Installation Instructions
PGE Series
575 Volt – 3 Phase
PACKAGE GAS/ELECTRIC UNITS

TABLE OF CONTENTS

ARI PERFORMANCE CERTIFIED ARI Standard 210/240 Unitary Air Conditioners

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Key: PGE

SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing 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 extinguishers available for all brazing operations.

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

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal 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.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death.

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could death and/or property damage.

Disconnect gas piping from unit when leak testing at pressure greater than $^1/_2$ psig. Pressures greater than $^1/_2$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than $^1/_2$ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of $^1/_2$ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve(s).

INSTALLATION

Unit is shipped in the vertical discharge configuration. To convert to horizontal discharge application, remove duct opening covers. Using the same screws, install covers on duct openings in basepan of unit with insulation-side down. Seals around openings must be tight. (See Fig. 1.)

Step 1 —Provide Unit Support

Roof Curb

Assemble and install accessory roof curb in accordance with instructions shipped with curb. Install insulation, cant strips, roofing felt, and counter flashing. *Ductwork must be attached to curb, not to the unit.* If electric control power or gas service is to be routed through the basepan, attach the accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions. Connections must be installed before unit is set on roof curb.

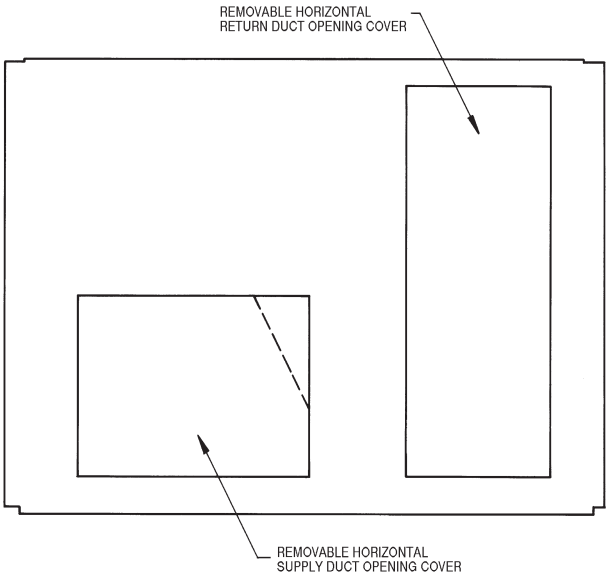


Fig. 1 – Horizontal Conversion Panels

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb. Improperly applied gasket can result in air leaks and poor unit performance.

Curb should be level. Unit leveling tolerances are shown in Fig. 2. This is necessary for unit drain to function properly. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

Slab Mount (Horizontal Units Only)

Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a gravel apron in front of condenser-coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE: Horizontal units may be installed on a roof curb if required.

Alternate Unit Support

When the curb or adapter cannot be used, support unit with sleeper rails using unit curb or adapter support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Step 2 —Field Fabricate Ductwork

Secure all ducts to roof curb and building structure on vertical discharge units. *Do not connect ductwork to unit.* For horizontal applications, field-supplied isolation flanges should be attached to horizontal discharge openings and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork. Cabinet return-air static pressure (a negative condition) shall not exceed 0.35 in. wg with economizer or 0.45 in. wg without economizer.

These units are designed for a minimum continuous return-air temperature in heating of 50°F (dry bulb), or an intermittent operation down to 45°F (dry bulb), such as when used with a night setback thermostat.

To operate at lower return-air temperatures, a field-supplied outdoor air temperature control must be used to initiate both stages of heat when the temperature is below 45°F. Indoor comfort may be compromised when these lower air temperatures are used with insufficient heating temperature rise.

Step 3 —Install External Trap for Condensate Drain

Condensate drain connections are located on the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, ensure the plug (Red) in the alternate bottom connection is tight before installing the unit.

To use the bottom drain connection for a roof curb installation, relocate the factory-installed plug (Red) from the bottom connection to the side connection. The center drain plug looks like a star connection, however it can be removed with a $^1/_2$-in. socket drive extension. (See Fig. 3.) The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap 4-in. deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection ($^3/_4$ in.). (See Fig. 4.)

Step 4 —Rig and Place Unit

Inspect unit for transportation damage, and file any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit, and rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 5 for additional information. Operating weight is shown in Table 1 and Fig. 5.

Lifting holes are provided in base rails as shown in Fig. 7. Refer to rigging instructions on unit.

⚠ WARNING

PERSONAL INJURY AND PROPERTY DAMAGE HAZARD

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

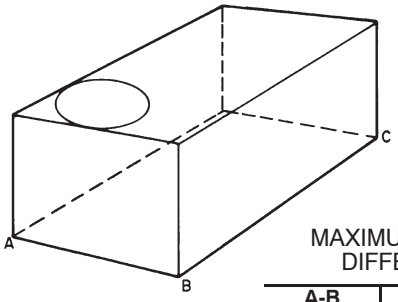
All panels must be in place when rigging and lifting.

Positioning

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. (See Fig. 6 and 7.)

Position unit on roof curb so that the following clearances are maintained: $^1/_4$ in. clearance between the roof curb and the base rail inside the front and rear, 0.0 in. clearance between the roof curb and the base rail inside on the duct end of the unit.

Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air.



MAXIMUM ALLOWABLE DIFFERENCE (in.)

A-B	B-C	A-C
0.5	1.0	1.0

Fig. 2 – Unit Leveling Tolerances

Be sure that unit is installed such that snow will not block the combustion intake or flue outlet.

Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Locate mechanical draft system flue assembly at least 48 in. from an adjacent building or combustible material. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

NOTE: When unit is equipped with an accessory flue discharge deflector, allowable clearance is 18 inches.

Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials.

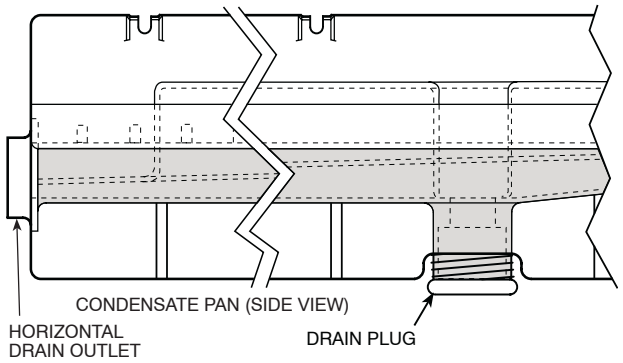
Adequate combustion-air space must be provided for proper operation of this equipment. Be sure that installation complies with all local codes and Section 5.3, Air for Combustion and Ventilation, NFGC (National Fuel Gas Code), ANSI (American National Standards Institute) Z223.1-1984 and addendum Z223.1a-1987. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances.

Flue vent discharge must have a minimum horizontal clearance of 4 ft from electric and gas meters, gas regulators, and gas relief equipment.

After unit is in position, remove shipping materials and rigging skids.

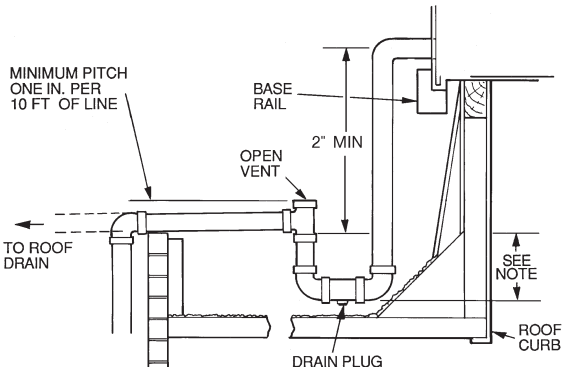
Install Flue Hood

Flue hood is shipped screwed to the burner compartment access panel. Remove from shipping location and, using screws provided, install flue hood in location shown in Fig.7.



NOTE: Drain plug is shown in factory-installed position.

Fig. 3 – Condensate Drain Connection



NOTE: Trap should be deep enough to offset maximum unit static difference. A 4-in. trap is recommended.

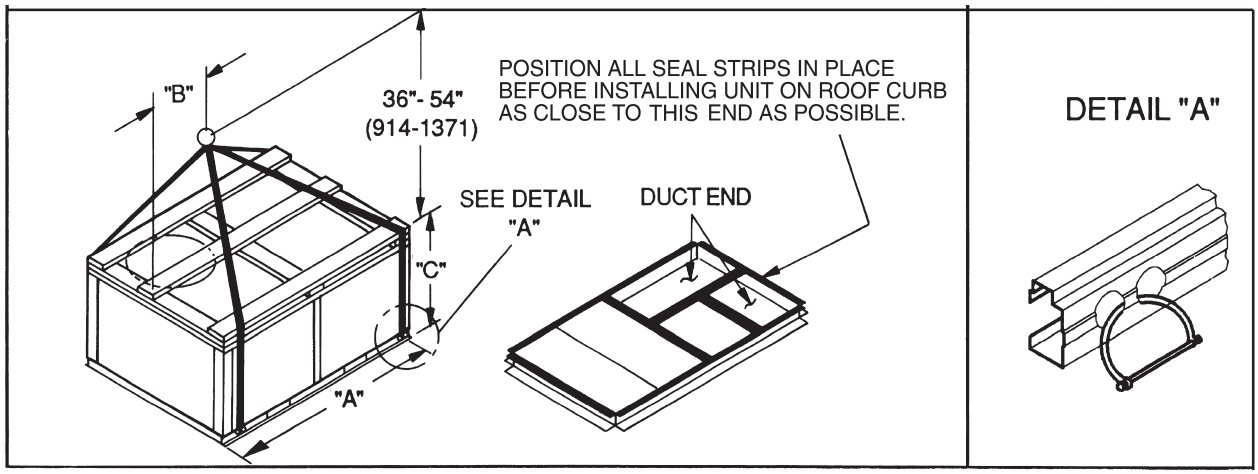
Fig. 4 – Condensate Drain Piping Details

Install Gas Piping

Unit is equipped for use with type of gas shown on nameplate. Refer to local building codes, or in the absence of local codes, to ANSI Z223.1-1984 and addendum Z223.1A-1987 entitled National Fuel Gas Code. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances.

