Installation Manual: PC5 Series - 208/230 V - 1 Phase

15.2 SEER2 R-454B Packaged Air Conditioner with Optional Field-Installed Electric Heat



⚠ CAUTION

Risk of fire

This unit uses a mildly flammable (A2L) refrigerant. See A2L refrigerant safety considerations to ensure safe installation, operation, and servicing of this unit.

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About the PC5 unit

PC5 units are factory-assembled two-stage air conditioners designed for outdoor installation on a roof or at ground level. Field-installed electric heat kits 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.

Certification

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

C US

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

GoTemp Pro app (Formerly DS Solutions app)

BHC Group Heating & Cooling believes in empowering our customers with up-to-date, unit-specific information. Download GoTemp Pro app, a powerful, comprehensive app designed for contractors on the jobsite, available now in the App Store for iOS and Google Play for Android. Use the app to scan the unique QR code on the unit rating plate for easy access to product information and resources such as nomenclature, technical guide, installation manual, wiring diagrams, parts list, product registration, warranty, and much more. Simplify your tasks, save time, and stay ahead with the most comprehensive app built for professionals.

GoTemp Pro

iOS

Android

Safety

It is important to understand the safety symbols used in this manual. Read safety information carefully and follow all safety requirements.

Understanding safety symbols and instructions

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**, as well as the **NOTICE**, **Important**, and **Note** alerts.

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.

NOTICE indicates information considered important, but not hazard-related, such as messages relating to property damage.

Important indicates information that is essential to complete a task or may result in damage to the device if not followed.

Note indicates something of special interest or importance. Notes can contain any type of information except safety information.

Safety requirements

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 unit malfunction, death, personal injury, and/or property damage. A qualified contractor, installer, or service agency must 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-454B refrigerant. No other refrigerant may be used in this system. Gauge sets, hoses, refrigerant containers, and recovery systems must be designed to handle R-454B. If you are unsure, consult the equipment manufacturer. Failure to use R-454B compatible servicing equipment may result in property damage or injury.

⚠ WARNING

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

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

⚠ CAUTION

Do not install the appliance above 3353 m (11,000 ft) altitude. Ensure the appliance's functions, including and not limited to electric heat, work properly before installation/servicing is completed.

⚠ CAUTION

In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.

⚠ WARNING

RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH

System contains oversize protective earthing (grounding) terminal which shall be properly connected.

⚠ WARNING

RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH

System contains two independent protective earthing (grounding) terminals which both shall be properly connected and secured.

Adhere to the following:

- Be aware that 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 the unit 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.

A2L refrigerant safety guidance

⚠ CAUTION

You must read all of this section before installing this unit.

⚠ WARNING

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

The appliance shall be placed outdoors and kept away from continuously operating ignition sources (for example: open flames, a third-party operating gas appliance or a third-party operating electric heater.)

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

⚠ WARNING

Any required ventilation and circulation openings must be kept clear of obstruction.

⚠ WARNING

Any ducts connected to the unit shall not contain any potential ignition source(s).

Do not install auxiliary devices not approved by the appliance manufacturer or not declared suitable with the refrigerant in connecting ductwork.

⚠ WARNING

If disconnect switch(es) are installed within 6.6 ft (2 m) of any surfaces of the unit and/or the installation/commissioning/troubleshooting/servicing requires powering up or down the unit by operating the disconnect switch(es), confirm there is no presence of A2L refrigerant around the disconnect switch(es) before operating them. This requirement can be waived if such disconnect switch(es) are intrinsically safe or compliant with necessary safety standard to not cause any flammability concern with A2L refrigerant.

General

Table 1: General

Item number	Safety guideline
1	Typical potential continuously operating sources that could cause ignition of A2L refrigerants include but are not limited to gas appliances, electric heaters, hot surfaces over 700°C (1292°F), all sorts of continuously operating open flames, all sorts of continuously operating devices that generate open arcs and/or sparks, and cigarette smoking. Follow the A2L safety guideline in this manual to eliminate such a concern or risk and ensure safe/compliant operation of the unit.
2	Any appliance containing 1.776 kg (3.915 lb) or more of A2L charge amount for any refrigerant circuit must be constructed such that any refrigerant leak cannot flow or stagnate in a way that would create a fire or explosion hazard.
3	Ensure return and supply duct openings of the unit are not obstructed. Ensure any air vents in all rooms are not obstructed in any way. If zoning dampers are installed in a space conditioned by a unit with an A2L charge amount at or over 1.776 kg (3.915 lb), ensure that they are actuated by the A2L mitigation controls to be open in a detected A2L leakage event **and** the actual floor area of the total conditioned space (TA) is no less than the required minimum floor area of the total conditioned space (TA_{min}). ⓘ **Note:** If zoning dampers are installed in a space conditioned by a unit with an A2L charge amount under 1.776 kg (3.915 lb), there are no A2L mitigation requirements for the zoning dampers.
4	For the unit marked as LEAK DETECTION SYSTEM installed, the unit must be powered except for service. Such a unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.
5	Ensure the unit refrigerant circuit is protected from physical damage in installation, operation, and service. Ensure pipe work including piping material, pipe routing, and installation follows the factory design and specification and complies with applicable national and local codes and standards such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection before being covered or enclosed. Consider leaving sufficient inspection space in addition to following the unit clearances table.

Table 1: General

Item number	Safety guideline
6	If the refrigerant tubing in the unit needs repair during servicing, the refrigerant tubing must be pressure tested with nitrogen and then vacuum tested before refrigerant charging. Adhere to the following: • The minimum test pressure is 423 PSIG (2.92 MPa, gauge) for residential packaged units. • Field-made joints or refrigerant tubing not directly exposed to ambient air must be tightness tested. Use a tester with a sensitivity of 5 grams per year of refrigerant or better under 163+ PSIG test pressure. Ensure no leak can be detected.
7	You must verify actuation of A2L mitigation actions before installation or any A2L refrigerant-leakage-related service is completed.
8	You must replace refrigerant detection sensors only with the ones specified by the appliance manufacturer for the refrigerant detection system (RDS). There are no exceptions.
9	Do not use false ceilings or drop ceilings as a return air plenum.
10	After transporting a unit to the installation site **and** before working on any electrical connection/ wiring, ensure there is no refrigerant leak in the system, especially in the indoor coil section.
11	Before beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, item 12 to item 18 below must be adhered to before conducting work on the system.
12	Work must be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
13	Instruct all maintenance staff and others working in the local area on the nature of work being carried out. Avoid work in confined spaces.
14	The area must be checked with an appropriate refrigerant detector before and during work to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants: non-sparking, adequately sealed, or intrinsically safe.
15	If conducting any hot work on the refrigerating equipment or any associated parts, you must have appropriate fire-extinguishing equipment on hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.
16	If conducting work in relation to the refrigerating system that involves exposing any pipework, do not use any sources of ignition in such a manner that may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, must be kept sufficiently far away from the site of installation, repair, removal, and disposal, during which refrigerant can possibly be released to the surrounding space. Before conducting any work, survey the area around the equipment to ensure that there are no flammable hazards or ignition risks. Display “No Smoking” signs.
17	Ensure the area is in the open or that it is adequately ventilated before opening the system or while conducting any hot work. The ventilation must safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
18	Ensure that the refrigerant detection sensor is not obstructed in any way.

Meeting conditioned space and system requirements

Important:

- It is the installer's responsibility to ensure that the actual floor area of the total conditioned space (TA) is well above the required minimum floor area of the total conditioned space (TA_{min}), in a space that is to be conditioned by a unit with an A2L system charge amount (m_c) before proceeding with the unit installation. See Table 2. For most installations, the TA value is typically well above the TA_{min} value, but you must review Table 2 carefully to ensure compliance.
- For PC5E24 and PC5E36 units, the refrigerant charge is less than 1.776 kg (3.915 lb) so an A2L mitigation system or a mechanical ventilation system is not required, and there are no minimum floor area or circulation airflow rate requirements.

For PG5E48 and PC5E60 units, the refrigerant charge is more than 1.776 kg (3.915 lb), so an A2L mitigation system that meets requirements for minimum floor area and system airflow rates as outlined in Table 2 is required. Table 3 provides an altitude adjustment factor (AAF) based on the building site ground level altitude (H_{alt}) to use if required. In typical applications of PC5E48 and PC5E60 units, the TA value is well above the TA_{min} value, so adding natural ventilation openings to meet the TA_{min} requirement or installing a mechanical ventilation system as outlined in this procedure is not generally required. Figure 1 and Figure 2 provide more specific sizing and installation information for upper and lower natural ventilation openings if needed.

Table 2: Requirements for minimum conditioned space floor area and system airflow rates

Model	A2L system charge amount		Minimum opening for natural ventilation connecting conditioned and unconditioned spaces		Actual floor area of the total conditioned space		Required minimum floor area of the total conditioned space		Allowable maximum refrigerant charge in the total conditioned space based on TA		Minimum circulation airflow by A2L system to the total conditioned space		Minimum mechanical ventilation airflow required only if $TA<TA_{min}$ or $m_c>m_{max}$	
	m_c		Anv_{min}		TA		TA_{min}		m_{max}		Q_{min_circ}		$Q_{min_mech_vent}$	
	lb	kg	in²	m²	ft²	m²	ft²	m²	lb	kg	CFM	m³/h	CFM	m³/h
PC5E48	4.44	2.01	47.7	0.0308	75	7.0	133.16	12.37	2.50	1.13	240	408	52.5	89.1
	4.44	2.01	27.2	0.0175	100	9.3	133.16	12.37	3.33	1.51	240	408	29.9	50.8
	4.44	2.01	0	0	133.16	12.4	133.16	12.37	4.44	2.01	240	408	0	0
PC5E60	5.19	2.35	45.6	0.0295	100	9.3	155.65	14.46	3.33	1.51	281	477	50.2	85.3
	5.19	2.35	25.1	0.0162	125	11.6	155.65	14.46	4.17	1.89	281	477	27.7	47
	5.19	2.35	0	0	155.65	14.5	155.65	14.46	5.19	2.35	281	477	0	0

Table 3: Altitude adjustment factor (AAF)

AAF based on building site ground level altitude (H_{alt}) in m/ft									
H_{alt}	0 m/0 ft	200 m/656 ft	400 m/1312 ft	600 m/1969 ft	800 m/2625 ft	1000 m/3281 ft	1200m/3937 ft	1400 m/4593 ft	1600 m/5249 ft
AAF	1	1	1	1	1.02	1.05	1.07	1.1	1.12
H_{alt}	1600 m/5249 ft	1800 m/5906 ft	2000 m/6562 ft	2200 m/7218 ft	2400 m/7874 ft	2600 m/8530 ft	2800 m/9186 ft	3000 m/9843 ft	3200 m/10499 ft
AAF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

Important: It is important to be aware of the following about the data provided in Table 2 and Table 3:

- The TA_{min} values, m_{max} values, Q_{min_circ} values, and $Q_{min_mech_vent}$ values shown are compliant with both UL60335-2-40 3rd Edition and UL60335-2-40 4th Edition.
- Follow national, state and local codes and standards if there are more stringent requirements on TA_{min} values, m_{max} values, Q_{min_circ} values, and $Q_{min_mech_vent}$ values. For example, if there is a building code that requires higher $Q_{min_mech_vent}$ values than shown, follow the higher airflow requirement.
- Follow national, state, and local codes and standards to check if UL60335-2-40 3rd Edition is required. If so, multiply the appropriate AAF by the TA_{min} value to get the corrected TA_{min} value. This AAF correction applies to only the TA_{min} value as required in UL60335-2-40 3rd Edition and not to the TA_{min} value as required in UL60335-2-40 4th Edition. For example, the TA_{min} value of 133.2 ft² (12.37 m²) meets the UL60335-2-40 4th Edition requirement for a space conditioned by a PC5E48 unit. But if there is a code requiring compliance to UL60335-2-40 3rd Edition for the same conditioned space and the building site ground level altitude is 1400 m (4593 ft), the corrected TA_{min} value is 1.1 × 133.2 = 146.5 ft² (13.61 m²). This AAF correction for UL60335-2-40 3rd Edition applies to only TA_{min} values and not to other values.

- The data in the *Minimum opening for natural ventilation connecting conditioned and unconditioned spaces* column in Table 2 is for increasing total conditioned space floor area if required. This data is not typically needed.
- One of the required warning labels on the unit refers to the following:
  - Minimum installation height, X m (W ft). The minimum installation height does not apply to this model series.
  - Minimum room area (operating or storage), Y m^2 (Z ft^2). For the minimum room area, use the values in the *Required minimum floor area of the total conditioned space* column in Table 2.

Figure 1: Natural ventilation openings - lower opening entirely below the 0.3 m point above the floor

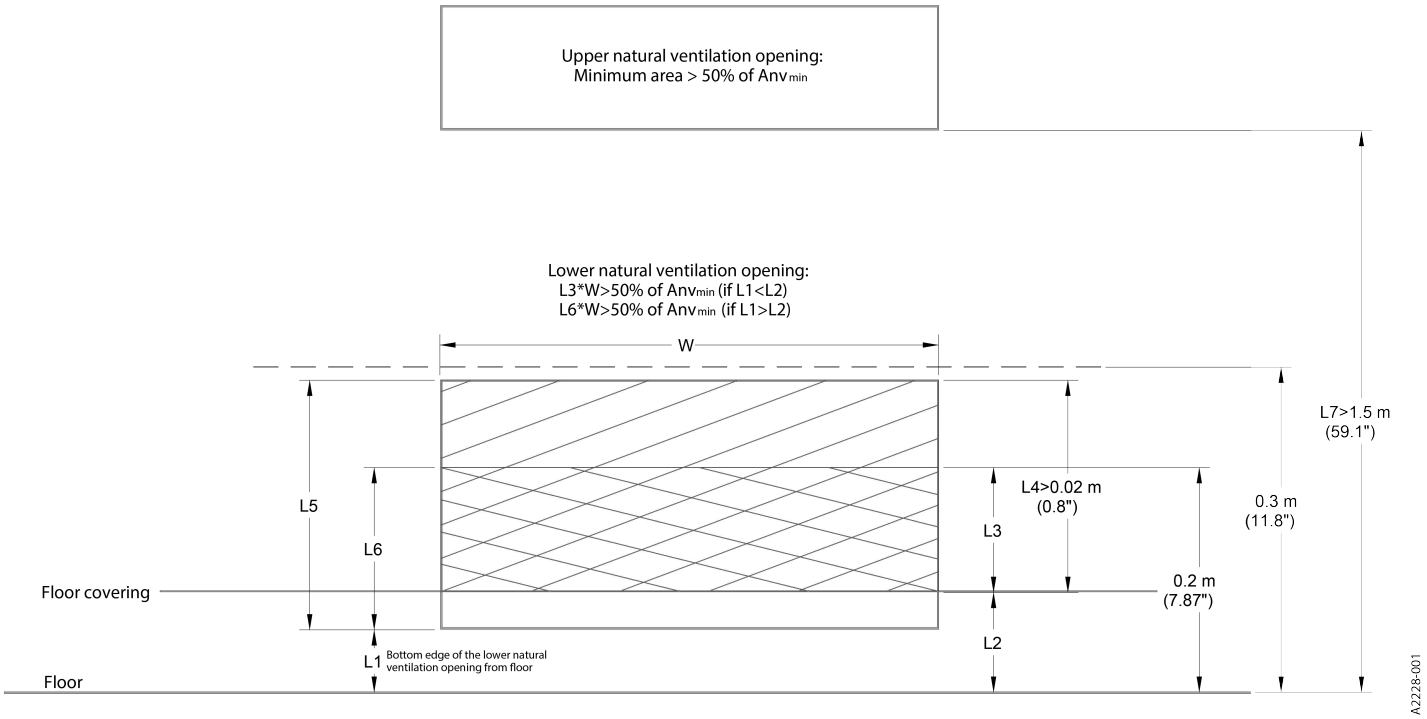
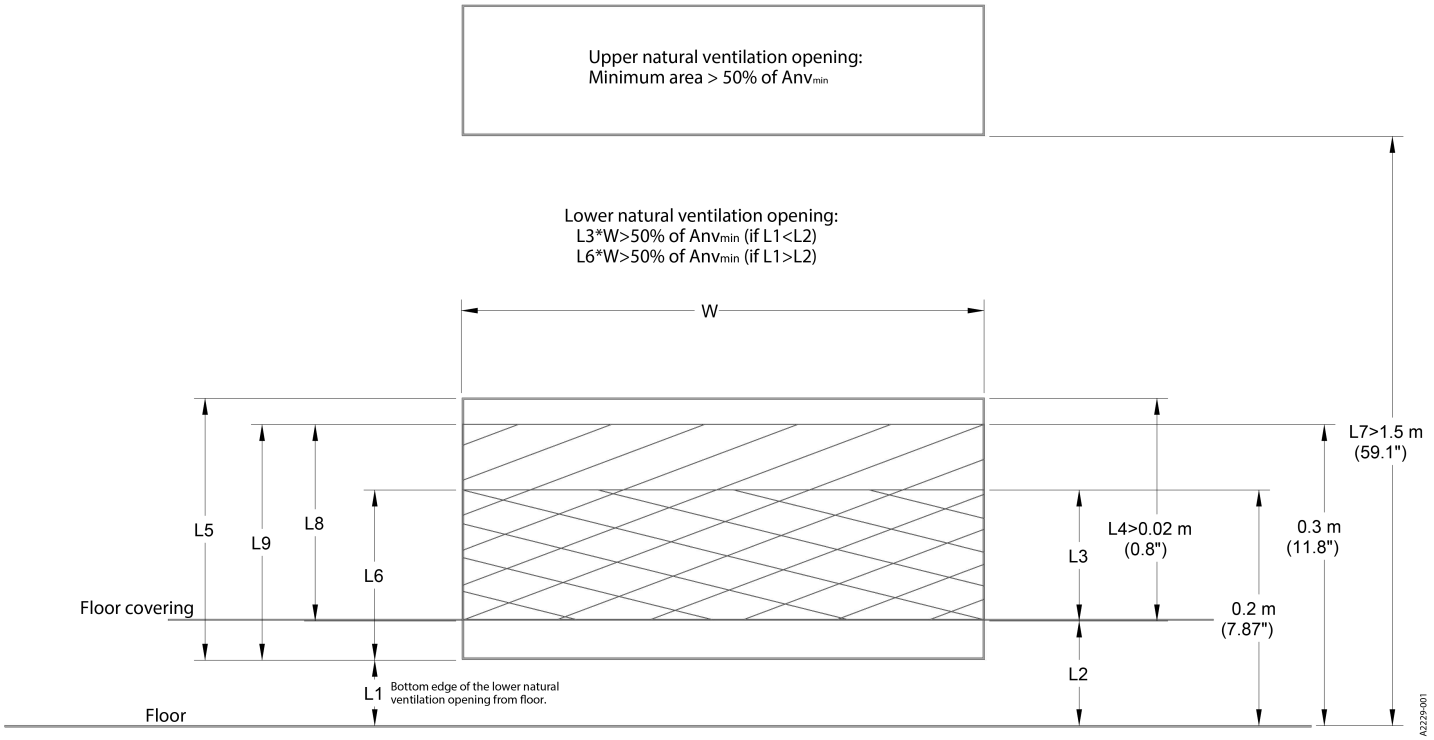


