Unit is level and installed on:	<input type="checkbox"/> Slab	<input type="checkbox"/> Roof curb	<input type="checkbox"/> Duct connections are complete:	<input type="checkbox"/> Supply	<input type="checkbox"/> Return
<input type="checkbox"/> Condensate drain properly connected per the installation instructions	<input type="checkbox"/> Condensate trap has been primed with water				

Filters

<input type="checkbox"/> Filters installed	Number of filters	<input type="text"/>	Filter size	<input type="text"/>	<input type="radio"/> Filter located inside	<input type="radio"/> Filter located outside
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Additional Kits & Accessories Installed (Check all that apply)

<input type="checkbox"/> Refrigerant safety kit	<input type="checkbox"/> Low ambient kit	<input type="checkbox"/> Anti-recycle timer	<input type="checkbox"/> Crank case heater	<input type="checkbox"/> Filter frame kit
<input type="checkbox"/> Transformer kit	<input type="checkbox"/> Economizer	<input type="checkbox"/> Roof curb kit	<input type="checkbox"/> Burglar bar kit	<input type="checkbox"/> Hail guard kit
<input type="checkbox"/> Manual fresh air damper kit	<input type="checkbox"/> Motorized fresh air damper kit			

Electrical Connections & Inspection (Check all that apply)

<input type="radio"/> Single phase	<input type="radio"/> Three phase	<input type="radio"/> 208 volts AC	<input type="radio"/> 230 volt AC	<input type="radio"/> 460 volts AC	<input type="radio"/> 575 volts AC						
<input type="checkbox"/> Inspect wires and electrical connections	<input type="checkbox"/> Transformer wired properly for primary supply voltage		<input type="checkbox"/> Ground connected								
<input type="checkbox"/> Low voltage present at control board "R & C"	Measured voltage "R" and "C" outdoor unit control board				<input type="text"/>						
<input type="checkbox"/> Line voltage present at disconnect	Measured voltage "L1 to L2"	<input type="text"/>	"L2 to L3"	<input type="text"/>	"L1 to L3"	<input type="text"/>					
Compressor amperes "L1"	<input type="text"/>	"L2"	<input type="text"/>	"L3"	<input type="text"/>	Total amperes "L1"	<input type="text"/>	"L2"	<input type="text"/>	"L3"	<input type="text"/>
<input type="radio"/> Single stage compressor		<input type="radio"/> Two stage compressor									

Air Flow Setup / Cooling

Blower Type & Set-Up	<input type="radio"/> ECM	COOL	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
		ADJUST	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
		DELAY	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
	<input type="radio"/> X-13	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
	<input type="radio"/> PSC	<input type="radio"/> Low	<input type="radio"/> Medium Low	<input type="radio"/> Medium	<input type="radio"/> Medium High	<input type="radio"/> High
Supply static (inches of water column)	<input type="text"/>	Supply air dry bulb temperature	<input type="text"/>	Outside air dry bulb temperature	<input type="text"/>	
Return static (inches of water column)	<input type="text"/>	Return air dry bulb temperature	<input type="text"/>	Return air wet bulb temperature	<input type="text"/>	
Total external static pressure	<input type="text"/>	Temperature drop	<input type="text"/>	Supply air wet bulb temperature	<input type="text"/>	

Refrigerant Charge and Metering Device

<input type="radio"/> R-410A <input type="radio"/> R-22	Data plate - lbs / Oz <input type="text"/>	Suction line temperature <input type="text"/>	Discharge pressure <input type="text"/>
<input type="radio"/> TXV <input type="radio"/> Fixed Orifice	Discharge line temperature <input type="text"/>	Suction pressure <input type="text"/>	Liquid line temperature <input type="text"/>
TXV# / Orifice size <input type="text"/>		Superheat <input type="text"/>	Subcooling <input type="text"/>

Electric Heat

Electric heat kit - Model number <input type="text"/>		Serial number <input type="text"/>		Rated KW <input type="text"/>	
<input type="radio"/> Single Phase	Measured Amperage	Heater 1 <input type="text"/>	Heater 2 <input type="text"/>	Heater 3 <input type="text"/>	
<input type="radio"/> Three Phase		Heater 4 <input type="text"/>	Heater 5 <input type="text"/>	Heater 6 <input type="text"/>	
Number of elements <input type="text"/>	Measured Voltage	Heater 1 <input type="text"/>	Heater 2 <input type="text"/>	Heater 3 <input type="text"/>	
		Heater 4 <input type="text"/>	Heater 5 <input type="text"/>	Heater 6 <input type="text"/>	
Heating return air dry bulb temperature <input type="text"/>		Heating supply air dry bulb temperature <input type="text"/>		Air temperature rise <input type="text"/>	

Clean Up Job Site

Job site has been cleaned, indoor and outdoor debris removed from job site

Tools have been removed from unit

All panels have been installed

Unit Operation and Cycle Test

Operate the unit through continuous fan cycles from the thermostat, noting and correcting any problems

Operate the unit through cooling cycles from the thermostat, noting and correcting any problems

Owner Education

Provide owner with the owner's manual

Explain operation of system to equipment owner

Explain thermostat use and programming (if applicable) to owner

Explain the importance of regular filter replacement and equipment maintenance

Comments and Additional Job Details