For natural gas applications, gas pressure at unit gas connection must not be less than 4 in. wg or greater than 13 in. wg while the unit is operating.

Size gas supply piping for 0.5 in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.



NOTES:
1. Place unit on curb as close as possible to the duct end.
2. Dimension in ( ) is in millimeters.
3. Hook rigging shackles through holes in base rail as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.

Fig. 5 – Rigging Details

UNIT PAE	OPERATING WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
036	530	240	73.69	1872	35.50	902	33.31	847
048	540	245	73.69	1872	35.50	902	33.31	847
060	560	254	73.69	1872	35.50	902	33.31	847

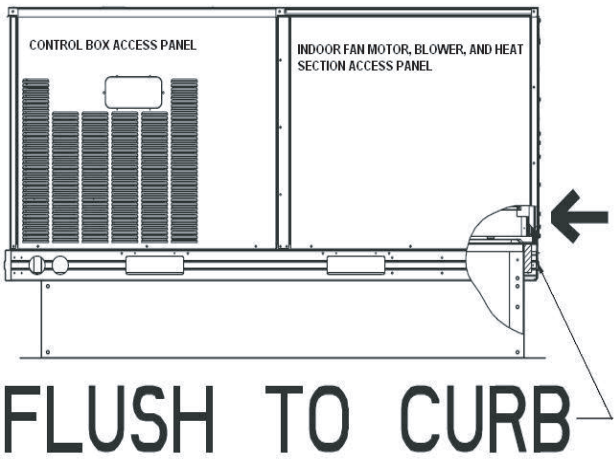


Fig. 6 – Roof Curb Alignment

Support gas piping as shown in the table in Fig. 9. For example, a $^{3}/_{4}$-in. gas pipe must have one field-fabricated support beam every 8 ft. Therefore, an 18-ft long gas pipe would have a minimum of 3 support beams, and a 48-ft long pipe would have a minimum of 6 support beams.

⚠ WARNING

PERSONAL INJURY AND PROPERTY DAMAGE HAZARD

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

All panels must be in place when rigging and lifting.

See Fig. 9 for typical pipe guide and locations of external manual gas shutoff valve.

NOTE: If accessory thru-the-bottom connections and roof curb are used, refer to the Thru-the-Bottom Accessory Installation Instructions for information on power wiring and gas connection piping. The power wiring, control wiring and gas piping can be routed through field-drilled holes in the basepan. The basepan is specially designed and dimpled for drilling the access connection holes.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

When connecting the gas line to the unit gas valve, the installer MUST use a backup wrench to prevent damage to the valve.

Unit PGE	STD. UNIT WEIGHT LB	STD. UNIT WEIGHT KG	(A) CORNER WEIGHT LB	(A) CORNER WEIGHT KG	(B) CORNER WEIGHT LB	(B) CORNER WEIGHT KG	(C) CORNER WEIGHT LB	(C) CORNER WEIGHT KG	(D) CORNER WEIGHT LB	(D) CORNER WEIGHT KG	"J" FT -IN.	"J" MM
036	530	240	127	57.6	122	55.3	138	62.6	143	64.9	2'-9 5/16"	846.5
048	540	245	129	58.5	124	56.2	141	64.0	146	66.2	↓	↓
060	560	254	134	60 8	129	58 5	146	66 2	151	68.5	↓	↓

BOTTOM POWER CHART,
THESE HOLES REQ'D FOR USE
WITH ACCESSORY PACKAGES
AXB035PKA

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001,003)	POWER*	1 1/8" [28.4]
1 1/4" (002,004)	POWER*	1 3/4" [44.4]
(003) 1/2" FPT	GAS	1 1/4" [31.8]
(004) 3/4" FPT	GAS	1 5/8" [41.3]

* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. ⊕ CENTER OF GRAVITY.
3. ⇨ DIRECTION OF AIR FLOW.
4. ON VERTICAL DISCHARGE UNITS, DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. FOR HORIZONTAL DISCHARGE UNITS FIELD SUPPLIED FLANGES SHOULD BE ATTACHED TO HORIZONTAL DISCHARGE OPENINGS, AND ALL DUCTWORK SHOULD BE ATTACHED TO THE FLANGES.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BETWEEN UNIT, FLUE SIDE AND COMBUSTIBLE SURFACES, 36 IN.,18 IN. WHEN USING ACCESSORY FLUE DISCHARGE DEFLTR.
   b. BOTTOM OF UNIT TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 1 INCH.
      BOTTOM OF BASE RAIL TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES.
   c. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   d. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   g. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   h. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL AND COMBUSTION SIDE AS STATED IN NOTE #5a, b, AND c, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B, OR C ROOF COVERING MATERIAL IF SET ON BASE RAIL.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6" [457] UP FROM FROM THE BOTTOM OF THE BASE RAIL.

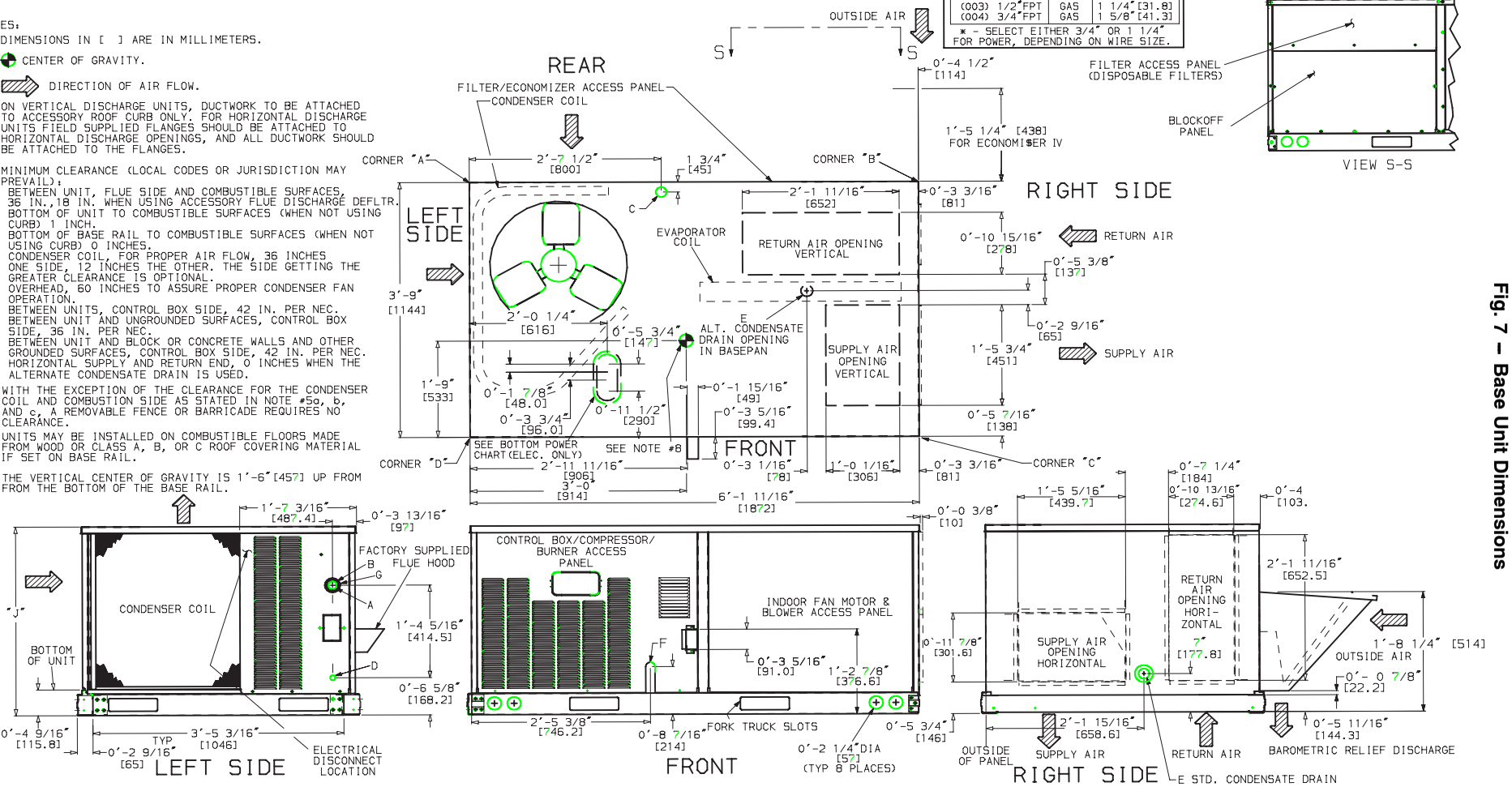


Fig. 7 – Base Unit Dimensions

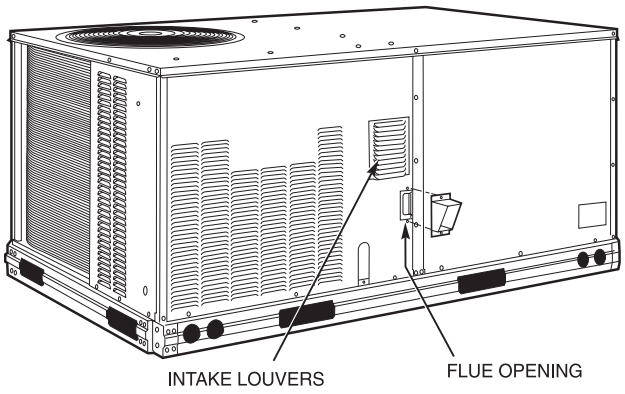
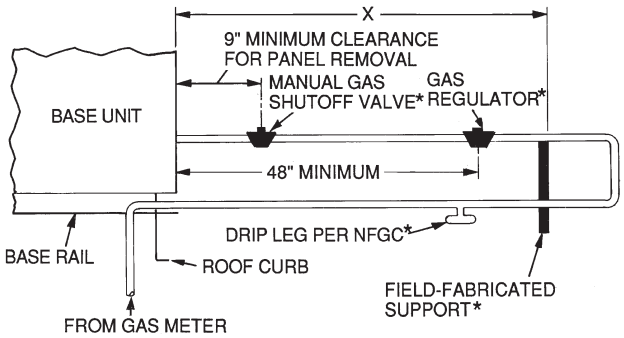


Fig. 8 – Flue Hood Details



LEGEND

NFGC — National Fuel Gas Code

*Field supplied.