Figure 2: Natural ventilation openings - lower opening partially below the 0.3 m point above the floor



Note: In Figure 2, only the shaded opening area below the 0.3 m point and above the floor covering (L2) counts as the effective natural ventilation area for the lower natural ventilation opening. To discern the effective natural ventilation area for the lower natural ventilation opening, use the area between the 0.3 m point and whichever is higher of the floor covering height (L2) or the opening bottom edge height (L1).

To meet conditioned space and system requirements for PC5E48 and PC5E60 units, do the following:

1. Measure the area of each conditioned space that has air vents in it, for example, bedroom, office, living room, kitchen, and dining room, to calculate the TA value.
2. Check if the TA value is equal to or above the relevant TA_{min} value:
   - If compliance with UL60335-2-40 4th Edition is required, use the TA_{min} values in Table 2.
   - If compliance with UL 60335-2-40 3rd Edition is required, use Table 3 to calculate the corrected TA_{min} value. You can use the example provided for a PC5E48 unit above as a guide.
3. Depending on the result of Step 2, proceed as follows:
   - If the TA value is equal to or above the TA_{min} value, you do not need to install a mechanical ventilation system.
   - If the TA value is below the TA_{min} value, do the following:
     i. Select one conditioned space and check its adjacent unconditioned space, for example, linen closet, space under the staircase, or pantry, to determine if it is feasible to add two natural ventilation openings to connect the two adjacent spaces, so the added floor area of the conditioned space increases. Do the same for other applicable conditioned spaces to determine if it is possible to attain a TA value equal to or above the TA_{min} value in Table 2.

        Note: The two natural ventilation openings are an upper natural ventilation opening and a lower natural ventilation opening. Each opening must be at least 50% of the Anv_{min} area and the openings must be located on the same side of the wall. See Figure 1 and Figure 2.

   ii. If you can attain a TA value equal to or above the TA_{min} value in Table 2, add the natural ventilation openings as required. This is a cost-competitive approach to meet the TA_{min} requirement and avoid installing a mechanical ventilation system.
   iii. If you can not attain a TA value equal to or above the TA_{min} value in Table 2, install a mechanical ventilation system to ventilate outdoors and bring in makeup air from the atmosphere.
4. Make sure that the circulation airflow is above the Q_{min_circ} value in Table 2. The unit control board sets the indoor motor to operate at the maximum airflow rate in a detected A2L leakage event to promptly remove any leaked R-454B from the unit. The max airflow rate is well above the required Q_{min_circ} value.
5. For applications where a mechanical ventilation system is required, make sure that the mechanical ventilation airflow is above the $Q_{min_mech_vent}$ value in Table 2, and adhere to the following:
   - For mechanical ventilation, ensure that the lower edge of openings extracting air from the conditioned space are not more than 3.94 in. (100 mm) above the floor.
   - Locate the openings supplying makeup air to the conditioned space so the supplied makeup air mixes with any leaked refrigerant.
   - Set the mechanical ventilation system so the makeup air is supplied from the atmosphere and the ventilation air extracted from the conditioned space is discharged to the atmosphere. Ensure that the ventilation air discharge openings are separated by a sufficient distance, but not less than 9.84 ft (3 m), from the makeup air intake openings to prevent re-circulation to the conditioned space.

   ⓘ **Note:** As the TA value increases from a very low value to the TA_{min} value, the $Q_{min_mech_vent}$ value decreases from a positive value to 0. When the TA value is above the TA_{min} value, no mechanical ventilation system is required, no opening is needed between the conditioned and unconditioned spaces for natural ventilation, and the allowable maximum refrigerant charge in the A2L system (m_{max} value) is above the unit charge (m_c value).

Refrigerant equipment checks

Table 4: Refrigerant equipment checks

Item number	Safety guideline
1	Where electrical components are being changed, they must be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines must be followed. If in doubt, consult the manufacturer's technical department for assistance.
2	Apply the following checks to installations using flammable refrigerants: • Ensure the actual refrigerant charge is in accordance with the total conditioned space floor area. • Ensure the ventilation machinery and outlets are operating adequately and are not obstructed. • Ensure marking on the equipment continues to be visible and legible. Correct any markings and signs that are illegible. • Install refrigerating pipe or components in a position where they are unlikely to be exposed to any substance that may corrode refrigerant-containing components, unless the components are constructed of materials that are inherently resistant to being corroded or are suitably protected against being corroded.

Electrical devices checks

Table 5: Electrical devices checks

Item number	Safety guideline
1	Repair and maintenance to electrical components must include initial safety checks and component inspection procedures.
2	If a fault exists that could compromise safety, then do not connect any electrical supply to the circuit until the fault is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, use an adequate temporary solution. This must be reported to the owner of the equipment so all parties are advised.
3	Initial safety checks must include: • Ensure capacitors are discharged: take care to avoid the possibility of sparking. • Ensure no live electrical components and wiring are exposed while charging, recovering, or purging the system. • Ensure there is continuity of earth bonding.
4	Check that wiring and/or cabling are not subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors, indoor blowers, and outdoor fans.

Detection of refrigerant

Table 6: Detection of refrigerant

Item number	Safety guideline
1	Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. Do not use a halide torch or any other detector using a naked flame.
2	The following leak detection methods are deemed acceptable for all refrigerant systems. • Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate or may need re-calibration. Calibrate the detection equipment in a refrigerant-free area. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Set leak detection equipment at a percentage of the LFL of the refrigerant and calibrate to the refrigerant employed. Ensure the appropriate percentage of gas with a maximum of 25% is confirmed. • Leak detection fluids are also suitable for use with most refrigerants but avoid the use of detergents containing chlorine as the chlorine may react with the refrigerant and corrode the copper pipework. Examples of leak detection fluids are bubble method and fluorescent method agents.
3	If a leak is suspected, all naked flames shall be removed/extinguished.
4	If a leakage of refrigerant is found that requires brazing, recover all of the refrigerant from the system and purge the system with nitrogen.

Removing and evacuating refrigerant

You must follow conventional procedures to remove and evacuate A2L flammable refrigerant charge before breaking into the refrigerant circuit to make repairs or for any other purposes. Safely remove refrigerant following local and national regulations, and adhere to the following requirements:

1. During evacuation, the outlet for the vacuum pump must not be close to any potential ignition sources, and ventilation must be available. The refrigerant charge must be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. See Recovering refrigerant for servicing or decommissioning for more requirements on recovery.
2. Continuously flush or purge with oxygen-free nitrogen before and when using flame to open the refrigerant circuit. **Do not** use compressed air or oxygen for purging.

Charging

For standard charging procedures, see Checking the refrigerant charge and refer to the charging chart on the compressor barrier. Follow standard charging procedures and adhere to the following requirements:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Keep hoses or lines as short as possible to minimize the amount of refrigerant contained in them.
- Keep cylinders in an appropriate position according to the instructions.
- Ensure that the refrigerating system is grounded before charging the system with refrigerant.
- Ensure to meet the requirements for weighing scales outlined in Recovering refrigerant for servicing or decommissioning.
- Label the system when charging is complete, if this has not been done already.
- Take extreme care not to overfill the refrigerating system.
- Before recharging the system, pressure test the system with oxygen-free nitrogen. Leak test the system on completion of charging but before commissioning. Do a follow-up leak test before leaving the site.

Recovering refrigerant for servicing or decommissioning

Before you begin:
Before starting the procedure, do the following:

- Ensure that you (the technician) are completely familiar with the equipment and all its detail.
- Take an oil and refrigerant sample in case analysis is required before reusing the recovered refrigerant.
- Ensure that electrical power is available.
- Ensure that mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- Ensure that all personal protective equipment is available and being used correctly.
- Ensure that a competent person is available to supervise the recovery process at all times.
- Ensure that recovery equipment and cylinders conform to the appropriate standards. Note the following:
  - The recovery equipment must be in good working order with necessary and sufficient instructions and must be suitable for the recovery of the flammable refrigerant. If in doubt, consult the manufacturer.
  - All cylinders to be used must be designated for the recovered refrigerant and labeled for that refrigerant.
  - Cylinders must have a pressure relief valve and associated shut-off valves in good working order.
  - Empty recovery cylinders must be evacuated and, if possible, cooled before recovery occurs.

To safely recover all refrigerants for unit servicing or decommissioning, do the following:

1. Isolate the system electrically.
2. Connect a recovery machine to remove refrigerant from the system.

3. Ensure that the cylinder is situated on the scales before recovery takes place and the following requirements are met:
   - The weighing scales are calibrated and in good working order.
   - The weighing scales are placed on solid horizontal foundation that can sufficiently support the total weight of the cylinders and weighing scales without any compromise.
   - Hoses are complete with leak-free disconnect couplings and in good condition.
4. Start the recovery machine and operate in accordance with the instructions provided with the machine. Adhere to the following requirements:
   - Do not overfill cylinders to more than 80% volume liquid charge.
   - Do not exceed the maximum working pressure of the cylinder, even temporarily.
5. When the cylinders have been filled correctly and the process completed, ensure that the cylinders and the equipment are removed from the site promptly and that all isolation valves on the equipment are closed off. Adhere to the following requirements:
   - Process the recovered refrigerant according to local legislation in the correct recovery cylinder, and arrange the relevant waste transfer note.
   - Do not mix refrigerants in recovery units and especially not in cylinders.
   - Do not charge recovered refrigerant into another refrigerating system unless it has been cleaned and checked.
   - If removing compressors or compressor oils, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. Do not heat the compressor body by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it must be carried out safely.

- If you are servicing the unit, read Removing and evacuating refrigerant and Charging to get the refrigerant circuit to proper function. Before any other checks, follow the guidance in Detection of refrigerant to ensure safety.
- If you are decommissioning the unit, label the equipment stating that it has been decommissioned and emptied of refrigerant. Date and sign the label. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating that the equipment contains a flammable refrigerant.

Competence of service personnel

Training on all required and relevant procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence must be documented by a certificate. Training must include but is not limited to information about the following:

- The explosive potential of flammable refrigerants to show that flammables may be dangerous when handled without care
- Potential ignition sources especially those that are not obvious
- Safety concepts such as unventilated and ventilated enclosure and ventilated room
- Refrigerant detectors or detection sensors including a focus on the following:
  - Principle of function, including influences on the operation
  - Procedures for repairing, checking, or replacing a refrigerant detection sensor or parts of it in a safe way
  - Procedures for disabling a refrigerant detection sensor if repair work on the refrigerant carrying parts is needed
- The concept of sealed components and sealed enclosures
- Correct working procedures as outlined in Table 7

Table 7: Correct working procedures

Item number	Commissioning	Maintenance and repair	Decommissioning	Disposal
1	n/a	n/a	If safety is affected when the equipment is put out of service, the refrigerant charge must be removed before decommissioning.	n/a
2	Ensure that the total conditioned space floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled correctly.	Ensure that there is sufficient ventilation at the equipment place.		
3	Confirm that there is no refrigerant leak before doing any other commissioning or installation work.	Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.		n/a
4	Check safety equipment before putting it into service.	Discharge capacitors in a safe way that does not cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.		n/a
5	n/a	When brazing is required for A2L system, the following procedures must be carried out in the correct order: 1. Safely remove the refrigerant following local and national regulations. Follow the procedure outlined in Recovering refrigerant for servicing or decommissioning for recovery. 2. Purge the refrigerant circuit with oxygen-free nitrogen. 3. Remove parts that are to be replaced by cutting or brazing. 4. Continuously purge the braze point with nitrogen during the brazing procedure required for repair. 5. Perform a leak test. 6. Evacuate the refrigerant circuit. 7. Charge with refrigerant.	Safely remove the refrigerant following local and national regulations. Follow the procedure outlined in Recovering refrigerant for servicing or decommissioning for recovery.	
6	n/a	Reassemble sealed enclosures accurately. If seals are worn, replace them.	Fill with nitrogen up to atmospheric pressure.	Evacuate the refrigerant circuit and purge the refrigerant circuit with oxygen-free nitrogen.
7	n/a	Check safety equipment before putting it into service.	Put a label on the equipment indicating that the refrigerant is removed.	Cut out the compressor and drain the oil. Follow the procedure outlined in Recovering refrigerant for servicing or decommissioning for compressor and compressor oil treatment.

Wiring installation

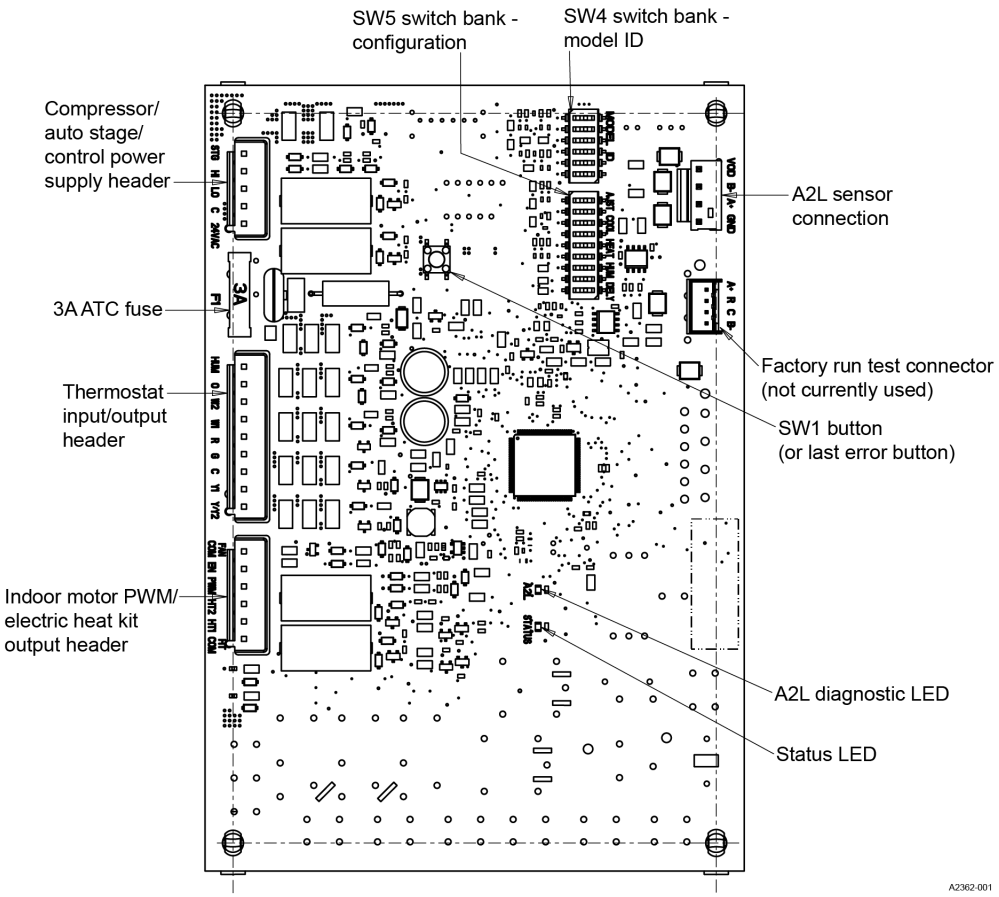
NOTICE

Cap unused wiring connections.

