Installation Manual: PG3 Series - 460 V - 3 Phase

13.4 SEER2 Packaged Air Conditioner with Gas 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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6651480-UIM-A-0425

Supersedes: 6453313-UIM-A-1124

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Contents

About the PG3 unit

These are electric cooling and gas heating units designed for outdoor installation. Only gas piping, electric power, and duct connections are required at the point of installation. The gas-fired heaters have spark ignition. The refrigerant system is fully charged with R-454B refrigerant, tested, and factory sealed.

Certification

AHRI CERTIFIED www.ahridirectory.org Residential Furnaces DOE 10 CFR Part 430

C US

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

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

CERTIFIED

DESIGN CERTIFIED

DS Solutions App

Johnson Controls believes in empowering our customers with unit-specific information at all times. Download the Ducted Systems Solutions Mobile App (DS Solutions App), which is available through the App Store for iOS and Google Play for Android. Users can use the DS Solutions App to scan the QR code located on the rating plate that is unique to each unit and provides information specific to the product. Take advantage of the features available for all units: Nomenclature, Literature (Technical Guide, Installation Manual and Wiring Diagrams), Parts list, Product Registration, Claims Tracking, and more.

Ducted Systems Solutions

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 3,048 m (10,000 ft) altitude. Ensure the appliance’s functions, including but not limited to gas 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

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

- **WHAT TO DO IF YOU SMELL GAS:**

• Do not try to light any appliance.

• Do not touch any electrical switch; do not use any phone (including cell phone) in your building.

• Do not generate any open flames, arcs or sparks; do not smoke.

• Leave the building immediately.

• Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

• If you cannot reach your gas supplier, call the fire department.

- *Installation and service must be performed by a qualified installer, service agency, or the gas supplier.*

⚠ WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warning exactly could result in serious injury, death, or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury, or loss of life.

Adhere to the following:

- Read these instructions before installing the unit. This is an outdoor combination heating and cooling unit.
- Be aware that due to system pressure, moving parts, and electrical components, installation and servicing of air conditioning equipment can be hazardous. Only qualified, trained 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. Ensure to follow all other applicable safety precautions and codes including ANSI Z223.1 or CSA-B149.1 (latest edition).
- Wear safety glasses and work gloves. Use quenching cloth and have a fire extinguisher available during brazing operations.
- Refer to the unit rating plate for the approved type of gas for this product.
- Install the unit only in a location and position specified in these instructions.
- Never test for gas leaks with an open flame. Use commercially available soap solution made specifically for the detection of leaks when checking all connections, as specified in these instructions.
- Install the unit to operate within the unit's intended temperature rise range with the duct system and within the allowable external static pressure range, as specified on the unit rating plate and in Table 24.
- Do not use this equipment for temporary heating of buildings or structures under construction.

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 all air vents in all rooms are not obstructed in any way. If zoning dampers are installed in a place that is conditioned by 4 ton or 5 ton packaged AC units, ensure that one of the following requirements is met: • All zoning dampers are actuated by the A2L mitigation controls to be open in a detected A2L leakage event **and** the total conditioned space floor area TA is no less than TA_{min}. • Zoning dampers are not actuated by the A2L mitigation controls but the combined conditioned space floor area in each zone is no less than TA_{min}. ⓘ **Note:** If zoning dampers are installed in a place that is conditioned by 2 ton to 3.5 ton packaged AC units, there is no requirement on zoning dampers for A2L mitigation.
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.
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 Respack AC 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.

Table 1: General

Item number	Safety guideline
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: For 2 ton to 3.5 ton packaged unit models, the refrigerant charge is less than 1.776 kg (3.915 lb) so an A2L mitigation system is not required.

For 4 ton and 5 ton packaged unit models, 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. In typical applications of 4 ton or 5 ton packaged unit models, the TA (total area) for the total conditioned space floor area is well above the TA_{min} requirement, 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	Unit charge		Minimum opening for natural ventilation connecting occupied and unoccupied spaces		Actual total conditioned space floor area		Required minimum area of total conditioned space		Allowable maximum refrigerant charge in A2L system		Minimum circulation airflow by A2L system to total conditioned space		Minimum mechanical ventilation airflow required if TA_{min} is not met	
	m_c		Anv_{min}		TA		TA_{min}		m_{max}		Q_{min_circ}		$Q_{min\_mech\_vent}$	
	lb	kg	in^2	m^2	ft^2	m^2	ft^2	m^2	lb	kg	CFM	m^3/h	CFM	m^3/h
PC3E48	4.06	1.84	181	0.117	75	7.0	121.8	11.32	2.50	1.13	220	374	42	72
PG3E48	4.06	1.84	170	0.110	100	9.3	121.8	11.32	3.33	1.51	220	374	20	33
	4.06	1.84	165	0.107	121.8	11.3	121.8	11.32	4.06	1.84	220	374	0	0
PC3E60	4.81	2.18	216	0.139	100	9.3	144.3	13.41	3.33	1.51	260	442	40	68
PG3E60	4.81	2.18	205	0.132	125	11.6	144.3	13.41	4.17	1.89	260	442	17	30
	4.81	2.18	195	0.126	144.3	13.4	144.3	13.41	4.81	2.18	260	442	0	0

Note:
- The data in the *Minimum opening for natural ventilation connecting occupied and unoccupied spaces* column is for increasing total conditioned space floor area if 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 area of total conditioned space* column.

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

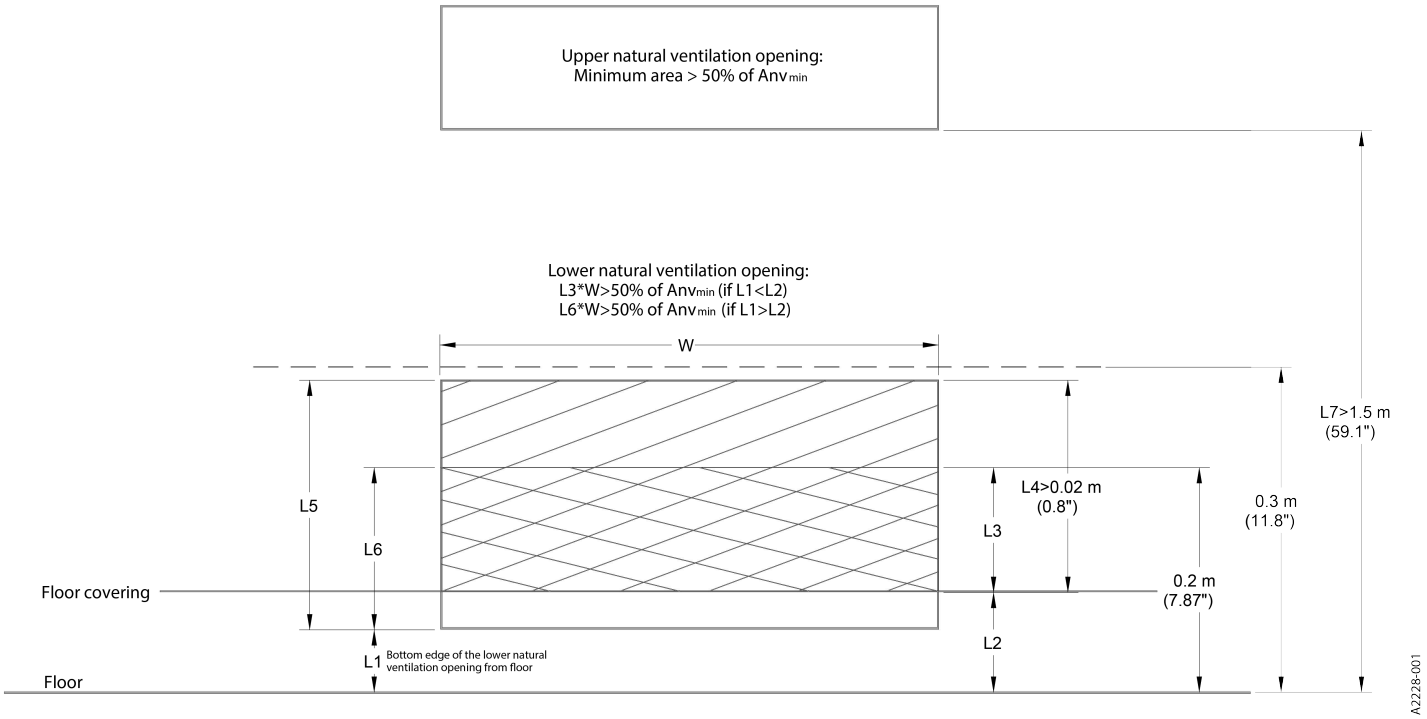
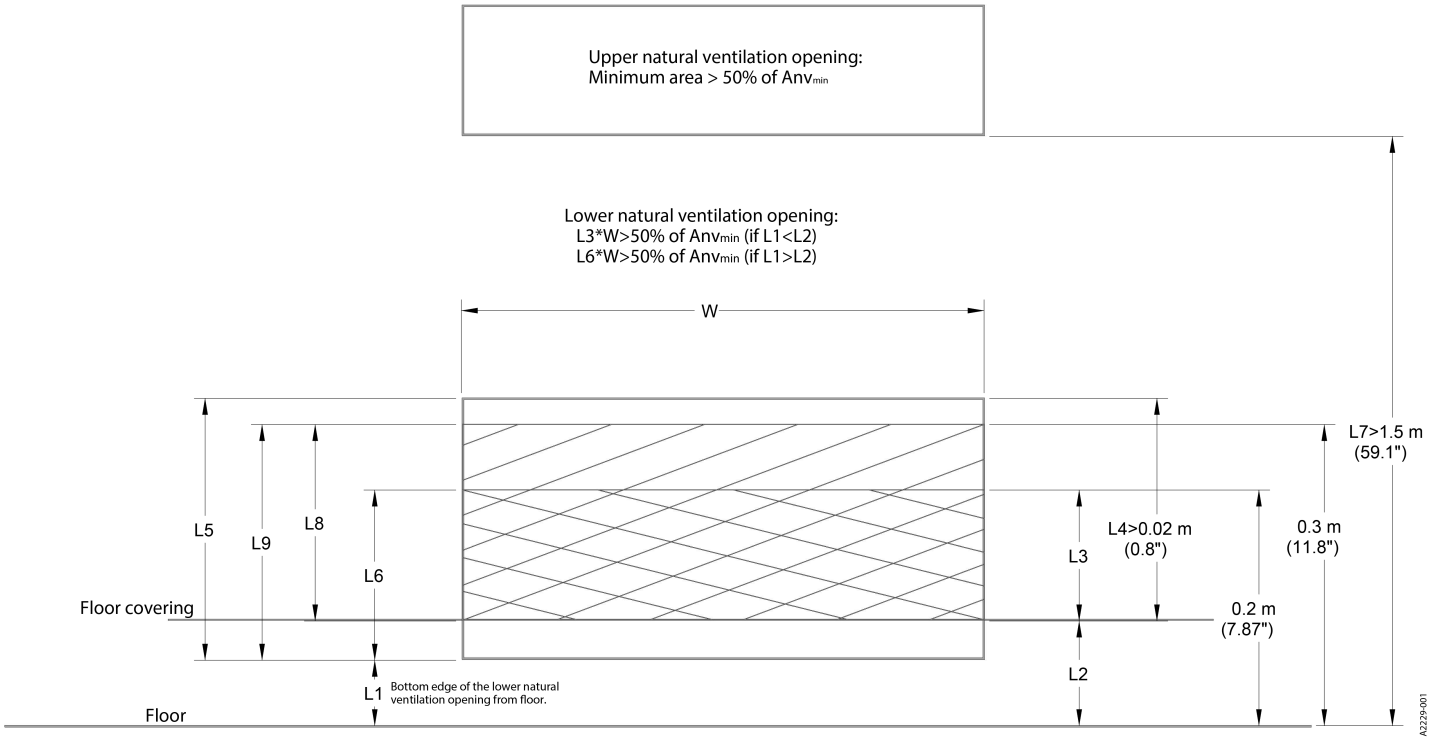


Figure 2: Natural ventilation openings - lower opening partially below the 0.3 m point above the floor



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, you 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 4 ton and 5 ton packaged unit models, do the following:

1. Measure the area of each occupied space that has air vents in it, for example, bedroom, office, living room, kitchen, and dining room) to calculate the actual TA for the total conditioned space floor area.
2. Check if the TA is equal to or above the TA_{min} value in Table 2 and proceed as follows:
   - If the TA is equal to or above the TA_{min} value in Table 2, you do not need to install a mechanical ventilation system.
   - If the TA is below the TA_{min} value in Table 2, do the following:
     i. Select one occupied space and check its adjacent unoccupied 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 occupied space increases. Do the same for other applicable occupied spaces to determine if is possible to attain a TA 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 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 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.

3. Make sure that the circulation airflow is above the Q_{min_circ} value in Table 2. The factory set motor tap provides sufficiently large A2L leakage mitigation airflow to promptly remove any leaked R-454B from the unit. If you adjust the circulation airflow setting, you must take precautions to ensure the actual circulation airflow is no less than the Q_{min_circ} value in Table 2 and ensure the safety of the A2L system and the conditioned space. See Configuring the airflow settings and use Table 2 to help determine the motor tap for A2L mitigation flow.
4. 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 occupied space are not more than 3.94 in. (100 mm) above the floor.
   - Locate the openings supplying makeup air to the occupied 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 occupied 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 occupied space.

   Note: As the TA increases from a very low value to the TA_{min}, the $Q_{min\_mech\_vent}$ decreases from a positive value to 0. When the TA is above the TA_{min}, no mechanical ventilation system is required.