NOTE: Follow all local codes.

SPACING OF SUPPORTS

STEEL PIPE NOMINAL DIAMETER (in.)	SPACING OF SUPPORTS X DIMENSION (ft)
1/2	6
3/4 or 1	8
1 1/4 or larger	10

Fig. 9 – Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)

Step 5 —Make Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code), ANSI/NFPA (National Fire Protection Association), latest edition, and local electrical codes. *Do not use gas piping as an electrical ground.*

Field Power Supply

All units are factory wired for the voltage shown on the nameplate.

Refer to unit label diagram for additional information. Pigtails are provided for field service. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper connector.

When installing units, provide a disconnect per NEC.

All field wiring must comply with NEC and local requirements.

Install conduit through side panel openings indicated in Fig. 7. Route power lines through connector to terminal connections as shown in Fig. 10.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 3 to determine the percent voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable warranty.

NOTE: If accessory thru-the-bottom connections and roof curb are used, refer to the Thru-the-Bottom Accessory Installation Instructions for information on power wiring and gas connection piping. The power wiring, control wiring and gas piping can be routed through field-drilled holes in the basepan. The basepan is specially designed and dimpled for drilling the access connection holes.

Field Control Wiring

Install an approved accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature in accordance with thermostat installation instructions.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through connector on unit to low-voltage connections (shown in Fig. 11 and 12).

Connect thermostat wires to matching screw terminals of low-voltage connection board. (See Fig. 11 and 12.)

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gauge) insulated wire (35°C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35°C minimum). For over 75 ft, use no. 14 AWG insulated wire (35°C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

Pass the control wires through the hole provided in the corner post; then feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box. (See Fig. 13). The raceway provides the UL required clearance between high and low-voltage wiring.

Heat Anticipator Settings

Set heat anticipator settings at 0.14 amp for first stage and 0.14 for second stage heating.

Table 1—Physical Data PGE

BASE UNIT PGE 575v-3 Phase-60Hz.		036	048	060
NOMINAL CAPACITY		3	4	5
OPERATING WEIGHT (lb)		530	540	560
COMPRESSOR			Scroll	
Quantity		1	1	1
Oil (oz)		42	53	50
REFRIGERANT TYPE			R-22	
Expansion Device			Fixed Orifice Metering Device	
Operating Charge (lb-oz)				
Standard Unit		5-8	10-2	10-0
CONDENSER FAN			Propeller	
Quantity...Diameter (in.)		1...22	1...22	1...22
Nominal Cfm		3500	3500	4100
Motor Hp...Rpm		1/8...825	1/8...825	1/4...1100
Watts Input (Total)		180	180	320
CONDENSER COIL			Enhanced Copper Tubes, Aluminum Lanced Fins	
Rows...Fins/in.		1...17	2...17	2...17
Total Face Area (sq ft)		14.6	16.5	16.5
EVAPORATOR COIL			Enhanced Copper Tubes, Aluminum Double-Wavy Fins	
Rows...Fins/in.		2...15	2...15	4...15
Total Face Area (sq ft)		5.5	5.5	5.5
EVAPORATOR FAN			Centrifugal Type, Belt Drive	
Quantity...Size (in.)		1...10 x 10	1...10 x 10	1...10 x 10
Nominal Cfm		1200	1600	2000
Maximum Continuous Bhp	Std	1.20	1.20	1.30/2.40*
Motor Frame Size	Std	48	48	56
Fan Rpm Range	Std	680-1044	770-1185	1035-1460
Motor Bearing Type		Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	Std	1.9/2.9	1.9/2.9	2.4/3.4
Nominal Motor Shaft Diameter (in.)	Std	1/2	1/2	5/8
Fan Pulley Pitch Diameter (in.)	Std	4.5	4.0	4.0
Belt — Type...Length (in.)	Std	1...A...36	1...A...36	1....4...40
Pulley Center Line Distance (in.)		10.0-12.4	10.0-12.4	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	65	70	75
Movable Pulley Maximum Full Turns from Closed Position	Std	5	5	6
Factory Setting — Full Turns Open	Std	3	3	3
Factory Speed Setting (rpm)	Std	826	936	1248
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8
HIGH-PRESSURE SWITCH (psig)				
Standard Compressor Internal Relief			450 ± 50	
Cutout / Reset (Auto.)			428 / 320	
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid LIne) (psig)				
Cutout / Reset (Auto.)			7 ± 3 / 22 ± 5	
FREEZE PROTECTION THERMOSTAT				
Opens (F) / Closes (F)			30 / 45	
OUTDOOR-AIR INLET SCREENS			Cleanable. Screen quantity and size varies with option selected.	
RETURN-AIR FILTERS			Throwaway	
Quantity...Size (in.)			2...16 x 25 x 2	

LEGEND

BHp — Brake Horsepower

TABLE 1 - Physical Data PGE (CONT)

BASE UNIT PGE	036	048	060
FURNACE SECTION			
Rollout Switch Cutout Temp (F)†	195	195	195
Burner Orifice Diameter (in. ...drill size)**			
Natural Gas — Std	113...33	113...33	113...33
Liquid Propane — Alt ***	089...43	089...43	089...43
Thermostat Heat Anticipator Setting (amps) 208/230/460/575 v			
First Stage	.14	.14	.14
Second Stage	.14	.14	.14
Gas Input (Btuh)			
First Stage/Second Stage	50,000/ 72,000	82,000/115,000	82,000/115,000
Efficiency (Steady State) (%)	82.8	81	81
Temperature Rise Range	25-55	35-65	35-65
Manifold Pressure (in. wg)			
Natural Gas — Std	3.5	3.5	3.5
Liquid Propane — Alt ***	3.5	3.5	3.5
Maximum Static Pressure (in. wg)	1.0	1.0	1.0
Field Gas Connection Size (in.)	1/2	1/2	1/2

LEGEND

BHP - Brake Horsepower
** 72,000 Btuh input units have 2 burners. 115,000 Btuh input units have3 burners
*** An LP kit is available as an accessory. Kit may be used at elevations as high as 2000 ft.

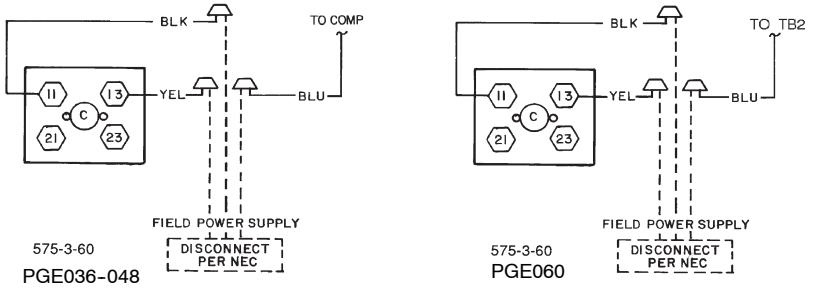
Table 2 — Electrical Data - PGE036-060

			VOLTAGE RANGE		COMPRESSOR (each)			OFM (each)		COMBUSTION FAN MOTOR	IFM
UNIT PGE	NOMINAL V-PH-Hz	IFM TYPE	Min	Max	QTY	RLA	LRA	QTY	FLA	FLA	FLA
036	575-3-60	STD	518	632	1	4.2	31	1	0.4	0.3†	1.9
048	575-3-60	STD	518	632	1	6.4	40	1	0.4	0.3†	1.9
060	575-3-60	STD	518	632	1	7.1	50	1	0.6	0.3†	2.0

	POWER SUPPLY *		MINIMUM UNIT DISCONNECT SIZE	
UNIT PGE	MCA	MOCP**	FLA	LRA
036	7.6	10	7	36
048	10.3	15	10	45
060	11.5	15	11	63

FLA -Full Load Amps
HACR - Heating, Air Conditioning and Refrigeration
IFM - Indoor (Evaporator) Fan Motor
LRA - Locked Rotor Amps
MCA - Minimum Circuit Amps
MOCP - Maximum Overcurrent Protection
NEC - National Electrical Code
OFM - Outdoor (Condenser) Fan Motor
RLA - Rated Load Amps

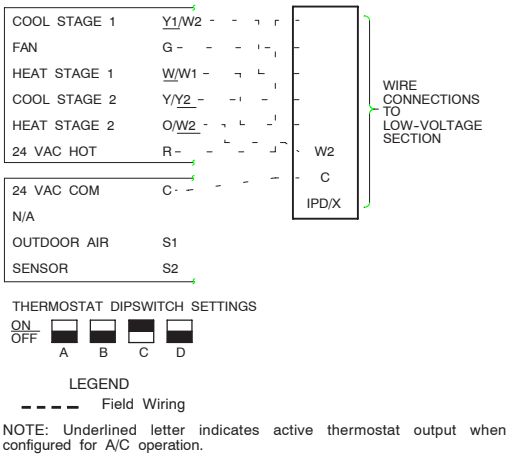
NOTES:
* The values listed in this table do not include power exhaust. See power exhaust table for power exhaust requirements.
** Fuse or HACR breaker



LEGEND

C	–	Contactor
COMP	–	Compressor
EQUIP	–	Equipment
GND	–	Ground
FC	–	Indoor (Evaporator) Fan Contactor
NEC	–	National Electric Code
TB	–	Terminal Block

Fig. 10 – Power Wiring Connections



NOTE: Underlined letter indicates active thermostat output when configured for A/C operation.