All PC5 units use the same two-stage air handler (AH) control board, which is referred to as the main control board. The main control board includes an A2L diagnostic LED. For PC5E24 and PC5E36 units, the A2L mitigation logic is deactivated and the A2L diagnostic LED does not emit light even in the event of A2L refrigerant leakage because the unit charge is under 1.776 kg (3.915 lb). PC5E24 and PC5E36 units do not include an A2L sensor because they do not require an A2L mitigation system. The main control board does not adjust the blower airflow in the event of A2L refrigerant leakage because there is no compliance or safety concern.

For PC5E48 and PC5E60 units, the A2L mitigation logic is activated and the A2L diagnostic LED emits light in the event of detected A2L refrigerant leakage. There is an A2L sensor in each unit as part of the A2L mitigation system. The main control board waits 5 s for the signal to remain continuous before flagging the detected A2L refrigerant leakage fault. The main control board energizes the 95% pulse width modulation (PWM) speed for the blower while the A2L refrigerant leakage fault is active and continues to energize the 95% PWM speed for the blower for 5 min after the A2L refrigerant leakage detection signal is removed. All thermostat calls are ignored while the A2L refrigerant leakage fault is active and the main control board is continuously energizing the 95% PWM output for the blower. Figure 3 shows the main control board layout for PC5 units.

Figure 3: Main control board layout



Field-testing the sensor and taking A2L mitigation actions

This task applies to PC5E48 and PC5E60 units.

1. After wiring and configuring the system, verify that the system is in standby mode.

   ⓘ **Note:** In standby mode, the status LED emits a slow red flash (or heartbeat) **and** the A2L diagnostic LED is off.

2. Simulate an A2L leak by disconnecting the A2L sensor wire from the main control board.
3. After 15 s, verify that the circulation fan is energized, which means that the indoor blower motor is turned on. Confirm that the status LED is emitting 2 red flashes **and** the A2L diagnostic LED is showing solid red.
4. Reinstall the A2L sensor wire, then wait 15 s and verify that the system returns to standby mode.
5. When the system is in standby mode, use the thermostat to call for first-stage cooling or second-stage cooling. First-stage cooling is a G and Y1 call and second-stage cooling is a G and Y1 + Y2 call. Then, test the system during cooling operation as follows:
   a. Let the system run for 5 min.
   b. Simulate an A2L leak by disconnecting the A2L sensor wire from the main control board.
   c. After 15 s, verify that the compressor shuts off, the outdoor fan shuts off, and only the indoor blower motor is still running.
   d. Reinstall the A2L sensor wire, then wait 15 s and verify that the system returns to cooling operation and the compressor, outdoor fan, and indoor blower motor run. Let the system run for 5 min.
6. Use the thermostat to put the system in standby mode.
7. If the unit has an electric heat kit installed, when the system is in standby mode, use the thermostat to call for first-stage heating or second-stage heating if applicable. First-stage heating is a W1 call and second-stage heating is a W1 + W2 call. Then, test the system during heating operation as follows:
   a. Let the system run for 5 min.
   b. Simulate an A2L leak by disconnecting the A2L sensor wire from the main control board.
   c. After 15 s, verify that the electric heat shuts off and only the indoor blower motor is still running.
   d. Reinstall the A2L sensor wire, then wait 15 s and verify that the system returns to heating operation and the electric heat and indoor blower motor run. Let the system run for 5 min.
8. When testing is complete, put the controls access panel on until it is time for more testing of the unit normal operation.

Understanding status LED and A2L diagnostic LED codes

PC5E48 and PC5E60 units include an A2L sensor and an AL2 diagnostic LED as shown in Figure 3. For PC5E48 and PC5E60 units, the A2L mitigation logic is activated and the A2L diagnostic LED works with the status LED on the main control board. See Using unit control board diagnostics and Table 35 for an overview of the status LED and A2L diagnostic LED codes and troubleshooting guidance for A2L-related faults.

ⓘ **Note:** PC5E24 and PC5E36 units do not include an A2L sensor because they do not require an A2L mitigation system. For these units, the A2L mitigation logic is deactivated and the A2L diagnostic LED does not emit light.

Model number nomenclature

Table 8: Model nomenclature description

Number	Category	Option	Description
1, 2	Model type	PG	Packaged air conditioner with gas heat
		PD	Packaged heat pump with gas heat
		PC	Packaged air conditioner with optional electric heat
		PH	Packaged heat pump with optional electric heat
3	Efficiency	3	13.4 SEER2
		5	15.2 SEER2
4	Refrigerant	E	R-454B
5, 6	Nominal capacity (Btu/h x 1000)	24	24,000 Btu/h or 2 ton
		30	30,000 Btu/h or 2.5 ton
		36	36,000 Btu/h or 3 ton
		42	42,000 Btu/h or 3.5 ton
		48	48,000 Btu/h or 4 ton
		60	60,000 Btu/h or 5 ton
7	Heat type	L	Low NOx <40ng/J
		U	ULNx <14ng/J
		N	Electric heat
8, 9	Gas heating input (Btu/h x 1000)	05	50,000 Btu/h
		06	65,000 Btu/h
		07	75,000 Btu/h
		10	100,000 Btu/h
		12	125,000 Btu/h
		00	Electric heat
10	Control strategy	C	Communicating
		B	Wireless, communicating
		S	Standard, conventional
		W	Wireless, conventional
11	Voltage (V-phase-Hz)	2	208/230-1-60
		3	208/230-3-60
		4	460-3-60
12	Generation	1	First generation
		2	Second generation
		3	Third generation
		4	Fourth generation
13	Style	A	Style A
		B	Style B
		C	Style C
		D	Style D

Model number nomenclature example

Table 9: Model nomenclature example

Number	1, 2	3	4	5, 6	7	8, 9	10	11	12	13
Option	PC	5	E	36	N	00	S	2	1	A

The PC5E36N00S21A model is a two-stage packaged air conditioner with optional electric heat. It has a 15.2 SEER2 efficiency rating and uses R-454B refrigerant. It has a nominal capacity of 36,000 Btu/h or 3 ton for cooling. It uses a standard control strategy and voltage of 208 V/230 V, single phase, 60 Hz. It is a first generation, style A model.

Installation

Complete all installation stages. You may not need to perform some tasks outlined, depending on the specific installation. See Unit components and operation to familiarize yourself with unit components and system operation as required, and see Troubleshooting if needed.

Important:

- See A2L refrigerant safety guidance and follow procedures as required.
- If you do not install a 6HK electric heat kit, you must mark the unit rating plate appropriately to indicate that no electric heat kit is installed.

Preparing for installation

Complete the necessary preparation before you begin the installation:

Selecting a location for installation

Before starting the installation, you must select a suitable location for the unit. You can install the unit on a roof or on the ground.

⚠ WARNING

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

Important: The unit is designed for outdoor installation only.

To select a location for installation, do the following:

- Select a location for the unit that meets the following general requirements for installation:
  - Provides the outdoor coil with 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.
  - Allows you to maintain the required clearances for construction, servicing, and correct unit operation.
  - Allows you to maintain level tolerance to 1/8 in. across the entire width and length of the unit.
- Select a location for the unit that meets any requirements that are specific to the type of installation as outlined in Table 10.

Table 10: Additional location requirements for each type of installation

Type of installation	Additional location requirements
Ground installation	• The location of the unit allows you to install the unit on a level equipment pad or concrete slab.
Roof installation	• The location of the unit allows you to install the unit on a solid, level roof curb or an appropriate angle iron frame. • The roof structure is able to support the weight of the unit and its options and accessories.

Unit clearances

Table 11: Unit clearances

Direction	Distance (in.)	Direction	Distance (in.)
Top	36	Right side	36
Side opposite ducts	36	Left side	24
Duct panel	6	Bottom	1

ⓘ **Note:**

- For 20 kW and 25 kW electric heat kits, provide a minimum clearance of 1 in. on all sides of the supply air duct for the first 3 ft of the supply air duct. 0 in. clearance is acceptable on all sides of the supply air duct for the remaining length of the supply air duct. For all other electric heat kits, 0 in. clearance is acceptable on all sides of the supply air duct 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 the factory base rails are left in place as shipped.
- 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.

Inspecting the unit

1. Inspect the unit immediately after receiving it for possible damage during transit.
2. If damage is evident, do the following:
   a. Note the extent of any damage on the carrier's receipt.
   b. Make a separate written request for the carrier's agent to inspect the unit.
   c. Contact your local distributor for more information.

Rigging and handling the unit

⚠ CAUTION

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

⚠ CAUTION

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

To rig and handle the unit, do the following:

- Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation.
- Use the slotted openings in the base rails if moving or lifting the unit with a forklift.
- Use Figure 4 and Table 12 to determine the required capacity of lifting gear to use.

Figure 4: Center of gravity

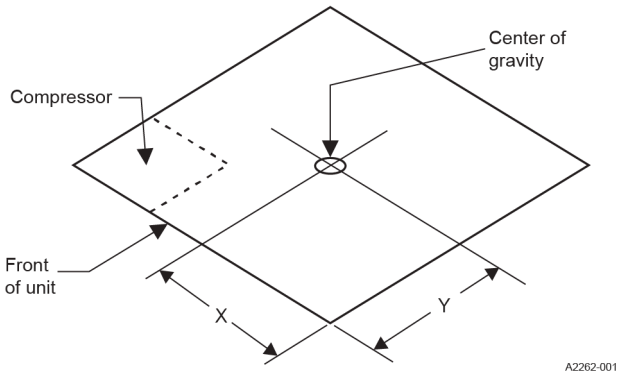


Table 12: Weights and dimensions

Model	Weight (lb)		Center of gravity (in.)	
	Shipping	Operating	X	Y
PC5E24N00S2	315	310	30	14
PC5E36N00S2	350	345	32	13
PC5E48N00S2	415	410	30	22
PC5E60N00S2	428	423	29	23

- Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails.
- Use spreader bars across the top of the unit. The length of the spreader bars must exceed the unit's longest width.

Understanding installation and operation limitations

Adhere to the following:

- Install the unit in accordance with the following national and local safety codes:
  - National Electrical Code (NEC) ANSI/NFPS No. 70, latest edition or Canadian Electrical Code (CEC) Part 1, C22.1, latest edition
  - Local plumbing and wastewater codes and other applicable local codes

  ⓘ **Note:** If it is necessary to add components to a unit to meet local codes, installation is done at the dealer's or the customer's expense.
- Observe the unit limitations shown in Table 13.
- Observe the application limitations shown in Table 14.
- Observe the physical data for the unit shown in Table 15.
- Observe the electrical data for the unit shown in Table 21, Table 22, Table 23, and Table 24.
- Make sure that the size of the unit for proposed installation is based on heat loss or heat gain calculations made in accordance with industry-recognized procedures such as the procedures of the Air Conditioning Contractors of America. Refer to *Manual J*.

Unit limitations

Table 13: Unit limitations

Model	Voltage (V-phase-Hz)	Unit limitations		
		Applied voltage (V)		Outdoor DB temperature (°F)
		Minimum	Maximum	Maximum
PC5E24N00S2 PC5E36N00S2 PC5E48N00S2 PC5E60N00S2	208/230-1-60	187	252	125

Application limitations

Table 14: Application limitations

Model	Air temperature at outdoor coil (°F)				Air temperature at indoor coil (°F)			
	Minimum		Maximum		Minimum		Maximum	
	DB cool	DB heat	DB cool	DB heat	WB cool	DB heat	WB cool	DB heat
PC5E24N00S2 PC5E36N00S2 PC5E48N00S2 PC5E60N00S2	55	—	125	—	57	55	72	80

Physical data

Table 15: Physical data

Model		PC5E24N00S2	PC5E36N00S2	PC5E48N00S2	PC5E60N00S2
Nominal tonnage		**2.0**	**3.0**	**4.0**	**5.0**
Refrigerant information	**Refrigerant type**	R-454B	R-454B	R-454B	R-454B
	Refrigerant charge (lb-oz)	2-8	3-11	4-7	5-3
Dimensions	**Length (in.)**	51 1/4	51 1/4	51 1/4	51 1/4
	Width (in.)	35 3/4	35 3/4	45 3/4	45 3/4
	Height (in.)	44	47	47	50
Operating weight (lb)		310	345	410	423
Compressor	**Type**	Scroll	Scroll	Scroll	Scroll
	Stage	2	2	2	2
Outdoor coil data	**Face area (sq ft)**	12.3	15.3	17.5	21.1
	Rows	1	1	1	1
	Fins per inch	21	23	23	23
	Tube width (mm)	12	16	16	16
	Coil type	Microchannel	Microchannel	Microchannel	Microchannel
Indoor coil data	**Face area (sq ft)**	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	Straight	Straight	Straight	Straight
	Refrigerant control	TXV	TXV	TXV	TXV
	Coil type	Finned tube	Finned tube	Finned tube	Finned tube
Outdoor fan data	**Fan diameter (in.)**	24	24	26	26
	Type	Propeller	Propeller	Propeller	Propeller
	Drive type	Direct	Direct	Direct	Direct
	Number of speeds	1	1	1	1
	Motor (hp)	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)	1/2	1/2	3/4	1
	RPM (maximum)	1400	1400	1400	1400
	Frame size (in.)	48	48	48	48
Filter size		A	A	B	B

ⓘ **Note:** You must size field-supplied external filters so as not to exceed 300 fpm air velocity through disposable filters. For internal filter use, an air filter frame kit is available for field installation. Refer to the instructions supplied with the kit for replacement filter sizes. Filter size A is 20 in. x 20 in. Filter size B is 20 in. x 30 in.

Becoming familiar with the unit dimensions

- Make sure that you are familiar with the unit dimensions before you begin the installation. See Figure 5 and Table 16.

Unit dimensions and access locations

Figure 5: Unit dimensions and access locations

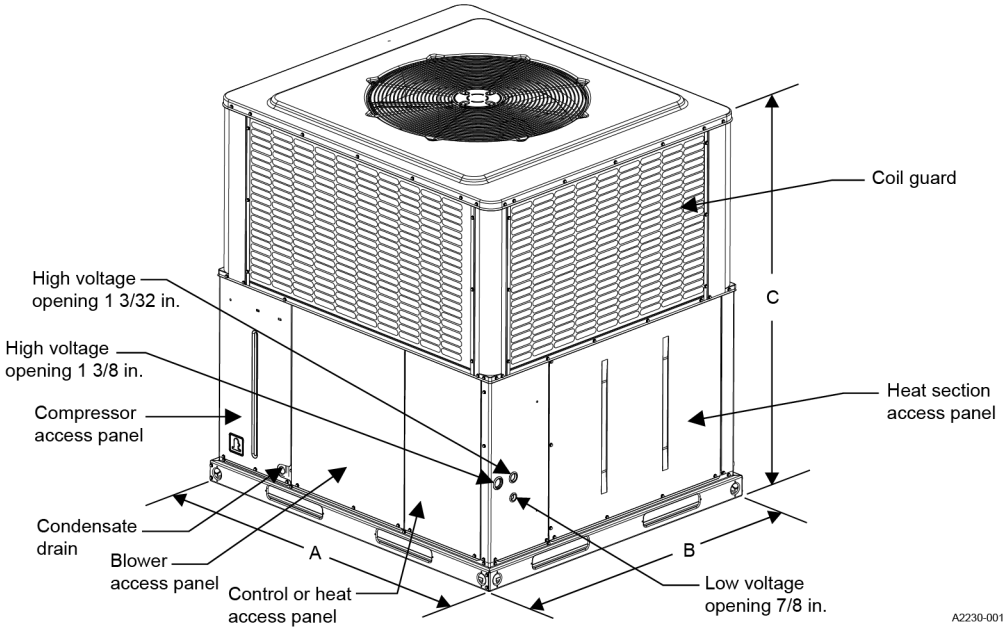


Table 16: Unit dimensions

Model	Dimensions (in.)		
	A	B	C
PC5E24N00S2	51 1/4	35 3/4	44
PC5E36N00S2	51 1/4	35 3/4	47
PC5E48N00S2	51 1/4	45 3/4	47
PC5E60N00S2	51 1/4	45 3/4	50

Installing a 6HK electric heat kit

You have the option to install an electric heat kit from the 6HK series for all unit models. For the electric heat kits you can use for each unit model and associated electrical data, see Table 21, Table 22, and Table 23 as relevant.

