# Installation Instructions

## PDX4 Series

## PACKAGED DUAL FUEL UNITS

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ARI PERFORMANCE CERTIFIED ARI Standard 210/240 Unitary Air Conditioners

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EFFICIENCY RATING CERTIFIED ama


International Comfort Products, LLC
Lewisburg, TN. 37091

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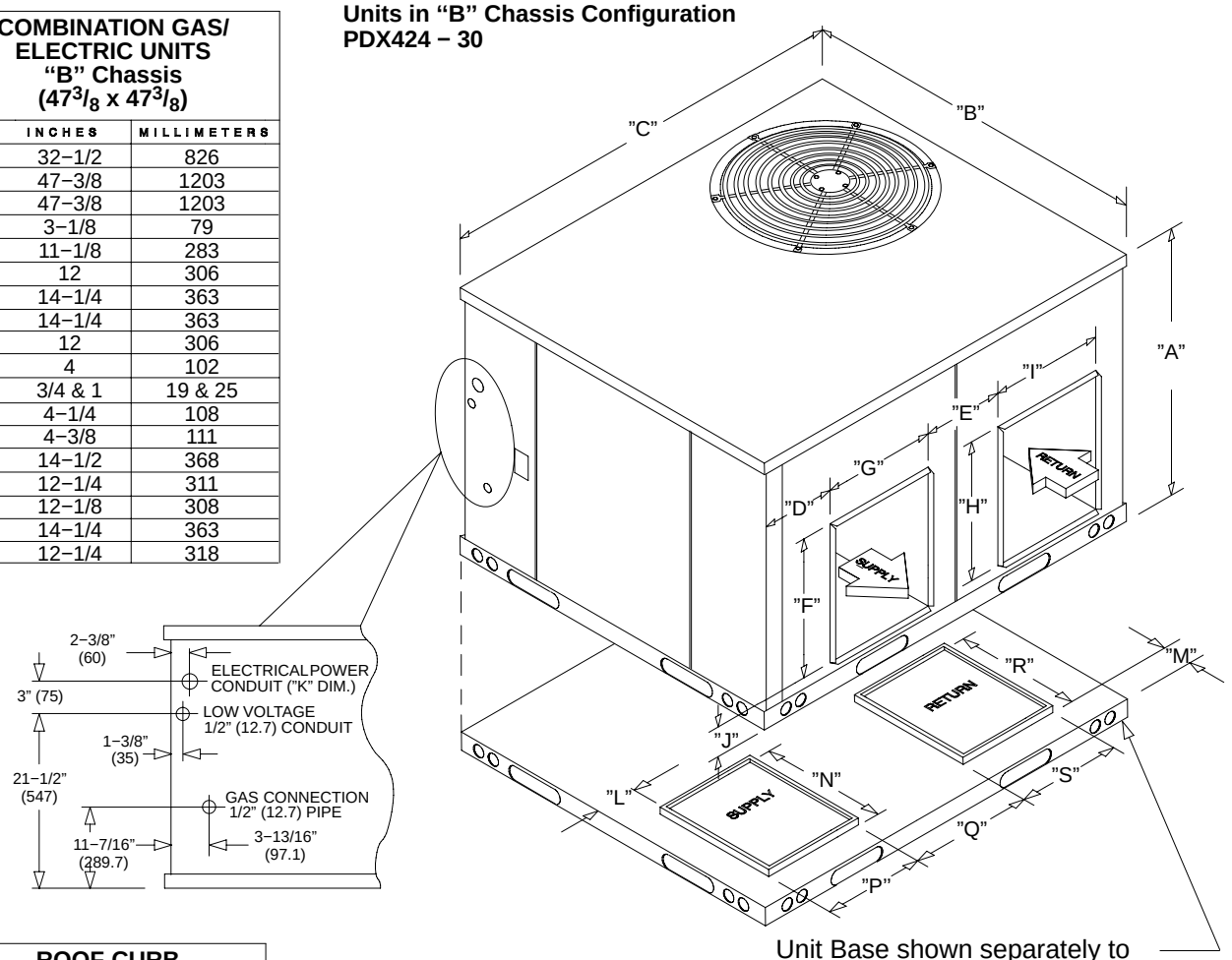
## 1. Unit Dimensions

# "B" CHASSIS UNIT DIMENSIONS

| COMBINATION GAS/ ELECTRIC UNITS "B" Chassis ($47^3/_8$ x $47^3/_8$) | | |
|---|---|---|
| DIM. | INCHES | MILLIMETERS |
| A | 32−1/2 | 826 |
| B | 47−3/8 | 1203 |
| C | 47−3/8 | 1203 |
| D | 3−1/8 | 79 |
| E | 11−1/8 | 283 |
| F | 12 | 306 |
| G | 14−1/4 | 363 |
| H | 14−1/4 | 363 |
| I | 12 | 306 |
| J | 4 | 102 |
| K | 3/4 & 1 | 19 & 25 |
| L | 4−1/4 | 108 |
| M | 4−3/8 | 111 |
| N | 14−1/2 | 368 |
| P | 12−1/4 | 311 |
| Q | 12−1/8 | 308 |
| R | 14−1/4 | 363 |
| S | 12−1/4 | 318 |

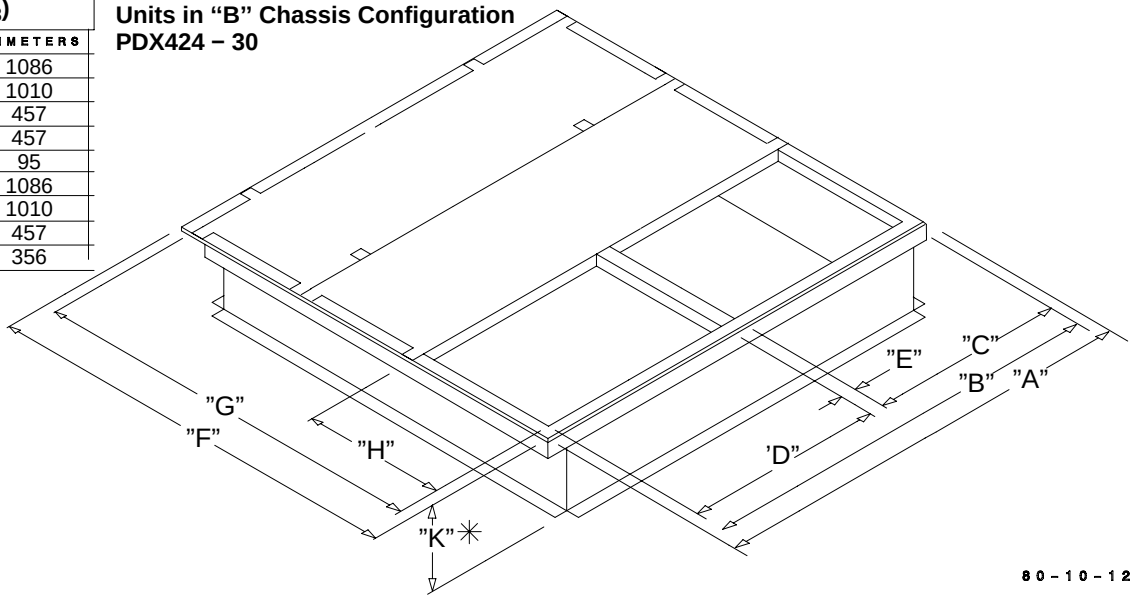
**Units in "B" Chassis Configuration**
**PDX424 − 30**




Unit Base shown separately to illustrate bottom of duct openings.

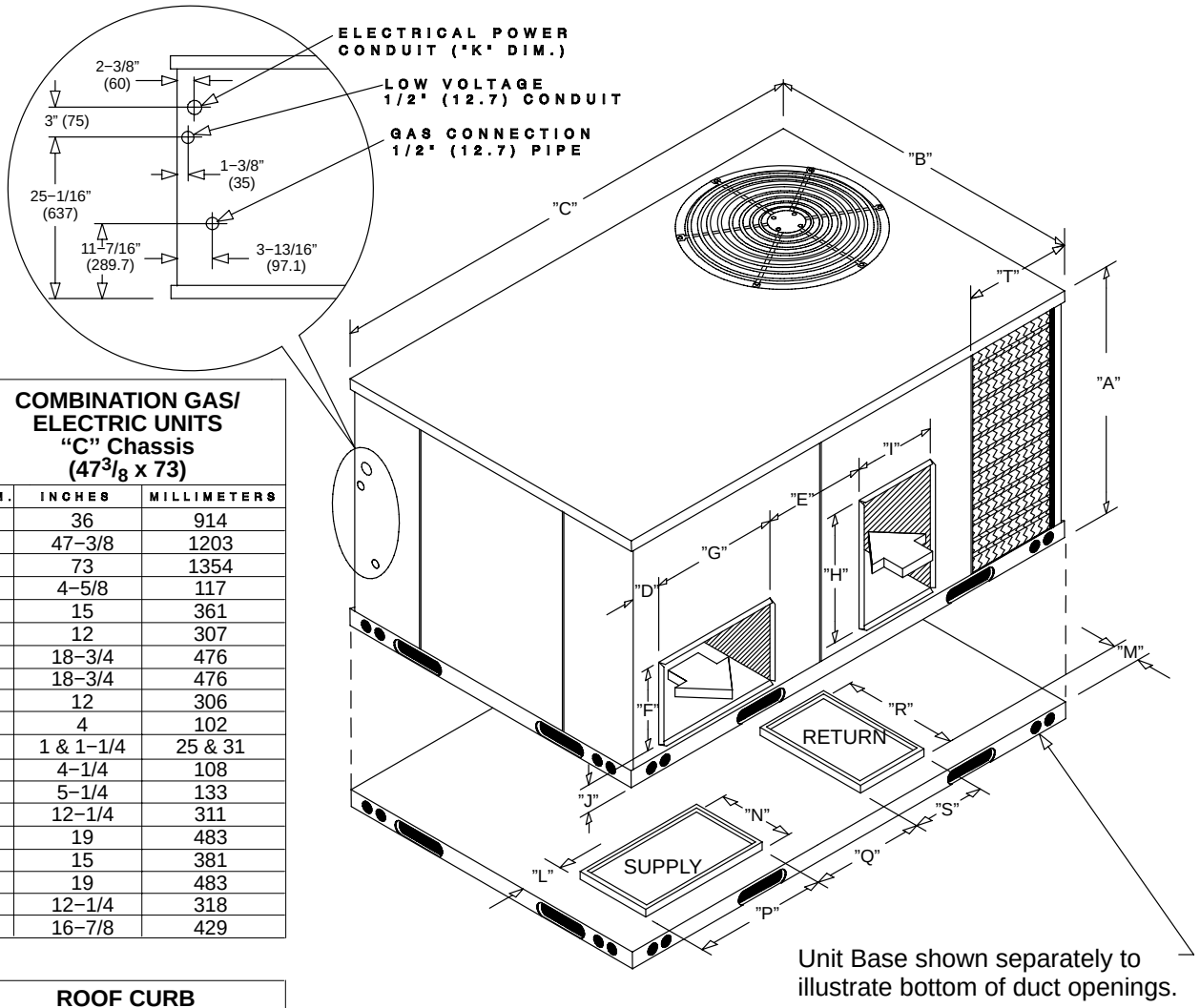
| ROOF CURB for units in "B" Chassis ($47^3/_8$ x $47^3/_8$) | | |
|---|---|---|
| DIM. | INCHES | MILLIMETERS |
| A | 42−3/4 | 1086 |
| B | 39−3/4 | 1010 |
| C | 18 | 457 |
| D | 18 | 457 |
| E | 3−3/4 | 95 |
| F | 42−3/4 | 1086 |
| G | 39−3/4 | 1010 |
| H | 18 | 457 |
| K* | 14 | 356 |

**Units in "B" Chassis Configuration**
**PDX424 − 30**




* Roof curbs are also available in 8" (203) and 24" (610) heights (K Dimensions).

# “C” CHASSIS UNIT DIMENSIONS




Unit Base shown separately to illustrate bottom of duct openings.

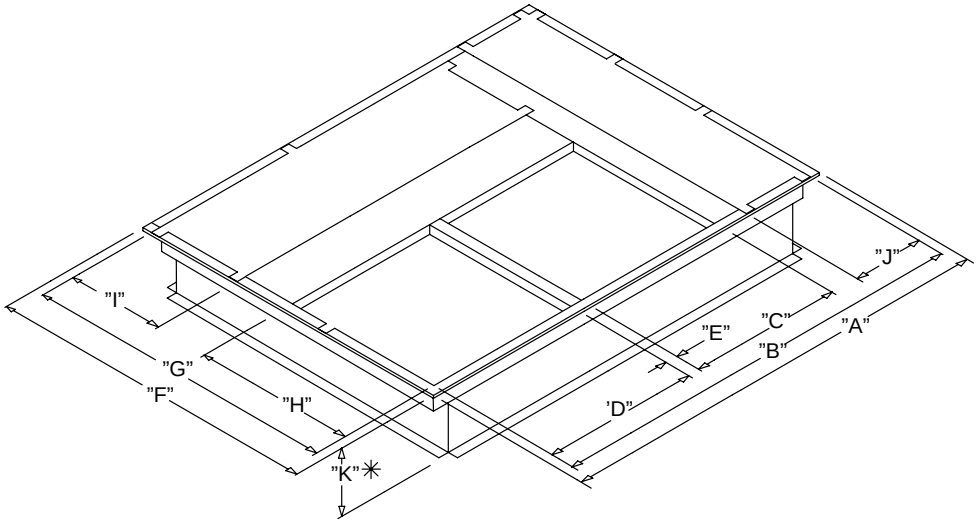
**COMBINATION GAS/ ELECTRIC UNITS “C” Chassis ($47^3/_8$ x 73)**

| DIM. | INCHES | MILLIMETERS |
|---|---|---|
| A | 36 | 914 |
| B | 47−3/8 | 1203 |
| C | 73 | 1354 |
| D | 4−5/8 | 117 |
| E | 15 | 361 |
| F | 12 | 307 |
| G | 18−3/4 | 476 |
| H | 18−3/4 | 476 |
| I | 12 | 306 |
| J | 4 | 102 |
| K | 1 & 1−1/4 | 25 & 31 |
| L | 4−1/4 | 108 |
| M | 5−1/4 | 133 |
| N | 12−1/4 | 311 |
| P | 19 | 483 |
| Q | 15 | 381 |
| R | 19 | 483 |
| S | 12−1/4 | 318 |
| T | 16−7/8 | 429 |