Fig. 11 – Low Voltage Connection With or without Economizer or Two-Position Damper

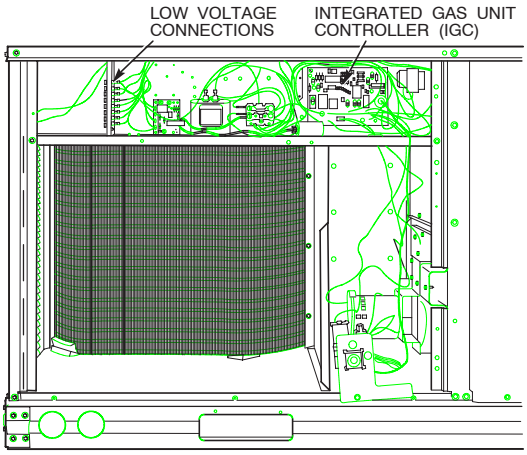


Fig. 13 – Field Control Wiring

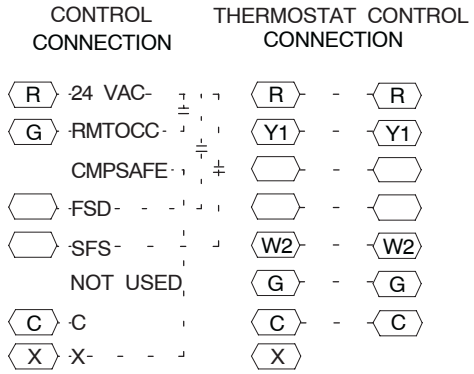


Fig. 12 – Low Voltage Connections

Table 3 – PGE Fan Rpm at Motor Pulley Setting With Standard Motor*

UNIT PGE	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
036	1044	1008	971	935	898	862	826	789	753	716	680	—	—
048	1185	1144	1102	1061	1019	978	936	895	853	812	770	—	—
060	1460	1425	1389	1354	1318	1283	1248	1212	1177	1141	1106	1070	1035

*Approximate fan rpm shown (standard motor/drive).

Table 4 – Evaporator-Fan Motor Data — Standard Motor

UNIT PGE	UNIT PHASE	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
036	Three	1.20	1000	575	2.2
048	Three	1.20	1000	575	2.2
060	Three	2.40	2120	575	3.0

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower and watts range of the motors can be utilized with confidence. Using the fan motors up to the ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 5 – Outdoor Sound Power (Total Unit) — PGE036-60

UNIT PGE	ARI RATING (decibels)	OCTAVE BANDS							
		63	125	250	500	1000	2000	4000	8000
036 - 048	76	55.9	66.0	64.0	66.2	68.4	64.5	61.7	57.3
060	80	59.1	68.9	68.7	71.9	74.0	68.9	65.7	59.0

LEGEND

ARI – Air Conditioning and Refrigeration Institute

GENERAL FAN PERFORMANCE NOTES

1. Values include losses for filters, unit casing, and wet coils.
2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using the fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
3. Use of a field-supplied motor may affect wire sizing.
4. Interpolation is permissible. Do not extrapolate.
5. Performance includes clean filter and wet coil.

Table 6 – Fan Performance PGE036 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	567	0.15	145	688	0.22	222	786	0.30	296	871	0.37	368	947	0.44	437
1000	599	0.18	177	717	0.27	265	814	0.35	349	897	0.43	430	972	0.51	509
1100	632	0.22	215	747	0.31	313	842	0.41	407	925	0.50	498	999	0.59	587
1200	666	0.26	257	778	0.37	367	871	0.47	471	952	0.57	572	1025	0.67	670
1300	701	0.31	306	810	0.43	426	901	0.54	540	981	0.65	651	1053	0.76	760
1400	737	0.36	361	842	0.49	491	931	0.62	616	1010	0.74	738	1081	0.86	856
1500	773	0.42	422	875	0.57	564	963	0.70	699	1040	0.84	831	1110	0.96	960

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1016	0.51	505	1080	0.57	572	1139	0.64	637	1195	0.71	702	1249	0.77	765
1000	1041	0.59	587	1104	0.67	662	1163	0.74	737	1219	0.81	811	1272	0.89	883
1100	1066	0.68	674	1129	0.76	759	1188	0.85	843	1243	0.93	925	1296	1.01	1007
1200	1093	0.77	767	1155	0.87	861	1213	0.96	955	1268	1.05	1047	1321	1.14	1137
1300	1119	0.87	866	1181	0.98	970	1239	1.08	1073	1294	1.18	1175	—	—	—
1400	1147	0.98	972	1208	1.09	1086	—	—	—	—	—	—	—	—	—
1500	1175	1.09	1086	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Table 7 – Fan Performance PGE048 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	666	0.26	257	778	0.37	367	871	0.47	471	952	0.57	572	1025	0.67	670
1300	701	0.31	306	810	0.43	426	901	0.54	540	981	0.65	651	1053	0.76	760
1400	737	0.36	361	842	0.49	491	931	0.62	616	1010	0.74	738	1081	0.86	856
1500	773	0.42	422	875	0.57	564	963	0.70	699	1040	0.84	831	1110	0.96	960
1600	810	0.49	491	909	0.65	643	994	0.79	790	1070	0.94	932	1140	1.08	1070
1700	847	0.57	567	943	0.73	730	1027	0.89	888	1101	1.05	1040	1170	1.20	1189
1800	885	0.66	652	978	0.83	826	1060	1.00	994	1133	1.16	1157	—	—	—
1900	923	0.75	745	1014	0.94	930	1093	1.11	1109	—	—	—	—	—	—
2000	962	0.85	847	1049	1.05	1043	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1093	0.77	767	1155	0.87	861	1213	0.96	955	1268	1.05	1047	1321	1.14	1137
1300	1119	0.87	866	1181	0.98	970	1239	1.08	1073	1294	1.18	1175	—	—	—
1400	1147	0.98	972	1208	1.09	1086	—	—	—	—	—	—	—	—	—
1500	1175	1.09	1086	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

Table 8 – Fan Performance PGE060 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	848	0.42	371	968	0.55	486	1069	0.68	600	1158	0.80	715	1238	0.94	831
1600	887	0.49	433	1004	0.63	556	1103	0.76	678	1190	0.90	800	1269	1.04	922
1700	927	0.57	502	1040	0.71	633	1137	0.86	763	1223	1.00	892	1302	1.15	1022
1800	967	0.65	579	1077	0.81	718	1172	0.96	856	1257	1.12	993	1334	1.27	1130
1900	1007	0.75	663	1115	0.91	811	1208	1.08	957	1291	1.24	1101	1368	1.40	1246
2000	1048	0.85	757	1153	1.03	913	1244	1.20	1066	1326	1.37	1219	1401	1.54	1371
2100	1090	0.97	859	1191	1.15	1023	1281	1.33	1185	1361	1.51	1345	1435	1.69	1505
2200	1131	1.09	970	1230	1.29	1143	1318	1.48	1313	1397	1.67	1481	1470	1.86	1649
2300	1173	1.23	1091	1269	1.43	1273	1355	1.63	1451	1433	1.83	1627	1505	2.03	1803
2400	1215	1.38	1223	1309	1.59	1413	1393	1.80	1600	1470	2.01	1784	1540	2.21	1967
2500	1258	1.54	1365	1349	1.76	1564	1431	1.98	1759	1506	2.20	1951	—	—	—

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1312	1.07	948	1380	1.20	1067	1445	1.34	1189	1506	1.48	1312	1564	1.62	1437
1600	1342	1.18	1047	1411	1.32	1173	1474	1.46	1300	1535	1.61	1429	1593	1.76	1560
1700	1374	1.30	1153	1441	1.45	1286	1505	1.60	1420	1565	1.75	1555	1622	1.91	1692
1800	1406	1.43	1268	1473	1.58	1407	1535	1.74	1548	1595	1.90	1690	1652	2.06	1833
1900	1438	1.57	1391	1504	1.73	1537	1567	1.90	1685	1626	2.06	1833	1682	2.23	1983
2000	1471	1.72	1523	1536	1.89	1677	1598	2.06	1831	1657	2.24	1986	—	—	—
2100	1504	1.87	1665	1569	2.06	1825	1630	2.24	1986	—	—	—	—	—	—
2200	1538	2.04	1816	1602	2.23	1984	—	—	—	—	—	—	—	—	—
2300	1572	2.23	1978	—	—	—	—	—	—	—	—	—	—	—	—
2400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

Table 9 – Fan Performance PGE036 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	553	0.14	134	681	0.22	221	782	0.32	316	870	0.42	417	948	0.53	526
1000	582	0.16	163	707	0.26	257	807	0.36	358	894	0.47	466	971	0.58	580
1100	612	0.20	196	734	0.30	297	833	0.41	405	919	0.52	519	995	0.64	639
1200	643	0.23	234	762	0.34	343	859	0.46	458	944	0.58	579	1020	0.71	705
1300	675	0.28	277	790	0.40	394	886	0.52	517	969	0.65	644	1044	0.78	777
1400	707	0.33	326	819	0.45	452	913	0.58	581	996	0.72	716	1070	0.86	855
1500	740	0.38	382	849	0.52	515	941	0.66	653	1023	0.80	795	1096	0.95	941

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1019	0.64	640	1084	0.76	760	1146	0.89	885	1203	1.02	1016	1258	1.16	1152
1000	1042	0.70	700	1107	0.83	825	1168	0.96	956	1225	1.10	1091	—	—	—
1100	1065	0.77	765	1130	0.90	896	1190	1.04	1032	1247	1.18	1173	—	—	—
1200	1089	0.84	837	1153	0.98	974	1213	1.12	1115	—	—	—	—	—	—
1300	1113	0.92	915	1177	1.06	1058	—	—	—	—	—	—	—	—	—
1400	1138	1.01	1000	1201	1.15	1149	—	—	—	—	—	—	—	—	—
1500	1163	1.10	1092	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Table 10 – Fan Performance PGE048 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	643	0.23	234	762	0.34	343	859	0.46	458	944	0.58	579	1020	0.71	705
1300	675	0.28	277	790	0.40	394	886	0.52	517	969	0.65	644	1044	0.78	777
1400	707	0.33	326	819	0.45	452	913	0.58	581	996	0.72	716	1070	0.86	855
1500	740	0.38	382	849	0.52	515	941	0.66	653	1023	0.80	795	1096	0.95	941
1600	773	0.45	444	879	0.59	586	970	0.73	731	1050	0.88	880	1123	1.04	1034
1700	807	0.52	513	910	0.67	663	999	0.82	817	1078	0.98	973	1150	1.14	1134
1800	841	0.59	589	942	0.75	749	1029	0.91	910	1106	1.08	1074	—	—	—
1900	875	0.68	674	974	0.85	842	1059	1.02	1012	1135	1.19	1184	—	—	—
2000	910	0.77	767	1006	0.95	944	1090	1.13	1122	—	—	—	—	—	—