Important:

- Install the 6HK electric heat kit before you install the unit. You connect the wiring for the 6HK electric heat kit as part of the procedures outlined in Connecting the wiring. You set the blower speed for the 6HK electric heat kit as part of the procedures outlined in Checking and configuring the unit.
- If you do not install a 6HK electric heat kit, you must mark the unit rating plate appropriately to indicate that no electric heat kit is installed.

To install a 6HK electric heat kit, do the following:

- Follow the installation procedure in the *Installation Manual* for the 6HK series of electric heat kits.

Installing the unit

There are two installation options for the unit: ground installation or roof installation. You must follow all requirements for the specific type of installation.

Important: If the unit is received with unpainted, uninsulated covers installed on the rear duct openings, you must discard those covers.

Designing and installing the ductwork

You may need to design and install ductwork, depending on the specific installation, for example, in a new construction.

To design and install the ductwork, do the following:

- Design and size ductwork according to the methods of the Air Conditioning Contractors of America (ACCA), as outlined in their *Manual D*.
- Always consider filter size, type, and pressure drop during duct system design. Correct filter sizing is very important.
- Use a closed return duct system. This does not preclude use of economizers or ventilation air intake.

Using an existing duct system

- Check that the ductwork meets requirements and is correctly sized, and adjust the ductwork if needed. See Designing and installing the ductwork for more information about requirements.

Adapting the unit for downflow application

You can adapt the unit for downflow application if needed.

To adapt the unit for downflow application, do the following:

1. Remove the duct covers from the bottom return and supply air duct openings. Save the four screws securing each duct cover to use in Step 3.
2. If the unit has unpainted, uninsulated covers installed on the rear duct openings, discard those covers. You must use the insulated duct covers from the bottom duct openings.
3. Install the duct covers removed in Step 1 to the rear supply and return air duct openings. Secure the duct covers with the four screws removed in Step 1.
4. Seal the duct covers with silicone caulk.

Setting the unit on the ground

Before you begin:
Make sure that the location you have selected for the unit is suitable.

For ground installation, you must use a level equipment pad or concrete slab. The thickness and size of the equipment pad or concrete slab must meet local codes and support the weight of the unit. Do not tie the equipment pad or concrete slab to the building foundation.

To set the unit on the ground, do the following:

1. Position the equipment pad or concrete slab so the unit is level.
2. Set the unit on the equipment pad or concrete slab.

Setting the unit on a roof

Before you begin:
Make sure that the location you have selected for the unit is suitable.

For roof installation, you must use a solid, level roof curb or an appropriate angle iron frame.

⚠ CAUTION

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

To set the unit on the roof, do the following:

1. Position the roof curb or iron frame so the unit is level.
2. Set the unit on the roof curb or iron frame.

Connecting the unit to the ductwork

⚠ WARNING

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

⚠ 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. Seal the ductwork to the unit using duct mastic. Outdoor ductwork must be insulated and waterproofed.

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.

NOTICE

Be sure to note supply and return openings.

To connect the unit to the ductwork, do the following:

- Use flexible duct connectors in the supply and return ductwork to minimize the transmission of vibration and noise.

- Observe the information about bottom and rear supply and return air duct openings in Figure 6, Table 17, Figure 7, and Table 18.

Bottom duct dimensions

Figure 6: Bottom duct dimensions (in.)

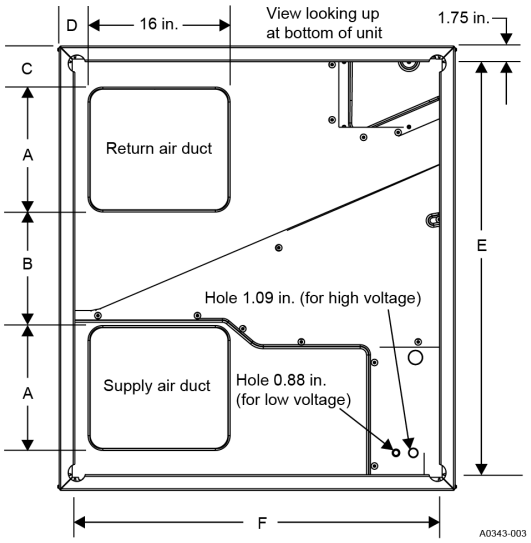


Table 17: Bottom duct dimensions

Model	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)
PC5E24 and PC5E36	10	21.5	5	4.5	47.5	32
PC5E48 and PC5E60	14	13.5	5	3.5	47.5	42

Rear duct dimensions

Figure 7: Rear duct dimensions (in.)

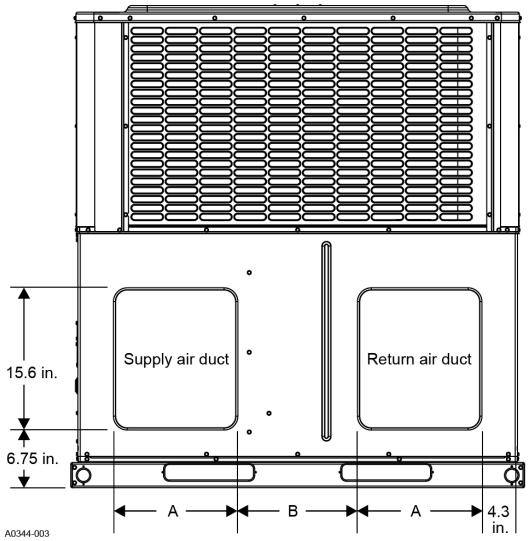


Table 18: Rear duct dimensions

Model	A (in.)	B (in.)
PC5E24 and PC5E36	9.6	22
PC5E48 and PC5E60	13.6	14
ⓘ **Note:** See Figure 5 for side hole sizes of electrical lines.		

Installing the air filter

Single-phase units are shipped without air filters or an air filter frame kit. You must install an air filter or an air filter frame kit.

Important:

- One air filter is typically used, but this depends on the specific installation.
- Make sure that the air filter size is correct.
- It is essential to always use air filters and keep air filters clean. When air filters become dirty, insufficient air is delivered by the blower, decreasing the unit's efficiency and increasing operating costs and deterioration of the unit and controls.

To install the air filter, do the following:

- Secure an air filter in the return air ductwork or inside the conditioned space at the return air opening, **or** install an air filter frame kit using the installation procedure in the *Installation Manual* provided with the kit.

Installing a condensate trap

You must install a condensate trap for the unit. The plumbing must conform to local codes.

⚠ CAUTION

Hand tighten only.

To install a condensate trap, do the following:

- Install a condensate trap in the condensate drain.

Connecting the wiring

Follow all requirements when connecting the unit wiring. See Wiring diagrams, Table 21, Table 22, Table 23, Table 24, Table 20, and Humidistat feature as needed.

Completing the power and control wiring

Make sure that all field wiring to the unit conforms 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. See Table 21, Table 22, or Table 23 for unit electrical data as needed.

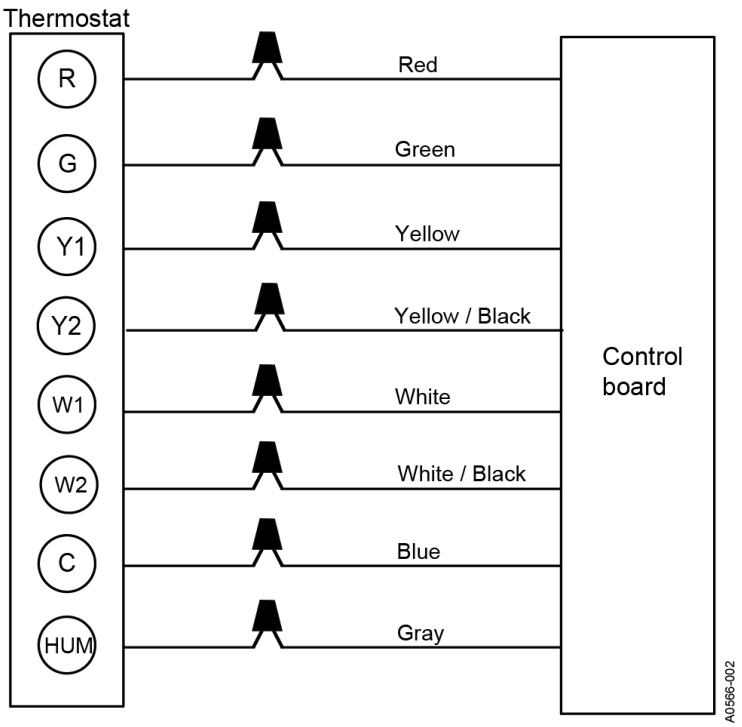
Important:

If a 6HK electric heat kit is installed, refer to the *Installation Manual* for the 6HK electric heat kit for additional information about connecting the wiring for the 6HK electric heat kit as needed.

To complete the power and control wiring, do the following:

- See Figure 5, which shows where wiring enters the unit.
- Use Figure 8 and Figure 9, which show typical field wiring, as a guide, and refer to the appropriate unit wiring diagram for control circuit and power wiring information. See Wiring diagrams.

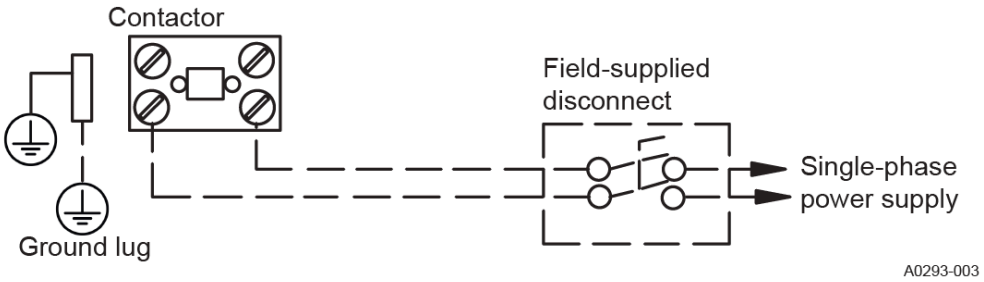
Figure 8: Typical field control wiring diagram for optional electric heat - residential packaged AC models



Note:

- Use a minimum wire size of 18 AWG wire for all field-installed control wiring.
- Set the heat anticipator at 0.35 A for all unit models.

Figure 9: Typical field power wiring diagram



Note: Use the relevant electrical data table to size the disconnect switch. See Table 21, Table 22, or Table 23.

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 UL1995 (5th edition), Article 26.20 (in reference to all circuit breakers).

- Observe the voltage tolerances that must be maintained at the compressor terminals during starting and running conditions as outlined on the unit rating plate and in Table 13.

- Provide the wiring entering the unit cabinet with mechanical strain relief.
- Install a fused disconnect switch for the unit.

  ⓘ **Note:** The fused disconnect switch is field provided.
- If you need to replace any of the wire supplied with the unit, make sure that the replacement wire is the type shown on the wiring diagrams. See Wiring diagrams.
- Make sure that the electrical service is 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.
- Be aware that 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.

Connecting the thermostat

➤ **Important:**

- The unit contains a multistage cooling compressor to provide two stages of electric cooling, and may contain an optional electric heat kit to provide either one or two stages of electric heating. If a field supplied electric heat kit of 10 kW or under is installed, the unit requires the use of a single-stage heat/two-stage cool (1H/2C) thermostat for correct operation. For units installed with 6HK electric heat kits of 15 kW and above, use a two-stage heat/two-stage cool (2H/2C) thermostat.
- Do not use a power-stealing thermostat.
- If using an electronic thermostat, make sure that it has a 24 V common connection.

To connect the thermostat, do the following:

1. 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.
2. Use sealant behind the thermostat to prevent air infiltration.
3. Install the thermostat in accordance with the installation instructions for the thermostat provided by the manufacturer.
4. Use color-coded insulated wires that are No. 18 AWG minimum to connect the thermostat to the unit. See Figure 8.

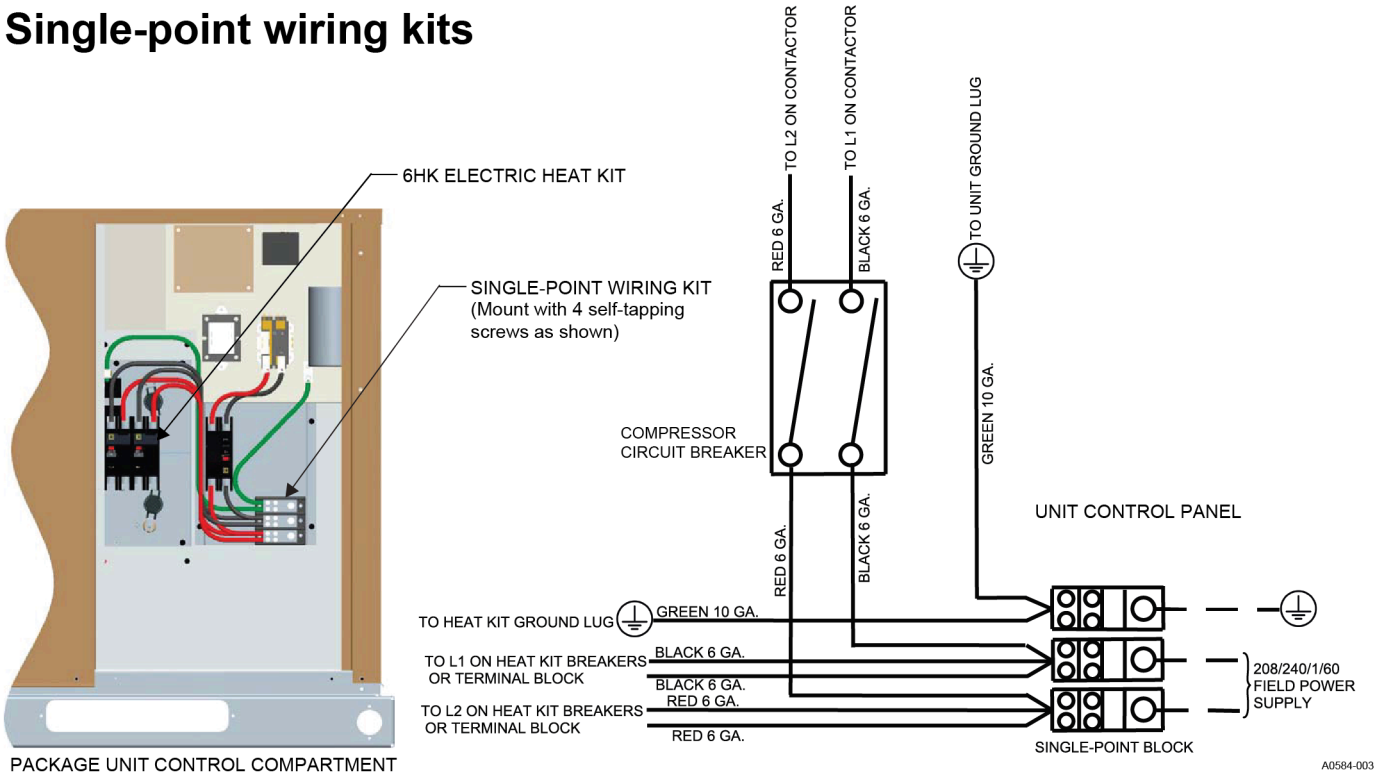
Installing a single-point wiring kit

If you have installed a 6HK electric heat kit and you want to use single-source power wiring, you must install a single phase single-point wiring kit. Single-phase single-point wiring kits are available for all electric heat kits except 25 kW electric heat kits. The single-point wiring kit allows one appropriately sized electrical circuit to power the electric heat kit and the unit. Use Table 19 to check which single-point wiring kit to use for the unit model. See Figure 10 for an illustration of how to install a single-point wiring kit and connect the wiring.

Table 19: Single-point wiring kit

Model	Single-point wiring kit part number	Breaker size (A)	Electric heat kit (kW)
PC5E24N00S2	S1-2SPWK006	25	up to 10
PC5E36N00S2	S1-2SPWK002	35	up to 15
PC5E48N00S2	S1-2SPWK003	45	up to 20
PC5E60N00S2	S1-2SPWK005	60	up to 20

Figure 10: Installing and connecting a single-point wiring kit



Note:

- For single circuit electric heat kits, remove the wires for the second circuit from the single-point block.
- The wire gauge varies depending on the specific electric heat kit model.

To install a single-point wiring kit, do the following:

- Follow the installation procedure in the *Installation Manual* for the single-point wiring kit.

Electric heat multipliers data

Table 20: Electric heat multipliers

Nominal voltage (V)	Applied voltage (V)	kW capacity multipliers
240	208	0.75
	230	0.92
Note: Electric heat kits are rated at nominal voltage. Use the data is this table to determine the electric heat capacity for electric heat kits applied at lower voltages.		