Refrigerant equipment checks

Table 3: 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 4: 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 5: 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 6

Table 6: Correct working procedures

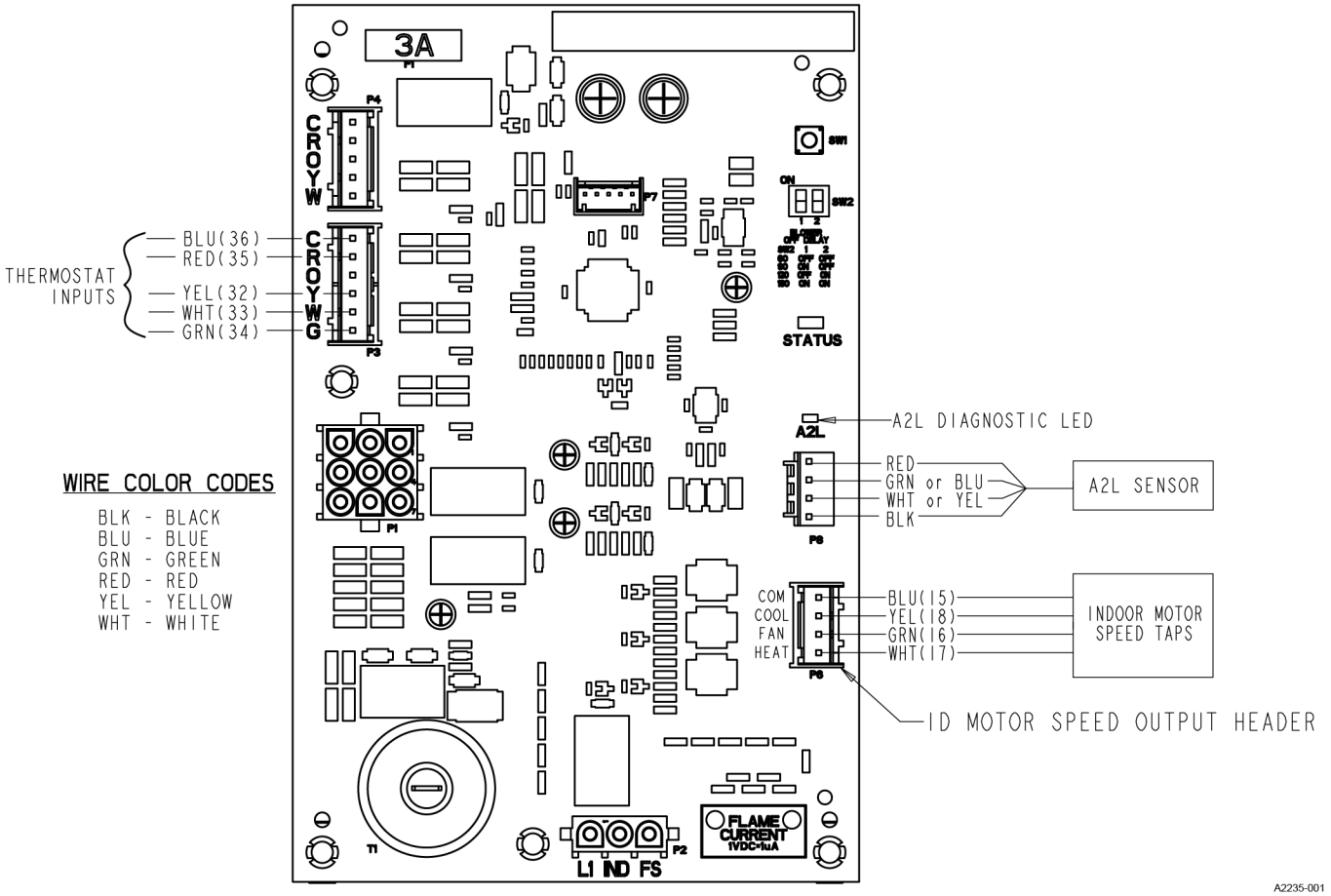
Item number	Commissioning	Maintenance and repair	Decommissioning	Disposal
1	n/a	n/a	If safety is affected when the equipment is put out of service, the refrigerant charge must be removed before decommissioning.	n/a
2	Ensure that the total conditioned space floor area is sufficient for the refrigerant 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.

Figure 3: Mitigation control wiring



Note: Figure 3 shows mitigation control wiring for PG3E48 and PG3E60 units. See Table 30 for an overview of the status LED and A2L diagnostic LED codes and troubleshooting guidance for A2L-related faults.

Field-testing the sensor and taking A2L mitigation actions

This task applies to PG3E48 and PG3E60 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 green flash (or heartbeat) **and** the A2L diagnostic LED is off.

2. Simulate an A2L leak by disconnecting the A2L sensor wire from the single-stage direct spark ignition (DSI) control.
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 cooling, which is a G and Y call, and 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 single-stage DSI control.
   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. When the system is in standby mode, use the thermostat to call for heating, which is a W call, and 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 single-stage DSI control.
   c. After 15 s, verify that the gas 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 gas 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

PG3E48 and PG3E60 units include an A2L sensor and a single-stage direct spark ignition (DSI) control board with an RDS module. PG3E48 and PG3E60 units have an A2L diagnostic LED that works with the status LED on the single-stage DSI control board. See Using unit control board diagnostics and Table 30 for an overview of the status LED and A2L diagnostic LED codes and troubleshooting guidance for faults.

Model number nomenclature

Table 7: 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 8: Model number nomenclature example

Number	1, 2	3	4	5, 6	7	8, 9	10	11	12	13
Option	PG	3	E	36	L	05	S	4	1	A

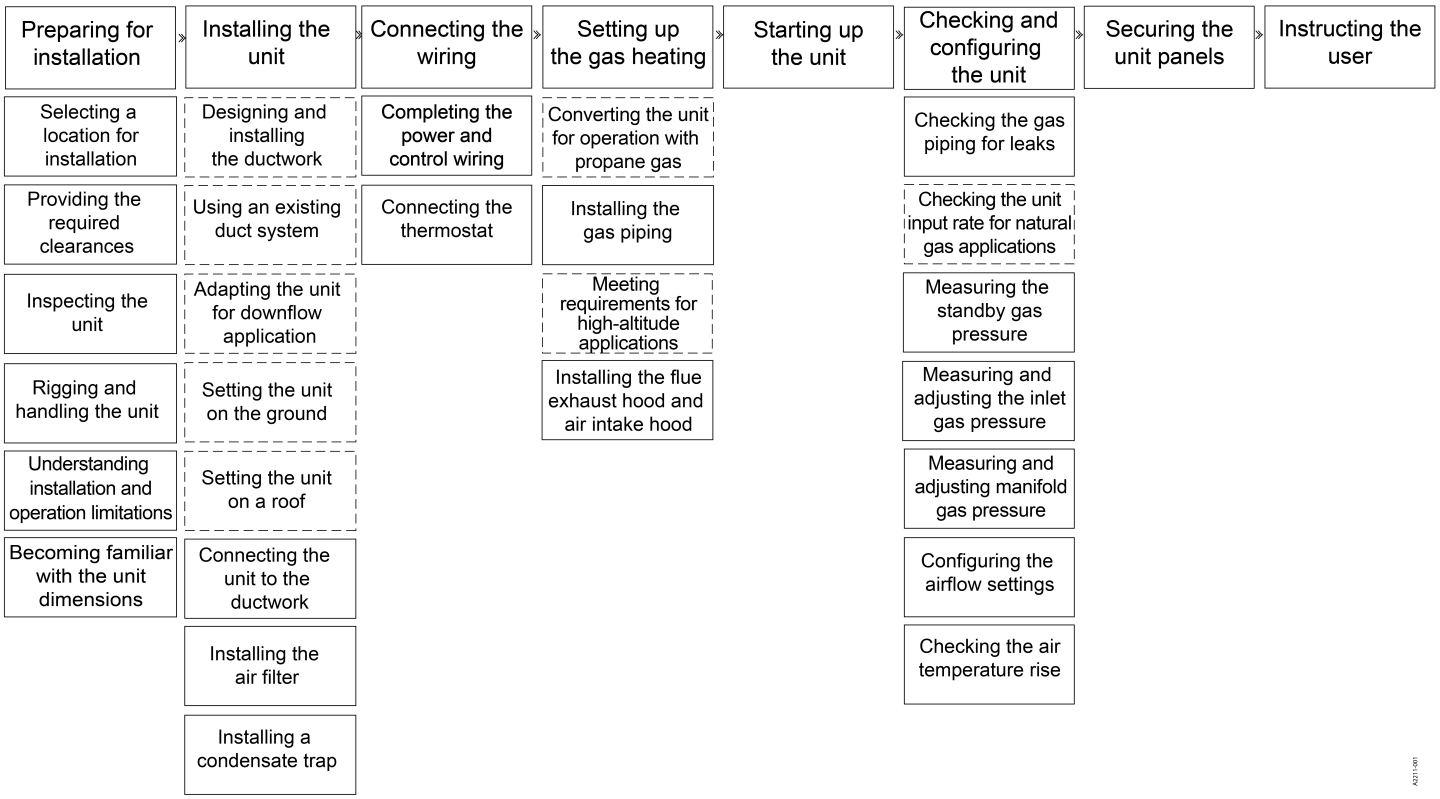
The PG3E36L05S41A model is a packaged air conditioner with gas heat. It has a 13.4 SEER2 efficiency rating and uses R-454B refrigerant. It has a nominal capacity of 36,000 Btu/h or 3 ton for cooling. It produces <40ng/J Low NOx emissions and has a gas heating input of 50,000 Btu/h. It uses a standard control strategy and voltage of 460 V, three phase, 60 Hz. It is a first generation, style A model.

Installation overview

Complete all of the stages outlined in Figure 4. You may not need to perform tasks indicated with a dashed outline, depending on the specific installation. See Physical data, Electrical data, Airflow data, Natural gas application data, and Propane (LP) gas application data for unit data as needed throughout the 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.

Figure 4: Installation overview



Preparing for installation

Complete the necessary preparation before you begin the installation:

1. Visit the installation site to select a suitable location for the unit and make sure that you can provide the required clearances.
2. Inspect the unit.
3. Follow the requirements for rigging and handling the unit to avoid damage to the unit.
4. Make sure that you are aware of the installation and operation limitations.
5. Make sure that you are familiar with the unit dimensions.

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

Excessive exposure of this unit to contaminated combustion air may result in equipment damage or personal injury. Typical contaminates include: permanent wave solution, chlorinated waxes and cleaners, chlorine based swimming pool chemicals, water softening chemicals, carbon tetrachloride, Halogen type refrigerants, cleaning solvents (for example, perchloroethylene), printing inks, paint removers, varnishes, hydrochloric acid, cements and glues, anti-static fabric softeners for clothes dryers, masonry acid washing materials.

⚠ WARNING

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

Important: The unit is designed for only outdoor installation.

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 all required clearances, for example, for combustible construction, servicing, correct unit operation, and adequate combustion and ventilation air. See Providing the required clearances and Unit clearances.
  - 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 9.

Table 9: 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.

Providing the required clearances

You must provide all required clearances, for example, for combustible construction, servicing, correct unit operation, and adequate combustion and ventilation air.

⚠ WARNING

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

To provide the required clearances, do the following:

- Make provisions for adequate combustion and ventilation air in accordance with the following:
  - **US**: Section 5.3 of Air for Combustion and Ventilation of the National Fuel Gas Code, ANSI Z223.1 - latest edition and applicable provisions of local building codes
  - **Canada**: Sections 7.2, 7.3, or 7.4 of Gas Installation Codes, CSA-B149.1 - latest edition and applicable provisions of local building codes
- Provide clearances in accordance with Unit clearances.

Unit clearances

Table 10: Unit clearances

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

ⓘ **Note:**
- Provide a 1 in. clearance between any combustible material and the supply air ductwork.
- Do not allow the products of combustion to accumulate within a confined space and recirculate.
- 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.

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 5 and Table 11 to determine the required capacity of lifting gear to use.

Figure 5: Unit four-point load

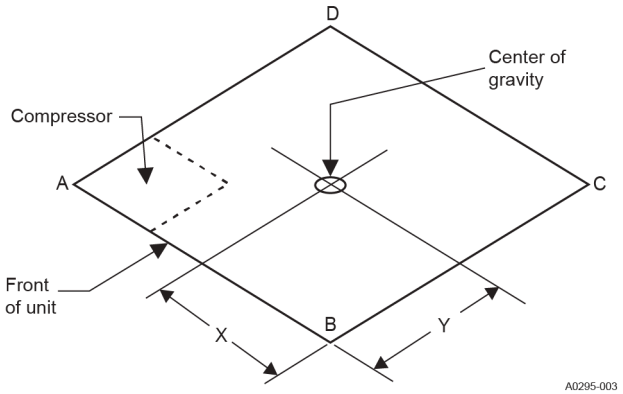


Table 11: Weights and dimensions

Model	Weight (lb)		Center of gravity (in.)		Four-point load location (lb)			
	Shipping	Operating	X	Y	A	B	C	D
PG3E36L05S4	370	365	27	15	91	118	55	101
PG3E36L07S4	373	368	28	15	120	89	81	78
PG3E36L10S4	377	372	27	15	119	92	83	78
PG3E48L06S4	443	438	28	19	161	100	101	76
PG3E48L10S4	450	445	28	19	162	103	103	77
PG3E48L12S4	454	449	27	19	162	105	104	77
PG3E60L06S4	465	460	28	19	157	117	88	98
PG3E60L10S4	472	467	28	19	158	120	90	99
PG3E60L12S4	476	471	28	19	158	122	91	99

- 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

- Install the unit in accordance with the following national and local safety codes:
  - **US**
    - National Electrical Code, ANSI/NFPA No. 70 - latest edition
    - National Fuel Gas Code, ANSI Z223.1 - latest edition
    - Gas-Fired Central Furnace Standard, ANSI Z21.47a. - latest edition
    - Local building codes
    - Local gas utility requirements
  - **Canada**
    - Canadian Electrical Code, CSA C22.1
    - Installation Codes, CSA - B149.1
    - Local plumbing and wastewater codes
    - 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 12.
- Observe the application limitations shown in Table 13.
- Observe the physical data for the unit shown in Table 24.
- Observe the electrical data for the unit shown in Table 25.
- 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 (ACCA). Refer to *Manual J*.
- After installation, adjust gas-fired units to obtain a temperature rise within the range specified on the unit rating plate.
- Do not use this furnace for temporary heating of buildings or structures under construction.

Unit limitations

Table 12: Unit limitations

Model	Voltage (V-phase-Hz)	Unit limitations		
		Applied voltage (V)		Outdoor DB temperature (°F)
		Minimum	Maximum	Maximum
PG3E36	460-3-60	432	504	125
PG3E48	460-3-60	432	504	125
PG3E60	460-3-60	432	504	125

Application limitations

Table 13: Application limitations

Model	Air temperature at outdoor coil (°F)		Air temperature at indoor coil (°F)	
	Minimum	Maximum	Minimum	Maximum
	DB cool	DB cool	WB cool	WB cool
PG3E36	55	125	57	72
PG3E48	55	125	57	72
PG3E60	55	125	57	72

Becoming familiar with the unit dimensions

- Make sure that you are familiar with the unit dimensions before you begin the installation. See Figure 6 and Table 14.

Unit dimensions and access locations

Figure 6: Unit dimensions and access locations

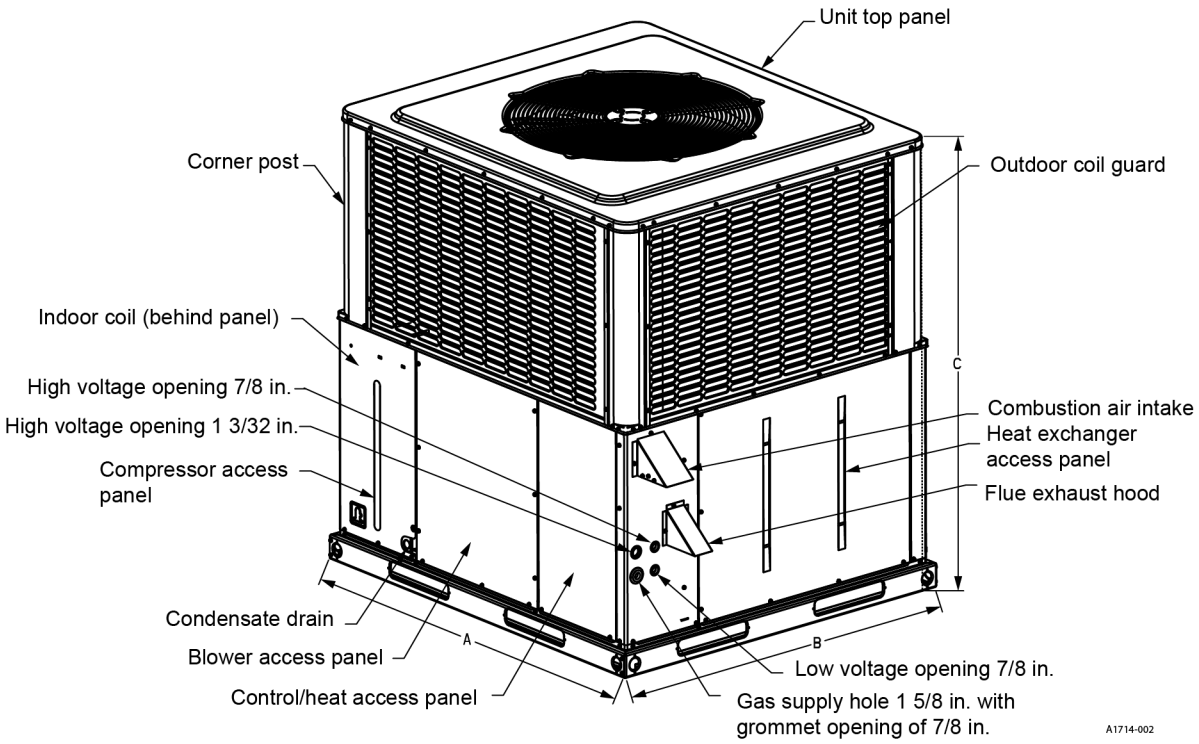


Table 14: Unit dimensions

Model	Dimensions (in.)		
	A	B	C
PG3E36	51 1/4	35 3/4	47
PG3E48	51 1/4	45 3/4	47
PG3E60	51 1/4	45 3/4	50

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.

To install the unit correctly, you must do the following:

1. Design and install the ductwork or make sure that the existing duct system meets requirements.
2. Adapt the unit for downflow application if required for the specific installation.
3. Set the unit on the ground or roof.
4. Connect the unit to the ductwork.
5. Install an air filter or air filter frame kit.
6. Install a condensate trap for the unit.

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 2.
2. 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.
3. 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. See Selecting a location for installation.

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. See Selecting a location for installation.

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 Johnson Controls Ducted Systems 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 7, Table 15, Figure 8, and Table 16.

Bottom duct dimensions

Figure 7: Bottom duct dimensions (in.)

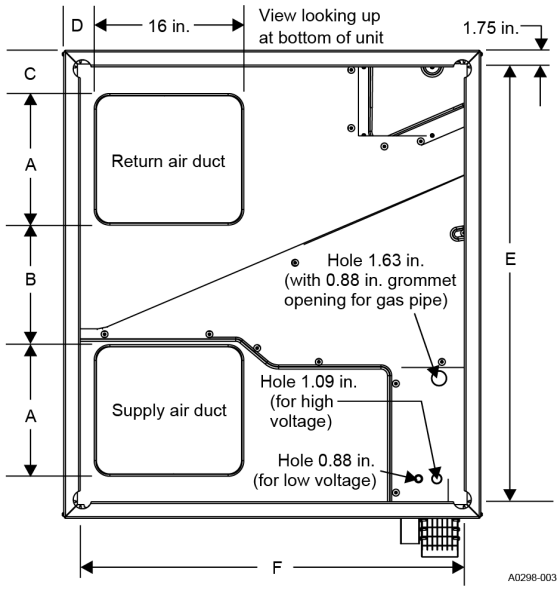


Table 15: Bottom duct dimensions

Model	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)
PG3E36	10	21.5	5	4.5	47.5	32
PG3E48 and PG3E60	14	13.5	5	3.5	47.5	42

Rear duct dimensions

Figure 8: Rear duct dimensions (in.)

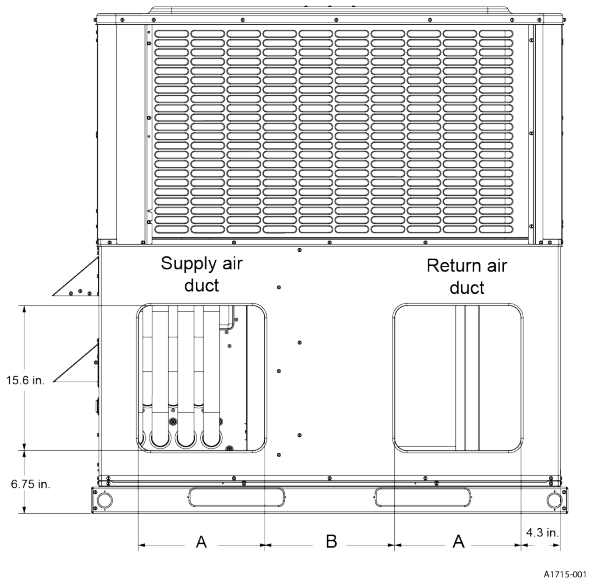


Table 16: Rear duct dimensions

Model	A (in.)	B (in.)
PG3E36	9.6	22
PG3E48 and PG3E60	13.6	14
ⓘ **Note:** See Figure 6 for side hole sizes of electrical and gas lines.		

Installing the air filter

Three-phase models are shipped with an air filter frame kit. You must install an air filter or install the air filter frame kit provided with the unit.

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 the 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

To connect the wiring correctly, you must do the following:

1. Complete the power and control wiring.
2. Connect the thermostat.

See Wiring diagrams for the connection wiring diagram and the ladder wiring diagram for the unit.

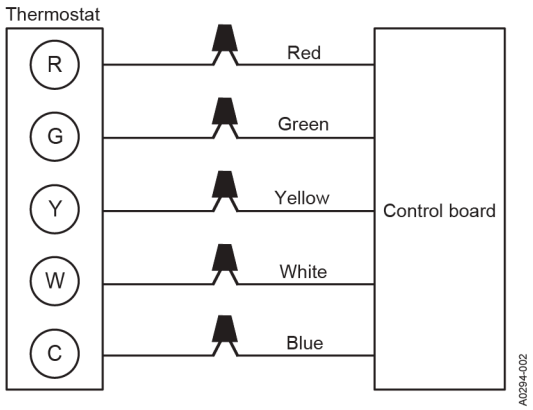
Completing the power and control wiring

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 25 for unit electrical data as needed.

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

- See Figure 6, which shows where wiring enters the unit.
- Use Figure 9 and Figure 10, 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.

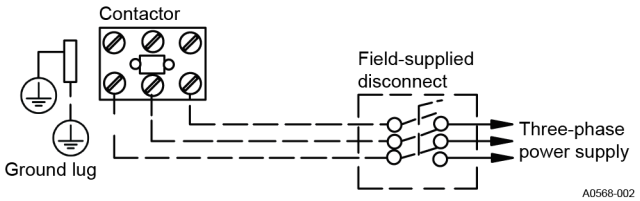
Figure 9: Typical field control wiring diagram for gas heat - air conditioner models



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 10: Typical field power wiring diagram



Note: Use Table 25 to size the disconnect switch.

- 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 12.
- 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. The 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:

- Do not use a power-stealing thermostat.
- If using an electronic thermostat, make sure that it has a 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 9.

Setting up the gas heating

These single-stage gas-fired heat sections have direct spark ignition. To set up the gas heating components correctly, do the following:

1. Convert the unit for operation with propane gas if required.
2. Install the gas piping.
3. Follow the requirements for high-altitude applications if the unit is installed at an altitude above 2,000 ft.
4. Install the flue exhaust hood and air intake hood.

Converting the unit for operation with propane gas

The unit is constructed at the factory for natural gas-fired operation. To convert the furnace for operation with propane gas, you must use a propane (LP) conversion accessory kit. See Table 29 for the correct propane (LP) conversion kit to install for the specific unit model. Refer to *Applications and accessories* in the *Technical Guide* for more information.

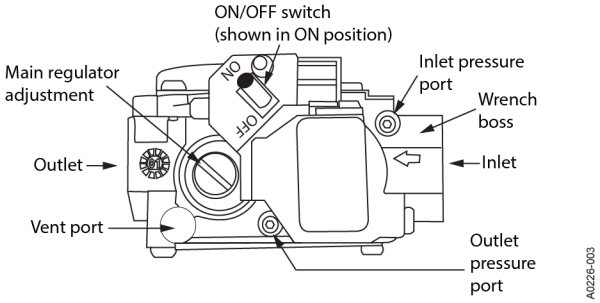
To convert the unit for operation with propane gas, do the following:

- Follow the installation procedure in the *Installation Manual* for the propane (LP) conversion kit.

Installing the gas piping

See Figure 11 for the gas valve components.

Figure 11: Gas valve



To install the gas piping, do the following:

- Bring gas piping to connect the gas supply mains to the inlet port of the gas valve.
- Be aware that correct sizing of gas piping depends on the cubic feet per hour of gas flow required, the specific gravity of the gas, and the length of run. Follow National Fuel Gas Code Z223.1 or CSA B149.1 in all cases unless superseded by local codes or gas company requirements. See Table 17 and Table 18.

NOTICE

There may be a local gas utility requirement specifying a minimum diameter for gas piping. All units require a 1/2 in. pipe connection at the gas valve.

- Be aware that the Btu content of the gas may differ with locality. Check the value with the local gas utility.
- Route the gas supply line through the 1 5/8 in. hole located on the right side of the unit. See Figure 6 for the location. The unit is supplied with a rubber grommet that fits in this hole and is used to seal around the gas pipe.

  Important: Install the rubber grommet to prevent leakage of air and water into the heating/controls compartment.

- Install a drip leg and a ground joint union in the gas piping.
- When required by local codes, install a manual shutoff valve outside of the unit.
- Use wrought iron or steel pipe for all gas lines. Apply pipe thread sealant sparingly to male threads only.

⚠ CAUTION

If flexible stainless steel tubing is allowed by the authority having jurisdiction, wrought iron or steel pipe must be installed at the gas valve and extend a minimum of 2 in. outside of the unit casing.

⚠ WARNING

Natural gas may contain some propane. Propane, being an excellent solvent, will quickly dissolve white lead or most standard commercial compounds. Therefore, a special pipe thread sealant must be applied when wrought iron or steel pipe is used. Compounds such as RectorSeal No. 5 or equivalent compounds may be used.

- Clean all piping of dirt and scale by hammering on the outside of the pipe and blowing out the loose dirt and scale. Before initial start-up, ensure that all of the gas lines external to the unit have been purged of air.
- Be aware that the gas supply must be a separate line and installed in accordance with all applicable safety codes. After the gas connections have been completed, open the main shutoff valve admitting normal gas pressure to the gas valve. Check all joints for leaks with soap solution or other material suitable for the purpose. **Never test for gas leaks with an open flame.**

⚠ WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warning exactly could result in serious injury, death, or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury, or loss of life.

- Disconnect the unit and its equipment shutoff valve from the gas supply system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa).
- Isolate the unit from the gas supply piping system by closing its individual manual shut-off valve before conducting any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.5 kPa).

Natural gas pipe sizing

Table 17: Natural gas pipe sizing

Length (ft)	Iron pipe size in nominal inches			
	1/2 in.	3/4 in.	1 in.	1 1/4 in.
10	132	278	520	1050
20	92	190	350	730
30	73	152	285	590
40	63	130	245	500
50	56	115	215	440
60	50	105	195	400
70	46	96	180	370
80	43	90	170	350
90	40	84	160	320
100	38	79	150	305

ⓘ **Note:** Maximum capacity of pipe in cubic feet of gas per hour, based upon a pressure drop of 0.3 in. W.C. and 0.6 specific gravity gas.

Propane (LP) gas pipe sizing

Table 18: Propane (LP) gas pipe sizing

Length (ft)	Iron pipe size in nominal inches			
	1/2 in.	3/4 in.	1 in.	1 1/4 in.
10	275	567	1071	2205
20	189	393	732	1496
30	152	315	590	1212
40	129	267	504	1039
50	114	237	448	913
60	103	217	409	834
70	96	196	378	771
80	89	185	346	724
90	83	173	322	677
100	78	162	307	630

ⓘ **Note:** Maximum capacity of pipe in thousands of Btu/h, based upon a pressure drop of 0.5 in. W.C.

Meeting requirements for high-altitude applications

The unit is constructed at the factory for natural gas-fired operation at altitudes up to 2,000 ft above sea level.

If the unit is installed at an altitude above 2,000 ft, do the following:

- Reduce the gas input rate to the burners by 4% per 1,000 ft above sea level.
- Be aware that it may be necessary to change to smaller orifices at high altitude. See Table 19 for the correct orifice size to use.

High-altitude gas orifice sizing

Table 19: High-altitude gas orifice sizing

Gas type	Model	Cabinet size	Elevation above sea level (ft)								
			0 to 2,000 (Factory)	2,001 to 3,000	3,001 to 4,000	4,001 to 5,000	5,001 to 6,000	6,001 to 7,000	7,001 to 8,000	8,001 to 9,000	9,001 to 10,000
Natural gas orifice sizes	PG3E48 PG3E60	B	36	37	38	38	39	40	41	41	42
	PG3E36	A	42	42	43	43	43	44	44	45	46
Propane (LP) gas orifice sizes	PG3E48 PG3E60	B	51	51	52	52	52	52	53	53	53
	PG3E36	A	54	54	55	55	55	55	55	56	56

Note: PG3E36 units are cabinet size A, and PG3E48 and PG3E60 units are cabinet size B.

Installing the flue exhaust hood and air intake hood

The flue exhaust hood and air intake hood are shipped loose. You must install these hoods to ensure correct unit operation.

⚠ WARNING

Flue exhaust hood surfaces may be hot.

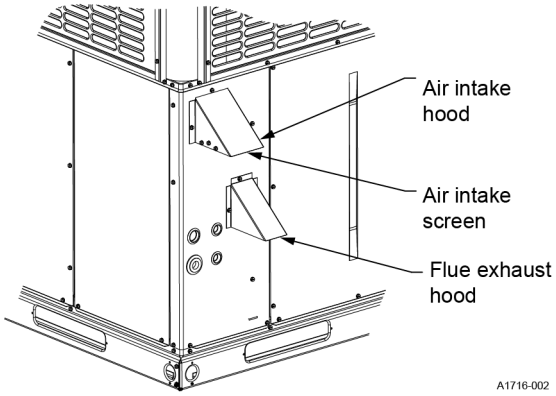
⚠ CAUTION

The flue exhaust hood must be properly installed and within the recommended clearances. Further communications and action must be given to the home or building owners to eliminate any unauthorized human contact around this area during the heating cycle. Flue exhaust hood surfaces and the immediate area reach high temperatures during the heating cycle.

To install the flue exhaust hood and air intake hood, do the following:

- Fasten the hoods to the outside of the side gas control/electrical compartment with the screws provided. See Figure 12.

Figure 12: Flue exhaust hood and air intake hood



Starting up the unit

Before you begin:
Complete the following checks before starting up the unit:

- Check the type of gas being supplied. Ensure that it is the same as listed on the unit rating plate.
- Make sure that the flue exhaust hood and air intake hood are correctly installed. See Installing the flue exhaust hood and air intake hood.

You must complete the checks outlined above before starting up the unit. If you need to turn off the thermostat, electric power, and gas supply to the unit at any point, follow the procedure in Turning off the thermostat, electric power, and gas supply to the unit.

To start up the unit, do the following:

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.

> **⚠ WARNING**
>
> **Do not** try to light the burners by hand. This unit is equipped with an ignition device that automatically lights the burners.

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. Set the gas valve switch to the **OFF** position.
9. Wait 5 min to clear out any gas and then proceed as follows:
   - If you smell gas, **stop**. Locate the lighting instructions at the inside surface of the control access panel and follow item B.
   - If you do not smell gas, go to the next step.
10. Set the gas valve switch to the **ON** position.
11. Replace the control access panel.
12. Turn on all electric power to the unit.
13. Set the thermostat to the required setting.
14. Make sure that the unit is operating correctly. When the entire control circuit is energized and the heating section is operating, proceed to check and configure the unit.

    ⓘ **Note:** See Unit components and operation for more information about the unit if needed. See Troubleshooting if needed. If the unit does not operate and the solution is to replace a broken part and the process takes extended time, follow the procedure outlined in Turning off the thermostat, electric power, and gas supply to the unit.

Checking and configuring the unit

To check and configure the unit, do the following:

1. Check the gas piping for leaks.
2. Check the unit input rate for natural gas applications.
3. Measure the standby gas pressure.
4. Measure the inlet gas pressure and adjust the inlet gas pressure if needed.
5. Measure the manifold gas pressure and adjust the manifold gas pressure if needed.
6. Configure the airflow settings.
7. Check the air temperature rise.

Checking the gas piping for leaks

You **must** do a gas piping leak check for every new unit installation.

To check the gas piping for leaks, do the following:

- Check for gas leaks in the unit piping as well as the supply piping.

Checking the unit input rate for natural gas applications

For natural gas applications, you **must** verify the natural gas input rate by clocking the gas meter for every new unit installation.

NOTICE
To find the Btu input, multiply the number of cubic feet of gas consumed per hour by the Btu content of the gas in your particular locality. Contact your gas company for this information since it varies widely from city to city.

To check the unit input rate for natural gas applications, do the following:

1. Turn off all other gas appliances connected to the gas meter.
2. With the unit turned on and in heating mode, measure the time needed in seconds for one revolution of the hand on the smallest dial on the gas meter. Note this measurement.

   Note: A typical gas meter usually has a 1/2 cu ft or a 1 cu ft test dial.
3. See Table 20 for the cubic feet per hour of gas for the specific time and test dial size.
4. Multiply the cubic feet per hour by the Btu rating of the gas obtained from the local gas company to calculate the input rate. See Table 20 for an example of calculating the input rate. If the actual input is not within 5% of the unit heating rating with allowance being made for the permissible range of the regulator setting, replace the orifice spuds with spuds of the correct size.

Gas rate in cubic feet per hour

Table 20: Gas rate in cubic feet per hour

Seconds for 1 revolution	Size of test dial	
	1/2 cu ft	1 cu ft
10	180	360
12	150	300
14	129	257
16	113	225
18	100	200
20	90	180
22	82	164
24	75	150
26	69	138
28	64	129
30	60	120
32	56	113
34	53	106
36	50	100
38	47	95
40	45	90
42	43	86
44	41	82
46	39	78
48	37	75
50	36	72
52	35	69
54	34	67
56	32	64
58	31	62
60	30	60

ⓘ **Note:** As an **example**, by actual measurement, it takes 38 s for the hand on the 1 cu ft dial to make a revolution with a 100,000 Btu/h furnace running. Using this information, locate 38 s in the first column of the table. Read across to the *1 cu ft* column, where you see that 95 ft^3/h of gas are consumed by the furnace at that rate. Multiply 95 x 1050 (the Btu rating of the gas obtained from the local gas company). The result is 99,750 Btu/h, which is close to the 100,000 Btu/h rating of the unit.

Measuring the standby gas pressure

You **must** measure the standby gas pressure for every new unit installation. Standby gas pressure refers to the pressure in the gas line when the unit is not in operation, including the pressure in the gas line upstream of the gas meter regulator. You can measure standby gas pressure by connecting a U-tube manometer to the inlet pressure port on the gas valve with a piece of flexible tubing. See Figure 11 for the location of the inlet pressure port, which is the port marked **IN P**.

Important:

- You must measure the standby gas pressure when the unit is not in operation.
- You take the standby gas pressure reading and the inlet gas pressure reading at the port marked **IN P**. You take the manifold gas pressure reading at the port marked **OUT P**. See Measuring and adjusting the inlet gas pressure and Measuring and adjusting the manifold gas pressure.

To check the standby gas pressure, do the following:

1. Turn off gas at the ball valve or gas cock on the gas supply line before the gas valve, and turn off the electrical supply.
2. Locate the inlet pressure port marked **IN P** on the gas valve. See Figure 11.
3. Using a 3/32 in. (2.4 mm) hex head wrench, loosen the set screw by turning it 1 turn counter clockwise. **Do not remove the set screw from the inlet pressure port.**
4. Connect the positive side of the U-tube manometer to the **IN P** tap on the gas valve. Do not connect any tubing to the negative side of the U-tube manometer, because it references atmospheric pressure.

   Note: See Figure 13 for an illustration of connecting a U-tube manometer.
5. Measure the standby gas pressure. Be aware that the standby gas pressure must not exceed 13.5 in. W.C. at any time for natural gas units or propane (LP) gas units. If the standby gas pressure is outside this limit, contact the local gas utility for corrective action.

Measuring and adjusting the inlet gas pressure

You **must** measure the inlet gas pressure and adjust the inlet gas pressure if needed for every new unit installation. Inlet gas pressure refers to the pressure entering the gas valve when the unit is in operation. You can measure inlet gas pressure by connecting a U-tube manometer to the inlet pressure port on the gas valve with a piece of flexible tubing. See Figure 11 for the location of the inlet pressure port, which is the port marked **IN P**.

Important:

- You must measure the inlet gas pressure with all gas appliances in the building at full fire and make sure that the inlet gas pressure is within the limits shown on the rating plate.
- You take the inlet gas pressure reading and the standby gas pressure reading at the port marked **IN P**. You take the manifold gas pressure reading at the port marked **OUT P**. See Measuring the standby gas pressure and Measuring and adjusting the manifold gas pressure.

To measure and adjust the inlet gas pressure, do the following:

1. Turn off gas at the ball valve or gas cock on the gas supply line before the gas valve, and turn off the electrical supply.
2. Locate the inlet pressure port marked **IN P** on the gas valve. See Figure 11.
3. Using a 3/32 in. (2.4 mm) hex head wrench, loosen the set screw by turning it 1 turn counter clockwise. **Do not remove the set screw from the inlet pressure port.**
4. Connect the positive side of the U-tube manometer to the **IN P** tap on the gas valve. Do not connect any tubing to the negative side of the U-tube manometer, because it references atmospheric pressure.

   Note: See Figure 13 for an illustration of connecting a U-tube manometer.

5. Turn on the gas and electrical supplies and follow the operating instructions to place the unit back in operation.
6. Measure the inlet gas pressure. Adjust the inlet gas pressure if needed. See Table 21.

Table 21: Inlet gas pressure operating range

Gas type	Minimum	Maximum
Natural gas	4.5 in. W.C. (1.12 kPa)	10.5 in. W.C. (2.61 kPa)
Propane (LP) gas	8.0 in. W.C. (1.99 kPa)	13.0 in. W.C. (3.24 kPa)

Important: The table specifies what the minimum and maximum gas line pressures must be for the furnace to operate safely. The gas line pressure **must be** a minimum of 7 in. W.C. (1.74 kPA) for natural gas and 11 in. W.C. (2.74 kPA) for propane (LP) gas to obtain the BTU input specified on the rating plate and/or the nominal manifold pressure specified in these instructions and on the rating plate. If the inlet gas pressure is outside this limit, contact the local gas utility for corrective action.

7. When the inlet gas pressure is correct, turn the gas valve to **OFF** and turn the electrical supply switch to **OFF**. Then, remove the flexible tubing of the manometer from the **IN P** pressure tap on the gas valve and tighten the **IN P** pressure tap plug using the 3/32 in. (2.4 mm) hex head wrench.
8. Turn on the electrical and gas supplies, and with the burners in operation, check for gas leakage around the inlet pressure port on the gas valve using an approved non-corrosive gas leak detection fluid or other non-flammable leak detection methods.

Measuring and adjusting the manifold gas pressure

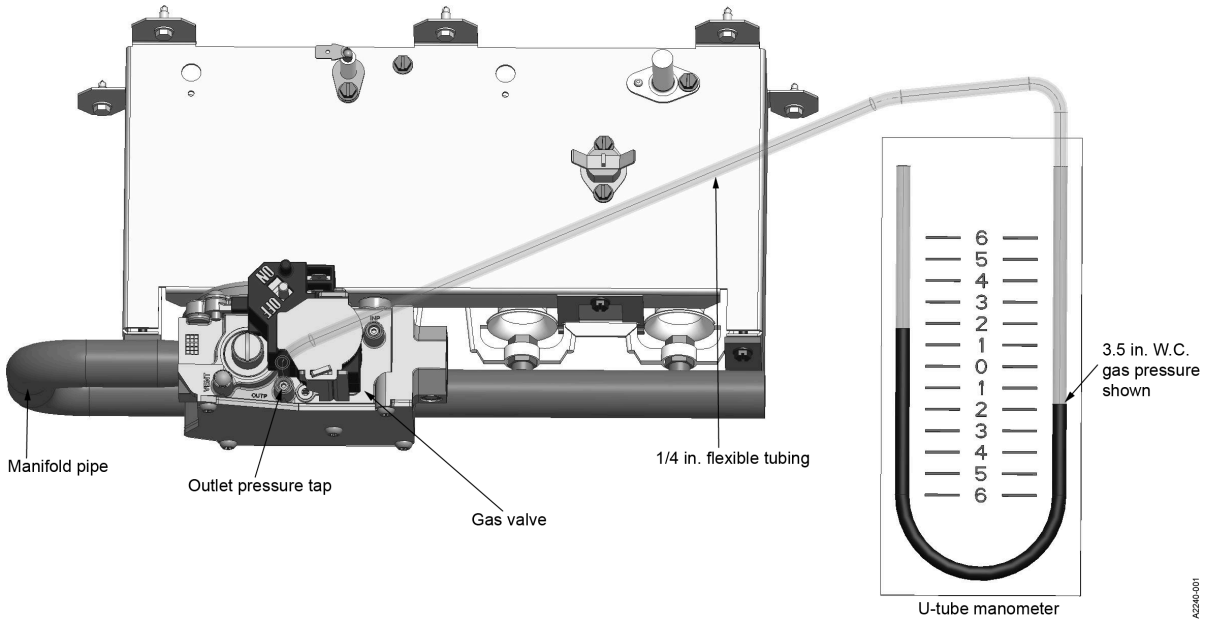
You **must** measure the manifold gas pressure and adjust the manifold gas pressure if needed for every new unit installation. You can measure manifold gas pressure by connecting a U-tube manometer to the outlet pressure port on the gas valve with a piece of flexible tubing. See Figure 11 for the location of the outlet pressure port, which is the port marked **OUT P**.

Important: You take the manifold gas pressure reading at the port marked **OUT P**. You take the standby gas pressure reading and the inlet gas pressure reading at the port marked **IN P**. See Measuring the standby gas pressure and Measuring and adjusting the inlet gas pressure.

To measure and adjust the manifold gas pressure, do the following:

1. Turn off gas at the ball valve or gas cock on the gas supply line before the gas valve, and turn off the electrical supply.
2. Locate the outlet pressure port marked **OUT P** on the gas valve. See Figure 11.
3. Using a 3/32 in. (2.4 mm) hex head wrench, loosen the set screw by turning it 1 turn counter clockwise. **Do not remove the set screw from the outlet pressure port.**
4. Connect the positive side of the U-tube manometer to the **OUT P** tap on the gas valve. See Figure 13. Do not connect any tubing to the negative side of the U-tube manometer, because it references atmospheric pressure.

Figure 13: Connecting a U-tube manometer to read manifold gas pressure



5. Locate the pressure regulator adjustment cap and adjustment screws on the main gas valve as shown in Figure 11.
6. Remove the cap from the pressure regulator to gain access to the adjustment screw.

   Important: You must remove the cap from the pressure regulator entirely to gain access to the adjustment screw. Loosening or tightening the cap does not adjust the flow of gas.
7. Turn on the gas and electrical supplies and follow the operating instructions to place the unit back in operation.
8. Measure the manifold gas pressure. Adjust the manifold gas pressure for the type of gas used if needed by adjusting the gas valve regulator screw so the manifold gas pressure is in accordance with Table 22.

   Table 22: Nominal manifold pressure

Gas type	Nominal manifold pressure
Natural gas	3.5 in. W.C. (0.87 kPa)
Propane (LP) gas	10.0 in. W.C. (2.488 kPa)

   Important: If the gas valve regulator screw is turned in (clockwise), the manifold pressure increases. If the gas valve regulator screw is turned out (counter clockwise), the manifold pressure decreases.
9. Re-calculate the unit input rate as outlined in Checking the unit input rate for natural gas applications to make sure you have not exceeded the specified unit input rate on the rating plate.
10. When the Btu/h input is correct, turn the gas valve to **OFF** and turn the electrical supply switch to **OFF**. Then, remove the flexible tubing of the manometer from the **OUT P** pressure tap on the gas valve and tighten the **OUT P** pressure tap plug using the 3/32 in. (2.4 mm) hex head wrench.
11. Turn on the electrical and gas supplies, and with the burners in operation, check for gas leakage around the outlet pressure port on the gas valve using an approved non-corrosive gas leak detection fluid or other non-flammable leak detection methods.

Configuring the airflow settings

You **must** configure the airflow settings correctly at the time of installation, as follows:

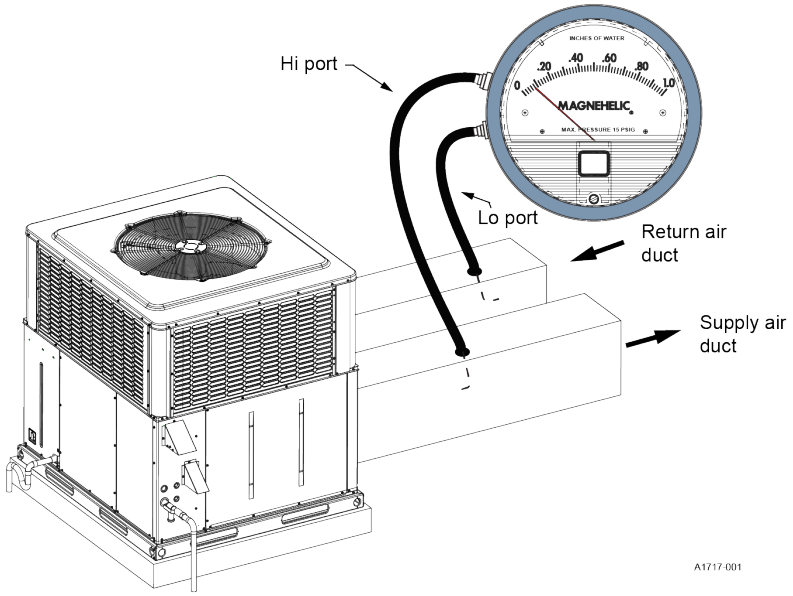
1. Measure the external static pressure and configure the cooling airflow settings as required. Follow the procedures outlined in Measuring the external static pressure and Configuring the cooling airflow settings.
2. Adjust the airflow settings for continuous fan operation if required for the specific installation. Follow the procedure outlined in Configuring the continuous fan airflow settings.
3. Configure the gas heating airflow settings, ensuring that the temperature rise requirements for the unit are met. Follow the procedure outlined in Configuring the gas heating airflow settings.
4. Adjust the gas heating blower off delay time if required for the specific installation. Follow the procedure outlined in Configuring the gas heating blower off delay settings.

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 14 shows how to use a manometer to measure external static pressure.

Figure 14: 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 the cooling airflow settings

Before you begin:
Measure the external static pressure.

The unit has a direct drive, multi-speed (five-speed) standard ECM blower motor. The blower speed tap connections are located on the motor plug in the blower compartment. When configuring the cooling airflow settings, select the cooling blower speed 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: To use the same speed tap for heating and cooling, you must connect the white heat speed wire and the yellow cool speed wire terminal to the required motor lead using a jumper wire or Y terminal.

To configure cooling airflow settings, do the following:

1. See Figure 3, Figure 18, and Figure 19.
2. Using Table 26, compare the CFM data for the energized blower motor cooling speed tap with the measured external static pressure and adjust the cooling blower speed as necessary to obtain the correct cooling airflow. To do so, connect the yellow cool speed wire coming from the ID motor speed output header of the single-stage DSI control board to the required motor speed tap.

Configuring the continuous fan airflow settings

The unit has a direct drive, multi-speed (five-speed) standard ECM blower motor. To operate the unit in continuous fan mode, you set the wall thermostat fan switch to the on position. In normal operation, the fan output in the ID motor speed output header of the single-stage DSI control board drives continuous fan airflow for all PG3E units. In addition, for PG3E48 and PG3E60 units, the same fan output drives A2L mitigation airflow in the event of detected R-454B leakage. In the factory-set position, the green blower speed wire coming from the fan output pin is connected to motor speed tap 1. For PG3E48 and PG3E60 units, this factory-set position provides sufficiently large A2L mitigation airflow to promptly remove any leaked R-454B from the unit. For 2 ton to 3.5 ton packaged unit models that do not require an A2L mitigation system, the factory-set position at motor speed tap 1 drives the lowest airflow among all of the motor taps for continuous fan operation. See Table 26. In certain circumstances, it may be necessary to adjust the factory set blower speed for continuous fan operation by moving the green blower speed wire to a different speed tap. However, adjusting the factory set blower speed is not necessarily best practice because it does the following:

- Causes higher electrical energy usage and electric utility bills for PG3E36 units
- Leads to a lower A2L mitigation airflow that may prolong the time for the unit to mitigate leaked R-454B in the event of a refrigerant leak for PG3E48 and PG3E60 units

You must give due consideration before moving the speed tap.

Important: Make sure that the continuous fan speed tap is not placed at a higher tap number than the heating or cooling speed tap, because the five speed taps of the motor follow a hierarchical order. To use the same speed tap for heating and continuous fan, you must connect the white heat speed wire and the green blower speed wire terminal to the required motor tap using a jumper wire or Y terminal.

To configure the continuous fan airflow settings, do the following:

1. See Table 26, Figure 18, and Figure 19. For PG3E48 unit and PG3E60 units, also see Table 2.
2. Connect the green blower speed wire coming from the single-stage DSI control board to the appropriate motor speed tap.

Configuring the gas heating airflow settings

The unit has a direct drive, multi-speed (five-speed) standard ECM blower motor. The blower speed tap connections are located on the motor plug in the blower compartment. When configuring the gas heating airflow settings, you can select any gas heating blower speed provided the temperature rise requirements for the unit are met. See Checking the air temperature rise and Table 24.

Important: To use the same speed tap for heating and cooling, you must connect the white heat speed wire and the yellow cool speed wire terminal to the required motor lead using a jumper wire or Y terminal.

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

1. See Figure 18 and Figure 19.
2. Connect the white blower speed wire coming from the single-stage DSI control board to the required motor speed tap.

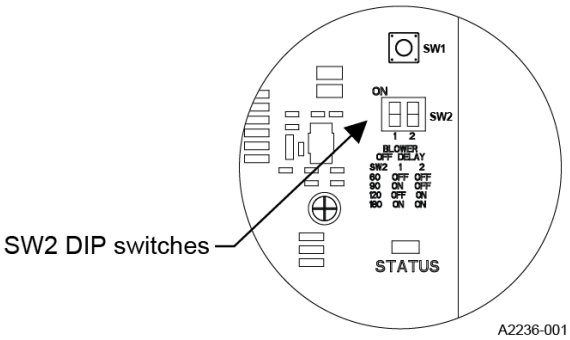
Configuring the gas heating blower off delay settings

You can adjust the gas heating blower off delay time for the unit if required. You do this using DIP switches 1 and 2 in the SW2 switch bank on the single-stage DSI control board, as shown in Figure 15. Table 23 shows the DIP switch setting options. The factory setting is 60 s with DIP switches 1 and 2 in the off position.

Table 23: Gas heating blower off delay DIP switch settings

SW2 switch bank		Gas heating blower off delay time
DIP switch 1	DIP switch 2	
Off	Off	60 s
On	Off	90 s
Off	On	120 s
On	On	180 s

Figure 15: SW2 DIP switches



To configure the gas heating blower off delay settings, do the following:

- See Table 23. Then, in the SW2 switch bank, set DIP switches 1 and 2 for the gas heating blower off delay time required.

Checking the air temperature rise

You **must** check the air temperature rise for every new unit installation.

⚠ DANGER

The temperature rise, or temperature difference between the return air and the supply (heated) air from the furnace, must be within the range shown on the furnace rating plate and within the application limitations shown in Table 24.

The supply air temperature cannot exceed the **Maximum Supply Air Temperature** specified in these instructions and on the furnace rating plate. Under NO circumstances can the furnace be allowed to operate above the Maximum Supply Air Temperature. Operating the furnace above the Maximum Supply Air Temperature will cause premature heat exchanger failure, high levels of Carbon Monoxide, a fire hazard, personal injury, property damage, and/or death.

To check the air temperature rise, do the following:

1. After about 5 min of operation, determine the furnace temperature rise. Measure the temperature of both the return air and the heated air in the ducts, about 6 ft (1.83 m) from the furnace where they are not affected by radiant heat.
2. Increase the blower speed to decrease the temperature rise or decrease the blower speed to increase the temperature rise if needed. See Configuring the gas heating airflow settings.

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. See Installing the air filter.

- 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.

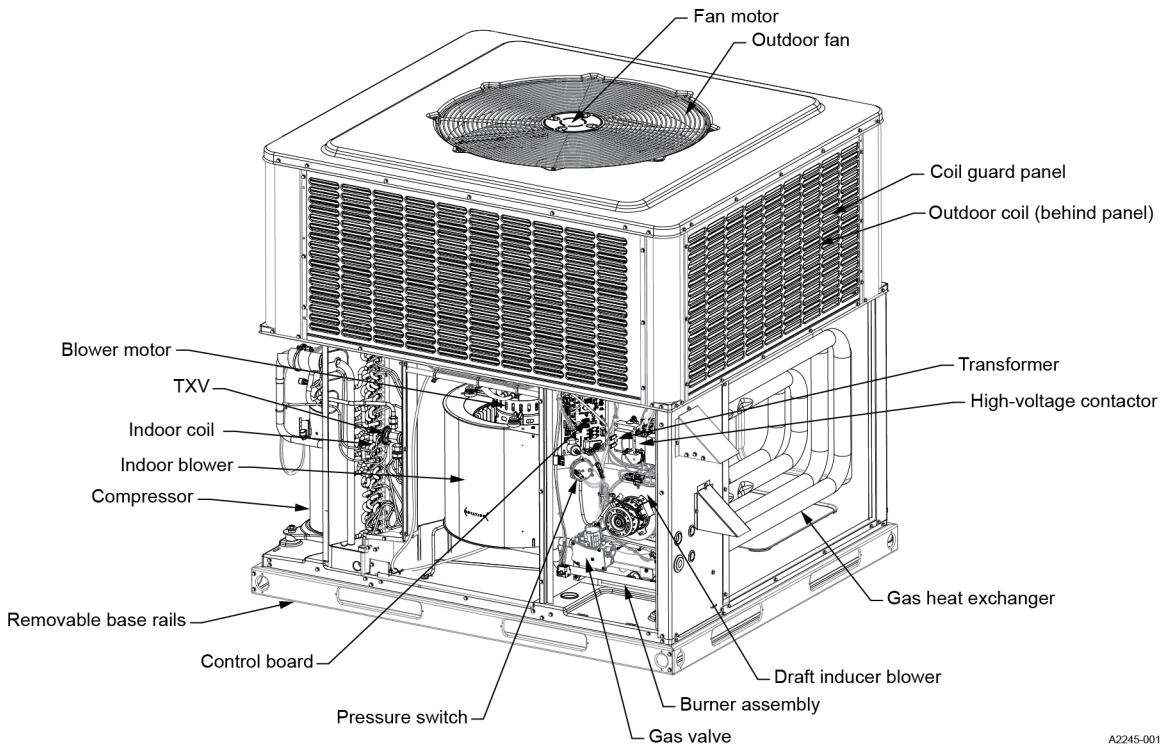
- Instruct the user to refer to *Maintaining your system* in the *User's Information Manual* for the unit for detailed information about maintenance and procedures.
- Direct the user to their limited warranty certificate in the *User's Information Manual*. Complete the following information fields in 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

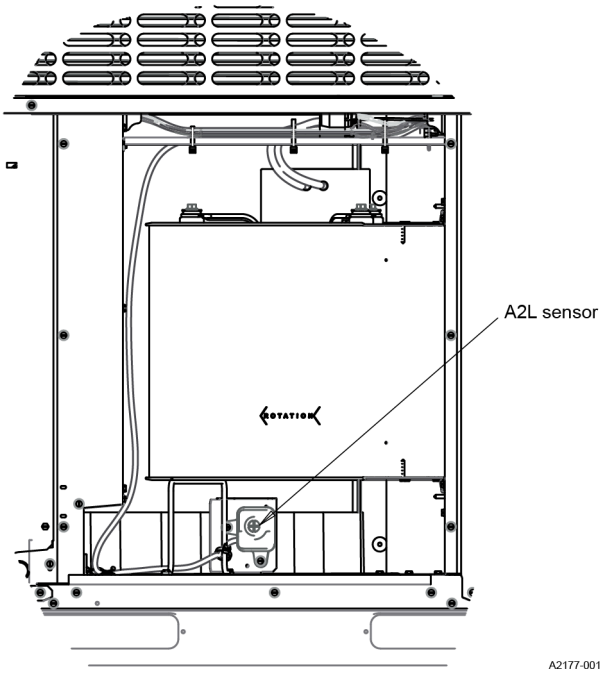
Figure 16: Unit components - PG3E36, PG3E48, and PG3E60 units



A2L components

PG3E48 and PG3E60 units include an A2L sensor and a single-stage DSI control board with an RDS module because they contain over 1.776 kg (3.915 lb) of refrigerant. Figure 17 shows the location of the A2L sensor. See A2L refrigerant safety guidance for more information.

Figure 17: A2L sensor location - PG3E48 and PG3E60 units



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.

Phasing

⚠ CAUTION

Scroll compressors require proper rotation to operate properly. Failure to check and correct rotation may result in property damage.

Three-phase scroll compressors operate in only one direction. If the scroll compressor is drawing low amperage, has similar suction and discharge pressures, or is producing a high noise level, the scroll compressor motor may be experiencing out of phase rotation and must be corrected. Check the compressor rotation. If the scroll compressor motor is experiencing out of phase rotation, change the incoming line connection phasing to obtain the correct rotation.

Heating safety controls

The control circuit includes the following heating safety controls:

- **High-temperature limit switch**: The high-temperature limit switch is located inside the blower compartment and protrudes into the heat exchanger compartment. The high-temperature limit switch is set to open at a temperature selected to prevent the outlet air temperature from exceeding the maximum shown on the unit rating plate. It resets automatically. The high-temperature limit switch operates when a high-temperature condition occurs. The high-temperature limit switch shuts down the ignition control, closes the main gas valve, and energizes the blower. See High-temperature limit switch operation for more information.
- **Pressure switch**: If the induced draft motor fails, the pressure switch prevents the ignition control and gas valve from being energized.
- **Flame sensor**: The flame sensor is located on the left-most burner. If an ignition control fails to detect a signal from the flame sensor indicating the flame is correctly ignited, the main gas valve closes.
- **Rollout switch**: The rollout switch is located on the burner assembly. In the event of a sustained main burner flame rollout, the rollout switch closes the main gas valve. This is a manual reset switch. See Rollout switch operation for more information.

NOTICE

The manual reset rollout switch (RS) must be reset before allowing furnace operation.

Cooling safety control

The control circuit includes a cooling safety control: 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.

Important: The high-pressure switch is 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 operation

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

1. **Heating**: The single-stage DSI control board begins a call for heating when W is energized (connected to R). The single-stage DSI control board checks if the pressure switch is open. If the pressure switch is closed, the status LED on the single-stage DSI control board emits 2 red flashes, and the single-stage DSI control board waits indefinitely for the pressure switch to open. When the pressure switch is sensed as open, the single-stage DSI control board begins the pressure switch proving period. If the call for heating is removed, the single-stage DSI control board goes back to standby.

2. **Pressure switch proving**: The single-stage DSI control board energizes the induced draft motor and waits for the pressure switch to close. When the pressure switch closes, the single-stage DSI control board begins the pre-purge period. If the call for heating is removed, the single-stage DSI control board de-energizes the inducer without a post-purge period and returns to standby. If the pressure switch does not close within 5 s of the inducer energizing, the status LED on the single-stage DSI control board emits 3 red flashes. If the pressure switch does not close within 60 s of the inducer energizing, the single-stage DSI control board shuts off the inducer for 60 s, then energizes the inducer for another 60 s in an attempt to close the pressure switch. This cycle continues indefinitely until the pressure switch is proved to be closed or the call for heating ends.
3. **Pre-purge**: The single-stage DSI control board monitors the pressure switch and ensures it remains closed during the pre-purge period. If the pressure switch opens, the single-stage DSI control board returns to pressure switch proving mode. The single-stage DSI control board waits for a 15 s pre-purge period, then begins the ignition trial.
4. **Ignition trial**: The single-stage DSI control board energizes the gas valve and spark outputs for a 5 s ignition trial. The single-stage DSI control board de-energizes the spark when the flame is sensed and enters a flame stabilization period. If the flame is not established within the ignition trial, the single-stage DSI control board de-energizes the spark and gas valve and begins an inter-purge period before attempting another ignition trial. If the call for heating is removed during an ignition trial, the single-stage DSI control board immediately de-energizes spark and gas. The single-stage DSI control board runs the induced draft motor through a post-purge period before de-energizing. If the pressure switch opens during an ignition trial, the single-stage DSI control board immediately de-energizes spark and gas. The single-stage DSI control board begins pressure switch proving before an inter-purge and reignition attempt.
5. **Heat blower on delay**: The single-stage DSI control board waits for 30 s and then energizes the indoor blower heat speed. The blower on delay time begins at the start of the flame proving period in the ignition trial. If the thermostat call for heating is removed, the single-stage DSI control board deenergizes the gas valve, energizes the blower on heat speed, and initiates a post-purge period and heat blower off delay.
6. **Main burner operation**: The single-stage DSI control board keeps the main gas valve and induced draft motor energized while continuously monitoring the call for heating, pressure switch, and flame status. If the call for heating (W) is removed, the single-stage DSI control board de-energizes the gas valve, and begins the post-purge period and heat blower off delay. If the pressure switch opens, the single-stage DSI control board de-energizes the gas valve and begins pressure switch proving mode. If the flame is removed, the single-stage DSI control board de-energizes the gas valve within 2 s and counts the flame loss. If the flame has been lost less than five times, the control attempts re-ignition after a 15 s inter-purge period. If the flame has been lost five times within the same call for heat, the single-stage DSI control board locks out, and the status LED on the single-stage DSI control board emits 8 red flashes.
7. **Post-purge**: The single-stage DSI control board runs the induced draft motor for a 15 s post-purge period, and then de-energizes the inducer. If a call for heating occurs during the post-purge period, the single-stage DSI control board finishes the post-purge period, and begins the next ignition sequence immediately.
8. **Heat blower off delay**: When the thermostat ends the call for heating operation, the single-stage DSI control board de-energizes the indoor blower motor after a delay time. There are four options for the blower off delay time: 60 s, 90 s, 120 s, or 180 s. The factory setting is 60 s. The blower off delay time is selected using DIP switches 1 and 2 in the SW2 switch bank on the single-stage DSI control board. See Configuring the gas heating blower off delay settings. The blower off timing begins when the thermostat is satisfied and removes the call for heating (W). The single-stage DSI control board returns to standby when the blower off delay is complete. If a thermostat call for heat occurs before the blower off delay is complete, the single-stage DSI control board begins an ignition sequence, starting with the pre-purge period, while the blower off delay continues.

See Lockout, High-temperature limit switch operation, Rollout switch operation, Power interruptions, Flame present with gas off, and Gas valve fault for more information about how these conditions affect heating operation.

Lockout

During a lockout condition, the single-stage DSI control board keeps the main gas valve and induced draft motor de-energized.

To reset lockouts resulting from failed ignition or flame losses, remove the call for heating (W) for more than 1 s **or** remove power from the single-stage DSI control board for over 0.25 s. The single-stage DSI control board automatically resets after 60 min.

Lockouts resulting from the detection of internal control faults reset after 60 min or power interruption. Cooling operations are available during a heating lockout.

High-temperature limit switch operation

Any time the high-temperature limit switch is open for less than 5 min, the single-stage DSI control board runs the indoor blower motor on heat speed, runs the inducer, and de-energizes the gas valve, and the status LED on the single-stage DSI control board emits 4 red flashes. When the high-temperature limit switch closes, the single-stage DSI control board restarts the ignition sequence, beginning with the pre-purge period.

If the high-temperature limit switch is open for more than 5 min, the single-stage DSI control board de-energizes the inducer and continues to operate the indoor blower motor on heat speed, and the status LED on the single-stage DSI control board emits 11 red flashes.

Rollout switch operation

If the limit circuit is open for more than 15 min, the status LED on the single-stage DSI control board emits 5 red flashes. The blower output is energized when the rollout switch is open.

If the rollout switch is reset, the single-stage DSI control board remains locked out until power is removed or a call for heating (W) is removed.

The rollout switch does not reset automatically.

Power interruptions

Power interruptions of any duration do not cause a lockout or any operation requiring manual intervention.

Flame present with gas off

If the flame is sensed for longer than 4 s during a period when the gas valve should be closed, the single-stage DSI control board enters lockout, and the status LED on the single-stage DSI control board emits 1 red flash. The single-stage DSI control board energizes the inducer blower while the flame is sensed.

Gas valve fault

If the main valve output is sensed as energized for more than 1 s when commanded to be off, the single-stage DSI control board de-energizes the induced draft motor, if the flame is not present, to attempt to open the pressure switch to de-energize the gas valve. If the main gas valve is still sensed as energized after the inducer has been off for 10 s, the single-stage DSI control board reenergizes the inducer to vent the unburned gas. The single-stage DSI control board enters a hard lockout, and the status LED on the single-stage DSI control board emits 10 red flashes.

➤ **Important:** To recover from a hard lockout, remove and reapply 24 VAC power to the single-stage DSI control board. This is the only way to recover from a hard lockout.

Cooling operation

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

1. Thermostat terminals G and Y are energized, which signals the compressor, outdoor fan, and indoor circulating blower to run. With a call for Y, the indoor circulating blower is energized at cooling speed.
2. When the thermostat is satisfied, terminals G and Y are de-energized, de-energizing the compressor and outdoor fan. After a cool blower off delay time of 60 s, the indoor circulating blower is de-energized.

Indoor circulating blower operation

When the thermostat calls for fan operation, the following occurs:

1. Thermostat terminal G is energized, signaling the indoor circulating blower to run at the G-speed airflow.
2. If a call for cooling occurs (Y), the indoor circulating blower switches to run at the Y-speed airflow. If a call for heating occurs (W), the indoor circulating blower switches to run at the W-speed airflow after a 30 s delay after a successful ignition.
3. When the thermostat ends the call for fan operation, the thermostat terminal G is de-energized, de-energizing the indoor circulating blower immediately.

Turning off the thermostat, electric power, and gas supply to the unit

1. Set the thermostat to the **OFF** position.
2. Turn off all electric power to the unit if service is to be performed.
3. Remove the control access panel by removing the screws and lifting the panel out.
4. Set the gas valve switch to the **OFF** position.

   Note: Do not force the gas valve switch.
5. Replace the control access panel.

Physical data

Table 24: Physical data

Model		PG3E36L05	PG3E36L07	PG3E36L10	PG3E48L06	PG3E48L10	PG3E48L12	PG3E60L06	PG3E60L10	PG3E60L12
Nominal tonnage		**3.0**	**3.0**	**3.0**	**4.0**	**4.0**	**4.0**	**5.0**	**5.0**	**5.0**
Refrigerant information	**Refrigerant type**	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B
	Refrigerant charge (lb-oz)	3-7	3-7	3-7	4-1	4-1	4-1	4-13	4-13	4-13
AHRI gas heat performance	**Heating model**	50	75	100	65	100	125	65	100	125
	Heat input (kBtu)	50.0	75.0	100.0	65.0	100.0	125.0	65.0	100.0	125.0
	Heat output (kBtu)	40	60	80	52	80	100	52	80	100
	AFUE (%)	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0
	Number of burners	2	3	4	2	3	4	2	3	4
	Number of stages	1	1	1	1	1	1	1	1	1
	Temp. rise range (°F)	35 to 65	40 to 70	40 to 70	40 to 70	40 to 70	40 to 70	40 to 70	40 to 70	40 to 70
	Maximum static pressure (in. W.C.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Maximum outlet air temp. (°F)	180	180	180	180	180	180	180	180	180
	Gas piping connection (in.)	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Dimensions	**Length (in.)**	51 1/4	51 1/4	51 1/4	51 1/4	51 1/4	51 1/4	51 1/4	51 1/4	51 1/4
	Width (in.)	35 3/4	35 3/4	35 3/4	45 3/4	45 3/4	45 3/4	45 3/4	45 3/4	45 3/4
	Height (in.)	47	47	47	47	47	47	50	50	50
Operating weight (lb)		365	368	372	438	445	449	460	467	471
Compressor type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Outdoor coil data	**Face area (sq ft)**	15.3	15.3	15.3	17.5	17.5	17.5	21.1	21.1	21.1
	Rows	1	1	1	1	1	1	1	1	1
	Fins per inch	23	23	23	23	23	23	23	23	23
	Tube diameter (mm)	16	16	16	16	16	16	16	16	16
	Coil type	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel	Microchannel
Indoor coil data	**Face area (sq ft)**	4.6	4.6	4.6	6.2	6.2	6.2	6.2	6.2	6.2
	Rows	3	3	3	3	3	3	4	4	4
	Fins per inch	16	16	16	16	16	16	16	16	16
	Tube diameter (in.)	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
	Circuitry type	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight
	Refrigerant control	TXV	TXV	TXV	TXV	TXV	TXV	TXV	TXV	TXV
	Coil type	Finned tube	Finned tube	Finned tube	Finned tube	Finned tube	Finned tube	Finned tube	Finned tube	Finned tube
Outdoor fan data	**Fan diameter (in.)**	24	24	24	26	26	26	26	26	26
	Type	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller	Propeller
	Drive type	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
	Number of speeds	1	1	1	1	1	1	1	1	1
	Motor (hp)	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3
	RPM	850	850	850	850	850	850	850	850	850
	Nominal total CFM	2400	2400	2400	3200	3200	3200	3200	3200	3200
Direct drive indoor blower data	**Blower size (in.)**	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10
	Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
	Motor (hp)	1/2	1/2	1	1	1	1	1	1	1
	RPM (maximum)	1400	1400	1400	1400	1400	1400	1400	1400	1400
	Frame size (in.)	48	48	48	48	48	48	48	48	48
Filter size		A	A	A	B	B	B	B	B	B

Note: You must size field-supplied external filters so as not to exceed 300 fpm air velocity through disposable filters. All three-phase models are shipped with an air filter frame kit and permanent filters that you can install in the field. 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.

Electrical data

Table 25: Electrical data for 460-3-60

Model	Voltage (V-phase-Hz)	Compressor			Outdoor fan motor	Supply blower motor	MCA	MOP
		RLA	LRA	MCC	FLA	FLA	A	A
PG3E36L05 PG3E36L07	460-3-60	4.1	39	6.4	0.9	2.3	8.3	15
PG3E36L10	460-3-60	4.1	39	6.4	0.9	4.3	10.3	15
PG3E48L06 PG3E48L10 PG3E48L12	460-3-60	6.3	60	9.8	0.9	4.3	13.0	15
PG3E60L06 PG3E60L10 PG3E60L12	460-3-60	6.6	60	10.3	0.9	4.3	13.4	20

Note:

- 460-3-60 indicates 460 V, three 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 maximum overcurrent protection must be in accordance with the UL 60335-2-40 standard (fourth edition).

Airflow data

See Table 26 and Table 27 for airflow data for the unit.

Airflow performance data for side duct application

Table 26: Airflow performance data for side duct application

Model	Motor speed	External static pressure (in. W.C.)								
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0
		SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
PG3E36L05	Low (1)	850	790	710	660	610	560	510	450	400
	Low/Medium (2)	960	910	860	790	740	690	640	590	510
	Medium (3)	1270	1230	1190	1150	1110	1060	1000	960	860
	Medium/High (4)	1320	1280	1250	1210	1160	1120	1060	1010	920
	High (5)	1490	1450	1420	1380	1340	1300	1260	1210	1120
PG3E36L07	Low (1)	850	790	710	660	610	560	510	450	400
	Low/Medium (2)	1130	1090	1050	1000	940	890	830	790	700
	Medium (3)	1270	1230	1190	1150	1110	1060	1000	960	860
	Medium/High (4)	1320	1280	1250	1210	1160	1120	1060	1010	920
	High (5)	1490	1450	1420	1380	1340	1300	1260	1210	1120
PG3E36L10	Low (1)	870	800	730	670	610	560	510	450	230
	Low/Medium (2)	1390	1350	1310	1270	1220	1180	1130	1080	970
	Medium (3)	1460	1420	1380	1340	1300	1260	1210	1160	1050
	Medium/High (4)	1520	1480	1440	1400	1360	1320	1270	1220	1110
	High (5)	1630	1590	1560	1520	1480	1440	1400	1350	1260
PG3E48L06	Low (1)	1690	1650	1620	1580	1540	1500	1470	1430	1350
	Low/Medium (2)	1100	1040	980	930	860	780	710	660	570
	Medium (3)	1150	1090	1030	980	910	840	780	720	620
	Medium/High (4)	1740	1710	1680	1630	1600	1560	1520	1490	1410
	High (5)	2010	1980	1950	1910	1870	1840	1800	1760	1680
PG3E48L10	Low (1)	1690	1650	1620	1580	1540	1500	1470	1430	1350
	Low/Medium (2)	1150	1090	1030	980	910	840	780	720	620
	Medium (3)	1510	1470	1430	1390	1340	1310	1260	1220	1130
	Medium/High (4)	1740	1710	1680	1630	1600	1560	1520	1490	1410
	High (5)	2010	1980	1950	1910	1870	1840	1800	1760	1680
PG3E48L12	Low (1)	1690	1650	1620	1580	1540	1500	1470	1430	1350
	Low/Medium (2)	1150	1090	1030	980	910	840	780	720	620
	Medium (3)	1740	1710	1680	1630	1600	1560	1520	1490	1410
	Medium/High (4)	1850	1820	1790	1750	1720	1680	1640	1600	1530
	High (5)	2010	1980	1950	1910	1870	1840	1800	1760	1680
PG3E60L06	Low (1)	1870	1840	1810	1770	1730	1690	1650	1620	1540
	Low/Medium (2)	1090	1020	960	910	840	750	690	640	550
	Medium (3)	1160	1100	1050	990	930	860	800	740	640
	Medium/High (4)	1940	1910	1870	1830	1800	1770	1720	1680	1610
	High (5)	2240	2210	2180	2150	2100	2070	2040	2010	1940
PG3E60L10	Low (1)	1870	1840	1810	1770	1730	1690	1650	1620	1540
	Low/Medium (2)	1300	1240	1200	1150	1090	1050	1000	940	820
	Medium (3)	1510	1470	1430	1390	1340	1310	1260	1220	1130
	Medium/High (4)	1940	1910	1870	1830	1800	1770	1720	1680	1610
	High (5)	2240	2210	2180	2150	2100	2070	2040	2010	1940

Table 26: Airflow performance data for side duct application

Model	Motor speed	External static pressure (in. W.C.)								
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0
		SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
PG3E60L12	Low (1)	1870	1840	1810	1770	1730	1690	1650	1620	1540
	Low/Medium (2)	1300	1240	1200	1150	1090	1050	1000	940	820
	Medium (3)	1700	1670	1630	1590	1550	1520	1480	1440	1370
	Medium/High (4)	1940	1910	1870	1830	1800	1770	1720	1680	1610
	High (5)	2240	2210	2180	2150	2100	2070	2040	2010	1940

Note:

- Applications above 0.8 in. W.C. external static pressure are not recommended.
- A brushless DC high-efficiency standard ECM blower motor is used for all indoor blower assemblies
- 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.

Additional static resistance data

Table 27: Additional static resistance data

Model	CFM	Wet indoor coil	Economizer	Air filter frame kit
PG3E36 - 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
PG3E48 - 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
PG3E60 - 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 IWG, 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.

Natural gas application data

Table 28: Natural gas application data

Model	Input (MBH)	Output (MBH)	Gas rate (ft^3/h)	Number of burners	Temperature rise at full input (°F)	
					Minimum	Maximum
PG3E36 - 3 ton	50	41	46	2	35	65
PG3E48 - 4 ton PG3E60 - 5 ton	65	53	60	2	40	70
PG3E36 - 3 ton	75	61	70	3	40	70
PG3E36 - 3 ton	100	81	93	4	40	70
PG3E48 - 4 ton PG3E60 - 5 ton	100	81	93	3	40	70
PG3E48 - 4 ton PG3E60 - 5 ton	125	101	116	4	40	70

Note:
- The heating capacity is valid for elevations up to 2,000 ft above sea level. For elevations above 2,000 ft, reduce the rated capacity by 4% for each 1,000 ft above sea level.
- The gas rate is based on 1,075 Btu/ft^3.
- The airflow must be adequate to obtain a temperature rise within the range shown in the table. The continuous return air temperature must not be below 55°F.

Propane (LP) gas application data

Table 29: Propane (LP) gas application data

Model	Input (MBH)	Output (MBH)	Gas rate high fire/low fire (ft^3/h)	Number of burners	Temperature rise at full input (°F)		Propane (LP) conversion accessory kit
					Minimum	Maximum	
PG3E36 - 3 ton	50	41	20	2	35	65	S1-1NP0703
PG3E48 - 4 ton PG3E60 - 5 ton	65	53	26	2	40	70	S1-1NP0704
PG3E36 - 3 ton	75	61	30	3	40	70	S1-1NP0703
PG3E36 - 3 ton	100	81	40	4	40	70	S1-1NP0703
PG3E48 - 4 ton PG3E60 - 5 ton	100	81	40	3	40	70	S1-1NP0704
PG3E48 - 4 ton PG3E60 - 5 ton	125	101	50	4	40	70	S1-1NP0704

Note:
- Propane applications require field installation of a propane (LP) conversion accessory kit. See Converting the unit for operation with propane gas and refer to *Applications and accessories* in the *Technical Guide* for more information.
- The heating capacity is valid for elevations up to 2,000 ft above sea level. For elevations above 2,000 ft, reduce the rated capacity by 4% for each 1,000 ft above sea level.
- The gas rate is based on 2,500 Btu/ft^3.
- The airflow must be adequate to obtain a temperature rise within the range shown in the table. The continuous return air temperature must not be below 55°F.

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 exchanger access panel

See Figure 6 and Figure 16 for an illustration.

See Table 10 for the minimum clearances you must maintain for the unit.

⚠ 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

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

Sourcing replacement parts

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

Troubleshooting

If troubleshooting is needed, follow all safety requirements.

Using unit control board diagnostics

The gas heating section has built-in self-diagnostic capability. The single-stage DSI control board continuously monitors its own operation and the operation of the system. The status LED on the single-stage DSI control board flashes red, green, or amber 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.

PG3E48 and PG3E60 units have an A2L sensor, an RDS module that is built into the single-stage DSI control board, and an A2L diagnostic LED that works with the status LED on the single-stage DSI control board. See Figure 3, A2L components, and Wiring diagrams.

Table 30 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 6 red flashes code, the status LED flashes on and off six times and then remains off for 2 s. This pattern repeats as long as the fault condition remains.

It is important to understand the following:

- **Soft lockout**: The control includes a soft lockout that resets automatically after 1 h. This provides protection for an unoccupied structure if a temporary condition causes a furnace malfunction, for example, if a temporary interruption in gas supply prevents the furnace from lighting. The single-stage DSI control board keeps trying to light each hour and resumes normal operation if the gas supply is restored.
- **Hard lockout**: Some fault conditions cause a hard lockout, and you must turn off the power to the unit and turn on the power to the unit again to reset the single-stage DSI control board. The single-stage DSI control board does not automatically restart.

Status LED and A2L diagnostic LED codes

Table 30: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PG3E48 and PG3E60 units	Condition	Solution
Slow green flash (or heartbeat)	Off	Indicates the following: • Normal operation with no thermostat calls. Standby mode • Indicates normal operation with a thermostat call for cooling • Indicates normal operation with a thermostat call for continuous fan	—
Rapid green flashes	Off	Indicates the single-stage DSI control board is in factory test mode	—
Slow amber flash (or heartbeat)	Off	Indicates normal operation with a thermostat call for heating	—

Table 30: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PG3E48 and PG3E60 units	Condition	Solution
Steady off	Off	Indicates there is no power to the single-stage DSI control board or the single-stage DSI control board has failed	If the status LED does not flash at all, check that there is power to the single-stage DSI control board and check for an open fuse on the single-stage DSI control board. If the single-stage DSI control board is correctly powered and the fuse is not open, the single-stage DSI control board may need to be replaced.
Steady on red or any color	Off	Indicates a possible single-stage DSI control board failure	Turn off the power to the unit and turn on the power to the unit again. If the fault code recurs, replace the single-stage DSI control board. The single-stage DSI control board is not field repairable.
Rapid amber flash	Off	Indicates the flame sense current is below 1.5 µA	Do the following: • Check and clean the flame sensor. • Check for correct gas flow. • Verify that the voltage is greater than 1.5 VDC at the flame current test pad.
4 amber flashes	Off	Indicates the single-stage DSI control board is receiving a Y signal from the thermostat without a G signal. The furnace operates normally during heating and cooling, but this fault code is displayed to alert the user that there is a wiring problem.	Verify that the G wire from the thermostat is connected correctly.
1 red flash	Off	Indicates the flame was sensed when there was no call for heating. The single-stage DSI control board turns on both the induced draft motor and supply air blower.	Check for a leaking or slow-closing gas valve.
2 red flashes	Off	Indicates the pressure switch is closed when it should be open. The single-stage DSI control board confirms the pressure switch contacts are open at the beginning of each heat cycle. The single-stage DSI control board prevents the ignition sequence from continuing if the pressure switch contacts are closed when they should be open.	Check for a faulty pressure switch or miswiring.
3 red flashes	Off	Indicates the pressure switch contacts are open when they should be closed	Check for the following: • Faulty inducer • Blocked vent • Broken pressure switch hose • Disconnected pressure switch or inducer wires • Faulty pressure switch

Table 30: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PG3E48 and PG3E60 units	Condition	Solution
4 red flashes	Off	Indicates the high-temperature limit switch or rollout switch has opened its contacts, which are normally closed. The single-stage DSI control board turns on the supply air blower and inducer.	Check for the following: • Dirty filter • Incorrectly sized duct system • Incorrect blower speed setting • Incorrect firing rate • Loose high-temperature limit switch or rollout switch wiring • Faulty blower motor ⓘ **Note:** If the high-temperature limit switch does not close within 5 min, the single-stage DSI control board operates as if the blower is not functioning. The single-stage DSI control board starts a hard lockout and the status LED on the single-stage DSI control board emits 11 red flashes. If the high-temperature limit switch does not close after 15 min, the single-stage DSI control board operates as if a manual reset rollout switch has opened, and the status LED on the single-stage DSI control board emits 5 red flashes. See the 5 red flashes and 11 red flashes entries in this table. If the high-temperature limit switch opens five times within a call for heat, the status LED on the single-stage DSI control board emits 4 red flashes, and the single-stage DSI control board enters a 1 h soft lockout.
5 red flashes	Off	Indicates the limit circuit has been open for more than 15 min, usually meaning that a manual reset rollout switch has opened	Check for the following: • Proper combustion air • Correct inducer operation • Primary heat exchanger failure • Burner problem ⓘ **Note:** The single-stage DSI control board enters a hard lockout. When the problem is corrected, you must turn off the power to the unit and turn on the power to the unit again to reset the single-stage DSI control board.
6 red flashes	Off	Indicates that while the unit was operating, the pressure switch opened four times during the call for heat	Check for a faulty inducer, blocked vent, or faulty pressure switch. ⓘ **Note:** The furnace locks out for 1 h and then restarts.
7 red flashes	Off	Indicates the flame could not be established during three attempts for ignition	Do the following: • Check that the gas valve switch is in the on position. • Check for the following: - Low gas pressure or no gas pressure - Faulty gas valve - Dirty or faulty flame sensor - Faulty ignitor - Loose wires - Burner problem ⓘ **Note:** The furnace locks out for 1 h and then restarts.

Table 30: Status LED and A2L diagnostic LED codes

Status LED	A2L diagnostic LED - applies to only PG3E48 and PG3E60 units	Condition	Solution
8 red flashes	Off	Indicates the flame has been lost five times (four recycles) during the heating cycle	Check for low gas pressure, a dirty or faulty flame sensor, or a faulty gas valve. ⓘ **Note:** The furnace locks out for 1 h and then restarts.
9 red flashes	Off	Indicates reversed line voltage polarity, a grounding problem, or reversed low-voltage transformer wires	Do the following: • Check the polarity at the furnace and branch. • Check the furnace grounding. • Check that the flame probe is not shorted to the chassis. ⓘ **Note:** The furnace does not start the ignition sequence until the problem is corrected.
10 red flashes	Off	Indicates the gas valve is energized with no call for heat. The main blower and inducer blower run and no ignition sequence starts as long as this condition exists. See Gas valve fault.	Check the gas valve and gas valve wiring.
11 red flashes	Off	Indicates the limit circuit has remained open for more than 5 min and less than 15 min. This condition is usually caused by a failed blower motor or blower wheel.	ⓘ **Note:** The single-stage DSI control board enters a hard lockout. When the problem is corrected, you must turn off the power to the unit and turn on the power to the unit again to reset the single-stage DSI control board.
Rapid red flash. Applies to only PG3E48 and PG3E60 units	Solid red	Indicates an A2L refrigerant leakage or potentially gas leakage	Proceed as follows: 1. Owner to notify service personnel as soon as possible. Maintain power to the unit and try to keep the house ventilated by opening windows if possible. 2. Service personnel to locate refrigerant leak point(s) and repair. Adjust unit charge and get unit back to proper functions. ⓘ **Note:** There is potential for the A2L sensor to detect gas or propane leakage. If the service person can not find refrigerant leakage, check on gas pipe leaks and other gas heat components for leakage. Change to new parts after you confirm gas heat component leak(s).
1 red flash. Applies to only PG3E48 and PG3E60 units	Solid red	Occurs only on power up. Indicates the A2L sensor is not connected to the A2L terminal of the single-stage DSI control board	Do the following: • Ensure the correct A2L sensor is properly plugged in the A2L terminal of the single-stage DSI control board. • Ensure the A2L sensor cable is not damaged.
2 red flashes. Applies to only PG3E48 and PG3E60 units	Solid red	Indicates the A2L sensor is not connected to the A2L terminal of the single-stage DSI control board	Do the following: • Ensure the correct A2L sensor is properly plugged in the A2L terminal of the single-stage DSI control board. • Ensure the A2L sensor cable is not damaged.
3 red flashes. Applies to only PG3E48 and PG3E60 units	Solid red	Indicates the A2L sensor may have failed or broken	Replace to a new part, and ensure it is the correct A2L sensor.

Displaying and clearing stored fault codes

The single-stage DSI control board stores fault codes for 30 days. You can use the SW1 button on the single-stage DSI control board to retrieve and clear stored fault codes if no active faults or thermostat calls are present. The SW1 button is referred to as the last error button on the unit wiring diagram.

Important: If an active fault or thermostat call is present when you press and hold the SW1 button, the single-stage DSI 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 single-stage DSI control board, press and hold the **SW1** button for 0.2 s to 5 s. If stored fault codes are present, the fault codes display.
3. Press and hold the **SW1** button for more than 5 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.

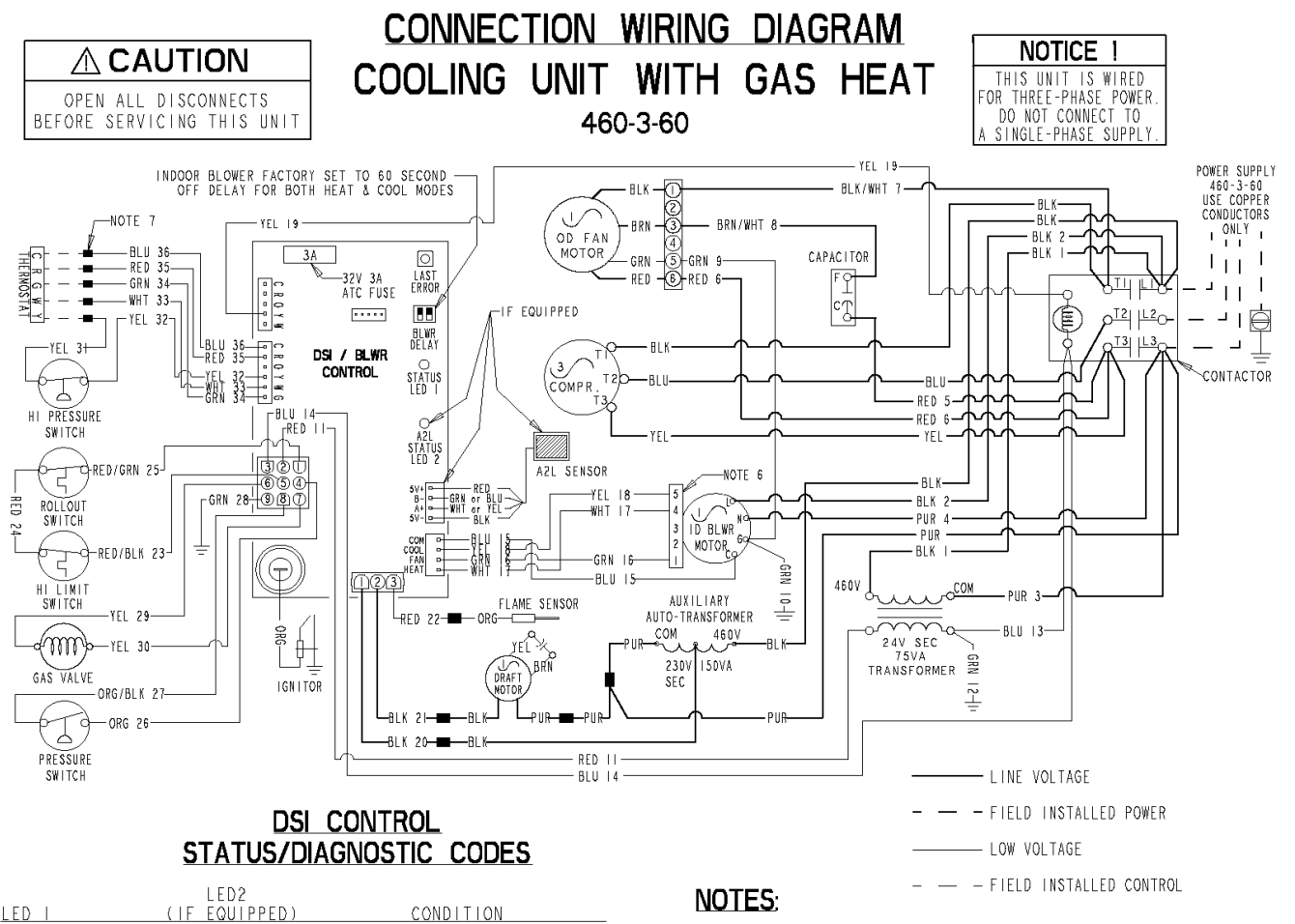
   Important: You can follow the charging chart to check and adjust unit charge if there is no hot work or refrigerant circuit repair involved; otherwise, read the A2L refrigerant safety guidance in its entirety before charging the unit. Whenever applicable, it is preferred to accurately charge the rating 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 18: Connection wiring diagram



DSI CONTROL STATUS/DIAGNOSTIC CODES

LED 1	LED2 (IF EQUIPPED)	CONDITION
OFF	OFF	NO POWER TO CONTROL OR CONTROL FAILURE
GREEN HEARTBEAT	OFF	STANDBY,CALL FOR FAN OR COOL
AMBER HEARTBEAT	OFF	CALL FOR HEAT ACTIVE
RAPID GREEN FLASH	OFF	FACTORY TEST MODE
RAPID AMBER FLASH	OFF	LOW FLAME CURRENT
ON (ANY COLOR)	OFF	CONTROL FAILURE
1 RED FLASH	OFF	FLAME SENSED W/GAS VALVE OFF
2 RED FLASHES	OFF	PRESS. SWITCH CLOSED W/DRAFT INDUCER OFF
3 RED FLASHES	OFF	PRESS. SWITCH OPEN W/DRAFT INDUCER ON
4 RED FLASHES	OFF	LIMIT/ROLLOUT SWITCH OPEN
4 AMBER FLASHES	OFF	CALL FOR COOL "Y" W/O CALL FOR FAN "G"
5 RED FLASHES	OFF	LIMIT/ROLLOUT SWITCH OPEN > 15 MIN.
6 RED FLASHES	OFF	DRAFT INDUCER PRESS. SWITCH CYCLE LOCKOUT
7 RED FLASHES	OFF	LOCKOUT - FAILED IGNITION
8 RED FLASHES	OFF	LOCKOUT - TOO MANY FLAME DROPOUTS
9 RED FLAHSES	OFF	TRANSFORMER LOW VOLTAGE OUT OF PHASE WITH LINE VOLTAGE
10 RED FLASHES	OFF	GAS VALVE FAULT
11 RED FLASHES	OFF	LIMIT/ROLLOUT OPEN BETWEEN 5 AND 15 MIN.
RAPID RED FLASH	ON	REFRIG. LEAK DETECTED (ABOVE 15% LFL)
1 RED FLASH	ON	REFRIG. DETECTION SENSOR - BYPASSED
2 RED FLASHES	ON	REFRIG. DETECTION SENSOR - LOST COMM.
3 RED 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 460 VOLT THREE PHASE SUPPLY POWER.
4. MOTORS ARE INHERENTLY PROTECTED.
5. SEE UNIT NAMEPLATE FOR MAXIMUM FUSE AND/OR CIRCUIT BREAKER SIZE AND MINIMUM CIRCUIT AMPACITY.
6. BLOWER MOTOR SPEED CONNECTIONS SHOWN ARE TYPICAL BUT MAY VARY BY MODEL AND APPLICATION. SEE INSTALLATION MANUAL FOR PROPER SPEED TAP INFORMATION FOR EACH APPLICATION TO OBTAIN PROPER HEAT RISE IN HEATING MODE AND APPROX. 400 CFM/TON IN COOLING.
7. CONNECT THERMOSTAT CONTROL WIRING TO MAIN WIRING HARNESS USING SPRING TYPE WIRE CONNECTORS OR EQUIVALENT WITH FACTORY RUN TEST CONNECTOR REMOVED.

FAULT CODE RETRIEVAL

PRESS "LAST ERROR" BUTTON FOR MORE THAN 1/5 SECOND AND LESS THAN 5 SECONDS WITH NO ACTIVE THERMOSTAT SIGNALS TO DISPLAY STORED ERROR CODES. HOLD FOR MORE THAN 5 SECONDS TO CLEAR MEMORY.

FOR MORE DETAILED INFORMATION, SEE INSTALLATION MANUAL

6454881-UWD-C-1024

Figure 19: Ladder wiring diagram

LADDER WIRING DIAGRAM
COOLING UNIT WITH GAS HEAT
460-3-60

⚠ CAUTION
OPEN ALL DISCONNECTS BEFORE SERVICING THIS UNIT

NOTICE !
THIS UNIT IS WIRED FOR THREE-PHASE POWER. DO NOT CONNECT TO A SINGLE-PHASE SUPPLY.

DSI CONTROL STATUS/DIAGNOSTIC CODES

LED 1	LED2 (IF EQUIP.)	CONDITION
OFF	OFF	NO POWER TO CONTROL OR CONTROL FAILURE
GREEN HEARTBEAT	OFF	STANDBY,CALL FOR FAN OR COOL
AMBER HEARTBEAT	OFF	CALL FOR HEAT ACTIVE
RAPID GREEN FLASH	OFF	FACTORY TEST MODE
RAPID AMBER FLASH	OFF	LOW FLAME CURRENT
ON (ANY COLOR)	OFF	CONTROL FAILURE
1 RED FLASH	OFF	FLAME SENSED W/GAS VALVE OFF
2 RED FLASHES	OFF	PRESS. SWITCH CLOSED W/DRAFT INDUCER OFF
3 RED FLASHES	OFF	PRESS. SWITCH OPEN W/DRAFT INDUCER ON
4 RED FLASHES	OFF	LIMIT/ROLLOUT SWITCH OPEN
4 AMBER FLASHES	OFF	CALL FOR COOL "Y" W/O CALL FOR FAN "G"
5 RED FLASHES	OFF	LIMIT/ROLLOUT SWITCH OPEN > 15 MIN.
6 RED FLASHES	OFF	DRAFT INDUCER PRESS. SWITCH CYCLE LOCKOUT
7 RED FLASHES	OFF	LOCKOUT - FAILED IGNITION
8 RED FLASHES	OFF	LOCKOUT - TOO MANY FLAME DROPOUTS
9 RED FLAHSES	OFF	TRANSFORMER LOW VOLTAGE OUT OF PHASE WITH LINE VOLTAGE
10 RED FLASHES	OFF	GAS VALVE FAULT
11 RED FLASHES	OFF	LIMIT/ROLLOUT OPEN BETWEEN 5 AND 15 MIN.
RAPID RED FLASH	ON	REFRIG. LEAK DETECTED (ABOVE 15% LFL)
1 RED FLASH	ON	REFRIG. DETECTION SENSOR - BYPASSED
2 RED FLASHES	ON	REFRIG. DETECTION SENSOR - LOST COMM.
3 RED FLASHES	ON	REFRIG. DETECTION SENSOR - FAILURE

FAULT CODE RETRIEVAL

PRESS "LAST ERROR" BUTTON FOR MORE THAN 1/5 SECOND AND LESS THAN 5 SECONDS WITH NO ACTIVE THERMOSTAT SIGNALS TO DISPLAY STORED ERROR CODES. HOLD FOR MORE THAN 5 SECONDS TO CLEAR MEMORY.

FOR MORE DETAILED INFORMATION, SEE INSTALLATION MANUAL

NOTES:

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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 460 VOLT THREE PHASE SUPPLY POWER.
4. MOTORS ARE INHERENTLY PROTECTED.
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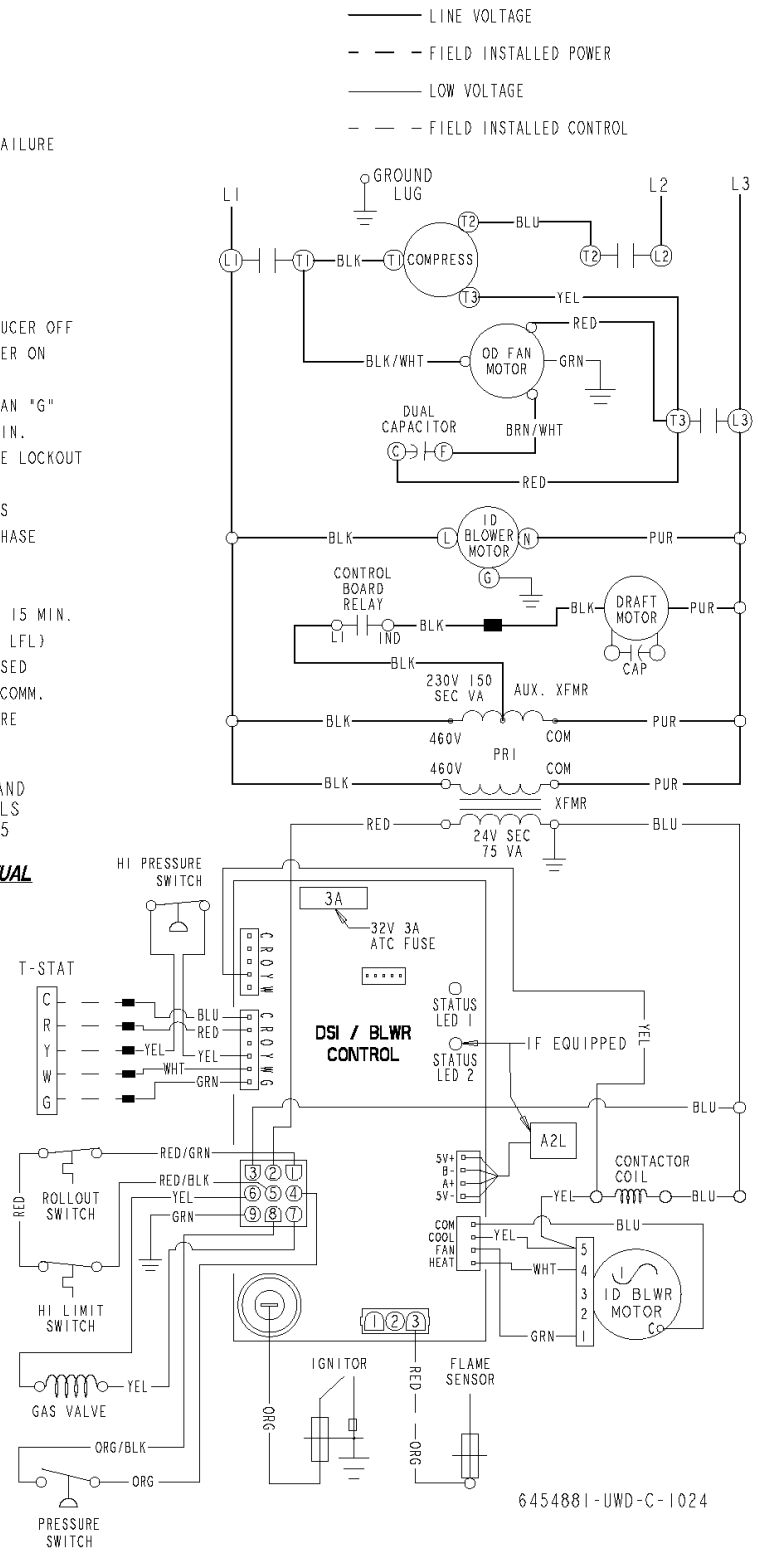
6. BLOWER MOTOR SPEED CONNECTIONS SHOWN ARE TYPICAL BUT MAY VARY BY MODEL AND APPLICATION. SEE INSTALLATION MANUAL FOR PROPER SPEED TAP INFORMATION FOR EACH APPLICATION TO OBTAIN PROPER HEAT RISE IN HEATING MODE AND APPROX. 400 CFM/TON IN COOLING.
7. CONNECT THERMOSTAT CONTROL WIRING TO MAIN WIRING HARNESS USING SPRING TYPE WIRE CONNECTORS OR EQUIVALENT WITH FACTORY RUN TEST CONNECTOR REMOVED.



Start-up sheet

Residential package unit cooling with gas 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 ☐ Crank case 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/cooling

Blower type and set-up	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	

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Refrigerant charge and metering device

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

Gas heat

○ Single stage ○ Two stage	○ Natural gas ○ Propane (LP) gas (requires LP conversion kit)		
LP conversion kit model	LP conversion kit installed by	Inlet gas pressure (in. W.C.)	
Manifold pressure at 100% firing rate (in. W.C.)	Measured Btu/h (Clock gas meter nat gas)	Rated Btu/h	
Manifold pressure/low fire rate (in. W.C.)	Return air dry bulb temp	Supply air dry bulb temp	Temp rise
☐ Burner flame inspection - Blue flames extending directly into the primary heat exchanger cells			

Clean up job site

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

Unit operation and cycle test

- ☐ 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 gas 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