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	837	1153	0.98	974	1213	1.12	1115	—	—	—	—	—	—
1300	1113	0.92	915	1177	1.06	1058	—	—	—	—	—	—	—	—	—
1400	1138	1.01	1000	1201	1.15	1149	—	—	—	—	—	—	—	—	—
1500	1163	1.10	1092	—	—	—	—	—	—	—	—	—	—	—	—
1600	1189	1.20	1191	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

Table 11 – Fan Performance PGE060 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	800	0.39	350	904	0.49	438	999	0.60	535	1087	0.72	640	1169	0.85	753
1600	839	0.46	412	938	0.57	505	1030	0.68	605	1115	0.80	714	1195	0.93	829
1700	879	0.54	483	974	0.65	580	1062	0.77	684	1144	0.90	796	1221	1.03	914
1800	919	0.63	561	1010	0.75	663	1095	0.87	771	1174	1.00	886	1250	1.14	1008
1900	960	0.73	648	1047	0.85	754	1129	0.98	867	1206	1.11	986	1279	1.25	1111
2000	1001	0.84	744	1085	0.96	855	1163	1.09	972	1238	1.23	1095	1309	1.38	1224
2100	1043	0.96	850	1123	1.09	965	1199	1.22	1086	1271	1.37	1213	1340	1.52	1346
2200	1085	1.09	966	1162	1.22	1086	1235	1.36	1211	1305	1.51	1342	1372	1.67	1479
2300	1127	1.23	1092	1201	1.37	1217	1272	1.52	1347	1340	1.67	1482	1405	1.83	1623
2400	1169	1.38	1229	1241	1.53	1359	1310	1.68	1493	1375	1.84	1633	1439	2.00	1778
2500	1212	1.55	1378	1281	1.70	1513	1348	1.86	1652	1412	2.02	1796	1473	2.19	1945

AIRFLOW	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
CFM	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1247	0.98	873	1320	1.13	1002	1390	1.28	1137	1457	1.44	1280	1522	1.61	1430
1600	1270	1.07	952	1342	1.22	1083	1411	1.37	1221	1476	1.54	1365	1540	1.71	1517
1700	1295	1.17	1040	1365	1.32	1173	1432	1.48	1313	1497	1.64	1459	1559	1.82	1612
1800	1321	1.28	1137	1390	1.43	1273	1455	1.59	1415	1518	1.76	1563	1579	1.93	1718
1900	1348	1.40	1243	1415	1.56	1381	1479	1.72	1526	1541	1.89	1677	1601	2.06	1834
2000	1377	1.53	1359	1442	1.69	1500	1505	1.86	1648	1565	2.03	1801	1624	2.21	1961
2100	1406	1.67	1485	1470	1.83	1629	1531	2.00	1780	1591	2.18	1936	1648	2.36	2098
2200	1437	1.83	1621	1499	1.99	1769	1559	2.16	1923	1617	2.34	2082	—	—	—
2300	1468	1.99	1769	1529	2.16	1920	1587	2.34	2077	—	—	—	—	—	—
2400	1500	2.17	1928	1559	2.35	2083	—	—	—	—	—	—	—	—	—
2500	1533	2.36	2098	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Gray cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

PRE-START-UP

⚠ WARNING

FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

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

1. Follow recognized safety practices and wear protective goggles when checking or servicing a refrigerant system.
2. Do not operate the compressor or provide any electric power to the unit unless the compressor terminal cover is in place and secured.
3. Do not remove the compressor terminal cover until all electrical sources are disconnected and tagged with lockout tags.
4. Relieve all pressure from the system before touching or disturbing anything inside the terminal box if a refrigerant leak is suspected around the compressor terminals. Use accepted methods to recover the refrigerant.
5. Never attempt to repair a soldered connection while the refrigerant system is under pressure.
6. Do not use a torch to remove any component. The system contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to the unit and tag disconnect.
   b. Recover refrigerant to relieve all pressure from the system using both high-pressure and low-pressure ports.
   c. Cut component connection tubing with a tubing cutter, and remove the component from the unit.
   d. Carefully unsweat the remaining tubing stubs when necessary. Oil can ignite when exposed to a torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field-wiring and factory-wiring connections. Be sure that connections are completed and tight. Be sure that wires are not in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blade are correctly positioned in fan orifice. See Condenser-Fan Adjustment section for more details.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

Step 1 —Unit Preparation

Make sure that the unit has been installed in accordance with installation instructions and applicable codes.

Step 2 —Gas Piping

Check gas piping for leaks.

⚠ WARNING

EXPLOSION HAZARD

Failure to follow this warning could cause personal injury or death.

Disconnect gas piping from unit when leak testing at pressure greater than $^1/_2$ psig. Pressures greater than $^1/_2$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than $^1/_2$ psig, it *must* be replaced before use. When pressure testing field- supplied gas piping at pressures of $^1/_2$ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve.

Step 3 —Return-Air Filters

Make sure the correct filters are installed in the unit (See Table 1). Do not operate the unit without return-air filters.

Step 4 —Outdoor-Air Inlet Screens

Outdoor-air inlet screen(s) must be in place before operating the unit.

Step 5 —Compressor Mounting

Compressors are internally spring mounted. Do not loosen or remove the compressor holddown bolts.

Step 6 —Internal Wiring

Check all electrical connections in unit control boxes; tighten them as required.

Step 7 —Refrigerant Service Ports

Each unit system has 4 Schrader-type service ports: one on the suction line, one on the liquid line, and 2 on the compressor discharge line. Be sure that caps on the ports are tight. Two additional Schrader valves are located under the high-pressure and low-pressure switches, respectively.

Step 8 —High Flow Valves

Two high flow refrigerant valves are located on the hot gas tube coming out of the compressor and the suction tubes. Large black plastic caps distinguish these valves with O-rings located inside the caps. No field access to these valves is available at this time. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

Step 9 —Compressor Rotation

Be certain that the compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect the service gauges to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the indoor fan (5 Ton units only) is probably also rotating in the wrong direction.

2. Turn off power to the unit and tag disconnect.
3. Reverse any two of the unit power leads.
4. Turn on power to the unit and energize the compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit makes more noise and does not provide cooling.

Step 10 —Cooling

Set the space thermostat to the OFF position. Set the system selector switch at COOL position and the fan switch at AUTO position. Adjust the thermostat to a setting below room temperature. The compressor starts when contactor closes.

Check cooling effects at a setting below room temperature. Check the unit charge. Refer to Refrigerant Charge section.

Reset the thermostat at a position above room temperature. The compressor will shut off.

To Shut Off Unit – Set the system selector switch at OFF position. Resetting the thermostat at a position above room temperature shuts off the unit temporarily until the space temperature exceeds the thermostat setting. Units are equipped with a anti-cycle protection device. The unit shuts down on any safety trip and remains off; an indicator light on the thermostat comes on. Check the reason for the safety trip.

Compressor restart is accomplished by manual reset at the thermostat by turning the selector switch to OFF position and then to ON position.

Step 11 —Main Burners

Main burners are factory set and should require no adjustment.

TO CHECK ignition of main burners and heating controls, move thermostat set point above room temperature and verify that the burners light and evaporator fan is energized. Check heating effect, then lower the thermostat setting below the room temperature and verify that the burners and evaporator fan turn off.

Refer to Tables 12 and 13 for the correct orifice to use at high altitudes.

Table 12 – Altitude Compensation* PGE036-60 Standard Units

ELEVATION (ft)	72,000 AND 115,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	33	43
2,000	36	44
3,000	36	45
4,000	37	45
5,000	38	46
6,000	40	47
7,000	41	48
8,000	42	49
9,000	43	50
10,000	44	50
11,000	45	51
12,000	46	52
13,000	47	52
14,000	48	53

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

†Orifices available through your local distributor.

Step 12 —Heating

1. Purge gas supply line of air by opening union ahead of the gas valve. If gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO or ON position. Set heating temperature lever above room temperature.
4. The induced-draft motor will start.
5. After a call for heating, the main burners should light within 5 seconds. If the burner does not light, then there is a 22-second delay before another 5-second try. If the burner still does not light, the time delay is repeated. If the burner does not light within 15 minutes, there is a lockout. To reset the control, break the 24 v power to W1.
6. The evaporator-fan motor will turn on 45 seconds after burner ignition.
7. The evaporator-fan motor will turn off in 45 seconds after the thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate.

NOTE: The default value for the evaporator-fan motor on/off delay is 45 seconds. The Integrated Gas Unit Controller (IGC) modifies this value when abnormal limit switch cycles occur. Based upon unit operating conditions, the on delay can be reduced to 0 seconds and the off delay can be extended to 180 seconds. When one flash of the LED (light-emitting diode) is observed, the evaporator-fan on/off delay has been modified.

If the limit switch trips at the start of the heating cycle during the evaporator on delay, the time period of the on delay for the next cycle will be 5 seconds less than the time at which the switch tripped. (Example: If the limit switch trips at 30 seconds, the evaporator-fan on delay for the next cycle will occur at 25 seconds.) To prevent short-cycling, a 5-second reduction will only occur if a minimum of 10 minutes has elapsed since the last call for heating.

The evaporator-fan off delay can also be modified. Once the call for heating has ended, there is a 10-minute period during which the modification can occur. If the limit switch trips during this period, the evaporator-fan off delay will increase by 15 seconds. A maximum of 9 trips can occur, extending the evaporator-fan off delay to 180 seconds.