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

Table 21: Electrical data for 208/230-1-60 single source power

Model	Compressor			Outdoor fan motor	Blower motor	Electric heat option						MCA (A)		MOP (A)	
						Electric heat kit model	Electric heat kit (kW)		Stages	Electric heat kit (A)					
	RLA	LRA	MCC	FLA	FLA		208 V	230 V		208 V	230 V	208 V	230 V	208 V	230 V
PC5E24	10.3	62	16.0	0.8	4.8	none	—	—	—	—	—	18.4	18.4	25	25
						6HK16500506	3.6	4.4	1	17.3	19.2	27.7	30.0	30	30
						6HK16500806	5.8	7.1	1	27.7	30.7	40.7	44.3	45	45
						6HK16501006	7.2	8.8	1	34.7	38.3	49.3	53.9	50	60
PC5E36	14.6	90	22.7	1.7	4.8	none	—	—	—	—	—	24.7	24.7	35	35
						6HK16500506	3.6	4.4	1	17.3	19.2	27.7	30.0	35	35
						6HK16500806	5.8	7.1	1	27.7	30.7	40.7	44.3	45	45
						6HK16501006	7.2	8.8	1	34.7	38.3	49.3	53.9	50	60
						6HK16501506	10.8	13.2	2	52.0	57.5	71.0	77.9	80	80
PC5E48	18.3	138	28.6	1.7	6.8	none	—	—	—	—	—	31.4	31.4	45	45
						6HK16500506	3.6	4.4	1	17.3	19.2	31.4	32.5	45	45
						6HK16500806	5.8	7.1	1	27.7	30.7	43.2	46.8	45	50
						6HK16501006	7.2	8.8	1	34.7	38.3	51.8	56.4	60	60
						6HK16501506	10.8	13.2	2	52.0	57.5	73.5	80.4	80	90
						6HK16502006	14.4	17.6	2	69.3	76.7	95.2	104.3	100	110
PC5E60	23.7	123	37.0	1.7	8.0	none	—	—	—	—	—	39.3	39.3	60	60
						6HK16500506	3.6	4.4	1	17.3	19.2	39.3	39.3	60	60
						6HK16500806	5.8	7.1	1	27.7	30.7	44.7	48.3	60	60
						6HK16501006	7.2	8.8	1	34.7	38.3	53.3	57.9	60	60
						6HK16501506	10.8	13.2	2	52.0	57.5	75.0	81.9	80	90
						6HK16502006	14.4	17.6	2	69.3	76.7	96.7	105.8	100	110

Note:

- 208/230-1-60 indicates 208 V/230 V, single phase, 60 Hz.
- MCA indicates minimum circuit ampacity.
- MOP indicates maximum overcurrent protection device. This must be a HACR circuit breaker or time delay fuse. The HACR circuit breaker or time delay fuse must be field installed. The maximum overcurrent protection must be in accordance with the UL 60335-2-40 standard (fourth edition).
- A single-point wiring kit is required.

Electrical data for 208-1-60 multi source power

Table 22: Electrical data for 208-1-60 multi source power

Model	Compressor			Outdoor fan motor	Blower motor	Electric heat option (208 V)				Multi source (208 V)							
						Electric heat kit model	Electric heat kit (kW)	Stages	Electric heat kit (A)	Circuit 1 (compressor)		Circuit 2 (heat)		Circuit 3 (heat)		Circuit 4 (heat)	
	RLA	LRA	MCC	FLA	FLA					MCA (A)	MOP (A)	MCA (A)	MOP (A)	MCA (A)	MOP (A)	MCA (A)	MOP (A)
PC5E24	10.3	62.0	16.0	0.8	4.8	none	—	—	—	18.4	25	—	—	—	—	—	—
						6HK(0,1)6500506	3.6	1	17.3	18.4	25	21.7	25	—	—	—	—
						6HK(0,1)6500806	5.8	1	27.7	18.4	25	34.7	35	—	—	—	—
						6HK(0,1)6501006	7.2	1	34.7	18.4	25	43.3	45	—	—	—	—
PC5E36	14.6	90.0	22.7	1.7	4.8	none	—	—	—	24.7	35	—	—	—	—	—	—
						6HK(0,1)6500506	3.6	1	17.3	24.7	35	21.7	25	—	—	—	—
						6HK(0,1)6500806	5.8	1	27.7	24.7	35	34.7	35	—	—	—	—
						6HK(0,1)6501006	7.2	1	34.7	24.7	35	43.3	45	—	—	—	—
						6HK16501506	10.8	2	52.0	24.7	35	21.7	25	43.3	45	—	—
						6HK26501506	10.8	2	52.0	24.7	35	65.0	70	—	—	—	—
PC5E48	18.3	138.0	28.6	1.7	6.8	none	—	1	—	31.4	45	—	—	—	—	—	—
						6HK(0,1)6500506	3.6	1	17.3	31.4	45	21.7	25	—	—	—	—
						6HK(0,1)6500806	5.8	1	27.7	31.4	45	34.7	35	—	—	—	—
						6HK(0,1)6501006	7.2	1	34.7	31.4	45	43.3	45	—	—	—	—
						6HK16501506	10.8	2	52.0	31.4	45	21.7	25	43.3	45	—	—
						6HK16502006	14.4	2	69.3	31.4	45	43.3	45	43.3	45	—	—
						6HK26501506	10.8	2	52.0	31.4	45	65.0	70	—	—	—	—
						6HK26502006	14.4	2	69.3	31.4	45	86.7	90	—	—	—	—
PC5E60	23.7	123.0	37.0	1.7	8.0	none	—	1	—	39.3	60	—	—	—	—	—	—
						6HK(0,1)6500506	3.6	1	17.3	39.3	60	21.7	25	—	—	—	—
						6HK(0,1)6500806	5.8	1	27.7	39.3	60	34.7	35	—	—	—	—
						6HK(0,1)6501006	7.2	1	34.7	39.3	60	43.3	45	—	—	—	—
						6HK16501506	10.8	2	52.0	39.3	60	21.7	25	43.3	45	—	—
						6HK16502006	14.4	2	69.3	39.3	60	43.3	45	43.3	45	—	—
						6HK16502506	18.0	2	86.7	39.3	60	43.3	45	43.3	45	21.7	25
						6HK26501506	10.8	2	52.0	39.3	60	65.0	70	—	—	—	—
						6HK26502006	14.4	2	69.3	39.3	60	86.7	90	—	—	—	—
						6HK26502506	18.0	2	86.7	39.3	60	108.3	110	—	—	—	—

Note:

- 208-1-60 indicates 208 V, single phase, 60 Hz.
- MCA indicates minimum circuit ampacity.
- MOP indicates maximum overcurrent protection device. This must be a HACR circuit breaker or time delay fuse.

Electrical data for 230-1-60 multi source power

Table 23: Electrical data for 230-1-60 multi source power

Model	Compressor			Outdoor fan motor	Blower motor	Electric heat option (230 V)				Multi source (230 V)							
						Electric heat kit model	Electric heat kit (kW)	Stages	Electric heat kit (A)	Circuit 1 (compressor)		Circuit 2 (heat)		Circuit 3 (heat)		Circuit 4 (heat)	
	RLA	LRA	MCC	FLA	FLA					MCA (A)	MOP (A)	MCA (A)	MOP (A)	MCA (A)	MOP (A)	MCA (A)	MOP (A)
PC5E24	10.3	62.0	16.0	0.8	4.8	none	--	--	--	18.4	25	--	--	--	--	--	--
						6HK(0,1)6500506	4.4	1	19.2	18.4	25	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	18.4	25	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	18.4	25	47.9	50	--	--	--	--
PC5E36	14.6	90.0	22.7	1.7	4.8	none	--	--	--	24.7	35	--	--	--	--	--	--
						6HK(0,1)6500506	4.4	1	19.2	24.7	35	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	24.7	35	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	24.7	35	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	24.7	35	24.0	25	47.9	50	--	--
						6HK26501506	13.2	2	57.5	24.7	35	71.9	80	--	--	--	--
PC5E48	18.3	138.0	28.6	1.7	6.8	none	--	1	--	31.4	45	--	--	--	--	--	--
						6HK(0,1)6500506	4.4	1	19.2	31.4	45	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	31.4	45	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	31.4	45	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	31.4	45	24.0	25	47.9	50	--	--
						6HK16502006	17.6	2	76.7	31.4	45	47.9	50	47.9	50	--	--
						6HK26501506	13.2	2	57.5	31.4	45	71.9	80	--	--	--	--
						6HK26502006	17.6	2	76.7	31.4	45	95.8	100	--	--	--	--
PC5E60	23.7	123.0	37.0	1.7	8.0	none	--	1	--	39.3	60	--	--	--	--	--	--
						6HK(0,1)6500506	4.4	1	19.2	39.3	60	24.0	25	--	--	--	--
						6HK(0,1)6500806	7.1	1	30.7	39.3	60	38.3	40	--	--	--	--
						6HK(0,1)6501006	8.8	1	38.3	39.3	60	47.9	50	--	--	--	--
						6HK16501506	13.2	2	57.5	39.3	60	24.0	25	47.9	50	--	--
						6HK16502006	17.6	2	76.7	39.3	60	47.9	50	47.9	50	--	--
						6HK16502506	22.0	2	95.8	39.3	60	47.9	50	47.9	50	24.0	25
						6HK26501506	13.2	2	57.5	39.3	60	71.9	80	--	--	--	--
						6HK26502006	17.6	2	76.7	39.3	60	95.8	100	--	--	--	--
						6HK26502506	22.0	2	95.8	39.3	60	119.8	125	--	--	--	--

Note:

- 230-1-60 indicates 230 V, single phase, 60 Hz.
- MCA indicates minimum circuit ampacity.
- MOP indicates maximum overcurrent protection device. This must be a HACR circuit breaker or time delay fuse.

Electric heat performance data for 208/230-1-60

Table 24: Electric heat performance data for 208/230-1-60

Electric heat kit model	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

Note:

- 208/230-1-60 indicates 208 V/230 V, single phase, 60 Hz.
- For electric heat kit model numbers in this table that include (0,1), 0 indicates no service disconnect **or** 1 indicates with service disconnect.
- For electric heat kit model numbers in this table that include (1,2), 1 indicates with service disconnect and no breaker jumper bar **or** 2 indicates with service disconnect and breaker jumper bar.

Starting up the unit

1. **Stop** and read the safety information on the unit label.
2. Set the thermostat to the **OFF** position.
3. Turn off all electrical power to the unit.
4. Check the electrical supply voltage being supplied. Make sure that it is within the specified range on the unit rating plate.
5. Remove the control access panel by removing the screws and lifting the panel out.
6. Make sure that all electrical connections are tight.
7. If the unit is connected to 208 V supply power, make sure that the control transformer is wired accordingly. See Completing the power and control wiring.
8. Replace the control access panel.
9. Turn on the electrical power to the unit.
10. 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.
11. Make sure that the unit is operating correctly.

ⓘ **Note:** See Unit components and operation for more information about the unit if needed. See Troubleshooting if needed.

Checking and configuring the unit

You **must** complete all required checks and configure unit settings correctly at the time of installation to ensure correct system operation. **STOP** and read all of the information and tasks relating to configuring main control board settings before you start to change settings. Otherwise, you may set DIP switches incorrectly and cause difficulties in the installation process.

Setting the unit model

The main control board in the unit can be used with many different models and must have the correct setting for the model in which it is installed. The model ID of each main control board is programmed in the factory for each production unit. The programming does not require manual setting of DIP switches, so the model ID DIP switches on the main control board are in the 0 or off position, but the correct model ID for the unit is set. It is best practice to manually set the model ID DIP switches during installation to facilitate unit servicing or repair. You **must** set the model ID if replacing the main control board in the unit. You set the model ID for your specific application using the six model ID (MODEL ID) DIP switches in the SW4 switch bank on the main control board. Table 25 shows the DIP switch settings for PC5 models.

Table 25: Model ID DIP switch settings

Model	A2L enabled	Model ID DIP switch setting - SW4 switch bank
PC5E24N00S2	No	001011
PC5E36N00S2	No	001100
PC5E48N00S2	Yes	001101
PC5E60N00S2	Yes	001110

ⓘ **Note:** The model ID DIP switch settings are shown left to right from DIP switch 1 to DIP switch 6. 0 is the off position and 1 is the on position.

To set the unit model, do the following:

- Check the DIP switch setting for the specific PC5 model in Table 25. Then, on the main control board, in the **SW4** switch bank, set the six **MODEL ID** DIP switches to the required position.

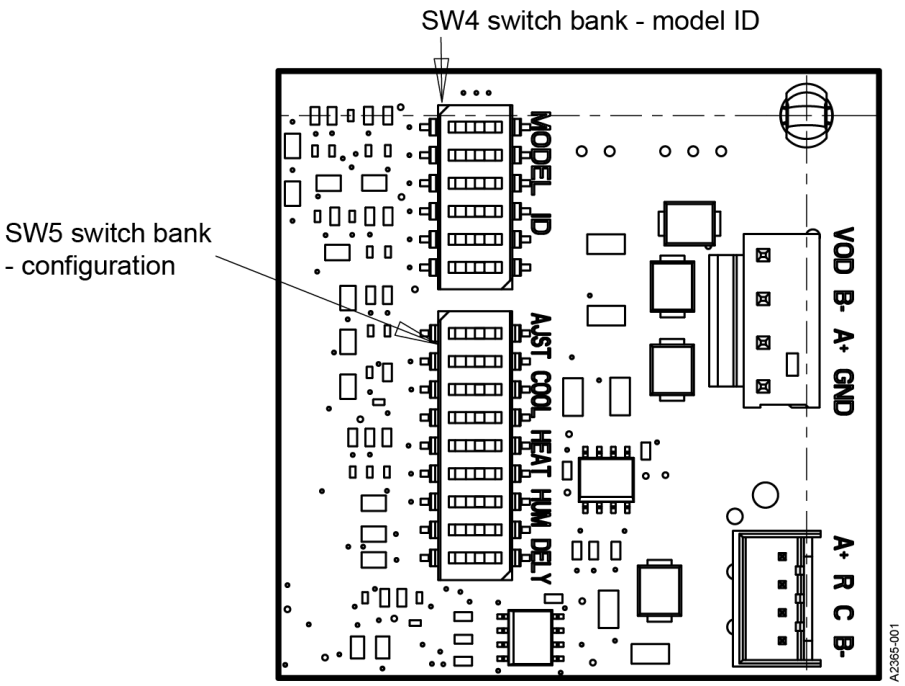
Configuring airflow settings

You **must** configure the unit airflow settings correctly at the time of installation. You do this on the main control board using the adjust, cool, heat, humidistat, and delay DIP switches in the SW5 switch bank. See Figure 11. Table 26 gives an overview of the DIP switch settings and how they operate for quick reference. Follow the procedures for configuring specific DIP switch settings as needed. The unit has a direct drive, constant airflow ECM blower motor. In normal operation, the continuous fan airflow is 67% of the high cool airflow selected using the cool and adjust DIP switches as outlined in Configuring cooling airflow settings. You do not configure additional continuous fan airflow settings. For unit airflow data, see Table 31, Table 32, and Table 34.

Table 26: Understanding airflow DIP switch settings

Mode	Airflow settings		SW5 switch bank - configuration								
			Adjust DIP switches - for compressor cooling		Cool DIP switches - for compressor cooling		Heat DIP switches - for electric heating		Humidistat DIP switch - for compressor cooling	Delay DIP switches - for compressor cooling	
	Cool or Heat	Adjust	1	2	3	4	5	6	7	8	9
Cooling	A	A	Off	Off	Off	Off	The heat DIP switch settings do not impact cooling CFM.		Enable the humidistat feature for cooling operation by setting the humidistat DIP switch to the on position if the unit is installed and operated with a humidistat. See Enabling the humidistat feature.	Select the cooling delay profile using the delay DIP switches based on customer preference and the specific installation. The selected profile does not impact the cooling values in Table 31. See Adjusting the cooling delay profile for the setting options.	
	A	B	Off	On	Off	Off					
	A	C	On	Off	Off	Off					
	B	A	Off	Off	Off	On					
	B	B	Off	On	Off	On					
	B	C	On	Off	Off	On					
	C	A	Off	Off	On	Off					
	C	B	Off	On	On	Off					
	C	C	On	Off	On	Off					
	D	A	Off	Off	On	On					
	D	B	Off	On	On	On					
	D	C	On	Off	On	On					
Heating	A	Any	The adjust DIP switch settings do not impact electric heating operation.		The cool DIP switch settings do not impact electric heating CFM.		Off	Off	The humidistat DIP switch setting does not impact electric heating operation.	The cooling delay profile does not impact electric heating operation.	
	B	Any					Off	On			
	C	Any					On	Off			
	D	Any					On	On			
For more information on configuring cool, adjust, and heat DIP switch settings, see Configuring cooling airflow settings and Configuring electric heating airflow settings.											