**ROOF CURB for “C” Chassis ($47^3/_8$ x 73)**

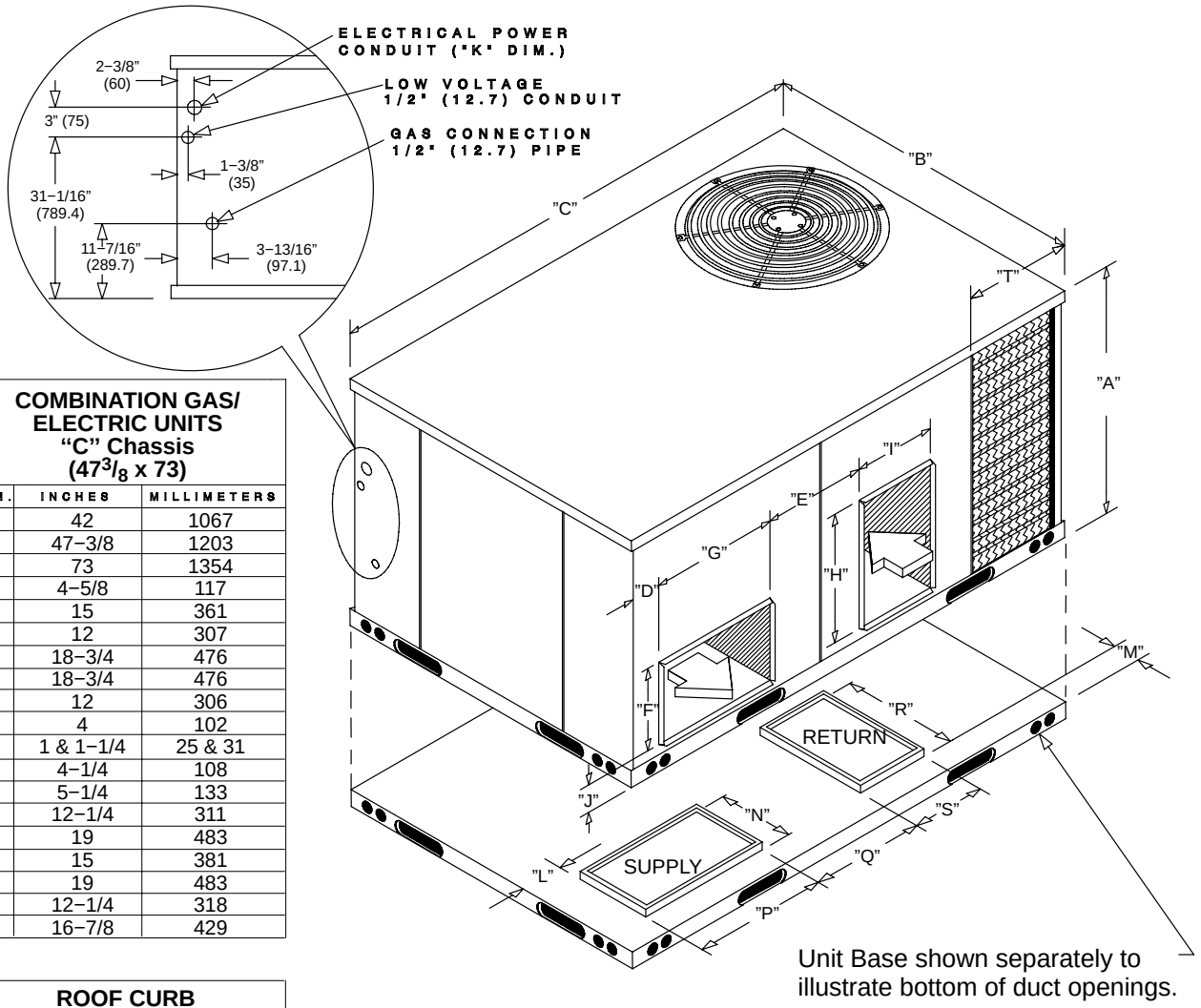
| DIM. | INCHES | MILLIMETERS |
|---|---|---|
| A | 67−3/4 | 1721 |
| B | 64−3/4 | 1645 |
| C | 23 | 584 |
| D | 23 | 584 |
| E | 2−1/2 | 64 |
| F | 42−3/4 | 1086 |
| G | 39−3/4 | 1010 |
| H | 23 | 584 |
| I | 12 | 305 |
| J | 12 | 305 |
| K* | 14 | 356 |

**Units in “C” Chassis Configuration**
**PDX436−42**




* Roof curbs are also available in 8” (203) and 24” (610) heights (K Dimensions).

# "C+" CHASSIS UNIT DIMENSIONS




Unit Base shown separately to illustrate bottom of duct openings.

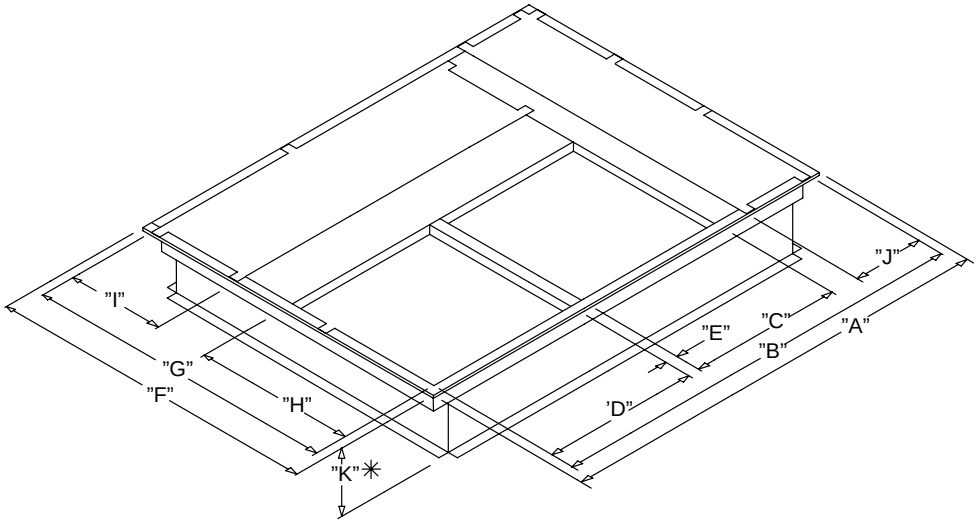
**COMBINATION GAS/ ELECTRIC UNITS "C" Chassis ($47^3/_8$ x 73)**

| DIM. | INCHES | MILLIMETERS |
|---|---|---|
| A | 42 | 1067 |
| B | 47−3/8 | 1203 |
| C | 73 | 1354 |
| D | 4−5/8 | 117 |
| E | 15 | 361 |
| F | 12 | 307 |
| G | 18−3/4 | 476 |
| H | 18−3/4 | 476 |
| I | 12 | 306 |
| J | 4 | 102 |
| K | 1 & 1−1/4 | 25 & 31 |
| L | 4−1/4 | 108 |
| M | 5−1/4 | 133 |
| N | 12−1/4 | 311 |
| P | 19 | 483 |
| Q | 15 | 381 |
| R | 19 | 483 |
| S | 12−1/4 | 318 |
| T | 16−7/8 | 429 |

**ROOF CURB for "C" Chassis ($47^3/_8$ x 73)**

| DIM. | INCHES | MILLIMETERS |
|---|---|---|
| A | 67−3/4 | 1721 |
| B | 64−3/4 | 1645 |
| C | 23 | 584 |
| D | 23 | 584 |
| E | 2−1/2 | 64 |
| F | 42−3/4 | 1086 |
| G | 39−3/4 | 1010 |
| H | 23 | 584 |
| I | 12 | 305 |
| J | 12 | 305 |
| K* | 14 | 356 |

**Units in "C" Chassis Configuration**
**PDX448−60**




* Roof curbs are also available in 8" (203) and 24" (610) heights (K Dimensions).

## 2. SAFE INSTALLATION REQUIREMENTS

Installation and servicing of air−conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified personnel should install, repair, or service air−conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters. All other operations should be performed by trained service personnel. When working on air−conditioning equipment, observe precautions in the literature, tags, and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

**⚠ WARNING**

**FIRE, EXPLOSION, ELECTRICAL SHOCK, AND CARBON MONOXIDE POISON HAZARD**

**Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, fire, or an explosion which could result in personal injury or unit damage. Consult a qualified installer, service agency, or gas supplier for information or assistance. The qualified installer or agency must use only factory−authorized kits or accessories when modifying this product.**

**⚠ WARNING**

**FIRE, EXPLOSION, ELECTRICAL SHOCK, AND CARBON MONOXIDE POISON HAZARD**

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

**Before performing service or maintenance operations on unit, turn off gas supply to unit. *Then* turn off unit main power switch and install lockout tag.**

Recognize safety information. This is the safety−alert symbol ⚠. When you see this symbol in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTE**. These words are used with the safety−alert symbol. **DANGER** identifies the most serious hazards which **will** result in serious injury or death. **WARNING** signifies a hazard which **could** result in serious injury or death. **CAUTION** is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.

**⚠ WARNING**

**FIRE, EXPLOSION, ELECTRICAL SHOCK, AND CARBON MONOXIDE POISON HAZARD**

**Failure to carefully read and follow all instructions in this manual could result in furnace malfunction, property damage, personal injury and/or death.**

**Installation or repairs made by unqualified persons can result in hazards to you and others. Installation MUST conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code NFPA 54−2005/ANSI Z223.1−2005 and the National Electrical Code NFPA70−2005 or in Canada the National Standard CAN/CGA B149−1 and CSA C.22.1 − Canadian Electrical Code Part 1.**

**The information contained in this manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments.**

### SAFETY CONSIDERATIONS

- Use only with type of gas approved for this unit. Refer to unit rating plate.
- Install this unit only in a location and position as specified in section 3 of this manual.
- 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, as specified in section 5.
- Always install unit to operate within the unit's intended temperature−rise range with a duct system, which has an external static pressure within the allowable range, as specified in section 9. Refer to unit rating plate for the allowable external static pressures.
- All connecting ductwork to the unit (supply and return) must be sealed to the unit casing as specified in section 7.
- Do **NOT** use this furnace as a construction heater.
- Check to see that filters are installed correctly and are the proper type an size.

**NOTE:** It is the personal responsibility and obligation of the customer to contact a qualified installer to ensure that the installation is adequate and conforms to governing codes and ordinances.

**⚠ CAUTION**

**UNIT SAFETY**

**Failure to follow this caution may reduce unit reliability.**

**It is recommended that a qualified service technician check the heat exchanger integrity every two (2) years, after the first four (4) years of operation.**

### INTRODUCTION

The PDX4 unit is a fully self−contained, combination Category I gas heating/electric heat pump unit designed for outdoor installation (See pages 2 to 4 for unit dimensions). All unit sizes have return and discharge openings for both horizontal and downflow configurations, and are factory−shipped with all downflow duct openings covered.

Units may be installed either on a rooftop, cement slab, or directly on the ground if local codes permit.

Models with a ”1” in the twelfth position of the model number are dedicated Low NOx units designed for California installations. The emissions of these models do not exceed 40 nanograms of nitrogen oxide emissions per joule of heat output as shipped from the factory, and must be installed in California Air Quality Management Districts or any other regions in North America where a Low NOx rule exists.

## 3. LOCATING THE UNIT

### ACCESS PANELS

See **Figure 1** for a general view of unit and location of access panels.

**⚠ WARNING**

**CARBON MONOXIDE POISONING HAZARD.**
**Failure to follow this warning could result in personal injury and/or death.**
**Keep blower door closed.**

### CLEARANCES

The location **MUST** allow for minimum clearances and should not be adjacent to a patio or other area where the unit’s operating sound level might be objectionable. The combustion air inlet openings **MUST** not be obstructed (see **Figure 1**). In addition, local codes **MUST** be observed.

**NOTE**: Units with available filter racks ( 3−1/2 to 5 ton), need a 30″ (762mm) minimum clearance at side of unit for removal of filters. See chart below if unit is going to be placed near combustible construction or materials.

While minimum clearances are acceptable for safety reasons, they may not allow adequate air circulation around the unit for proper operation in the cooling mode. Whenever possible, it is desirable to allow additional clearance, especially around the condenser inlet and discharge openings.

Do **NOT** install the unit in a location that will permit discharged air from the condenser to recirculate to the condenser inlet.

**⚠ CAUTION**

**UNIT DAMAGE HAZARD**

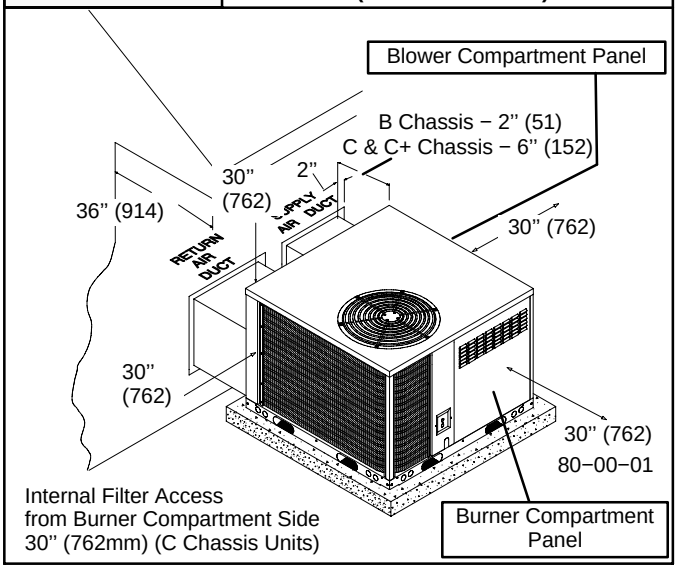
**Failure to follow this caution may result in shorten life of unit components.**

**Do NOT operate unit in a corrosive atmosphere containing chlorine, fluorine, or any other corrosive chemicals.**

**Minimum Clearances to Combustible Construction**

| | Inch | mm |
|---|---|---|
| Duct Side | 2 | 51 |
| Condenser Inlet | 30 | 762 |
| Blower Service (Side) | 30 | 762 |
| Control Service Side (Front Combustion Air Inlet) | 30 | 762 |
| Clearance between 3 Ft. Overhang and Top of Unit | 30 | 762 |
| Combustible Base (Wood or Class A, B or C roof covering material) | 0 | 0 |

**FIGURE 1** — **Minimum Clearances and Access Panels (B Chassis Shown)**




### INSTALLATION

**NOTICE**

**Unit will NOT operate properly unless it is installed level front to rear and side to side. The slope MUST NOT be greater than $^{1}/_{8}$″ per foot (10mm per meter). For side to side leveling, the drain side MUST always be lower.**

#### Ground Level Installation

Ground level platform requirements:

- The unit **MUST** be situated to provide safe access for servicing.
- Platform may be made of either concrete or pressure treated wood and **MUST** be level and strong enough to support unit weight.
- Position platform separate from building foundation.
- Install in well−drained area, with top surface of platform above grade level.
- Platform must be high enough to allow for proper condensate trap installation and drainage. See **FIGURE 4** and associated text for more information about condensate drainage.

#### Rooftop Installation

Rooftop platform requirements:

- The unit **MUST** be situated to provide safe access for servicing.
- The existing roof structure **MUST** be adequate to support the weight of the unit or the roof **MUST** be reinforced.
  Check the weight of the unit in relation to the roof structure and local building codes or ordinances and reinforce roof structure if necessary. See the last page of this manual for unit weights.
- Support for the unit **MUST** be level and strong enough to carry unit weight. The support may consist of a platform or a combination of platform and roof beams or curb.
- See *Hoisting* section for hoisting instructions.

### HOISTING

**NOTE:** All access panels **MUST** be secured in place before

hoisting.

The unit should be hoisted with two lifting slings. Attach the slings to rigging shackles that have been hooked through holes in the base rail.