To restore the original default value, reset the power to the unit.

To Shut Off Unit —Set system selector switch at off position. Resetting heating selector lever below room temperature will temporarily shut unit off until space temperature falls below thermostat setting.

Step 13 —Safety Relief

A soft solder joint at the suction line fitting provides pressure relief under abnormal temperature and pressure conditions.

Step 14 —Ventilation (Continuous Fan)

Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation. When the evaporator-fan selector switch is turned to the OFF position, there is a 30-second delay before the fan turns off.

Step 15 —Operating Sequence

Cooling - Units Without Economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC), reversing valve solenoid (RVS) and compressor contactor are energized and indoor-fan motor, compressor, and outdoor fan starts. The outdoor fan motor runs continuously while unit is cooling.

Heating - Units Without Economizer

When the thermostat calls for heating, terminal W1 is energized. To prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor is energized and the burner

ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high−fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45−second time−off delay.

SERVICE

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death.

When sevicing unit, shut off all electrical power to unit and install lockout tag.

Step 1 —Cleaning

Inspect unit interior at the beginning of heating and cooling season and as operating conditions require.

Evaporator Coil

1. Turn unit power off, tag disconnect. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex plug and removing mounting screws.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. Replace access panels.

Condenser Coil

Inspect coil monthly. Clean condenser coil annually, and as required by location and outdoor air conditions.

One-Row Coil

Wash coil with commercial coil cleaner. It is not necessary to remove top panel.

2-Row Coils

Clean coil as follows:

1. Turn off unit power and tag disconnect.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. (See Fig. 14.) To hold top panel open, place coil corner post between top panel and center post. (See Fig. 15.)

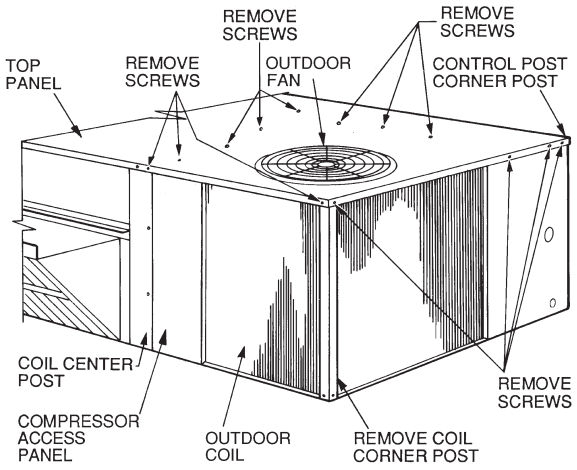


Fig. 14 – Cleaning Condenser Coil

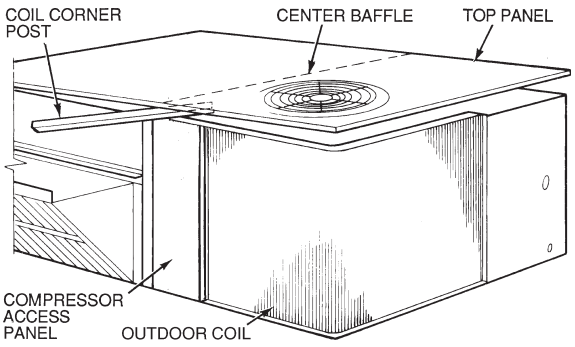


Fig. 15 – Propropping Up Top Panel

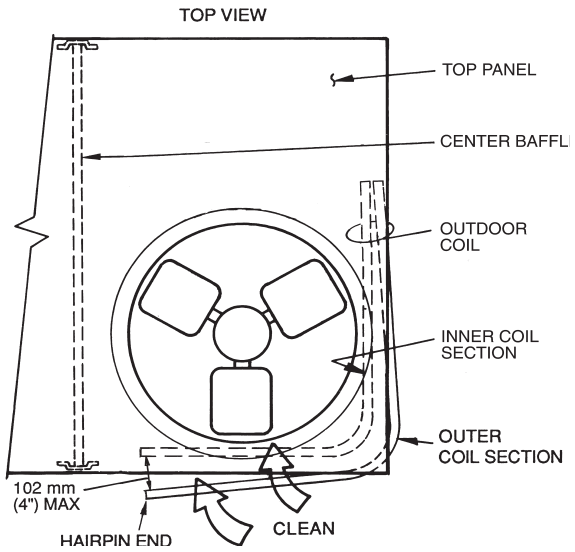


Fig. 16 – Separating Coil Sections

4. Remove screws securing coil to compressor plate and compressor access panel.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. (See Fig. 16.)
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.

8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Reinstall the coil corner post and replace all screws.

Condensate Drain

Check and clean each year at the start of the cooling season. In winter, keep the drain dry or protect it against freeze-up.

Filters

Clean or replace at the start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be the same dimensions as the original filters.

Outdoor-Air Inlet Screen

Clean the screen with steam or hot water and a mild detergent. Do not use disposable filters in place of screens.

Step 2 —Lubrication

Compressor

The compressor is charged with the correct amount of oil at the factory.

Fan Motor Bearings

Fan motor bearings are permanently lubricated. No further lubrication is required. No lubrication of condenser-fan or evaporator-fan motors is required.

Step 3 —Evaporator Fan Belt Inspection

Check condition of evaporator belt or tension during heating and cooling inspections or as conditions require. Replace belt or adjust as necessary.

Step 4 —High Pressure Switch

The high-pressure switch contains a Schrader core depressor, and is located on the compressor hot gas line. This switch opens at 428 psig and closes at 320 psig. No adjustments are necessary.

Step 5 —Loss of Charge Switch

The loss-of-charge switch contains a Schrader core depressor, and is located on the compressor liquid line. This switch opens at 7 psig and closes at 22 psig. No adjustments are necessary.

Step 6 —Freeze-Stat

The freeze-stat is a bimetal temperature-sensing switch that is located on the “hair-pin” end of the evaporator coil. The switch protects the evaporator coil from freeze-up due to lack of airflow. The switch opens at 30_F and closes at 45_F. No adjustments are necessary.

Step 7 —Refrigerant Charge

Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to HVAC Servicing Procedures literature available at your local distributor and the following procedures.

Unit panels must be in place when unit is operating during charging procedure. Unit must operate a minimum of 10 minutes before checking or adjusting refrigerant charge.

An accurate superheat, thermocouple-type or thermistor-type thermometer, and a gauge manifold are required when using the superheat charging method for evaluating the unit charge. *Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.*

No Charge

Use standard evacuating techniques. After evacuating system to 500 microns, weigh in the specified amount of refrigerant. (Refer to Table 1 and unit information plate.)

Low Charge Cooling

Using Cooling Charging Charts, Fig. 17–19, vary refrigerant until the conditions of the charts are met. Note the charging charts are different from type normally used. Charts are based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gauge to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

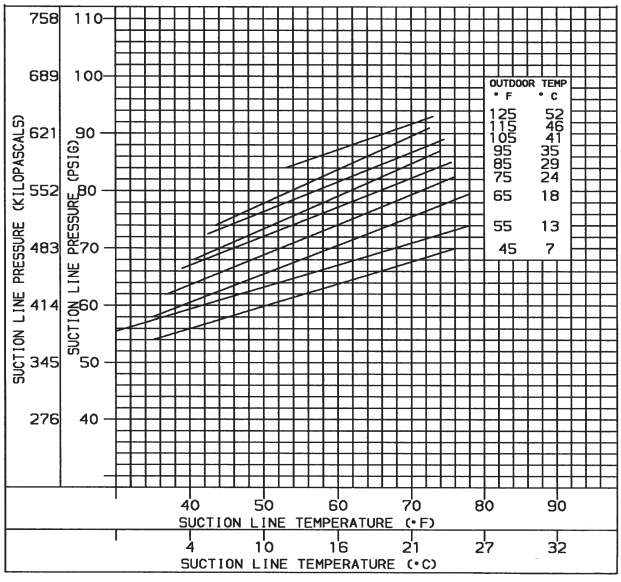


Fig. 17 – Cooling Charging Chart, Standard PGE036

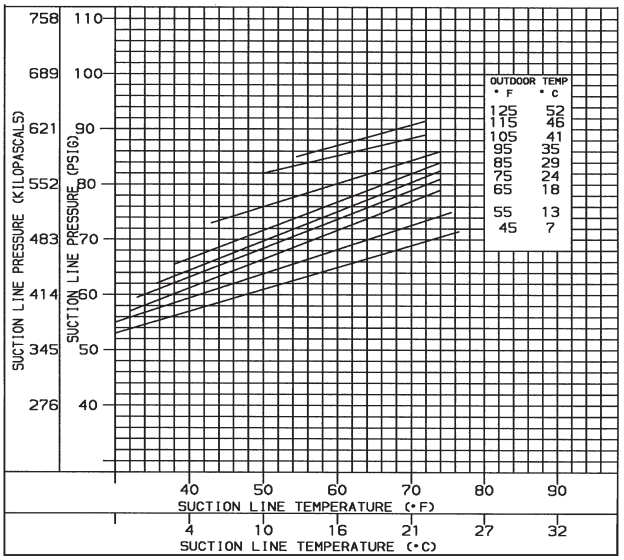


Fig. 18 – Cooling Charging Chart, Standard PGE048

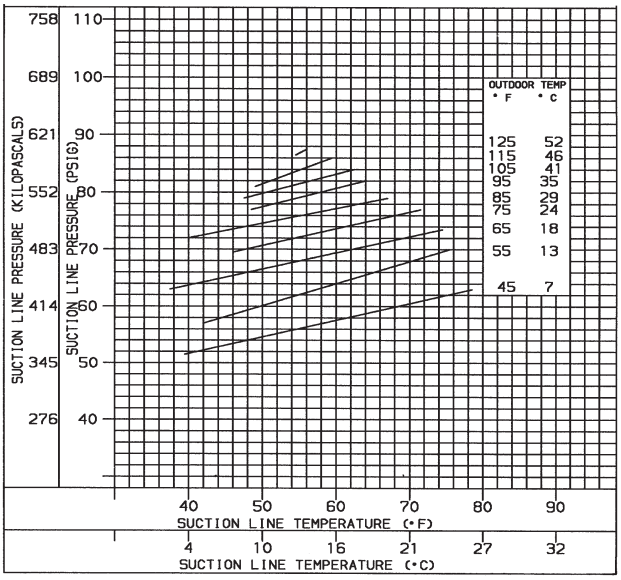


Fig. 19 – Cooling Charging Chart, Standard PGE060

NOTE: When using the charging charts, it is important that only the subcooling/reheat dehumidification coil liquid line solenoid valve be energized. The subcooling/reheat dehumidification coil liquid line solenoid valve MUST be energized to use the charging charts and the outdoor motor speed controller jumpered to run the fan at full speed.