Figure 11: Main control board - DIP switches

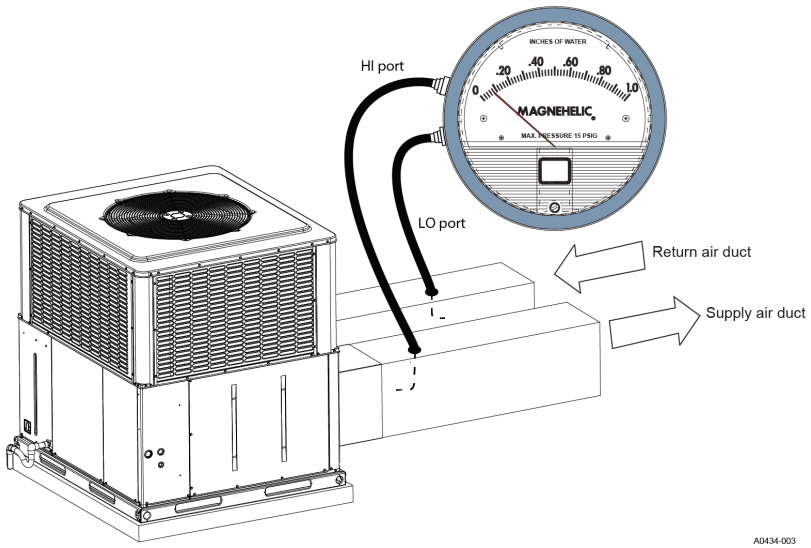


Measuring the external static pressure

Before you begin:
Make sure that the unit is in cooling mode.

You must use a manometer as part of this procedure. Figure 12 shows how to use a manometer to measure external static pressure.

Figure 12: Measuring the external static pressure



To measure the external static pressure, do the following:

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 number and add the two numbers together. This is the total external static pressure.

Configuring cooling airflow settings

Before you begin:
Measure the external static pressure.

The unit has a direct drive, constant airflow ECM blower motor. You can adjust the blower airflow settings for cooling on the main control board using the cool (COOL) and adjust (AJST) DIP switches in the SW5 switch bank. Use the cool DIP switches to select the required cooling blower airflow setting and use the adjust DIP switches to increase or decrease the airflow for the selected cooling blower airflow setting if needed. Table 27 and Table 28 show the DIP switch setting options. When configuring the cooling airflow settings, select the cooling blower airflow setting to deliver approximately 350 CFM to 400 CFM per ton of AC cooling capacity. Use of airflow outside of this range may cause diminished air conditioning performance, lower overall energy efficiency, and higher electric utility bills.

Important: The continuous fan airflow is based on the high cool airflow you select using the cool and adjust DIP switches. See Table 27 and Table 28. You do not configure additional continuous fan airflow settings. When a cool DIP switch setting is selected for compressor high cooling and the thermostat sends a G only call to the main control board, a continuous fan airflow rate is obtained at 67% of the high cool airflow.

Table 27: Cool DIP switch settings

SW5 switch bank - cool DIP switches		Setting description
DIP switch 3	DIP switch 4	
Off	Off	A - delivers nominal or medium high cooling airflow
Off	On	B - delivers the highest cooling airflow
On	Off	C - delivers medium low cooling airflow.
On	On	D - delivers the lowest cooling airflow

Table 28: Adjust DIP switch settings

SW5 switch bank - adjust DIP switches		Setting description
DIP switch 1	DIP switch 2	
Off	Off	A - nominal setting for cooling airflow
Off	On	B - 10% increase of nominal setting for cooling airflow
On	Off	C - 10% decrease of nominal setting for cooling airflow
On	On	D - nominal setting for cooling airflow. Setting D is the same as setting A

To configure cooling airflow settings, do the following:

1. See Figure 3, Figure 16, and Figure 17.
2. Using Table 31, compare the CFM data for the cooling blower airflow setting with the blower motor energized with the measured external static pressure. Then, adjust the cooling blower airflow setting as necessary to obtain the correct cooling airflow. To do so, on the main control board, in the **SW5** switch bank, set the **COOL** and **AJST** DIP switches to the required position.

Enabling the humidistat feature

The unit is designed to operate with an optional humidistat to help control the humidity level in the conditioned space during cooling operation. If the unit is being used with a humidistat, you must enable the humidistat feature on the main control board by setting the humidistat (HUM) DIP switch to the on position. When the humidistat DIP switch is set to the on position, if the humidistat reports high humidity, the main control board automatically reduces the airflow by 15% in cooling mode to help remove humidity from the indoor air. When the humidistat DIP switch is set to the off position, the main control board does not reduce airflow to remove humidity from the indoor air. See Humidistat feature.

To enable the humidistat feature, do the following:

- On the main control board, in the SW5 switch bank, set the **HUM** DIP switch to the **ON** position. The **HUM** DIP switch is DIP switch **7** in the **SW5** switch bank.

Adjusting the cooling delay profile

This unit has a compressor cooling delay profile feature that allows the unit cooling blower operation to be optimized for better control of humidity and efficiency. You can use the delay (DELY) DIP switches in the SW5 switch bank on the main control board to adjust the cooling delay profile if required. Table 29 shows the DIP switch settings options.

Table 29: Cooling delay profile DIP switch settings

SW5 switch bank - delay DIP switches		Cooling delay profile	Period	Cooling	
DIP switch 8	DIP switch 9			Level (%)	Time in state (min)
Off	Off	A	Pre-run	Bypass	Bypass
			Short-run	Bypass	Bypass
			Run	100	No limit
			Post-run	100	1
			Off Delay	Bypass	Bypass
Off	On	B	Pre-run	50	2
			Short-run	82	5
			Run	100	No limit
			Post-run	100	1
			Off Delay	Bypass	Bypass
On	Off	C	Pre-run	Bypass	Bypass
			Short-run	Bypass	Bypass
			Run	100	No limit
			Post-run	100	1
			Off Delay	50	1
On	On	D	Pre-run	Bypass	Bypass
			Short-run	63	1.55
			Run	100	No limit
			Post-run	100	1
			Off Delay	63	0.5

Note:

- The levels shown in the pre-run, short-run, and run periods are a percentage of the cooling blower airflow setting corresponding to the thermostat call.
- The post-run and off delay levels are derived from the level of the previous state, not the cooling blower airflow setting corresponding to the thermostat call.
- If cooling delay profile B is selected and the thermostat call is removed in the short-run period (82% of capacity), the main control board enters the post-run state. The post-run state level for cooling delay profile B is 100% of the previous level, so the level during the post-run state is 82%.

To adjust the cooling delay profile, do the following:

- On the main control board, in the **SW5** switch bank, set the **DELY** DIP switches to the required position.

Configuring electric heating airflow settings

The unit has a direct drive, constant airflow ECM blower motor. If you have installed an optional electric heat kit for the unit, you can adjust the blower airflow settings for electric heating on the main control board using the heat (HEAT) DIP switches in the SW5 switch bank. Table 33 shows the minimum blower airflow setting for electric heating required for each PC5E unit model and electric heat kit. Table 30 shows the DIP switch setting options. When configuring the electric heating airflow settings, you can select any blower airflow setting provided it meets the required minimum blower airflow setting in Table 33 and the maximum supply air temperature requirement for the unit. See Checking the supply air temperature.

Table 30: Heat DIP switch settings

SW5 switch bank - heat DIP switches		Setting description
DIP switch 5	DIP switch 6	
Off	Off	A - delivers the highest electric heating airflow
Off	On	B - delivers medium high electric heating airflow
On	Off	C - delivers medium low electric heating airflow
On	On	D - delivers the lowest electric heating airflow

To configure the electric heating airflow settings, do the following:

1. Check the required minimum blower airflow setting for the electric heat kit installed for the unit model in Table 33.
2. On the main control board, in the **SW5** switch bank, set the **HEAT** DIP switches to the required position at or above the required minimum blower airflow setting.
3. Check the supply air temperature to ensure it is no higher than the maximum supply air temperature specified on the unit rating plate: 90°C (194°F). To do so, follow the procedure in Checking the supply air temperature.

Checking the supply air temperature

You **must** check the supply air temperature for every new unit installation if there is a field installed electric heat kit in the unit. Make sure that the supply air temperature is no higher than the maximum supply air temperature specified on the unit rating plate: 90°C (194°F).

⚠ DANGER

The supply air temperature cannot exceed the **Maximum Supply Air Temperature** specified in these instructions and on the unit rating plate: 90°C (194°F). Under NO circumstances can the electric heater be allowed to operate above the Maximum Supply Air Temperature. Operating the electric heater above the Maximum Supply Air Temperature will cause premature heating element failure, a fire hazard, personal injury, property damage, and/or death.

To check the supply air temperature, do the following:

1. After about 5 min of operation, measure the temperature of the heated air in the supply air duct, about 6 ft (1.83 m) from the supply air duct opening of the unit where the temperature measurement is not affected by radiant heat.
2. Increase the blower airflow setting for electric heating to decrease the supply air temperature or decrease the blower airflow setting for electric heating to increase the supply air temperature if needed to meet the maximum supply air temperature requirement for the unit. See Configuring electric heating airflow settings.

Airflow performance data for side duct application

Table 31: Airflow cooling performance data for side duct application

Airflow settings		High and low stage cooling (CFM) by PC5E unit model							
Cool	Adjust	PC5E24N00S2		PC5E36N00S2		PC5E48N00S2		PC5E60N00S2	
		High cool	Low cool	High cool	Low cool	High cool	Low cool	High cool	Low cool
A	A	800	550	1150	750	1610	1100	1800	1250
A	B	880	610	1270	830	1770	1210	1980	1380
A	C	720	500	1040	680	1450	990	1620	1130
B	A	880	610	1270	830	1770	1210	1980	1380
B	B	970	670	1400	910	1950	1330	2180	1520
B	C	790	550	1140	750	1590	1090	1780	1240
C	A	720	500	1040	680	1450	990	1620	1130
C	B	790	550	1140	750	1600	1090	1780	1240
C	C	650	450	940	610	1310	890	1460	1020
D	A	640	440	920	600	1290	880	1440	1000
D	B	700	480	1010	660	1420	970	1580	1100
D	C	580	400	830	540	1160	790	1300	900

Table 32: Airflow heating performance data for side duct application

Airflow settings		High and low stage electric heating (CFM) by PC5E unit model							
Heat	Adjust	PC5E24N00S2		PC5E36N00S2		PC5E48N00S2		PC5E60N00S2	
		High heat	Low heat	High heat	Low heat	High heat	Low heat	High heat	Low heat
A	Any	900	900	1250	1020	1750	1150	1910	1420
B	Any	800	800	1150	920	1420	820	1670	1200
C	Any	550	550	1070	680	1260	720	1560	650
D	Any	380	380	980	620	1060	550	1420	450

Important: It is important to be aware of the following about the data provided in the airflow cooling and heating performance tables:

- Airflow is tested with dry coil conditions, without air filters, at 230 V.
- All CFMs are shown at 0.5 in. W.C. external static pressure. PC5E units have variable speed motors that automatically adjust to provide constant CFM from 0.0 in. W.C. to 0.6 in. W.C. external static pressure. From 0.6 in. W.C. to 1.0 in. W.C. external static pressure, CFM is typically reduced by 2% per 0.1 in. W.C. increase in static. Operation on duct systems with greater than 1.0 in. W.C. external static pressure is not recommended.
- A brushless DC high-efficiency standard 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 tables can be used in those cases.
- Heating applications are tested at 0.50 in. W.C. external static pressure. Cooling applications are tested according to AHRI Standard 210/240.
- The differences between side duct airflows and bottom duct airflows are insignificant.

Electric heat minimum supply air data

Table 33: Electric heat minimum supply air

Model	Minimum blower airflow setting for electric heat					
	Electric heat kit (kW)					
	5	8	10	15	20	25
PC5E24N00S2	D	C	B	—	—	—
PC5E36N00S2	D	D	D	B	—	—
PC5E48N00S2	D	D	C	C	B	—
PC5E60N00S2	D	C	C	B	B	B

Additional static resistance data

Table 34: Additional static resistance

Model	CFM	Wet indoor coil	Economizer	Filter frame kit
PC5E24N00S2 - 2 ton	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
PC5E36N00S2 - 3 ton	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
	1400	0.08	0.04	0.18
PC5E48N00S2 - 4 ton	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
PC5E60N00S2 - 5 ton	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

Note:

- 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 in. W.C., the unit delivers less CFM during full economizer operation.
- The filter pressure drop is based on standard filter media tested at velocities not exceeding 300 ft/min.

Completing the installation

Complete final installation tasks including filling out the unit start-up sheet provided and instructing the user on the unit.

Securing the unit panels

Before you begin:
If the air filter is located inside the unit, make sure that you have installed the air filter before you secure the unit panels.

- Secure all of the unit panels in place.

Instructing the user

The unit requires regular maintenance, so it is important to instruct the user about maintenance.

⚠ WARNING

Before performing any maintenance procedure, shut off all power to the unit to avoid personal injury.

- Instruct the user to refer to *Maintaining your system* in the *User's Information Manual* for the unit for detailed information about maintenance and procedures.
- Direct the user to their limited warranty certificate in the *User's Information Manual*. Complete the following information fields in the limited warranty certificate for user reference:
  - Product Model Number
  - Unit Serial Number
  - Installation Date
  - Participating Dealer

Unit components and operation

It is important to be familiar with the different unit components and understand how they operate.

Unit components

Figure 13: Unit components - PC5E24 and PC5E36 units

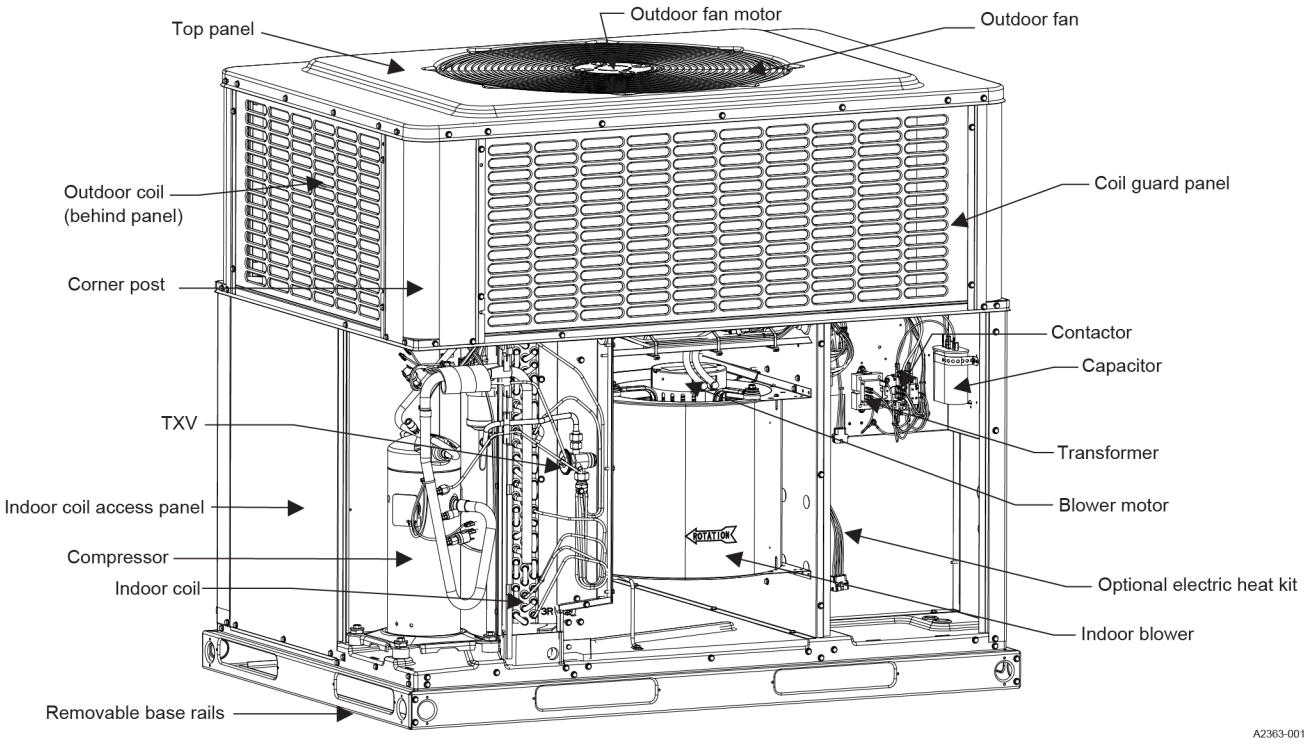
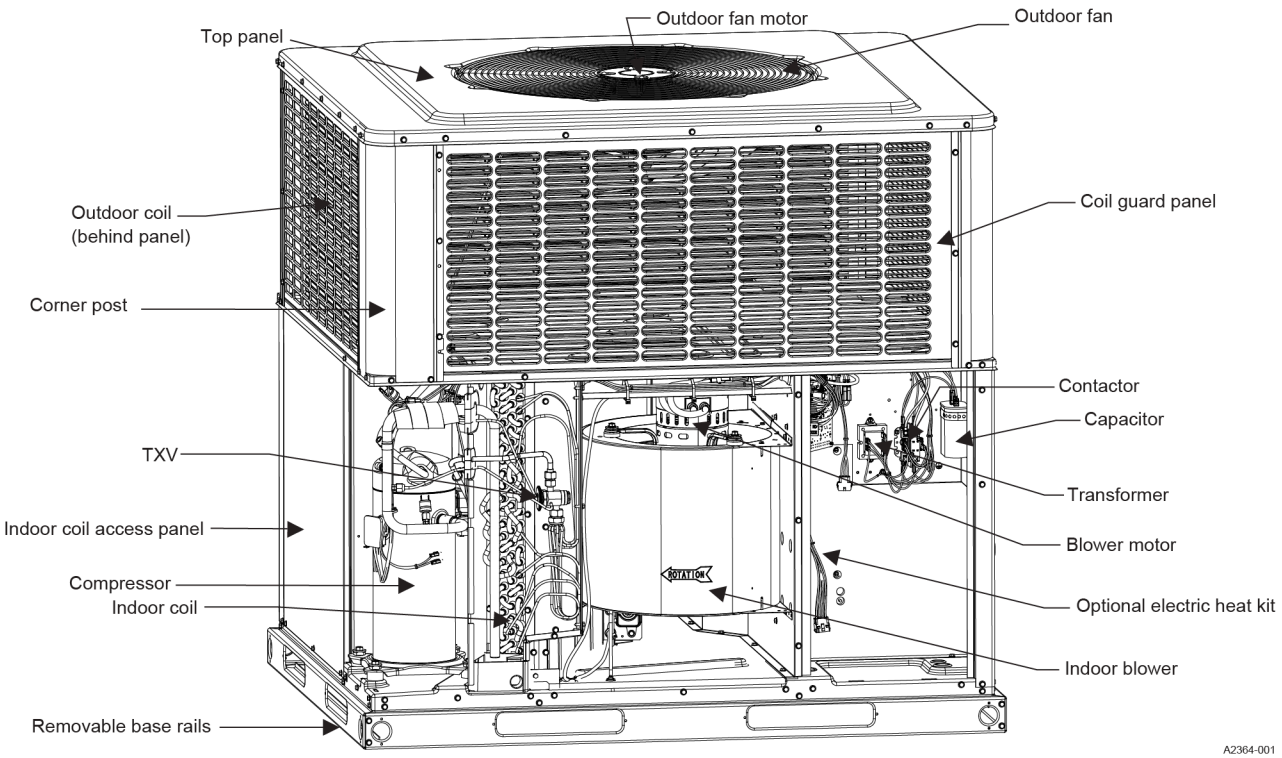