Two spreader bars **MUST** be placed on top of the unit to protect the unit from damage from the pressure exerted by the slings. Make sure that all equipment is adequate to handle the weight of the unit and that the slings will not allow the unit to shift.

Refer to **Figure 20** on the back cover of this manual for illustrated rigging instructions and weight chart.

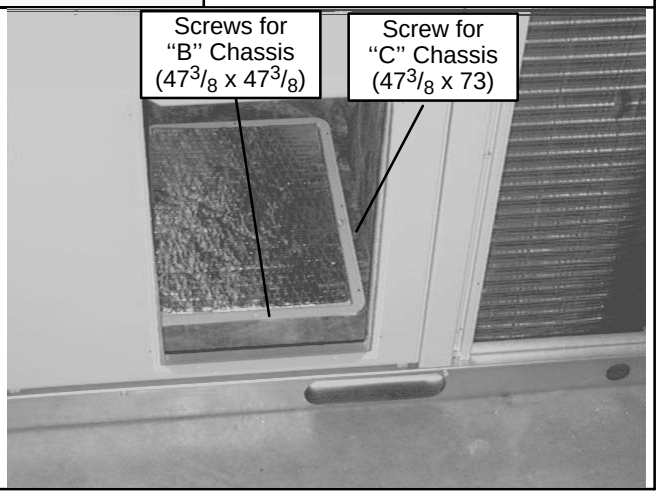
### DOWNFLOW CONVERSION

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

1. Remove the blockoff plates found in the return air compartment and the supply air compartment.

**NOTE**: Blockoff plate in the supply air compartment only contains one screw. If reinstalling plate, back part of plate **MUST** fit into mating dimples on flange. To reinstall, slant plate into dimples, then put plate into position and fasten with screw.

**FIGURE 2** Heating Vent Assembly

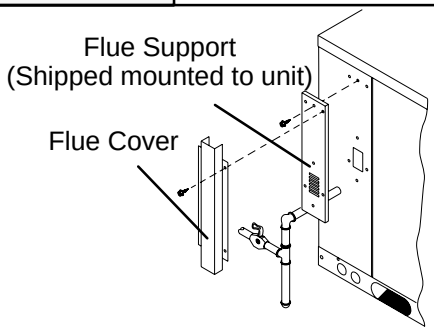



2. Install the removed plates on the horizontal return and supply air openings.
3. Install roof curb on the building. Be sure to follow all directions included with curb and all applicable building codes in your installation. See page 2 or 3 for appropriate roof curb to use.

### Heating Vent Assembly

The flue cover is packed with installation screws in the return air compartment. Refer to **FIGURE 3** and assemble as shown.

**FIGURE 3** Heating Vent Assembly




**⚠ CAUTION**

**UNIT DAMAGE**

**Failure to follow this caution may result in unit damage.**

**Do not operate the unit without the vent assembly installed.**

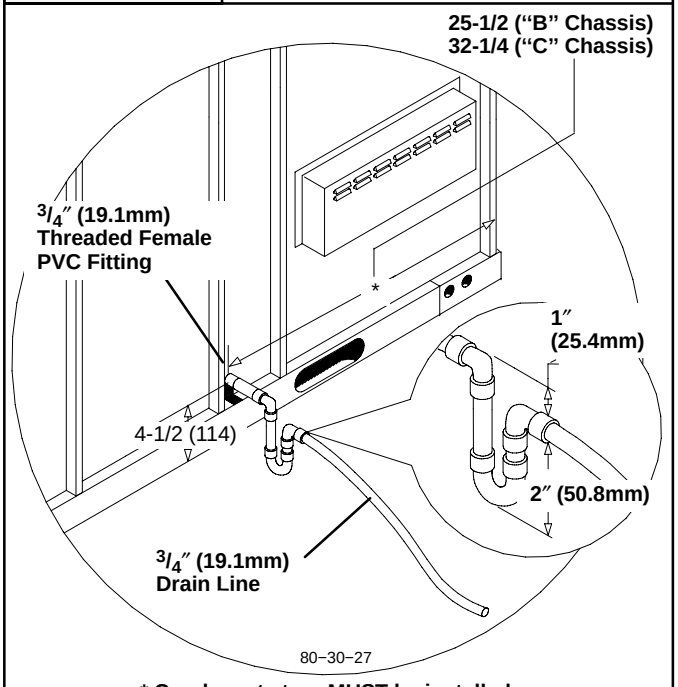
### Condensate Drain

The condensate drain outlet is a 3/4″ (19.1mm) female PVC connection located at the bottom of the unit to the right of the filter access panel (see **FIGURE 4**).

The circulating blower creates a negative pressure on the condensate drain line that can prevent the condensate from draining properly. To combat this negative pressure, a field supplied condensate trap that will allow a standing column of water of at least 2″ (50.8mm) **MUST** be installed . Top of outlet from trap **MUST** be at least 1″ (25.4mm) below top of outlet from unit. **Install the trap as near to the unit as possible for proper drainage.**

A 3/4″ (19.1mm) drain line **MUST** be installed if required by local codes or if location of unit requires it. Run the drain line to an open drain or other suitable disposal point.

**FIGURE 4** Condensate Drain Information*




*** Condensate trap MUST be installed.**

## 4. PRE−EXISTING COMMON VENT CHECK

If the installation of this new combination gas heat/electric cool unit involves removing an existing gas−fired furnace from a common vent system with other gas−fired appliances (gas−fired hot water heater, etc.), the existing vent system must be checked and inspected by a qualified technician. The qualified technician can determine if the existing vent system will properly vent the flue products of the remaining gas−fired appliances. In many cases, the existing vent system may be oversized for the remaining appliances.

## 5. GAS SUPPLY AND PIPING

**NOTE**: Because there are many types of liquified petroleum (propane) gases, the term propane as used in this manual refers to *propane* gas. If you intend to use any type of propane gas, proper precautions **MUST** be used in the handling, piping, and use of such gas. **NOTE**: In Canada, installations **MUST** be performed by licensed propane installers.

The UL rating plate located on the side panel on the unit contains the model number, type of gas, gas input rating, and other important information.

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD**

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

**Make certain the unit is equipped to operate on the type of gas available. Models designated as natural gas are to be used with natural gas only. Models designated for use with liquefied petroleum (propane ) gas are shipped with orifices sized for commercially pure propane gas. They MUST not be used with butane or a mixture of butane and propane unless properly sized orifices are installed by a licensed propane installer.**

### GAS PIPING

The gas supply line **MUST** be of adequate size to handle the Btu/hr requirements and length of the run for the unit being installed. Determine the minimum pipe size for natural gas from the table in **FIGURE 5** or **FIGURE 6**. Base the length of the run from the gas meter or source to the unit.

#### Gas Pipe Size

Btu ratings of all other gas appliances **MUST** be considered for sizing of main gas line. Check gas line to installation for compliance with local codes or, in the absence of local codes, with the National Fuel Gas Code NFPA 54−2005/ANSI Z223.1−2005 or in Canada the National Standard CAN/CGA B149−1 or current editions.

**FIGURE 5** Gas Pipe Size, Length and Btu/hr Capacity for Schedule 40 Iron Pipe (English)

| NATURAL GAS | | | | | |
|---|---|---|---|---|---|
| **Pipe Length** (Includes Fittings) | **Btu/hr (in thousands)** | | | | |
| | **3/4″** | **1″** | **1 1/4″** | **1 1/2″** | **2″** |
| 20′ | 190 | 350 | 730 | 1,100 | 2,100 |
| 40′ | 130 | 245 | 500 | 760 | 1,450 |
| 60′ | 105 | 195 | 400 | 610 | 1,150 |
| **propane GAS** | | | | | |
| **Pipe Length** (Includes Fittings) | **Btu/hr (in thousands)** | | | | |
| | **1/2″** | **3/4″** | **1″** | **1 1/4″** | **1 1/2″** |
| 20′ | 189 | 393 | 732 | 1,496 | 2,299 |
| 40′ | 129 | 267 | 504 | 1,039 | 1,559 |
| 60′ | 103 | 217 | 409 | 834 | 1,275 |

**FIGURE 6** Gas Pipe Size, Length and Btu/hr Capacity for Schedule 40 Iron Pipe (English)

| NATURAL GAS | | | | | |
|---|---|---|---|---|---|
| **Pipe Length** (Includes Fittings) | **kW**** | | | | |
| | **3/4″** | **1″** | **1 1/4″** | **1 1/2″** | **2″** |
| 6.1m | 56 | 103 | 214 | 322 | 615 |
| 12.2m | 38 | 72 | 147 | 223 | 425 |
| 18.3m | 31 | 57 | 117 | 179 | 337 |
| **Propane GAS** | | | | | |
| **Pipe Length** (Includes Fittings) | **kW**** | | | | |
| | **1/2″** | **3/4″** | **1″** | **1 1/4″** | **1 1/2″** |
| 6.1m | 55 | 115 | 215 | 438 | 674 |
| 12.2m | 38 | 78 | 148 | 305 | 457 |
| 18.3m | 30 | 64 | 120 | 244 | 374 |

**kW (Kilowatts) is the metric equivalent of Btu/hr.

### PIPING AT UNIT

#### Connections

In the state of Massachusetts:

- This product must be installed by a licensed Plumber or Gas Fitter.
- When flexible connections are used, the maximum length shall not exceed 36 inches (914mm).
- When lever type gas shutoffs are used they shall be T−handle type.
- The use of copper tubing for gas piping is not approved by the state of Massachusetts.

**NOTE:** The rules listed apply to natural and propane gas pipe installations.

1. If installation is for propane gas, have propane gas installer use **TWO−STAGE REGULATION** and make all connections from storage tank to unit.
2. Use black iron or steel pipe and fittings or other pipe approved by local code.
3. If copper tubing is used, it **MUST** comply with limitation set in Fuel Gas Code.

**NOTE:** If a flexible gas connector is used, it **MUST** be acceptable to local authority. Connector **MUST NOT** be used inside the furnace or be secured or supported by the furnace or ductwork. Do not use a connector which has

previously serviced another gas appliance. Always use a new listed connector.

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD**

**Failure to do so could result in personal injury, death and/or property damage.**

**Gas connector MUST be properly installed and can NOT be used inside the furnace.**

4. Use pipe joint compound on external (male) threads **ONLY**. Joint compound **MUST** be resistant to any chemical action of propane gases. Do **NOT** put pipe compound on last 2 threads of pipe.
5. Use ground joint unions and install a drip leg no less than 3 inches (76 mm) long to trap dirt and moisture before it can enter gas valve.

**⚠ CAUTION**

**UNIT OPERATION AND COMPONENT DAMAGE HAZARD**

**Failure to follow this caution may result in misaligned burners, flame rollout and or unit damage.**

**Overtightening assembly may cause damage to the gas valve and/or wiring and may misalign the burners.**

6. Use a wrench on gas valve when making connections to prevent gas valve from turning. Do **NOT** use a pipe wrench on the gas valve body.
7. Provide a $^1/_8$ inch (3mm) National Pipe Thread (NPT) plug for test gauge connection immediately upstream of the gas supply connection to the furnace if none is supplied with the gas valve of unit.
8. Install a manual shutoff valve and tighten all joints securely.

**LEAK CHECK /PRESSURE TESTING OF GAS SUPPLY PIPING**

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD**

**Failure to follow the safety warnings could result in personal 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.**

The unit and its equipment shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of .5 psi (3.5kPa).

The unit must be isolated from the gas supply piping system by closing the equipment shut off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than .5 psi (3.5 kPa).

**ORIFICES**

**Orifice Sizes**

Orifice sizes **MUST** be matched to the heating value of the gas (see **TABLE 1 & 2**). Check with your gas supplier and the National Fuel Gas Code ANSI Z223.1.

**NOTE:** A Propane Conversion Kit **MUST** be used for conversion to propane gas.

**NOTE:** For elevations above 2000 feet (610 meters), the Btu input rating **MUST** be reduced by 4% for each 1000 feet (305 meters) above sea level, unless the gas supplier's Btu/ft$^3$ content has already been adjusted for altitude. Check **Table 1 & 2** for the proper orifice sizes.

| Table 1 | NATURAL GAS MANIFOLD PRESSURE ("w.c.) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MEAN ELEVATION FEET ABOVE SEA LEVEL | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 to | | | 2001 to | | | 3001 to | | | 4001 to | | | 5001 to | | | 6001 to | | | 7001 to | | | 8001 to | | | 9001 to | | |
| HEATING VALUE at ALTITUDE | 2000 | | | 3000 | | | 4000 | | | 5000 | | | 6000 | | | 7000 | | | 8000 | | | 9000 | | | 10000 | | |
| | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | | Orifice | Mnfld Press | |
| BTU/CU. FT. | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo | No. | Hi | Lo |
| 700 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 47 | 3.7 | 1.8 | 48 | 3.6 | 1.8 | 49 | 3.6 | 1.8 |
| 725 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 46 | 3.6 | 1.7 | 47 | 3.5 | 1.7 | 48 | 3.4 | 1.7 | 49 | 3.4 | 1.7 |
| 750 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 46 | 3.3 | 1.6 | 48 | 3.7 | 1.8 | 49 | 3.7 | 1.8 | 50 | 3.7 | 1.8 |
| 775 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 46 | 3.6 | 1.8 | 47 | 3.5 | 1.7 | 48 | 3.5 | 1.7 | 49 | 3.5 | 1.7 | 50 | 3.5 | 1.7 |
| 800 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 45 | 3.7 | 1.8 | 46 | 3.4 | 1.7 | 47 | 3.3 | 1.6 | 48 | 3.3 | 1.6 | 49 | 3.3 | 1.6 | 50 | 3.3 | 1.6 |
| 825 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 46 | 3.7 | 1.8 | 47 | 3.6 | 1.8 | 48 | 3.6 | 1.7 | 49 | 3.6 | 1.8 | 50 | 3.6 | 1.8 | 51 | 3.7 | 1.8 |
| 850 | -- | -- | -- | -- | -- | -- | 45 | 3.7 | 1.8 | 46 | 3.4 | 1.7 | 47 | 3.4 | 1.7 | 48 | 3.4 | 1.6 | 49 | 3.4 | 1.7 | 50 | 3.4 | 1.7 | 51 | 3.5 | 1.7 |
| 875 | -- | -- | -- | -- | -- | -- | 46 | 3.7 | 1.8 | 47 | 3.7 | 1.8 | 48 | 3.7 | 1.8 | 49 | 3.7 | 1.8 | 49 | 3.2 | 1.6 | 50 | 3.2 | 1.6 | 51 | 3.3 | 1.6 |
| 900 | -- | -- | -- | -- | -- | -- | 46 | 3.5 | 1.7 | 47 | 3.5 | 1.7 | 48 | 3.5 | 1.7 | 49 | 3.5 | 1.7 | 50 | 3.6 | 1.8 | 51 | 3.7 | 1.8 | 51 | 3.1 | 1.5 |
| 925 | 43 | 3.4 | 1.7 | 45 | 3.6 | 1.8 | 46 | 3.3 | 1.6 | 48 | 3.7 | 1.8 | 48 | 3.3 | 1.6 | 49 | 3.3 | 1.6 | 50 | 3.4 | 1.7 | 51 | 3.5 | 1.7 | 52 | 3.6 | 1.8 |
| 950 | 44 | 3.7 | 1.8 | 46 | 3.6 | 1.8 | 47 | 3.6 | 1.7 | 48 | 3.6 | 1.7 | 49 | 3.6 | 1.8 | 50 | 3.7 | 1.8 | 50 | 3.2 | 1.6 | 51 | 3.3 | 1.6 | 52 | 3.4 | 1.7 |
| 975 | 44 | 3.5 | 1.7 | 46 | 3.4 | 1.7 | 47 | 3.4 | 1.7 | 48 | 3.4 | 1.7 | 49 | 3.5 | 1.7 | 50 | 3.5 | 1.7 | 51 | 3.6 | 1.8 | 51 | 3.1 | 1.5 | 52 | 3.3 | 1.6 |
| 1000 | 44 | 3.3 | 1.6 | 47 | 3.7 | 1.8 | 48 | 3.7 | 1.8 | 48 | 3.2 | 1.6 | 49 | 3.3 | 1.6 | 50 | 3.4 | 1.6 | 51 | 3.4 | 1.7 | 52 | 3.7 | 1.8 | 52 | 3.1 | 1.5 |
| 1050 | 45 | 3.6 | 1.8 | 47 | 3.3 | 1.6 | 48 | 3.3 | 1.6 | 49 | 3.4 | 1.7 | 50 | 3.5 | 1.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1100 | 46 | 3.5 | 1.7 | 48 | 3.4 | 1.7 | 49 | 3.6 | 1.7 | 50 | 3.7 | 1.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

Note: The orifice sizes in the chart above derate the input rate at 4%per 1000 feet above sea level for altitudes exceeding 2000 feet above sea level.