The charts reference a liquid pressure (psig) and temperature at a point between the condenser coil and the subcooling/reheat dehumidification coil. A tap is provided on the unit to measure liquid pressure entering the subcooling/reheat dehumidification coil.

To Use Cooling Charging Chart, Standard Unit

Take the outdoor ambient temperature and read the suction pressure gage. Refer to charts to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully recover some of the charge. Recheck the suction pressure as charge is adjusted.

Example

Outdoor Temperature ..... 75°F

Suction Pressure ..... 70 psig

Suction Temperature should be ..... 48°F

(Suction temperature may vary ± 5°F.)

If a charging device is used, temperature and pressure readings must be accomplished using the charging charts.

Step 8 —Flue Gas Passageways

To inspect the flue collector box and upper areas of the heat exchanger:

1. Remove the combustion blower wheel and motor assembly according to directions in Combustion-Air Blower section below.
2. Remove the 3 screws holding the blower housing to the flue cover.
3. Remove the flue cover to inspect the heat exchanger.
4. Clean all surfaces as required using a wire brush.

Step 9 —Combustion Air Blower

Clean periodically to ensure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

To inspect blower wheel, remove draft hood and screen. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel as follows:

1. Slide burner access panel out.
2. Remove the 5 screws that attach induced-draft motor assembly to the vestibule cover.
3. Slide the motor and blower wheel assembly out of the blower housing. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 4 and 5.
4. To remove blower from the motor shaft, remove 2 setscrews.
5. To remove motor, remove the 4 screws that hold the motor to mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
6. To reinstall, reverse the procedure outlined above.

Step 10 —Limit Switch

Remove blower access panel (Fig. 7). Limit switch is located on the fan deck.

Step 11 —Burner Ignition

Unit is equipped with a direct spark ignition 100% lockout system. Integrated Gas Unit Controller (IGC) is located in the control box (Fig. 11). A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is uninterrupted. The LED can be observed through the viewport. When a break in power occurs, the IGC will be reset (resulting in a loss of fault history) and the evaporator fan on/off times delay will be reset. During servicing, refer to the label on the control box cover or Table 14 for an explanation of LED error code descriptions.

If lockout occurs, unit may be reset by interrupting power supply to unit for at least 5 seconds.

Table 13 – LED Error Code Description*

LED INDICATION	ERROR CODE DESCRIPTION
ON	Normal Operation
OFF	Hardware Failure
1 Flash†	Evaporator Fan On/Off Delay Modified
2 Flashes	Limit Switch Fault
3 Flashes	Flame Sense Fault
4 Flashes	4 Consecutive Limit Switch Faults
5 Flashes	Ignition Lockout Fault
6 Flashes	Induced-Draft Motor Fault
7 Flashes	Rollout Switch Fault
8 Flashes	Internal Control Fault
9 Flashes	Software Lockout

LEGEND

LED — Light-Emitting Diode

*A 3-second pause exists between LED error code flashes. If more than one error code exists, all applicable codes will be displayed in numerical sequence.

†Indicates a code that is not an error. The unit will continue to operate when this code is displayed.

IMPORTANT: Refer to Troubleshooting Tables for additional information.

Step 12 —Main Burners

At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust, if necessary.

⚠ CAUTION

FURNACE DAMAGE HAZARD

Failure to follow this caution may result in reduced furnace life.

When servicing gas train, do not hit or plug orifice spuds.

REMOVAL AND REPLACEMENT OF GAS TRAIN (See Fig. 20 and 21)

1. Shut off manual gas valve.
2. Shut off power to unit, tag disconnect.
3. Remove compressor access panel.
4. Slide out burner compartment side panel.
5. Disconnect gas piping at unit gas valve.
6. Remove wires connected to gas valve. Mark each wire.
7. Remove induced-draft motor, igniter, and sensor wires at the Integrated Gas Unit Controller (IGC).
8. Remove the 2 screws that attach the burner rack to the vestibule plate.
9. Remove the gas valve bracket.
10. Slide the burner tray out of the unit (Fig. 21).
11. To reinstall, reverse the procedure outlined above.
12. Reinstall burners on rack.

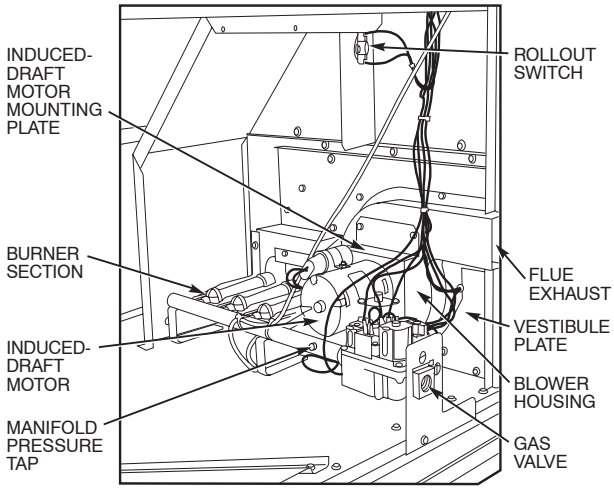


Fig. 20 – Burner Section Details

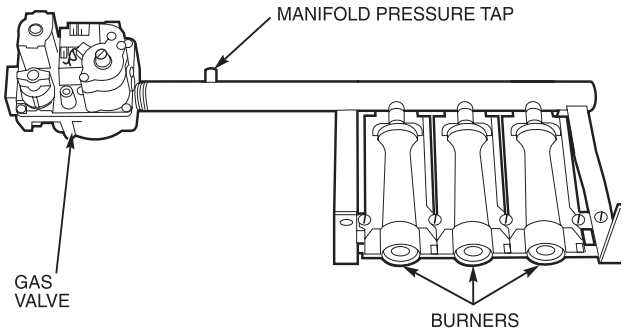
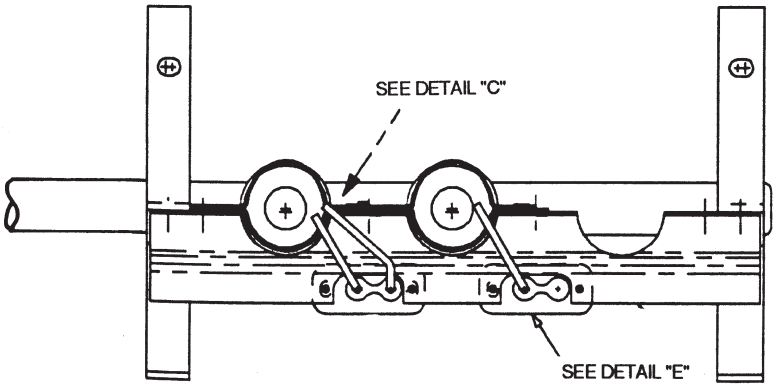
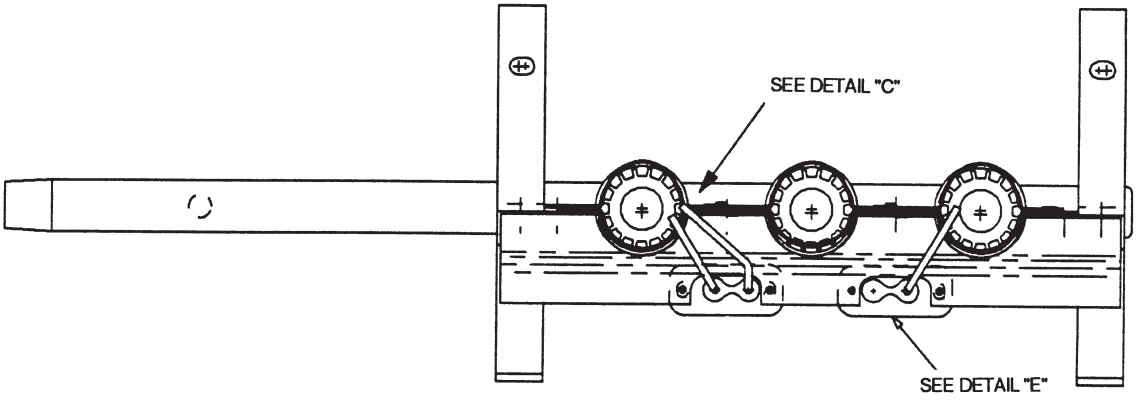


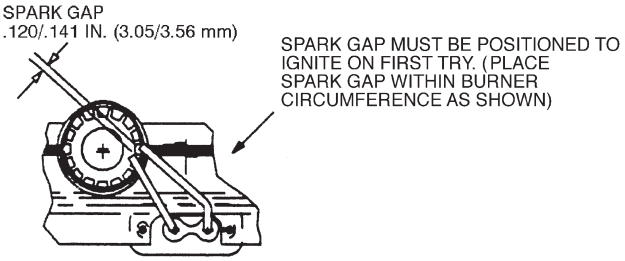
Fig. 21 – Burner Tray Details



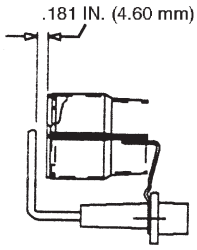
LOW HEAT
PGE036 – 72,000 BTUH INPUT



MEDIUM AND HIGH HEAT
PGE048 – 60 – 115,000 BTUH INPUT



DETAIL "C"



DETAIL 'E'

Fig. 22 – Spark Gap Adjustment

Cleaning and Adjustment

1. Remove burner rack from unit as described above
2. Inspect burners and, if dirty, remove burners from rack.
3. Using a soft brush, clean burners and crossover port as required.
4. Adjust spark gap. (See Fig. 22)

Step 13 —Replacement Parts

A complete list of replacement parts may be obtained from any distributor upon request. Refer to Fig. 23 for a typical unit wiring schematic.