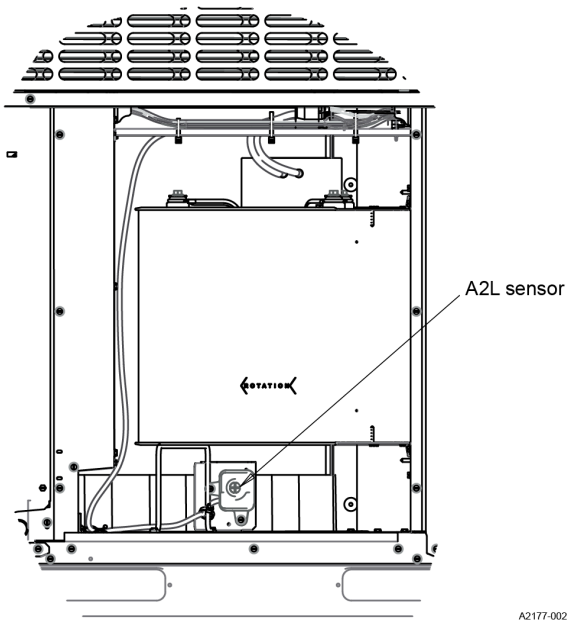
Figure 14: Unit components - PC5E48 and PC5E60 units



A2L components

PC5E48 and PC5E60 units have an A2L sensor and the A2L mitigation logic for the A2L diagnostic LED on the main control board is activated, because they contain over 1.776 kg (3.915 lb) of refrigerant. The main control board drives A2L mitigation airflow in the event of detected A2L refrigerant leakage. Figure 15 shows the location of the A2L sensor. See A2L refrigerant safety guidance for more information.

Figure 15: A2L sensor location - PC5E48 and PC5E60 units



Main control board

PC5 units have a two-stage air handler (AH) main control board. The main control board includes the following:

- **Status LED**: Indicates system status and fault codes.
- **A2L diagnostic LED**: For PC5E48 and PC5E60 units, the A2L diagnostic LED works with the status LED and indicates A2L-related status codes and fault codes. For PC5E24 and PC5E36 units, the A2L mitigation logic is deactivated so the A2L diagnostic LED does not operate.
- **A2L sensor connector**: Applies only to PC5E48 and PC5E60 units. PC5E24 and PC5E36 units do not include an A2L sensor because they do not require an A2L mitigation system. There is an A2L sensor in PC5E48 and PC5E60 units as part of the A2L mitigation system.
- **SW4 switch bank - model ID**: Contains the model ID DIP switches for setting the unit model. It is best practice to set the unit model during installation. You **must** set the unit model when replacing the main control board in the unit. See Table 25.
- **SW5 switch bank - configuration**: Used to configure blower airflow settings for cooling and electric heating, the humidistat feature, and the cooling delay profile for compressor cooling. Contains the adjust, cool, heat, humidistat, and delay DIP switches.
- **SW1 button**: Also referred to as the last error button. Used to view and clear stored fault codes.

Figure 3 shows the main control board and Figure 11 shows a close view of the SW4 and SW5 switch banks.

Compressor

It is important to be aware of the following:

- The unit compressor is specifically designed to operate with R-454B refrigerant and cannot be interchanged with a different type of compressor.
- The unit compressor uses polyolester (POE) oil. 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
- The unit is shipped with compressor mountings, which are factory-adjusted and ready for operation.

⚠ CAUTION

Do not loosen compressor mounting bolts.

Cooling safety controls

The control circuit includes the following cooling safety controls: a

- **High-pressure switch**: The high-pressure switch protects against excessive discharge pressures due to a blocked outdoor coil or an outdoor fan motor failure. The high-pressure switch opens at 650 ± 10 psig and closes at 450 ± 15 psig.
- **Low-pressure switch**: The low-pressure switch protects against abnormally low suction pressure due to refrigerant leakage or a blocked indoor coil or indoor blower motor failure. The low-pressure switch opens at 60 ± 5 psig and closes at 90 ± 7 psig.

Important: The high-pressure and low-pressure switches are specifically designed to operate with R-454B systems. Do not use R-22 pressure switches as replacements for R-454B pressure switches.

⚠ 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.

Heating safety controls

If an optional electric heat kit is installed, the control circuit includes two limit switches for electric heating as part of the electric heat kit. In each heating element circuit, there is one self-resetting limit switch and one non-self-resetting limit switch to prevent premature heating element failure and potential fire hazard. If the self-resetting limit switch opens, it resets when the surrounding air temperature cools down to a normal level. If the non-self-resetting limit switch opens, it does not automatically reset. Trained, qualified personnel must diagnose the issue and may need to order and replace parts to get the electric heat kit back to correct operation.

Cooling operation

The unit is controlled by a conventional heating or cooling thermostat. When the thermostat calls for cooling, the following occurs:

1. Thermostat terminals G and Y1 are energized, which signals the compressor, outdoor fan, and indoor blower to run on first stage cooling. With a call for Y1, the indoor circulating blower is energized at the low cool airflow setting.
2. The control board cycles the compressor and indoor blower to the second-stage cooling setting anytime a second-stage cooling (Y2) call is received during a first-stage cooling (Y1) call. The control board does not operate second-stage cooling without a call on the Y2 thermostat input.
3. When the thermostat is satisfied, terminals G and Y are de-energized, de-energizing the compressor and outdoor fan. After a blower off delay time in accordance with the selected cooling delay profile, followed by a 15 s staging down period, the indoor circulating blower is de-energized. See Table 29.

Humidistat feature

The unit can operate with an optional humidistat to help control the humidity level in the conditioned space during cooling operation. The unit has a built-in humidistat feature for advanced dehumidification in cooling mode. The main control board is designed to work with a humidity control that closes when the humidity is below the setpoint. The humidity control is open when the humidity is above the setpoint. This humidity control may be referred to as a humidistat or dehumidistat. During cooling operation, if the humidity level is above the humidistat setpoint, the humidity control opens and the indoor blower airflow is reduced by approximately 15% of the selected high cool airflow setting.

If the unit is being used with a humidistat, you must connect the humidistat from the low voltage R and HUM color-coded leads and enable the humidistat feature on the main control board by setting the humidistat (HUM) DIP switch to the on position. See Enabling the humidistat feature.

Heating operation

You have the option to install an electric heat kit for all unit models. The following heating sequence of operation is based on using a two-stage air conditioning thermostat:

1. Thermostat terminals G and W1 are energized, which signals the electric heater and the indoor blower to run on first stage heating. With a call for W1, the indoor circulating blower is energized at the low heat airflow setting.
2. The main control board cycles the electric heat kit and indoor blower to the second-stage heating setting anytime a second-stage heating (W2) call is received during a first-stage heating (W1) call. The control board does not operate second-stage heating without a call on the W2 thermostat input.
3. When the thermostat is satisfied, terminals G and W are de-energized, the electric heat kit is de-energized immediately, and the indoor blower motor stops after the electric heating blower off delay time followed by a 15 s staging down period. The electric heating blower off delay timing varies depending on the unit model: 0 s for PC5E24 units, 60 s for PC5E36 units, and 110 s for PC5E48 and PC5E60 units.

Indoor circulating blower operation

The unit is controlled by a conventional heating or cooling thermostat. When the thermostat calls for continuous fan operation, the following occurs:

1. Thermostat terminal G is energized, signaling the main control board to operate the indoor circulating blower continuously. The indoor circulating blower airflow is approximately 67% of the high cool airflow selected on the main control board.
2. If a call for cooling occurs on Y1, the indoor circulating blower runs at the low cool airflow based on the cool (COOL) DIP switch settings. If a call for cooling is present on Y1+Y2, the indoor blower runs at the high cool airflow based on the cool (COOL) DIP switch settings. If a call for heating occurs on W1 or W1+W2, the indoor circulating blower runs at the low heat or high heat airflow based on the heat (HEAT) DIP switch settings.
3. When the thermostat ends the call for continuous fan operation, thermostat terminal G is de-energized, and the main control board stops the indoor circulating blower operation after a 15 s staging down period.

Electric heat limit switch operation

If the self-resetting limit switch or the non-self-resetting limit switch for electric heating opens, the heating elements turn off, but the indoor blower continues to run. If the self-resetting limit switch opens, it automatically resets when the temperature falls to a normal level, and the heating elements turn on again. If the non-self-resetting limit switch opens, it does not automatically reset. Trained, qualified personnel must diagnose the issue and may need to order and replace parts to get the electric heat kit back to correct operation.

Servicing the unit

You can access all serviceable unit components at the following locations:

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

See Figure 13 or Figure 14 and Figure 5 for an illustration. See Table 11 for the minimum clearances you must maintain for the unit.

⚠ WARNING

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

⚠ CAUTION

This system uses R-454B refrigerant. No other refrigerant may be used in this system. Gauge sets, hoses, refrigerant containers, and recovery systems must be designed to handle R-454B. If you are unsure, consult the equipment manufacturer. Failure to use R-454B compatible servicing equipment may result in property damage or injury.

Sourcing replacement parts

Contact your local BHC Group Heating & Cooling parts distribution center for authorized replacement parts.

Troubleshooting

If troubleshooting is needed, follow all safety requirements, and use the unit control board diagnostics to assist.

⚠ 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.

Using unit control board diagnostics

The main control board continuously monitors its own operation and the operation of the system. The status LED on the main control board flashes red to indicate various conditions, for example, when there are active faults, when there are no thermostat calls, and when there are thermostat calls for heating, cooling, or continuous fan operation. If a fault occurs, the status LED indicates the fault code.

PC5E48 and PC5E60 units have an A2L sensor and use the A2L diagnostic LED in combination with the status LED on the main control board. See Main control board and A2L components.

Table 35 provides an overview of the status LED and A2L diagnostic LED codes and troubleshooting guidance for faults.

Note:

- For the slow flash codes, the slow flash speed of the status LED is 2 s on and 2 s off.
- For the continuous flash codes, the status LED flashes on and off continuously with no breaks or longer pauses.
- For the red flash codes, the status LED turns on for 1/3 s and turns off for 1/3 s. This pattern is repeated the number of times equal to the code. There is a 2 s pause between codes. For example, for the 8 red flashes code, the status LED flashes on and off eight times and then remains off for 2 s. This pattern repeats as long as the fault condition remains.

Status LED and A2L diagnostic LED codes

Table 35: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PC5E48 and PC5E60 units	Condition	Solution
Off	Off	Indicates there is no power to main control board or the main control board has failed	Do the following: 1. Supply power to the main control board. 2. Replace the fuse on the main control board if the fuse is open. 3. If the status LED on the main control board is still off, replace the main control board with a new control board.
Solid red	Off	Indicates an internal main control board fault	Replace the main control board.
Slow red flash (or heartbeat)	Off	Indicates the main control board is powered and the microprocessor is active. No active faults, normal operation	Normal operation. No action is required.
Rapid, continuous red flashes	Off	Indicates the main control board is powered and test mode is activated	Normal operation. No action is required.
7 red flashes	Off	Indicates a call for heating and cooling at the same time	Do the following: 1. Check the thermostat connections. 2. Verify the thermostat wiring is correct for the specific unit model number. 3. Check the model ID DIP switch settings are correct. See Setting the unit model.
8 red flashes	Off	Indicates the model ID for the unit is configured incorrectly	Check the model ID DIP switch settings. See Setting the unit model.
9 red flashes	Off	Indicates an internal main control board fault has been automatically corrected and the main control board is attempting to resume normal operation	Wait for the main control board to reset. If the condition persists, replace the main control board.

Table 35: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PC5E48 and PC5E60 units	Condition	Solution
Solid red. Applies to only PC5E48 and PC5E60 units	Rapid red flashes	Indicates A2L refrigerant leakage is detected above 15% lower flammability limit (LFL)	Proceed as follows: 1. Owner to notify service personnel as soon as possible. Maintain power to the unit and try to keep the conditioned space ventilated by opening windows if possible. 2. Service personnel to locate refrigerant leak point(s) and repair. Adjust the unit charge and get the unit back to correct functions.
Solid red. Applies to only PC5E48 and PC5E60 units	1 red flash	Indicates the refrigerant detection sensor is bypassed	Do the following: • Ensure the correct A2L sensor is correctly plugged in the A2L terminal of the main control board. • Check the A2L sensor connections. Replace the wiring to the A2L sensor if necessary.
Solid red. Applies to only PC5E48 and PC5E60 units	2 red flashes	Indicates refrigerant detection sensor communications have been lost	Do the following: 1. Ensure the correct A2L sensor is correctly plugged in the A2L terminal of the main control board. 2. Ensure the A2L sensor cable is not damaged.
Solid red. Applies to only PC5E48 and PC5E60 units	3 red flashes	Indicates refrigerant detection sensor failure	If the fault code occurs during normal operation, cycle power to the unit. If the fault code remains, replace the A2L sensor. Make sure the replacement is the correct A2L sensor. ⓘ **Note:** The A2L sensor may have this fault code if the unit is out of temperature range or out of humidity range, or if the A2L sensor is at its end of life.

Displaying and clearing stored fault codes

The main control board stores fault codes for 30 days. You can use the SW1 button (or last error button) on the main control board to retrieve and clear stored fault codes if no active faults or thermostat calls are present.

➤ **Important:** If an active fault or thermostat call is present when you press and hold the SW1 button, the main control board does not respond.

To display and clear stored fault codes, do the following:

1. Make sure that there are no active thermostat calls or faults.
2. On the main control board, press and hold the **SW1** button for 5 s to 10 s. If stored fault codes are present, the fault codes display. If there are no stored fault codes, the status LED on the main control board emits 2 red flashes.
3. Press and hold the **SW1** button for more than 10 s to clear the stored fault codes if required.

Checking the refrigerant charge

If you suspect there is a refrigerant circuit problem, check the refrigerant charge.

Important:

- The unit is critically charged. Several ounces of refrigerant are lost each time you connect a refrigerant gauge to the unit. **Do not** connect a refrigerant gauge to the unit to check the refrigerant charge unless you suspect there is a refrigerant circuit problem.
- See A2L refrigerant safety guidance and follow procedures as required. See Charging after refrigerant circuit repair work.

To check the refrigerant charge, do the following:

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-454B temperature pressure chart, convert 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. Obtain an ambient dry bulb temperature reading.
6. Compare readings taken to the unit charging chart.

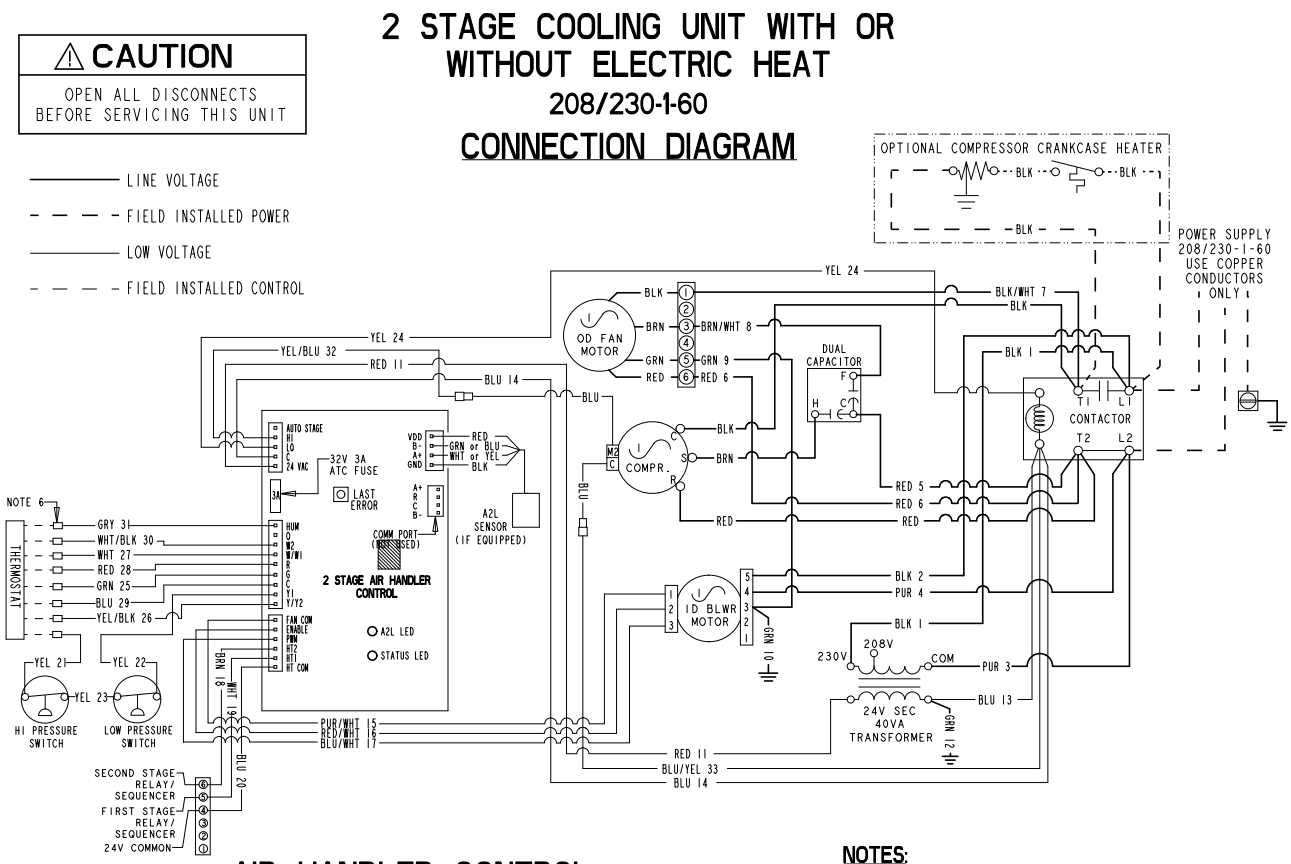
   Important: You can follow the charging chart to check and adjust unit charge if there is no hot work or refrigerant circuit repair involved; otherwise, read the A2L refrigerant safety guidance in its entirety before charging the unit. Whenever applicable, it is preferred to accurately charge the rating plate charge amount into the unit after satisfactory vacuuming.

Third-party trademarks

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

Wiring diagrams

Figure 16: Connection wiring diagram



AIR HANDLER CONTROL STATUS/DIAGNOSTIC CODES

STATUS LED	A2L LED (IF EQUIPPED)	CONDITION
OFF	OFF	NO POWER TO CONTROL OR CONTROL FAILURE
ON	OFF	CONTROL FAILURE
SLOW HEARTBEAT	OFF	NORMAL OPERATION
RAPID HEARTBEAT	OFF	FACTORY TEST MODE
7 FLASHES	OFF	CALL FOR HEAT AND COOL AT SAME TIME
8 FLASHES	OFF	MODEL ID INCORRECTLY CONFIGURED
9 FLAHSES	OFF	INTERNAL FAULT SELF CORRECTED, ATTEMPTING NORMAL OPPERATION
RAPID FLASH	ON	REFRIG. LEAK DETECTED (ABOVE 15% LFL)
1 FLASH	ON	REFRIG. DETECTION SENSOR - BYPASSED
2 FLASHES	ON	REFRIG. DETECTION SENSOR - LOST COMMUNICATION
3 FLASHES	ON	REFRIG. DETECTION SENSOR - FAILURE

NOTES:

1. ALL FIELD WIRING TO BE ACCOMPLISHED FOLLOWING CITY, LOCAL AND/OR NATIONAL CODES IN EFFECT AT THE TIME OF INSTALLATION OF THE UNIT.
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 THE UNIT MUST BE REPLACED, IT MUST BE 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, MOVE WIRE (BLK 1) FROM THE 230V TO THE 208V 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.
6. CONNECT THERMOSTAT CONTROL WIRING TO MAIN WIRING HARNESS USING SPRING TYPE WIRE CONNECTORS OR EQUIVALENT WITH 12 POSITION FACTORY RUN TEST CONNECTOR REMOVED.

FAULT CODE HISTORY

PRESS "LAST ERROR" BUTTON FOR MORE THAN 5 SECONDS AND LESS THAN 10 SECONDS WITH NO ACTIVE THERMOSTAT SIGNALS TO DISPLAY UP TO FIVE STORED ERROR CODE FLASHES ON STATUS LED WITH 2 SECONDS BETWEEN EACH CODE. A2L ERROR CODES ARE DISPLAYED ON STATUS LED WITH A2L LED ILLUMINATED. IF NO ERROR CODES ARE PRESENT, STATUS LED WILL DISPLAY 2 FLASHES. HOLD "LAST ERROR" BUTTON FOR MORE THAN 10 SECONDS TO CLEAR MEMORY. STATUS LED WILL FLASH 3 TIMES WHEN MEMORY IS CLEARED.

FOR MORE DETAILED INFORMATION, SEE INSTALLATION MANUAL

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Figure 17: Ladder wiring diagram

⚠ CAUTION

OPEN ALL DISCONNECTS
BEFORE SERVICING THIS UNIT

2 STAGE COOLING UNIT WITH OR WITHOUT ELECTRIC HEAT

208/230-1-60

LINE VOLTAGE
FIELD INSTALLED POWER
LOW VOLTAGE
FIELD INSTALLED CONTROL

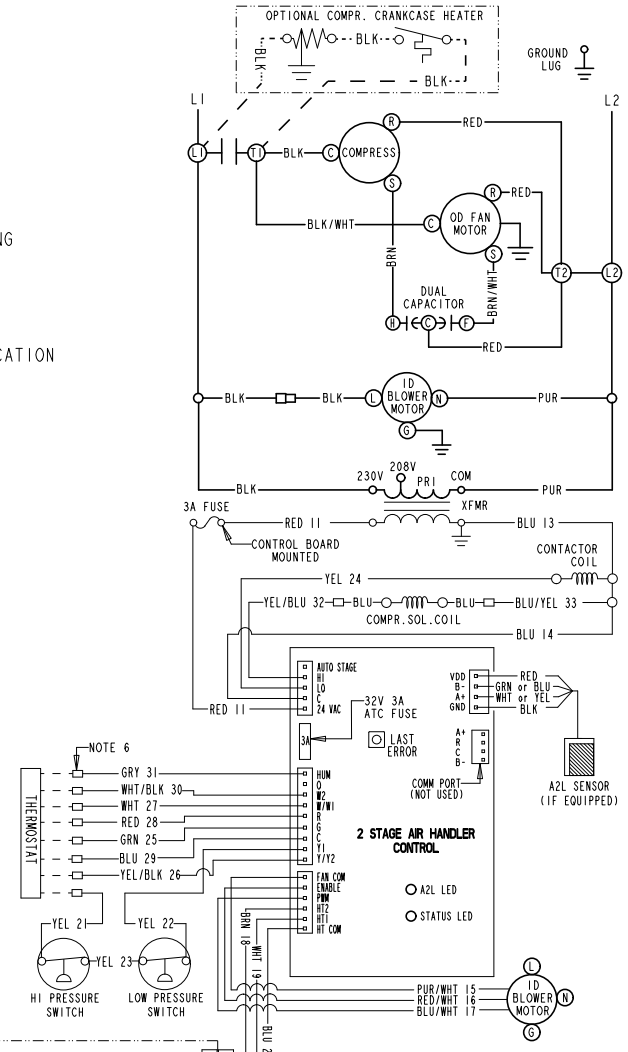
AIR HANDLER CONTROL STATUS/DIAGNOSTIC CODES

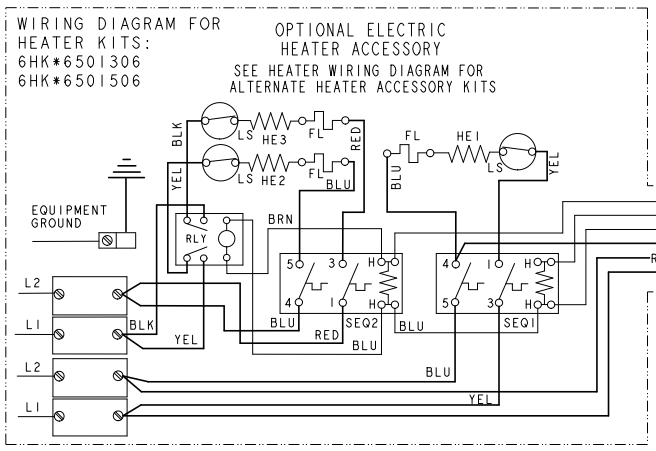
STATUS LED	A2L LED (IF EQUIP.)	CONDITION
OFF	OFF	NO POWER TO CONTROL OR CONTROL FAILURE
ON	OFF	CONTROL FAILURE
SLOW HEARTBEAT	OFF	NORMAL OPERATION
RAPID HEARTBEAT	OFF	FACTORY TEST MODE
7 FLASHES	OFF	CALL FOR HEAT AND COOL AT SAME TIME
8 FLASHES	OFF	MODEL ID INCORRECTLY CONFIGURED
9 FLAHSES	OFF	INTERNAL FAULT SELF CORRECTED, ATTEMPTING NORMAL OPPERATION
RAPID FLASH	ON	REFRIG. LEAK DETECTED (ABOVE 15% LFL)
1 FLASH	ON	REFRIG. DETECTION SENSOR - BYPASSED
2 FLASHES	ON	REFRIG. DETECTION SENSOR - LOST COMMUNICATION
3 FLASHES	ON	REFRIG. DETECTION SENSOR - FAILURE

NOTES:

1. ALL FIELD WIRING TO BE ACCOMPLISHED FOLLOWING CITY, LOCAL AND/OR NATIONAL CODES IN EFFECT AT THE TIME OF INSTALLATION OF THE UNIT.
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 THE UNIT MUST BE REPLACED, IT MUST BE 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, MOVE WIRE (BLK 1) FROM THE 230V TO THE 208V 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.
6. CONNECT THERMOSTAT CONTROL WIRING TO MAIN WIRING HARNESS USING SPRING TYPE WIRE CONNECTORS OR EQUIVALENT WITH 12 POSITION FACTORY RUN TEST CONNECTOR REMOVED.

LADDER DIAGRAM





FAULT CODE HISTORY

PRESS "LAST ERROR" BUTTON FOR MORE THAN 5 SECONDS AND LESS THAN 10 SECONDS WITH NO ACTIVE THERMOSTAT SIGNALS TO DISPLAY UP TO FIVE STORED ERROR CODE FLASHES ON STATUS LED WITH 2 SECONDS BETWEEN EACH CODE. A2L ERROR CODES ARE DISPLAYED ON STATUS LED WITH A2L LED ILLUMINATED. IF NO ERROR CODES ARE PRESENT, STATUS LED WILL DISPLAY 2 FLASHES. HOLD "LAST ERROR" BUTTON FOR MORE THAN 10 SECONDS TO CLEAR MEMORY. STATUS LED WILL FLASH 3 TIMES WHEN MEMORY IS CLEARED.

FOR MORE DETAILED INFORMATION, SEE INSTALLATION MANUAL

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Start-up sheet

Residential package unit heat pump or cooling only with electric heat start-up sheet

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

Start-up date | Company name | Start-up technician

Owner information

Name | Address | Daytime phone

City | State or province | Zip or postal code

Equipment data

Unit model number | Unit serial number

General information (Check all that apply)

◯ Residential	◯ New construction	◯ Roof level	◯ Down flow
◯ Commercial	◯ Retrofit	◯ Grade level	◯ Side flow

Unit location and connections (Check all that apply)

☐ Unit is level and installed on: ☐ Slab ☐ Roof curb ☐ Duct connections are complete: ☐ Supply ☐ Return

☐ Condensate drain correctly connected per the installation instructions ☐ Condensate trap has been primed with water

Filters

☐ Filters installed | Number of filters | Filter size | ◯ Filter located inside | ◯ Filter located outside

Additional kits and accessories installed (Check all that apply)

☐ Refrigerant safety kit ☐ Low ambient kit ☐ Anti-recycle timer ☐ Crankcase heater ☐ Filter frame kit

☐ Transformer kit ☐ Economizer ☐ Roof curb kit ☐ Burglar bar kit ☐ Hail guard kit

☐ Manual fresh air damper kit ☐ Motorized fresh air damper kit

Electrical connections and inspection (Check all that apply)

◯ Single phase ◯ Three phase ◯ 208 VAC ◯ 230 VAC ◯ 460 VAC ◯ 575 VAC

☐ Inspect wires and electrical connections ☐ Transformer wired correctly for primary supply voltage ☐ Ground connected

☐ Low voltage present at control board R and C | Measured voltage R and C outdoor unit control board

☐ Line voltage present at disconnect | Measured voltage L1 to L2 | L2 to L3 | L1 to L3

Compressor amperes L1 | L2 | L3 | Total amperes L1 | L2 | L3

◯ Single-stage compressor ◯ Two-stage compressor

Airflow setup

Blower type and set-up	◯ Constant airflow ECM	COOL	◯ A	◯ B	◯ C	◯ D	
		HEAT	◯ A	◯ B	◯ C	◯ D	
		COOL BLOWER DELAY	◯ A	◯ B	◯ C	◯ D	
		COOL ADJUST (D = A)	◯ A	◯ B	◯ C	◯ D	
		HUMIDISTAT	◯ NO	◯ YES			
		MODEL ID SET	◯ YES				
	◯ Standard ECM	COOL	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
		HEAT	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
		CONT. FAN	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5

Supply static (in. W.C.)	Supply air dry bulb temperature	Outside air dry bulb temperature
Return static (in. W.C.)	Return air dry bulb temperature	Return air wet bulb temperature
Total external static pressure	Temperature drop	Supply air wet bulb temperature

Page 1 of 2

Refrigerant charge and metering device

○ R-410A ○ R-454B	Data plate - lb-oz	Suction line temperature	Discharge pressure
○ TXV ○ Fixed orifice	Discharge line temperature	Suction pressure	Liquid line temperature
TXV model/orifice size	Discharge superheat	Suction superheat	Subcooling

Electric heat (supplemental and emergency heat)

Electric heat kit model number		Serial number		Rated kW	
○ Single phase ○ Three phase	Measured amperage	Heater 1	Heater 2	Heater 3	
		Heater 4	Heater 5	Heater 6	
Number of elements	Measured voltage	Heater 1	Heater 2	Heater 3	
		Heater 4	Heater 5	Heater 6	
Heating return air dry bulb temperature		Heating supply air dry bulb temperature		Air temperature rise	

Clean up job site

- ☐ Job site has been cleaned and indoor and outdoor debris removed from job site
- ☐ Tools have been removed from unit
- ☐ All panels have been installed

Unit operation and cycle test

- ☐ If the unit includes an A2L sensor and a refrigerant detection system (RDS), operate the unit through field testing the A2L sensor and taking A2L mitigation actions, noting and correcting any problems
- ☐ 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
- ☐ Operate the unit through mechanical heating cycles from the thermostat, noting and correcting any problems
- ☐ Operate the unit through emergency heating cycles from the thermostat, noting and correcting any problems

Owner education

- ☐ Provide owner with the user's information 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

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