If converting from propane (LP) gas to Natural Gas, use kit number 1175405 for altitudes up to 2000 feet above sea level.

If converting from propane (LP) gas to Natural Gas, use kit number 1175405 and altitudes exceeding 2000 feet above sea level, use kit number 1175405 with field-supplied orifices.

Natural gas data is based on .6 specific gravity.

For fuels with different specific gravity, consult the National Fuel Gas Code NFPA 54-2006/ANSI Z223.1 - 2006 or

National Standard of Canada , Natural Gas and Propane Installation Code CSA B149.1-05.

| Table 2 | PROPANE (LP) GAS MANIFOLD PRESSURE ("w.c.) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEATING VALUE at ALTITUDE | MEAN ELEVATION FEET ABOVE SEA LEVEL | | | | | | | | | | | | | | | | | |
| | 0 to 2000 | | 2001 to 3000 | | 3001 to 4000 | | 4001 to 5000 | | 5001 to 6000 | | 6001 to 7000 | | 7001 to 8000 | | 8001 to 9000 | | 9001 to 10000 | |
| BTU/CU. FT. | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo |
| 2500 | 10.0 | 5.5 | 10.0 | 5.0 | 11.0 | 6.0 | 11.0 | 5.7 | 10.7 | 5.2 | 10.0 | 5.0 | 11.0 | 5.9 | 10.6 | 5.2 | 10.0 | 5.0 |
| Orifice Size | #55 | | #55 | | #56 | | #56 | | #56 | | #55 | | #57 | | #57 | | #57 | |
| Kit Number | 1175406 | | | | | | | | | | | | | | | | | |

Note: The orifice sizes in the chart above derate the input rate at 4%per 1000 feet above sea level for altitudes exceeding 2000 feet above sea level.

Propane (LP) gas data is based on 1.52 specific gravity.

For fuels with different specific gravity, consult the National Fuel Gas Code NFPA 54-2006/ANSI Z223.1 - 2006 or

National Standard of Canada, Natural Gas and Propane Installation Code CSA B149.1-05.

### Changing Orifices

**⚠ WARNING**

**ELECTRICAL SHOCK, FIRE AND/OR EXPLOSION HAZARD**

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

**Shut off electric power at unit disconnect or service panel and shut off gas at manual shut off valve before beginning the following procedure.**

**Changing orifices requires a qualified service technician.**

1. Shut **OFF** gas at manual shut off valve.
2. Shut **OFF** electric power at unit disconnect or service panel. If unit is still running, allow 3 minutes after gas shut off before turning off power.
3. Disconnect the wires from the gas valve, sparker, and flame sensor.
4. Remove the four screws holding the manifold to the manifold brackets.
5. Carefully remove the manifold with the gas valve attached.
6. If unit has v−shaped NOx baffles installed in the firing tubes, they must be removed when coverting to propane. Some baffles may be attached by screws. Replace screws after removing NOx baffles (**figure 7).**

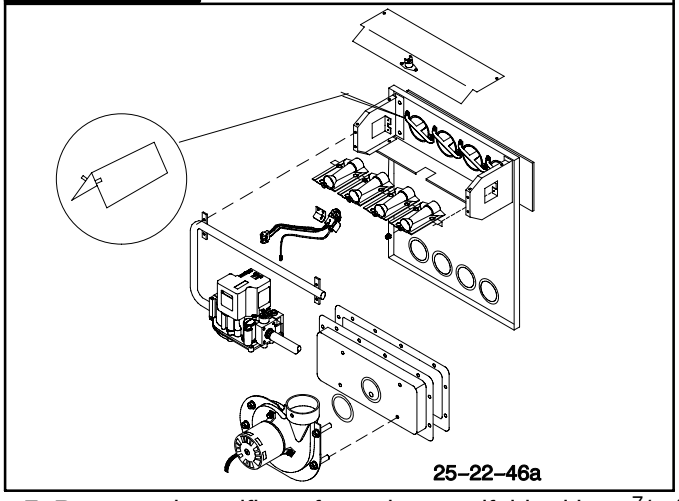
**⚠ WARNING**

**CARBON MONOXIDE HAZARD.**

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

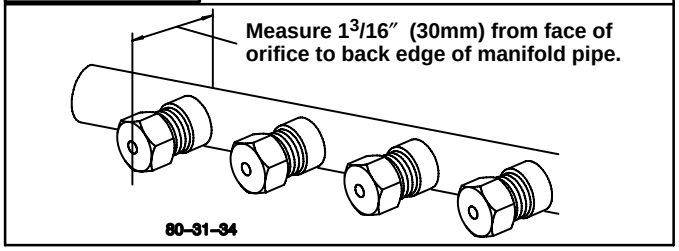
**NOx baffles for use with Natural Gas units ONLY. If propane Gas is required, NOx inserts must be removed.**

**FIGURE 7** **Removing NOx Baffles**




7. Remove the orifices from the manifold with a $^{7}/_{16}$″ (11mm) box end or socket wrench.
8. Check to be sure that the size of each orifice is correct for the Btu input desired.

**FIGURE 8** **Manifold/Orifice Measurement**




9. Install the correct orifices. Gauge the size of the orifices with a new twist drill bit of the correct size.

   Make sure that the orifices go in straight so that they form a right angle (90°) to the manifold pipe.

   Tighten the orifices so that there is a $1^{3}/_{16}$″ (30mm) distance between the faces of the orifices to the back of the manifold pipe.
   Measure the distance with a set of calipers. If you do not have a calipers, you can use an adjustable wrench and measure between the face of the jaws.
10. Reassemble in reverse order.

## 6. ELECTRICAL WIRING

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD.**

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

**The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of serious injury if an electrical fault should occur. This ground may consist of an electrical wire connected to the unit ground lug in the control compartment, or conduit approved for electrical ground when installed in accordance with National Electric Code (NEC) NFPA 70, National Fuel Gas Code NFPA 54−2005/ANSI Z223.1−2005 and local electrical codes. In Canada, follow Canadian Electrical Code CSA (Canadian Standards Association) C22.1 and local electrical codes.**

**⚠ CAUTION**

**REDUCED EQUIPMENT LIFE HAZARD**

**Failure to follow these cautions could result in damage to the unit being installed.**

**1) Make all electrical connections in accordance with National Electric code (NEC) NFPa 70, National Fuel Gas Code NFPA 54−2005/ANSI Z223.1−2005 and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1, Canadian Electrical Code Part 1, and applicable local codes. Refer to unit wiring diagram.**
**2) Use only copper conductor for connections between field−supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.**
**3) Be sure that high−voltage power to unit is within operating voltage range indicated on unit rating plate.**
**4) Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc. Consult local power company for correction of improper voltage and/or phase imbalance.**

For access, remove the burner access panel. See **Figure 1** for access panel location. Wiring **MUST** be protected from possible mechanical damage.

### Disconnect Switch

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

### Ground Connections

Do **NOT** complete line voltage connections until unit is permanently grounded. All line voltage connections and the ground connection **MUST** be made with copper wire.

A ground screw is installed in the control box area for the ground connection. Use a copper conductor of the appropriate size from the unit to a grounded connection in the electrical service panel or a properly driven and electrically grounded ground rod. See warning above.

### Line Voltage Wiring

Connections for line voltage are made in the unit control box area. Refer to wiring diagram located on the Burner Access panel. For access, remove the burner access panel.

1. Run the high voltage (L1, L2) and ground leads into the control box.
2. Connect ground lead to chassis ground connection.
3. Connect L1 to pressure lug connection 11 of the compressor contactor.
4. Connect L2 to pressure lug connection 23 of the compressor contactor.

### Thermostat / Low Voltage Wiring

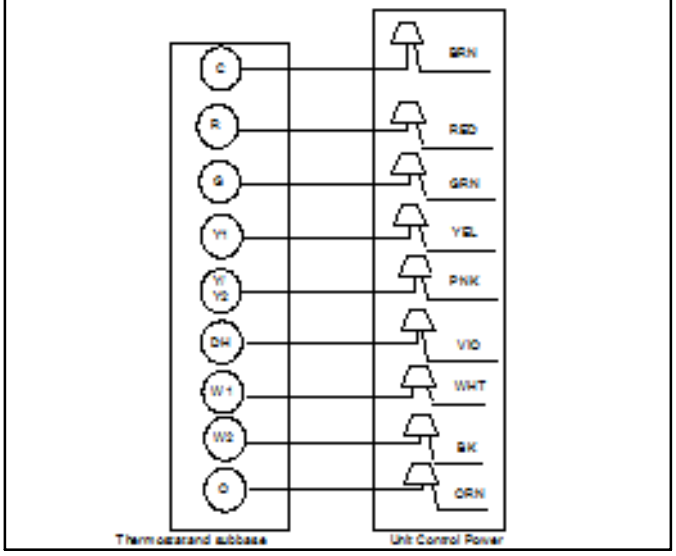
Location of the thermostat has an important effect on home comfort. FOLLOW THE THERMOSTAT INSTRUCTION MANUAL FOR CORRECT LOCATION, MOUNTING, AND WIRING.

These dual fuel units are designed for two−stage cooling operation, two−stage heat pump heating operation, and two−stage gas heating operation. In order for the unit to operate properly in cooling and heat pump heating modes, a two−stage cooling thermostat is required (Y1 and Y2 terminals). Do NOT use a single−stage cooling thermostat. A single−stage cooling thermostat will not activate the second stage of cooling or the second stage of heat pump heat

Optimal gas heating operations is achieved with a two−stage gas heating thermostat (W1 and W2). If a one−stage gas heating thermostat is used (W/W1), the unit will fire on low−stage for 12 minutes, and if the call for heat continues, it will switch to high−stage gas heat until satisfied. **NOTE: One−stage or two−stage gas heating thermostat must be selected on the furnace control board, DIP switch 3. See Figure 9.**

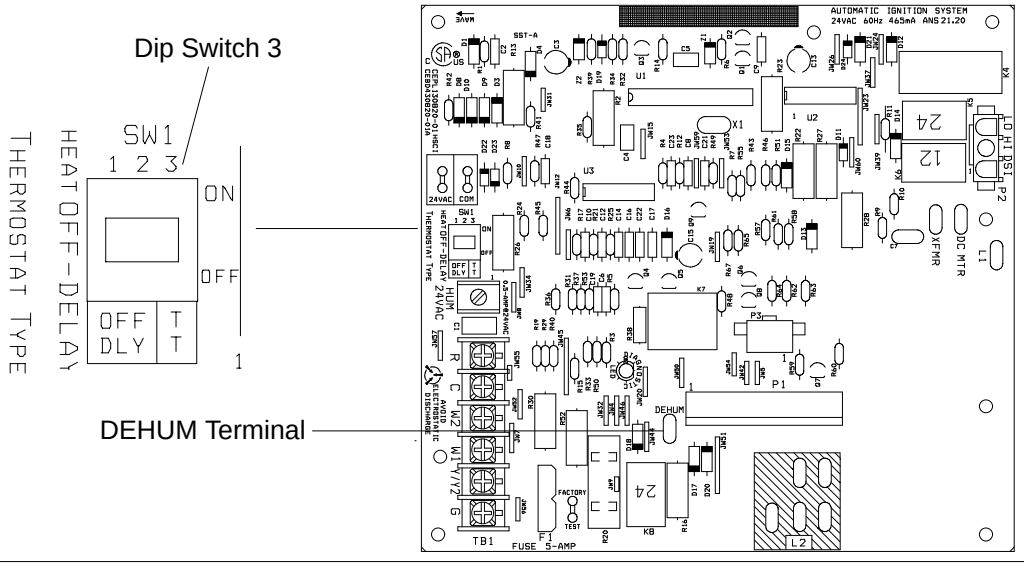
Some thermostats feature a dehumidification function, designed to increase latent heat removal (moisture) when humidity is high. If the thermostat has a “DH” terminal, wire it to the “DEHUM” terminal on the control board. See Figure 9.

**FIGURE 10** **Thermostat Connections**




Low voltage lead wires (”pig−tails”) are provided at the unit for all thermostat wire connections. Using wire nuts, follow the connections shown in Figure 10.

**Figure 9** **PDX4 Furnace Control Board**




### Thermostat Heat Anticipator

Some thermostats have an adjustable heat anticipator. The heat anticipator prevents temperature overshoot in heating mode. If the heat doesn’t turn off until the set point temperature on the thermostat is exceeded, then the anticipator setting is too low. If the heat turns off before the thermostat reaches the set point temperature on the thermostat, then the anticipator setting is too high. Follow the thermostat instruction manual for proper adjustment of the heat anticipator.

### Final Electrical Check

Make a final wiring check to be sure system is correctly wired. Inspect field installed wiring and the routing to ensure that rubbing or chafing due to vibration will not occur.

**NOTE**: Wiring **MUST** be installed so it is protected from possible mechanical damage.

## BALANCE POINT TEMPERATURES

The dual fuel models require a dual fuel thermostat for proper operation. A dual fuel thermostat allows a balance point temperature to be programmed into the thermostat and has an outdoor temperature sensor that must be installed outside. Follow the thermostat installation instructions for proper location of outdoor sensor. The dual fuel unit operates either in heat pump mode or gas heat mode, but NEVER both modes at the same time.

There are 2 different balance point temperatures to consider when programming the thermostat: Economic and Load.

### Economic Balance Point Temperature

The economic balance point temperature is the outdoor temperature where the utility cost of running in heat pump mode is the same as running in gas heat mode. If the outdoor temperature is above the economic balance point temperature, then the heat pump mode will be less costly. If the outdoor temperature is below the economic balance point temperature, then the gas heat mode will be less costly. The economic balance point temperature is affected by electrical utility cost, gas utility cost, and model size.

Knowing the utility cost of electricity and gas, the economic balance point temperature can be determined using **Figure 11.**

**Figure 11 – Economic Balance Point Temperature Chart**

| Cost Ratio* | Economic Balance Point Temperature (°F) | | | | | |
|---|---|---|---|---|---|---|
| | PDX424 040 | PDX430 060 | PDX436 080 | PDX442 080 | PDX448 100 | PDX460 100 |
| 0.075 | 0 | 0 | 2 | 0 | 1 | 2 |
| 0.100 | 20 | 19 | 20 | 20 | 18 | 18 |
| 0.125 | 42 | 32 | 34 | 34 | 31 | 29 |
| 0.1375 | 50 | 40 | 38 | 38 | 40 | 38 |
| 0.150 | 57 | 48 | 43 | 42 | 46 | 44 |

* Cost Ratio is the electrical cost, in $ per kilowatt−hour, divided by the gas cost, in $ per therm.

**Example:** A PDX442080 is installed in a residence where the electrical utility cost is 9 cents per kilowatt−hour and the gas cost is 90 cents per therm. Proceed as follows:

1. $.09/$.90 = .1
2. Using **Figure 11**, a PDX342080 with a .1 cost ratio => Economic Balance Point Temperature = 20° F

Some utilities have a sliding cost based on consumption. In this case, take the total bill and divide by the total consumption to determine the average utility cost.

Some natural gas suppliers sell gas by every 100 cubic feet (CCF) of gas. For an approximate gas cost per therm, multiply CCF by 97. Example: A price of $.01 per CCF is approximately equivalent to $.97 per therm.

Note: The 97 multiplier is based on a typical heating value of 1030 Btu per cubic foot of natural gas. For a more accurate cost, contact your gas supplier to obtain the Btu content of natural gas in your area. Divide 100,000 by the actual Btu content per cubic foot to obtain the correct multiplier.

If the economic balance point is chosen, keep in mind that utility rates fluctuate substantially over time. Review monthly utility bills and re−calculate economic balance points as necessary.

### Load Balance Point Temperature

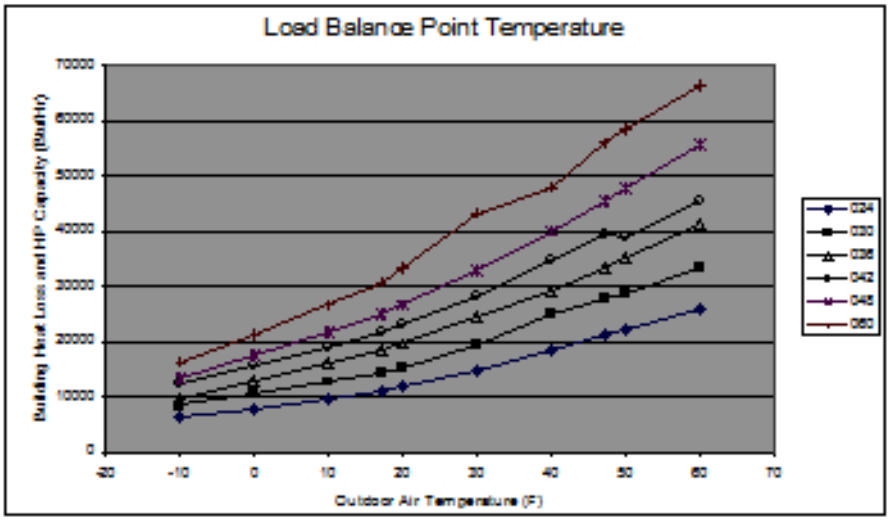
The load balance point temperature is the outdoor temperature at which the load may be met using either heat pump mode or gas heat mode. If the outdoor temperature is above the load balance point temperature, the demand for heat may be met using the heat pump mode. If the outdoor temperature is below the load balance point temperature, the gas heat mode is required to meet the building load.

To find the load balance point temperature, a load calculation must be performed on the building. The load calculation must be performed at 3 different outdoor temperatures and graphed on **Figure 12**. Plot the three load calculations at their appropriate outdoor temperatures and draw a smooth line through the 3 points. NOTE: The line connecting the 3 points may not be a straight line.

Locate where the building load line intersects the appropriate model capacity line. This is the load balance point temperature.

No matter what the balance point temperature is set at, the unit will automatically switch to gas heat if the heat pump is not able to meet the demand of the house. Calculating the load balance point temperature and programming it into the thermostat will minimize temperature fluctuations in the house.

**Figure 12** **Load Balance Point Temperature**




## 7. DUCTWORK

### Ductwork Sizing

The maximum recommended velocity in trunk ducts is 1000 feet per minute. The maximum recommended velocity in branch ducts is 800 feet per minute.

Ductwork sizing affects the discharge temperature, airflow velocity, and efficiency of the system. Be sure to properly size ductwork to the capacity of the unit and to the airflow requirements of the conditioned space. Failure to properly size ductwork can result in inadequate airflow and poor efficiency. Undersized ductwork may result in tripped limit controls and premature failure of compressors, motors and other components.

### Ductwork Insulation

Ductwork installed outdoors must have a minimum 2" thick fiberglass "wrap" insulation and a weatherproof vapor barrier installed around it. The insulation and vapor barrier must be protected against potential damage. Caulking, flashing, and other means of providing a permanent weather seal must be used.

### Ductwork Connections

The use of flexible, non−combustible connectors between main trunk ducts and supply and return air plenums is permitted. If flexible connectors are used, they should be protected from potential mechanical damage such as punctures and tears.

**NOTE:** When connecting the supply and return plenums to the unit, make sure that the plenums are sealed against the side casing of the unit and do not interfere with removal of the top of the unit.

### FILTERS

All return air MUST pass through a filter before entering the unit. An electronic air cleaner, optional filter racks, or other accessible filter arrangement must be installed in the return air ductwork. Minimum recommended filter sizes are listed in FIGURE 13 and are based on maximum face velocities of 300 ft/min for disposable filters and 600 ft/min for washable (high velocity) filters. See figure 10 for filter sizes.

**⚠ CAUTION**

**REDUCED EQUIPMENT LIFE HAZARD**

**Failure to follow this caution may result in improper unit operation.**

**Do not operate the unit without a filter.**

**Figure 13** **Filter Sizes**

| | Disposable Filters | | Washable Filters[1] | |
|---|---|---|---|---|
| Model | Nominal Size (qty x w x d) | Minimum Area (sq. inches) | Nominal Size (w x d) (inches) | Minimum Area (sq. inches) |
| PDX424040 | 1 x 20" x 20" | 384 | 1 x 10" x 20" | 192 |
| PDX430060 | 1 x 20" x 24" | 480 | 1 x 12" x 20" | 240 |
| PDX436080 | 2 x 15" x 20" | 576 | 1 x 15" x 20" | 288 |
| PDX442080 | 2 x 18" x 20" | 672 | 1 x 18" x 20" | 336 |
| PDX448100 | 2 x 20" x 20" | 768 | 1 x 20" x 20" | 384 |
| PDX460100 | 2 x 20" x 24" | 960 | 1 x 20" x 24" | 480 |

1 Washable filter size is based on an allowable face velocity of 600 ft/min. Refer to filter manufacturer's specifications for allowable face velocity and required filter area.

## 8. AIRFLOW ADJUSTMENT

Figure 14 Airflow Adjustment

| Model | Cooling Tons | High Stage Heating | | | | | Low Stage Heating | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Heating Input (Btu/hr) | Heating Rise Range (°F) | Dip Switch 3 & 4 ) | Ext. Static Pressure (in w.c) .1" - .7" | | Heating Input (Btu/hr) | Heating Rise Range (°F) | Dip Switch 3 & 4 ) | Ext. Static Pressure (in w.c) .1" - .7" | |
| | | | | | CFM | Heating Rise (°F) | | | | CFM | Heating Rise (°F) |
| PDX424040 | 2 | 40 000 | 35 - 65 | HI | 904 | 33 | 28000 | 25 - 55 | HI | 800 | 26 |
| | | | | MED HI | 791 | 37 | | | MED HI | 700 | 30 |
| | | | | MED LO | 678 | 44 | | | MED LO | 600 | 35 |
| | | | | LO* | 554 | 52 | | | LO* | 490 | 42 |
| PDX430060 | 2.5 | 60 000 | 35 - 65 | HI* | 904 | 49 | 42000 | 25 - 55 | HI* | 800 | 39 |
| | | | | MED HI | 791 | 56 | | | MED HI | 700 | 44 |
| | | | | MED LO | 689 | 64 | | | MED LO | 610 | 51 |
| | | | | LO | 554 | NA | | | LO | 490 | NA |
| PDX436080 | 3 | 80 000 | 35 - 65 | HI* | 1288 | 48 | 56000 | 25 - 55 | HI* | 1140 | 38 |
| | | | | MED HI | 1164 | 53 | | | MED HI | 1030 | 42 |
| | | | | MED LO | 1034 | 59 | | | MED LO | 915 | 47 |
| | | | | LO | 904 | NA | | | LO | 800 | NA |
| PDX442080 | 3.5 | 80 000 | 35 - 65 | HI | 1319 | 45 | 56000 | 25 - 55 | HI | 1220 | 35 |
| | | | | MED HI* | 1288 | 48 | | | MED HI* | 1140 | 38 |
| | | | | MED LO | 1198 | 51 | | | MED LO | 1060 | 41 |
| | | | | LO | 1113 | 55 | | | LO | 985 | 44 |
| PDX448100 | 4 | 100000 | 35 - 65 | HI | 1785 | 43 | 70000 | 25 - 55 | HI | 1580 | 34 |
| | | | | MED HI | 1719 | 45 | | | MED HI | 1521 | 35 |
| | | | | MED LO | 1653 | 46 | | | MED LO | 1463 | 36 |
| | | | | LO* | 1588 | 48 | | | LO* | 1405 | 38 |
| PDX460100 | 5 | 100000 | 35 - 65 | HI | 1797 | 43 | 70000 | 25 - 55 | HI | 1590 | 34 |
| | | | | MED HI | 1732 | 44 | | | MED HI | 1533 | 35 |
| | | | | MED LO | 1669 | 46 | | | MED LO | 1477 | 36 |
| | | | | LO* | 1605 | 48 | | | LO* | 1420 | 38 |

NOTES:
*Factory-shipped speed
NA = Not Allowed for Heating Speed

| Model | COOLING | | | | HEAT PUMP - Comfort Mode | |
|---|---|---|---|---|---|---|
| | High Stage | | Low Stage | | | |
| | Normal Mode (CFM) | Dehumidy Mode (CFM) | Normal Mode (CFM) | Dehumidify Mode (CFM) | High Stage | Low Stage |
| PDX424040 | 800 | 640 | 560 | 448 | 700 | 490 |
| PDX430060 | 875 | 700 | 648 | 518 | 875 | 650 |
| PDX436080 | 1200 | 960 | 852 | 682 | 1050 | 745 |
| PDX442080 | 1400 | 1120 | 980 | 784 | 1225 | 853 |
| PDX448100 | 1600 | 1280 | 1104 | 883 | 1450 | 998 |
| PDX460100 | 1750 | 1400 | 1295 | 1036 | 1575 | 1170 |

### CIRCULATING AIR BLOWER SPEEDS

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD.**
**Failure to follow this warning could result in personal injury, death and/or property damage.**
**Turn off electric power supply at disconnect switch or service panel before removing access or service panels from unit.**

### CONSTANT CFM MOTOR

The circulating air (indoor) blower motor is a true variable speed motor designed to deliver constant CFM. Constant CFM is valid for systems with total external static pressure between 0.1 and 0.7 inches water column.

### COOLING

Motors are factory set to deliver appropriate cooling CFM for each model size. **Standard, nominal cooling CFM is not field adjustable.** As long as the duct system static pressure is between 0.1 and 0.7 inches water column, the motor will automatically adjust its speed to deliver the design CFM. Cooling CFM values are shown in Figure 14. Dip switch 5 and 6 have no affect because cooling size of unit is fixed.

### DEHUMIDIFY

Dehumidfy mode is 80% cfm of the current cooling stage.

### HEAT PUMP HEATING

Motors are factory set to deliver appropriate heat pump heating CFM for each model size. **Standard, nominal heat pump heating CFM is not field adjustable.** As long as the duct system static pressure is between 0.1 and 0.7 inches water column, the motor will automatically adjust its speed to deliver the design CFM. Heating CFM values are shown in Figure 14.

### GAS HEATING (A) (See Figure 15)

CFM values for gas heating are adjustable to account for different temperature rise values. Adjustment is made using

DIP switches 3 and 4 on the motor control board. Refer to Figure 15 for location of the DIP switches on the board. Refer to Figure 14 for gas heating CFM values.

**NOTE: Changes to the DIP switch settings affect both the High−stage and Low−stage gas heating CFM values: they cannot be changed independently.**

**UNIVERSAL CFM ADJUSTMENT (B) (See Figure 15)**

In the middle of the motor control board there is a jumper plug marked “+NOM−”. With this jumper, ALL the CFM values shown in Figure 14 can be adjusted up or down by approximately 10%. Factory setting is “NOM” ( for “Nominal”), and this matches the CFM values shown in Figure 14. Options are provided to adjust airflow to meet individual installation needs for such things as noise, comfort, and humidity removal.

**NOTE: Changing this jumper will affect ALL CFM values, heating, cooling, continuous fan, low−stage, high stage, etc.**

**CONTINUOUS FAN (C) (See Figure 15)**

Continuous fan CFM is factory set to equal 40% of the high−stage cooling speed. Continuous fan CFM is not field adjustable. DIP switches 1 and 2 have no affect on CFM.

**COOLING DELAY (D) (See Figure 15)**

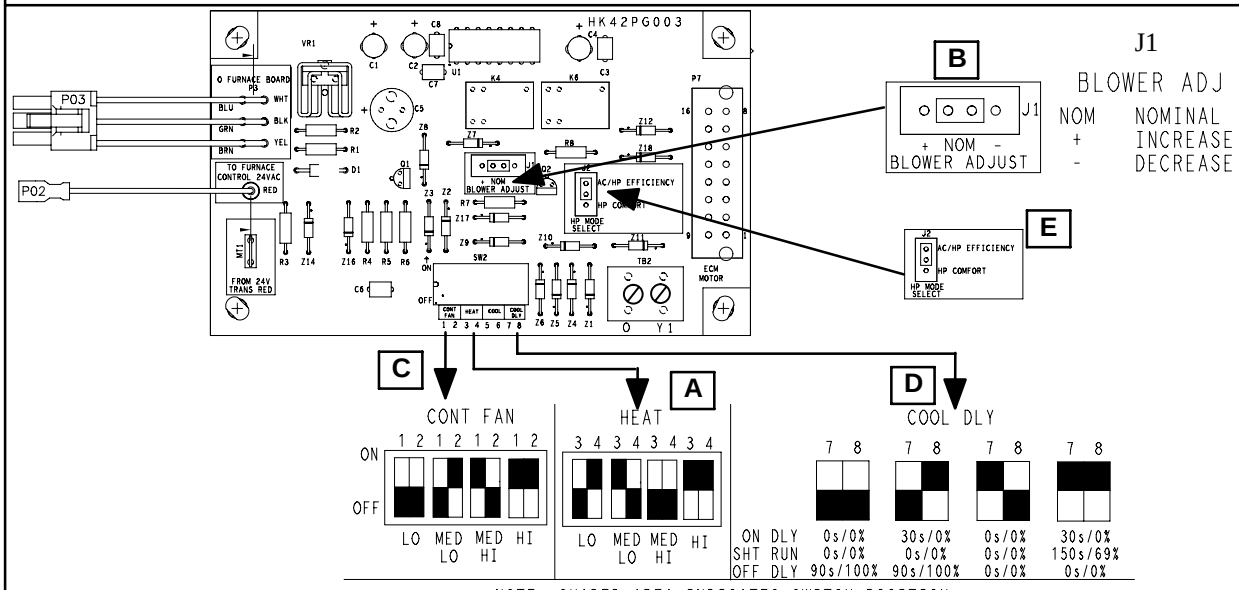
Four cooling operation delay profiles are provided to customize and enhance system operation. DIP switches 7 and 8 control cooling delay. Options are:

1. 0/0/90: No on delay and 90 second off delay at 100% airflow (factory setting).
2. 30/0/90: 30 second on delay with no airflow and 90 second off delay at 100% airflow profile. Used when it is desirable to allow system coils time to heat−up/cool−down in conjunction with the airflow.
3. 0/0/0: No delay option. Used for servicing unit or when a thermostat is utilized to perform delay functions.
4. 30/150/0: Enhanced selection provides a 30 second on delay with 0 airflow followed by 150 seconds at 70% airflow, and no off delay for added comfort. This profile will minimize cold blow in heat pump operation and could enhance system efficiency.

**HEAT PUMP EFFICIENCY MODE (E) (See Figure 15)**

Some homeowners dislike the air temperature delivered by a heat pump in traditional heating mode. There is a jumper plug (J2) on the control board that can be set to “Heat Pump Comfort Mode”. In Hp Comfort mode, heat pump heating CFM is reduced to approximately 315 CFM per ton for higher than normal heating air delivery temperature. (Cooling CFM and gas heating CFM are not affected.)

**Figure 15 − Airflow Adjustment**




## 9. START−UP PROCEDURES

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD**

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

**Do NOT attempt to light the burner with a match or flame of any kind.**

**CHECK BEFORE STARTING**

1. Check that the blower motor speed terminal block is running the correct heating and cooling speeds.
2. Check to see that clean, properly sized air filters are installed.
3. Replace all service access panels.

**COOLING**

Cooling speeds are listed in Figure 14. In dehumidification mode, cooling airflow is reduced to 80% of nominal.

## CONTINUOUS FAN OPERATION

For energy efficiency, continuous fan speed is 40% of the high stage cooling speed.

## COOLING

1. Turn electric power **OFF**
2. Set thermostat Heat−Cool select to **COOL**.
3. Adjust thermostat setting to below room temperature.
4. Turn power **ON**, for approximately one minute, then **OFF**. During power application check the following:
   a. Contactor − Contacts Closing
   b. Compressor − **ON**
   c. Condenser fan motor − **ON**
   d. Circulating Air Blower − **ON**, Adjustable delay ON of 0 or 30 seconds.
5. Turn power **OFF**, check the following:
   a. Contactor contacts opening.
   b. Compressor − **OFF**
   c. Condenser fan motor − **OFF**
   d. Circulating blower − **OFF**, Adjustable delay OFF of 0 or 90 seconds.

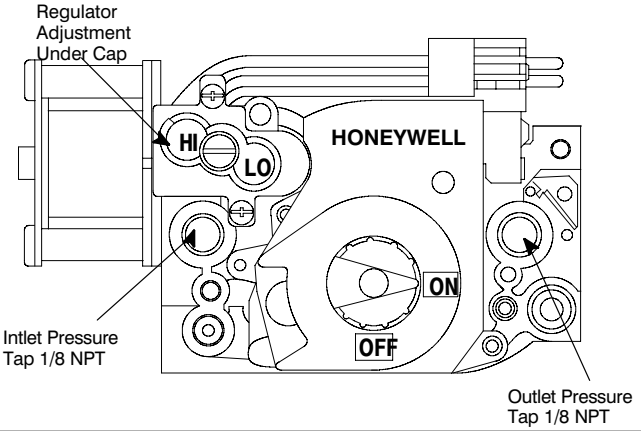
**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD.**

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

**Turn OFF gas at shut off before connecting U−tube manometer.**

**Figure 16** Honeywell Gas Valve




## GAS PRESSURES

1. Do **NOT** allow gas supply pressure to fall below the listed minimums. Doing so will decrease input to furnace. Refer to **Figure 17** for gas supply pressures.
2. Gas input **MUST NOT** exceed rated input shown on rating plate.
3. Do **NOT** allow pressures to exceed the maximum limits as listed in **Figure 17**.

| **Figure 17** | **Gas Pressures** | |
|---|---|---|
| | **Natural Gas** | **Propane (LP) Gas** |
| **Minimum Inlet** | 4.5 in wc (1120 Pa) | 11 in wc (2740 Pa) |
| **Recommended Inlet** | 7 in wc (1740 Pa) | 11 in wc (2740 Pa) |
| **Maximum Inlet** | 13 in wc. (3230 Pa) | 13 in wc (3230 Pa) |

### Manifold Pressure Adjustment

Manifold pressures are listed in **Tables 1 and 2**. Check manifold pressures using the following procedure.

1. With gas OFF, connect U−Tube manometer to outlet pressure tap on gas valve (see figure 14). Use a manometer with a 0” to 12” water column range.
2. Turn gas ON. Temporarily set balance point temperature warm enough to lock out heat pump operation. Change thermostat to HEAT mode and adjust temperature set point so unit runs in High stage. Make sure that the third (3rd) dip switch on the ignition board is set in the OFF position (See wiring diagram). Wait 10 minutes for unit to switch to high stage gas heat.
3. Remove the manifold pressure adjustment screw cover on gas valve. Turn high stage adjusting screw, marked ”HI”, counterclockwise to decrease the manifold pressure and clockwise to increase pressure. See figure 16.
4. Set manifold pressure to value shown in Table 1 or Table 2. Replace adjustment screw cover and re−check manifold pressure.
5. Turn thermostat mode to OFF. Change thermostat to HEAT mode and adjust temperature set point so unit will run in Low stage.

NOTE: From the time the thermostat is set to gas heat, you have 10 minutes to complete low stage gas adjustments. After 10 minutes, the thermostat will shift to high stage gas heat.

6. Remove the manifold pressure adjustment screw cover on gas valve. Turn low stage adjusting screw, marked ”LO”, counterclockwise to decrease the manifold pressure and clockwise to increase pressure. See figure 16.
7. Set manifold pressure to value shown in Table 1 or Table 2. Replace adjustment screw cover and re−check manifold pressure.
8. Turn thermostat ”OFF”. Remove manometer connection from the outlet pressure tap of gas valve and replace plug in outlet pressure tap. See figure 16.
9. Return thermostat to customer’s desired settings (balance point temperature, mode, and desired temperature) after final checkout.

## ⚠ WARNING

**FIRE AND/OR EXPLOSION HAZARD**

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

**Do NOT adjust manifold pressure more than + 0.3 inches water column to obtain rated input.**

Check the unit's operation as outlined in the following instructions. If any unusual sparking, odors or unusual noises are encountered, shut off electric power immediately. Recheck for wiring errors, or obstructions in or near blower motors.

1. Set thermostat Heat−Cool selector to **OFF**.
2. Set thermostat fan switch to **AUTO**.
3. Turn electric power **ON**. Nothing should start running.
4. Turn manual gas valve **ON**.
5. Turn gas control valve **ON**.
6. Set thermostat fan switch to **ON**.
7. Reset thermostat fan switch to **AUTO**.

**GAS HEATING START−UP PROCEDURE**

1. Temporarily set balance point warm enough to lock out heat pump. Adjust thermostat setting above room temperature and set thermostat selector to HEAT. The combustion air blower will energize on high speed.
2. The combustion air blower will run on high speed for 15 seconds to purge the combustion chamber.
3. After the 15 second purge, the combustion air blower will remain on. The sparker will turn on to ignite the gas at the same time the gas valve is energized on low stage. Make sure the gas valve is in the "ON" position (Refer to Figure 16 and the instruction label located on the inside of the burner access panel.
4. The sparker will remain energized for 7 seconds or until a flame is detected by the flame sensor. It may take several ignition attempts to purge the air out of the gas line at the initial start−up of the unit.
5. Once flame is proven, the ignition control will switch the combustion air blower to low speed. The unit will run in low stage gas heat for 10 minute or until the thermostat is satisfied, whichever is shorter. If the thermostat is not satisfied after 10 minutes, the unit will go to second stage gas heat and run until the thermostat is satisfied.
6. 30 seconds after the burners light, the circulating air blower will begin to run.
7. After checking start up, return balance point temperature to desired setting.

## ⚠ WARNING

**FIRE AND/OR EXPLOSION HAZARD**

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

**Do NOT attempt to light the burner with a match or flame of any kind.**

**GAS HEATING INPUT RATE CHECK**

The gas input to the unit is determined by measuring the gas flow at the meter. Measuring gas flow at the meter is recommended for natural gas units. To measure the heating input, perform the following steps for both low and high stage:

1. Turn off all other gas appliances that use the same meter.
2. Turn off gas supply to unit and attach manifold pressure manometer as instructed in the "Manifold Pressure Adjustment" section. Turn gas ON.
3. Temporarily set balance point temperature warm enough to lock out heat pump operation. Change thermostat to HEAT mode and adjust temperature set point to at least 7 degrees above room temperature to set unit to high stage. Wait 10 minutes for unit to switch to high stage. Make sure that the third (3rd) dip switch on the ignition board is set in the OFF position (See wiring diagram).
4. Record the number of seconds for the gas meter dial to make 1 revolution.
5. Divide number of seconds in step 4 into 3600 (number of seconds in 1 hour).
6. Multiply result of step 5 by the number of cubic feet shown for one revolution of the meter dial to obtain the cubic feet of gas flow per hour.
7. Multiply result of step 6 by Btu heating value of gas to obtain total measured input in Btu/hr. Compare this with the unit rating plate and make any adjustments as needed according to the "Manifold Pressure Adjustments" section. Consult with local gas supplier if the heating value of gas is not known.

NOTE: From the time the thermostat is set to gas heat, you have 10 minutes to complete low stage gas adjustments. After 10 minutes, the thermostat will shift to high stage gas heat.

8. Turn thermostat mode to OFF. Reset the thermostat by changing mode back to HEAT and adjust temperature set point to 5 degrees above room temperature to set unit to low stage.
9. Repeat steps 4 thru 7 for low stage.
10. Return thermostat to customer's desired settings (balance point temperature, mode, and desired temperature) after final checkout.
11. Relight all appliances and ensure all pilots are operating.

Example: Assume that the size of the meter dial is 1 cu. ft., one revolution takes 44 seconds, and the heating value of the gas is 1020 Btu/ft3. Proceed as follows:

1. 38 sec. To complete 1 revolution
2. 3600/38 = 94.7
3. 94.7 x 1 = 94.7
4. 94.7 x 1020 = 96,632 Btu/hr

For this example, the nameplate input is 100,000 Btu/hr, so only a minor change in manifold pressure is required. In no case should the final manifold pressure vary more than +− .3 in wc from the values in **Tables 1 and 2**.

**GAS HEATING TEMPERATURE RISE CHECK**

**NOTE:** Air temperature rise is the temperature difference between supply and return air. With a properly designed distribution system, the proper amount of temperature rise will normally be obtained when the unit is operating at rated input with the recommended blower speed.

1. The temperature rise must be within the specifications marked on the unit rating plate for each stage of gas heat.

   To check the temperature rise through the unit, place thermometers in the supply and return air ducts as close to the unit as possible.

   Open **ALL** registers and duct dampers. Operate unit **AT LEAST** 15 minutes before taking readings.

If the correct amount of temperature rise is not obtained when operating on the recommended blower speed, it may be necessary to change the blower speed. A faster blower speed will decrease the temperature rise. A slower blower speed will increase the temperature rise.

**NOTE:** The blower speed **MUST** be set to give the correct air temperature rise through the furnace as marked on the rating plate. See **Figure 14** for more information.

2. After 15 minutes of operation check the limit control function by blocking the return air grille(s).

   After several minutes the main burners and pilot should go **OFF**. The circulating air blower should continue to run.

   Remove air restrictions. Pilot and main burners should relight after a cool down period of a few minutes.

3. Adjust the thermostat setting below room temperature.

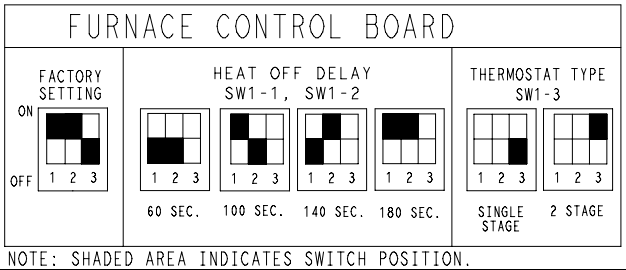
   Main burners and combustion air blower should go **OFF**.

   The circulating air blower should continue to run for 60, 100, 140 or 180 seconds. This time is adjustable. See **Figure 18** for more information.

4. Set thermostat Heat−Cool selector to **OFF**.

**FAN CONTROL CHECK**

**Figure 18** **Fan Delay DIP Switch Settings**




The Fan Control has adjustable settings for the circulating air blower to delay it ‘‘ON’’ and ‘‘OFF’’.

1. The Fan Control has a fixed ”ON” delay of 30 seconds, and a field adjustable ”OFF” delay of 60, 100, 140 and 180 seconds. The ”OFF” delay is factory set at 140 seconds.

Refer to **Figure 18** for proper DIP switch settings.

2. Operate the furnace and ensure that the blower turns **ON** and **OFF** at the appropriate time to provide the desired comfort level.

## 10. OPERATION

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD.**

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

**Turn off electric power supply at disconnect switch or service panel before removing any access or service panel from unit.**

**TROUBLE SHOOTING**

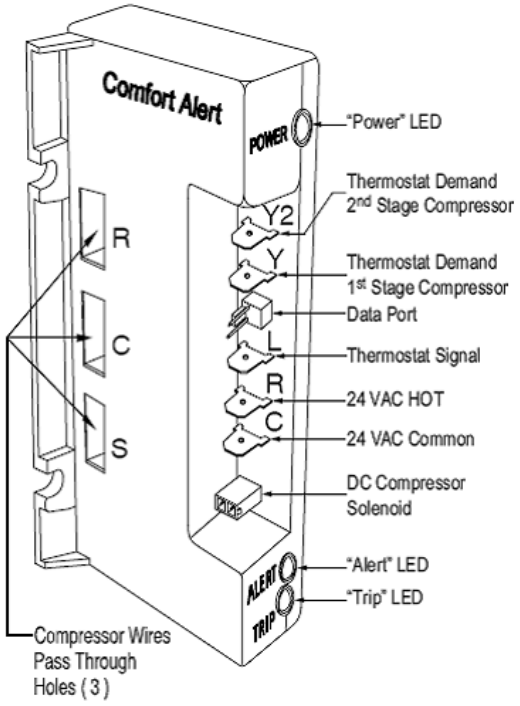
Models are factory equipped with the Comfort Alert™ Diagnostics device (refer to **Figure 19**) in the control box. Comfort Alert™ Diagnostics device provides compressor staging from low to high and high to low capacity. Comfort Alert™ Diagnostics device provides around−the−clock monitoring for common electrical problems, compressor defects, and broad system faults.

If trouble is detected, an alert code is displayed with a flashing LED indicator. Alert codes are listed in **Figure 19**. The device is factory wired and requires no modification. Low voltage lead wires are provided in the control box for connection to thermostat wires (use wire nuts). The Comfort Alert™ Diagnostics device must be powered to properly stage compressor to high capacity. Energizing the Y (Y1) terminal operates the compressor in low stage. Both the Y (Y1) and Y2 terminals must be energized for high−stage operation. The Comfort Alert™ Diagnostics device operates by monitoring the compressor power leads and the thermostat demand signals Y (Y1) and Y2 terminals. It draws constant 24 VAC power at the R and C terminals. When the compressor is operating in low stage (Y or Y1), the 24v DC compressor solenoid coil is de−energized. When the compressor is operating in high stage (Y or Y1 and Y2), the 24v DC solenoid coil is energized. The 24v DC plug that is connected to the compressor does NOT have an internal rectifier. DO NOT INSTALL A PLUG WITH INTERNAL RECTIFIER.

NOTE: There is a 5 sec delay from when Y2 energizes to when the solenoid is energized.

The Comfort Alert™ Diagnostics is a passive device. This device will not shut down unit if it senses a fault.

**Figure 19** **Comfort Alert™ Diagnostics**




| Status LED | Status LED Description | Status LED Troubleshooting Information |
|---|---|---|
| Green POWER | Module has power | Supply voltage is present at module terminals |
| Red TRIP | Thermostat demand signal Y is present, but the compressor is not running | 1. Compressor protector is open<br>2. Outdoor unit power disconnect is open<br>3. Compressor circuit breaker or fuse(s) is open<br>4. Broken wire or connector is not making contact<br>5. Compressor contactor has failed open |
| Yellow "ALERT" Flash Code 1 | **Long Run Time** Compressor is running extremely long run cycles | 1. Low refrigerant charge<br>2. Evaporator blower is not running<br>3. Evaporator coil is frozen<br>4. Faulty metering device<br>5. Condenser coil is dirty<br>6. Liquid line restriction (filter drier blocked if present in system)<br>7. Compressor Second Stage Cooling Wiring<br>• Solenoid plug not connected/solenoid malfunction<br>• Comfort Alert failure<br>8. Thermostat is malfunctioning |
| Yellow "ALERT" Flash Code 2 | **Internal Protector Trip** | 1. The internal motor protector has opened |
| Yellow "ALERT" Flash Code 3 | **Short Cycling** Compressor is running only briefly | 1. Thermostat demand signal is intermittent<br>2. High pressure switch open<br>3. Condenser coil poor air circulation (dirty, blocked, damaged)<br>4. Condenser fan is not running<br>5. Return air duct has substantial leakage<br>6. Low pressure switch open |
| Yellow "ALERT" Flash Code 4 | **Locked Rotor** | 1. Run capacitor has failed<br>2. Low line voltage (contact utility if voltage at disconnect is low, below 197v)<br>3. Excessive liquid refrigerant in compressor<br>4. Compressor bearings are seized |
| Yellow "ALERT" Flash Code 5 | **Open Circuit** | 1. Outdoor unit power disconnect is open<br>2. Compressor circuit breaker or fuse(s) is open<br>3. Compressor contactor has failed open<br>4. Open circuit in compressor supply wiring or connections<br>5. Unusually long compressor protector reset time due to extreme ambient temperature<br>6. Compressor windings are damaged |
| Yellow "ALERT" Flash Code 6 | **Open Start Circuit** Current only in run circuit | 1. Run capacitor has failed<br>2. Open circuit in compressor start wiring or connections<br>3. Compressor start winding is damaged |
| Yellow "ALERT" Flash Code 7 | **Open Run Circuit** Current only in start circuit | 1. Open circuit in compressor run wiring or connections<br>2. Compressor run winding is damaged |
| Yellow "ALERT" Flash Code 8 | **Welded Contactor** Compressor continuosly operates | 1. Compressor contactor has failed closed<br>2. Thermostat demand signal not connected to module |
| Yellow "ALERT" Flash Code 9 | **Low Voltage** Control circuit < 17 VAC | 1. Control circuit transformer is overloaded<br>2. Low line voltage (contact utility if voltage at disconnect is low) |

*Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.*
*TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation.*
*Reset ALERT Flash code by removing 24VAC power from module*
*Last ALERT Flash code is displayed for 1 minute after module is powered on.*

Comfort Alert™ Diagnostics

332841-201 REV A

## COMBUSTION/INDOOR FAN CONTROL

All functions of the combustion and indoor blower are controlled by the ignition control board and interface board.

**On a call for gas heat:**
The ignition control energizes the combustion blower on high speed. Once the combustion air proving switch closes, the ignition sequence begins. The ignition control will sense when the main (low stage) operator of gas valve has been energized thereby firing the burners and starting the ‘‘delay on’’ timing sequence of the indoor blower. The unit will then run in low stage gas heat or until the thermostat is satisfied, whichever is shorter. If the thermostat is not satisfied ater 10 minutes, the unit will go to second stage gas heat and run until the thermostat is satisfied.

**NOTE:** If the control senses that one of the safety limits has opened, the combustion and indoor fans will operate until the limit resets.

**On a call for cooling:**
The fan interface control board starts the indoor blower on full speed immediately or after a 30 second delay (field−selectable). Once the thermostat is satisfied, the fan control will operate the blower for 0 or 90 additional seconds (field−selectable).

**Defrost Mode**

**On a call for defrost:**
When the defrost sensor closes in the heating mode, there is a 30, 60, 90 or 120 minute delay before the defrost mode begins. This delay is selected by the position of the dipswitches on the defrost board. Defrost interval timing can be configured by selection switch 1 and 2 on the dipswitch per the following table.

| Switch 1 | Switch 2 | Time |
|---|---|---|
| ON | OFF | 30 Minutes |
| OFF | ON | 60 Minutes |
| OFF | OFF | 90 Minutes |
| ON | ON | 120 Minutes |

**NOTES:**

1. The backup defrost terminate time is fixed at 10 minutes.
2. The compressor recycle delay timer is 5 minutes.
3. The power interrupt response is minimum 17 msec. to maximum 35 msec.
4. Quite shift compressor recycle delay is 30 seconds.

In normal defrost mode, the following sequence will occur after the set delay:

1. Condenser fan off.
2. Reversing valve energized to cooling and auxiliary gas heat (W1) is energized.
3. After defrost sensor opens or a maximum of 10 minutes; the condenser fan is energized (after 20 seconds) and the reversing valve is de−energized to the heat mode. The call for heating is completed by the auxiliary gas heat. ON the next call for heat, the heat pump will be used for heat, provided the outdoor temperature is above the balance point.
4. Should the system indoor thermostat be satisfied during the defrost cycle, the control will de−energize the reversing valve and auxiliary heat outputs and ”hold” the defrost timer until the next call for heat, at which time the defrost cycle will be completed.

Service testing: the pins marked “speed up” when momentarily shorted together (for 5 seconds) and released,

will defeat the 5 minutes recycle delay timer and allow the compressor contactor to be immediately energized, thus forcing a defrost cycle. Termination of this forced mode will be by the defrost thermostat or the 10 minute backup timer, provided the defrost thermostat was closed when the defrost was “forces.” If the defrost thermostat was not closed, at the time of the “forced defrost,” the defrost mode will remain for 30 seconds and then terminate.

## 11. MAINTENANCE

### MONTHLY MAINTENANCE AND INSPECTION CHECKS

**Air Filters**

**⚠ CAUTION**

**REDUCED EQUIPMENT LIFE HAZARD**

**Failure to follow this cautions may result in damage to the unit being installed.**

**Do not operate the unit without a filter.**

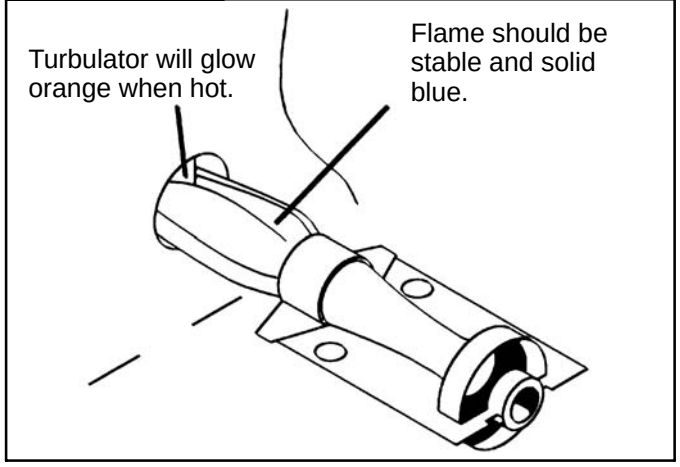
Inspect filters at least monthly and replace or clean as required. Washable filters may be cleaned by soaking in mild detergent and rinsing with cold water. Replace filters with the arrows on the side pointing in the direction of air flow. Dirty filters are the most common cause of inadequate heating or cooling performance, and of compressor failures.

### HEATING SEASON CHECKS (MONTHLY)

**Main Burner Flame**

Flames should be stable and solid blue, (dust may cause orange tips or they may have wisps of yellow, but they **MUST** not have solid yellow tips). They should extend directly into the heat exchanger tubes and the turbulators should glow orange (after about five minutes of operation). Main burner flame should be inspected monthly.

**Figure 20** Normal Flame




Using a light and mirror (as required) inspect the inside of the vent hood and the inlet air opening in the burner compartment. Look for soot and severe rust or corrosion and any obstructions due to leaves, spiderwebs, etc. Clean as required.

### COOLING SEASON CHECKS (MONTHLY)

**Condenser Coil**

Keep the condenser inlet and outlet area clean and free of leaves, grass clippings or other debris. Grass should be kept short in front of the condenser inlet. Shrubbery **MUST** be trimmed back so it is no closer than 30 inches to unit.

**Condensate Drain**

Check for condensate drainage. Clean as required.

### ANNUAL MAINTENANCE AND INSPECTION

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD.**

**Failure to follow this warning could result in personal injury, and/or death.**

**Turn off electric power supply at disconnect switch or service panel before removing any access or service panel from unit.**

The annual inspection should include cleaning as required to ensure efficient operation of the unit. To simplify access, remove all access panels and the top from the unit if possible .

**Condenser Fan Motor**

Note: The condenser fan motor is permanently lubricated. No further lubrication is required. Do not attempt to lubricate the condenser fan motor.

**⚠ CAUTION**

**BURN HAZARD.**

**Failure to follow this caution may result in personal injury.**

**Flue cover may be hot! Allow adequate time for flue cover to cool.**

### BLOWER MOTOR ACCESS

Refer to **Figure 21** for a view of blower motor and compartment.

1. Remove the blower access panel
2. Remove the three screws securing the blower motor housing. If unit has a support bracket, remove the two screws securing the bracket.
3. Remove the two red wires attached to the limit switch.

**Motor removal and replacement**

This method is required to replace or repair blower wheel, blower housing, or any unreachable components behind blower assembly.

1. Remove all screws around rim of unit top, (except screws which are inaccessible because of proximity to structure).
2. Raise unit top at corner of unit closest to blower at least 2″ and place a sturdy brace at least 2″ thick between top and unit corner. A 2X4 piece of wood is ideal for this.
3. Disconnect all wires from housing and slide housing out of unit. Reverse this process to reinstall.

**Circulating Air Blower**

Visually inspect the blower wheel for accumulations of dirt or lint. Clean the compartment and the blower wheel. If accumulation is excessive on blower wheel, or does not easily remove, it will be necessary to remove the blower assembly.

Note: The blower motor is permanently lubricated. No further lubrication is required. Do not attempt to lubricate the blower motor.

**Burners / Heat Exchangers / Flue Gas Passages**

To inspect the burners, heat exchanger and interior flue gas passages, use a light and small mirror on an extension handle.

Check the exterior of the heat exchanger and the interior flue gas passages for any evidence of deterioration due to corrosion, cracking or other causes. If signs of scaling or sooting exist, remove the burners and clean the heat exchanger, as required.

**INSPECTION AND CLEANING OF BURNER ASSEMBLY/HEAT EXCHANGERS/FLUE GAS PASSAGES**

**For Qualified Service Technician Only**

See **Figure 21** for identification of parts.

1. Disconnect electrical power to unit.
2. Turn **OFF** gas at manual shut off valve.
3. Remove burner access panel.
4. Remove the vent assembly flue pipe.
5. Disconnect gas pipe at union.
6. Disconnect wires from gas valve, note connections.
7. Remove screws that secure the flame shield and remove gas control valve, manifold and burners as an assembly.
8. Remove collector box, injector plate, and restrictor plate, including gaskets.
9. Hold the burner assembly vertically and lightly tap it against a wood block. Clean also with a stiff brush. Severe cases of lint clogging may require washing the burners in hot water.
10. Clean flue gas passages by using small brushes and a vacuum cleaner. It may be necessary to fabricate handle extensions for the brushes to reach the areas that require cleaning. Reinspect after cleaning and replace the heat exchanger if defective.
11. Reinstall parts and gaskets in reverse order. On direct spark models check the spark gap. $^1/_8$ inch is required between the sparker electrodes.
12. Turn gas on and check for leaks.
13. Install all access panels, turn power on and check for normal operation.

**REFRIGERANT CIRCUIT**

For Qualified Service Technician Only

Annually inspect all refrigerant tubing connections and the unit base for oil accumulations. Detecting oil generally indicates a refrigerant leak.

**⚠ WARNING**

**FIRE AND EXPLOSION HAZARD.**

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

**System under pressure. Relieve pressure and recover all refrigerant before system repair or final unit disposal to avoid serious injury or death. Use all service ports and open all flow control devices, including solenoid valves.**

If oil is detected or if low cooling performance is suspected, leak−test all refrigerant tubing using an electronic leak detector, halide torch, or liquid−soap solution.

| Figure 21 | Component Locations |
|---|---|

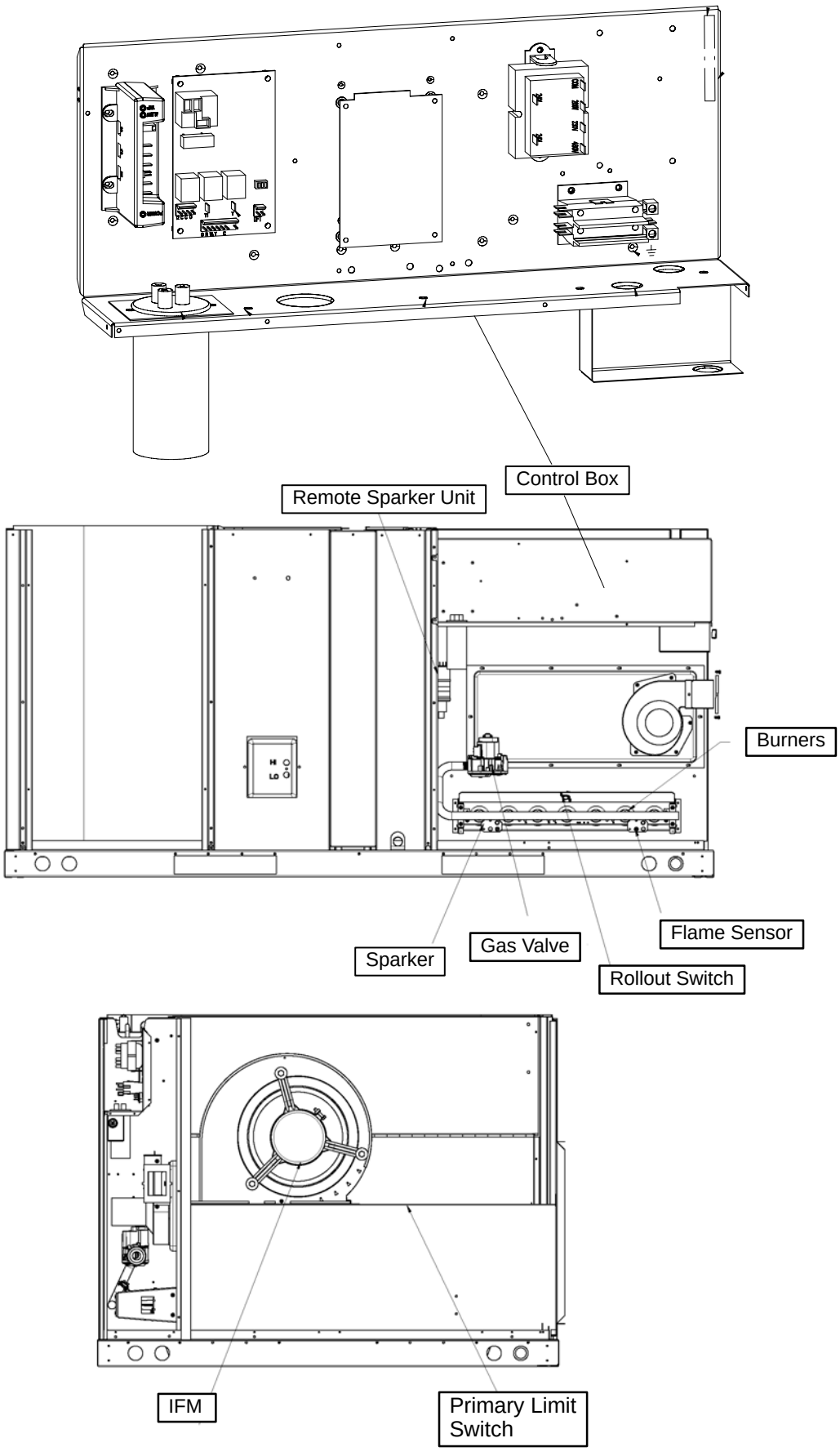


**Figure 22** **Rigging Instructions**

RIGGING INSTRUCTIONS

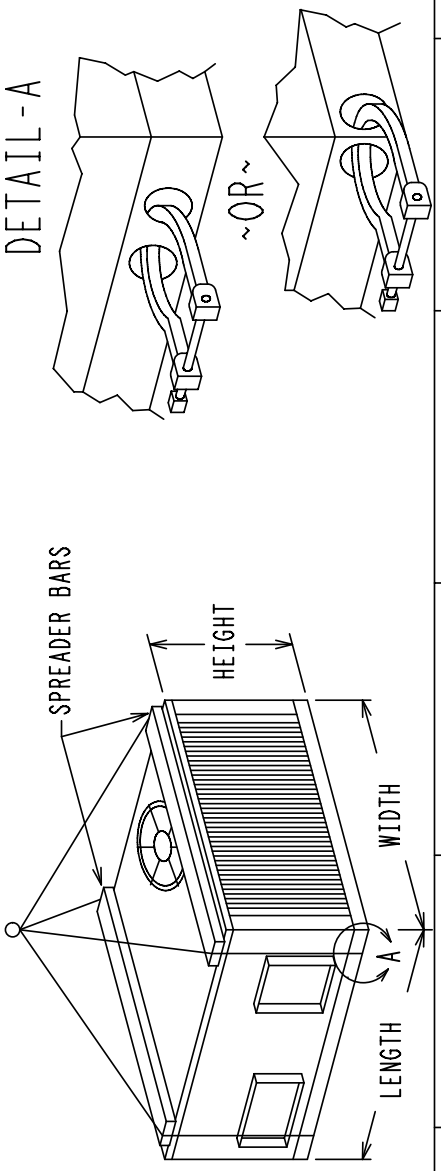
50CY501872

⚠ WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN PROPERTY DAMAGE, BODILY INJURY OR DEATH.

- ALL PANELS MUST BE IN PLACE WHEN RIGGING AND LIFTING.
- HOOK RIGGING SHACKLES THROUGH HOLES IN BASE RAIL, AS SHOWN IN DETAIL-A.
- USE SPREADER BARS, WHEN RIGGING, TO PREVENT UNIT DAMAGE.
- BE SURE RIGGING AND SHACKLES ARE SUFFICIENT TO HANDLE WEIGHT LISTED BELOW.

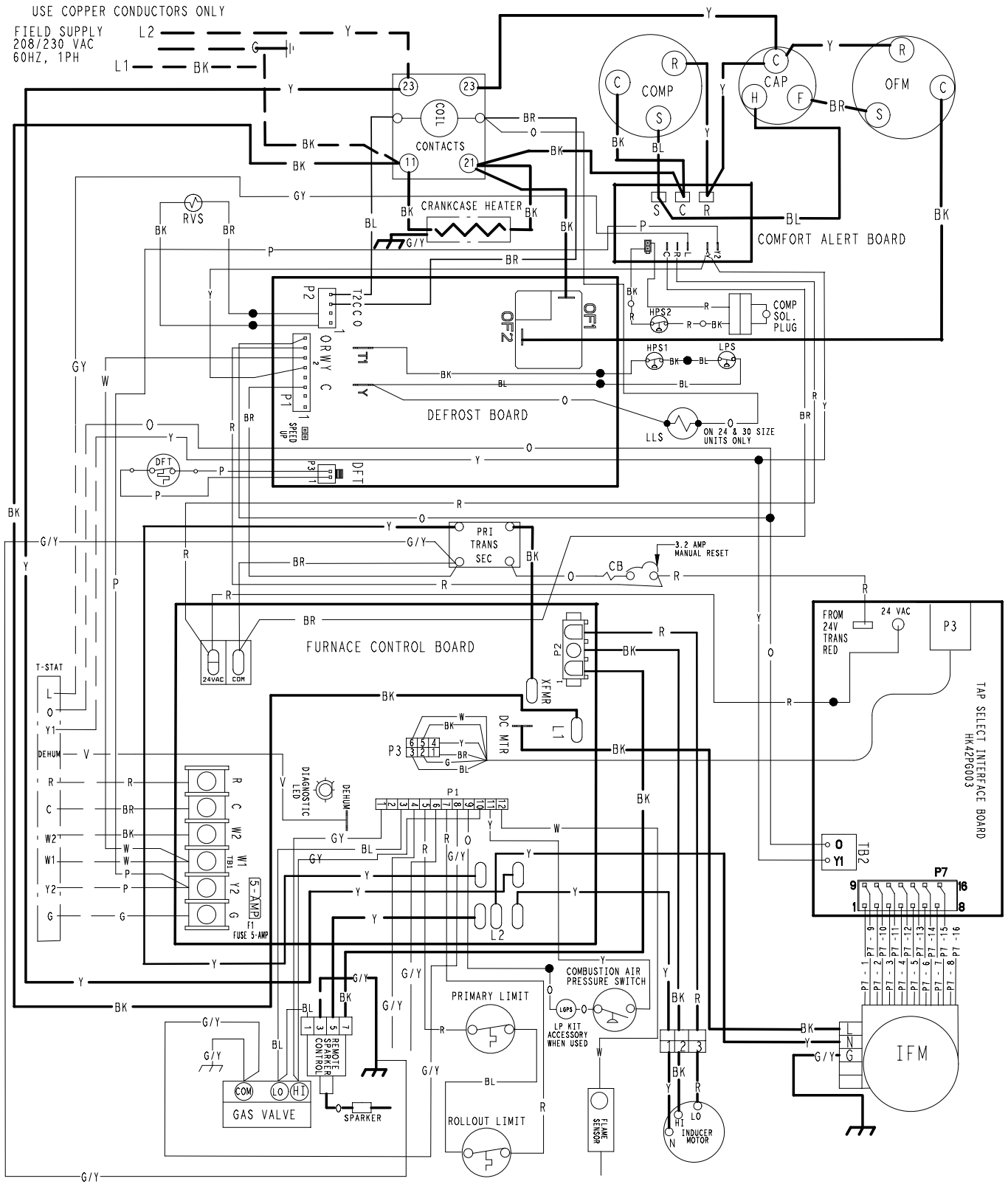
DETAIL-A




| CABINET | MAX. LENGTH | | MAX. WIDTH | | MAX. HEIGHT | | MAX. WEIGHT | |
|---|---|---|---|---|---|---|---|---|
| | IN | MM | IN | MM | IN | MM | LB | KG |
| SMALL | 52.00 | 1219 | 48.00 | 1219 | 38.00 | 965 | 500 | 227 |
| LARGE | 73.00 | 1854 | 48.00 | 1219 | 44.00 | 1118 | 680 | 308 |

# All Models Wiring Diagram

CONNECTION WIRING DIAGRAM




IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE AWM-105°C OR ITS EQUIVALENT.
SEE INSTALLATION INSTRUCTIONS FOR PROPER HEATING AND COOLING CONNECTIONS FOR YOUR UNIT. INDOOR FAN MOTOR PLUGS- "Do Not Disconnect Under Load"

LINE VOLTAGE FACTORY
LOW VOLTAGE FIELD
LOW VOLTAGE FACTORY
LINE VOLTAGE FIELD
INTERNAL CIRCUIT BOARD WIRING

COLOR CODE :

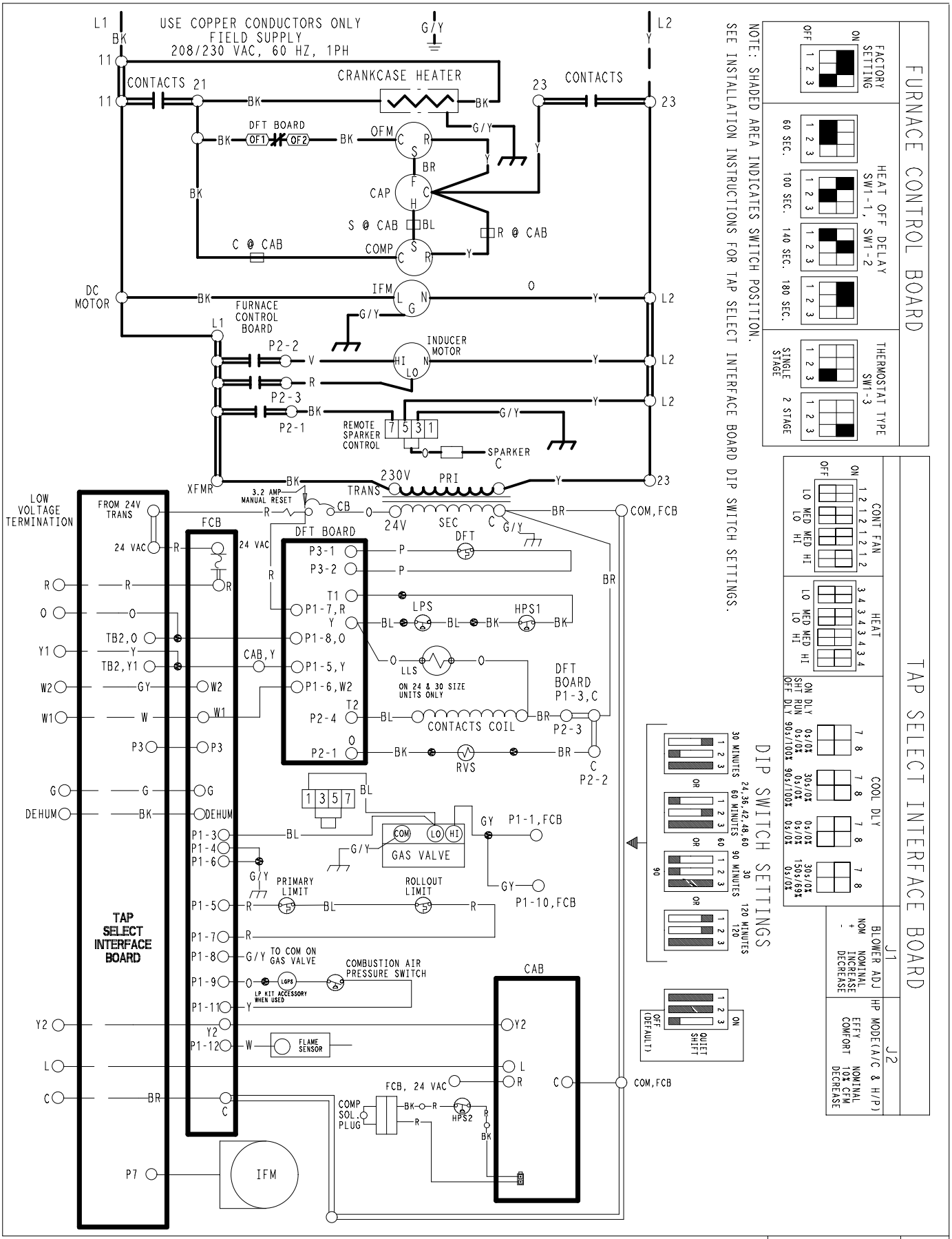
| | | | | | |
|---|---|---|---|---|---|
| BLACK | BK | GREEN | G | WHITE | W |
| BLUE | BL | ORANGE | O | YELLOW | Y |
| BROWN | BR | RED | R | | |
| GRAY | GY | VIOLET | V | | |
| PINK | P | GRN & YEL | G/Y | | |

COMP = COMPRESSOR
SOL. = SOLENOID
CAP = CAPACITOR
IFM = INDOOR FAN MOTOR
PRI = PRIMARY
SEC = SECONDARY
DH = DEHUMIDIFIER
CB = CIRCUIT BREAKER
FCB = FURNACE CONTROL BOARD

OFM = OUTDOOR FAN MOTOR
HPS = HIGH PRESSURE SWITCH
LPS = LOW PRESSURE SWITCH
CAB = COMFORT ALERT BOARD
DFT = DEFROST
CONT = CONTINUOUS
● = WIRE SPLICE
LLS = LIQUID LINE SOLENOID
LGPS = LOW GAS PRESSURE SWITCH

# All Models Wiring Diagram

LADDER WIRING DIAGRAM




DANGER: ELECTRICAL SHOCK HAZARD DISCONNECT POWER BEFORE SERVICING | 50CY501710 | 6.0