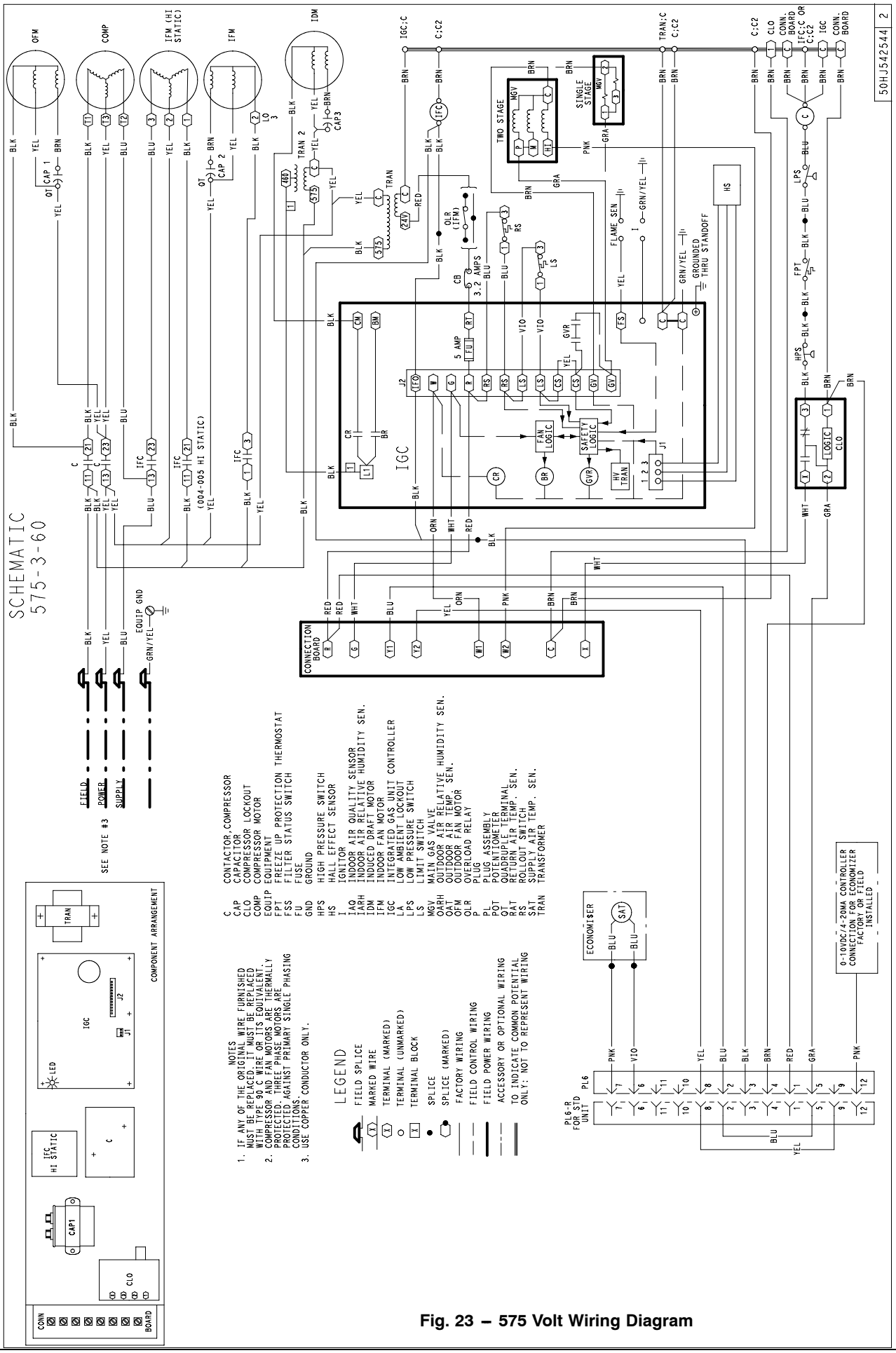


Fig. 23 – 575 Volt Wiring Diagram

Table – 14 LED Error Code Service Analysis

SYMPTOM	CAUSE	REMEDY
Hardware Failure. (LED OFF)	Loss of power to control module (IGC).	Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, and transformer. Units without a 24-v circuit breaker have an internal overload in the 24-v transformer. If the overload trips, allow 10 minutes for automatic reset.
Fan ON/OFF Delay Modified (LED/FLASH)	High limit switch opens during heat exchanger warm-up period before fan-on delay expires. Limit switch opens within three minutes after blower-off delay timing in Heating mode.	Ensure unit is fired on rate and temperature rise is correct. Ensure units' external static pressure is within application guidelines.
Limit Switch Fault. (LED 2 Flashes)	High temperature limit switch is open.	Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is in accordance with the range on the unit nameplate.
Flame Sense Fault. (LED 3 Flashes)	The IGC sensed flame that should not be present.	Reset unit. If problem persists, replace control board.
4 Consecutive Limit Switch Faults. (LED 4 Flashes)	Inadequate airflow to unit.	Check operation of indoor (evaporator) fan motor and that supply-air temperature rise agrees with range on unit nameplate information.
Ignition Lockout. (LED 5 Flashes)	Unit unsuccessfully attempted ignition for 15 minutes.	Check ignitor and flame sensor electrode spacing, gaps, etc. Ensure that flame sense and ignition wires are properly terminated. Verify that unit is obtaining proper amount of gas.
Induced-Draft Motor Fault. (LED 6 Flashes)	IGC does not sense that induced-draft motor is operating.	Check for proper voltage. If motor is operating, check the speed sensor plug/IGC Terminal J2 connection. Proper connection: PIN 1— White, PIN 2 — Red, PIN 3 — Black.
Rollout Switch Fault. (LED 7 Flashes)	Rollout switch has opened.	Rollout switch will automatically reset, but IGC will continue to lock out unit. Check gas valve operation. Ensure that induced-draft blower wheel is properly secured to motor shaft. Reset unit at unit disconnect.
Internal Control Fault. (LED 8 Flashes)	Microprocessor has sensed an error in the software or hardware.	If error code is not cleared by resetting unit power, replace the IGC.
Temporary Software Lockout (LED 9 Flashes)	Electrical interference is impeding the IGC software.	Reset 24-v to control board or turn thermostat off and then on. Fault will automatically reset itself in one hour.

LEGEND
IGC – Integrated Gas Unit Controller
LED – Light–Emitting Diode

⚠ CAUTION

COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in component damage.

If the IGC must be replaced, be sure to ground yourself to dissipate any electrical charge that may be present before handling new control board. The IGC is sensitive to static electricity and may be damaged if the necessary precautions are not taken.

IMPORTANT: Refer to heating troubleshooting for additional heating section troubleshooting information.

Table 15 – Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners Will Not Ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit.
		Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool-down period before resetting. Check 24-v circuit breaker; reset if necessary.
	Miswired or loose connections.	Check all wiring and wirenut connections.
	Burned-out heat anticipator in thermostat.	Replace thermostat.
	Broken thermostat wires.	Run continuity check. Replace wires, if necessary.
Inadequate Heating.	Dirty air filter.	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow.	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Use high speed tap, increase fan speed, or install optional blower, as suitable for individual units, Adjust pulley.
	Limit switch cycles main burners.	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
	Too much outdoor air.	Adjust minimum position.
		Check economizer operation.
Poor Flame Characteristics.	Incomplete combustion (lack of combustion air) results in:	Check all screws around flue outlets and burner compartment. Tighten as necessary.
	Aldehyde odors, CO (carbon monoxide), sooting flame, or floating flame.	Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary.
		Check orifice to burner alignment.
Burners Will Not Turn Off.	Unit is locked into Heating mode for a one minute minimum.	Wait until mandatory one-minute time period has elapsed or reset power to unit.

Table 16 – Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Condenser Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor Will Not Start But Condenser Fan Runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, start relay.	Determine cause and replace.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor Operates Continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Outdoor ambient below 25 F.	Install low-ambient kit.
Evaporator Fan Will Not Shut Off.	Time off delay not finished.	Wait for 30-second off delay.

START-UP CHECKLIST
(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

II. PRE-START-UP (insert checkmark in box as each item is completed)

- ☐ VERIFY THAT JOBSITE VOLTAGE AGREES WITH VOLTAGE LISTED ON RATING PLATE
- ☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE ALL SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT RETURN (INDOOR) AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEELS AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ CHECK TO ENSURE THAT ELECTRICAL WIRING IS NOT IN CONTACT WITH REFRIGERANT LINES OR SHARP METAL EDGES
- ☐ CHECK PULLEY ALIGNMENT AND BELT TENSION PER INSTALLATION INSTRUCTIONS

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2		L2-L3		L3-L1	
COMPRESSOR AMPS	L1		L2		L3	
INDOOR-FAN AMPS	L1		L2		L3	

TEMPERATURES

OUTDOOR-AIR TEMPERATURE		DB		
RETURN-AIR TEMPERATURE		DB		WB
COOLING SUPPLY AIR		DB		
HEATING SUPPLY AIR		DB		

PRESSURES (Cooling Mode)

GAS INLET PRESSURE		IN.WG
GAS MANIFOLD PRESSURE	___	IN.WG (HIGH FIRE)
REFRIGERANT SUCTION		PSIG
REFRIGERANT DISCHARGE		PSIG

- ☐ VERIFY THAT 3-PHASE FAN MOTOR AND BLOWER ARE ROTATING IN CORRECT DIRECTION. IF THEY ARE NOT ROTATING IN CORRECT DIRECTION, LOCKING COLLAR MUST BE RE-TIGHTENED AFTER CORRECTING DIRECTION OF ROTATION
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS