48PG16
Single Package Rooftop units
Electric Cooling/Gas Heating with PURON® (R-410A)
Refrigerant and *COMFORT*LINK™ Controls

Carrier®
Turn to the Experts.

Installation Instructions

IMPORTANT: This installation instruction contains basic unit installation information including installation of field control devices. For information on unit start-up, service, and operation, refer to the unit Controls, Start- Up, Operation, Service, and Troubleshooting Instructions also enclosed in the unit literature packet.

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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 the 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

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

Puron (R-410a) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron refrigerant equipment.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:
1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier, call the fire department.

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could cause 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).

IMPORTANT: Units have high ambient operating limits. If limits are exceeded, the units will automatically lock the compressor out of operation. Manual reset will be required to restart the compressor.

INSTALLATION

Step 1 —Provide Unit Support

Roof Curb

Assemble or install accessory roof curb in accordance with instructions shipped with this accessory. (See Fig. 1.) Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be installed to roof curb before unit is set in place. Ductwork must be attached to curb and not to the unit. Curb must be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is ± $^1/_{16}$ in. per linear ft in any direction. Refer to Accessory Roof Curb Installation Instructions for additional information as required. When accessory roof curb is used, unit may be installed on class A, B, or C roof covering material. Carrier roof curb accessories are for flat roofs or slab mounting.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket with the roof curb as shown in Fig. 1. Improperly applied gasket can also result in air leaks and poor unit performance. Do not slide unit to position on roof curb.

Alternate Unit Support

When a curb cannot be used, install unit on a noncombustible surface. Support unit with sleepers, using unit curb support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Step 2 —Rig and Place Unit

Inspect unit for transportation damage. See Table 1 for physical data. File any claim with transportation agency.

⚠ WARNING

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.

Do not drop unit; keep upright. Use wooden top skid or spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit rail as a reference; leveling tolerance is ± $^1/_{16}$ in. per linear ft in any direction. See Fig. 2 for additional information. Unit rigging weight is shown in Fig. 2.

Rigging holes are provided in the unit base rails as shown in Fig. 2. Refer to rigging instructions on unit.

Positioning

Maintain clearance, per Fig. 3, around and above unit to provide minimum distance from combustible materials, proper airflow, and service access.

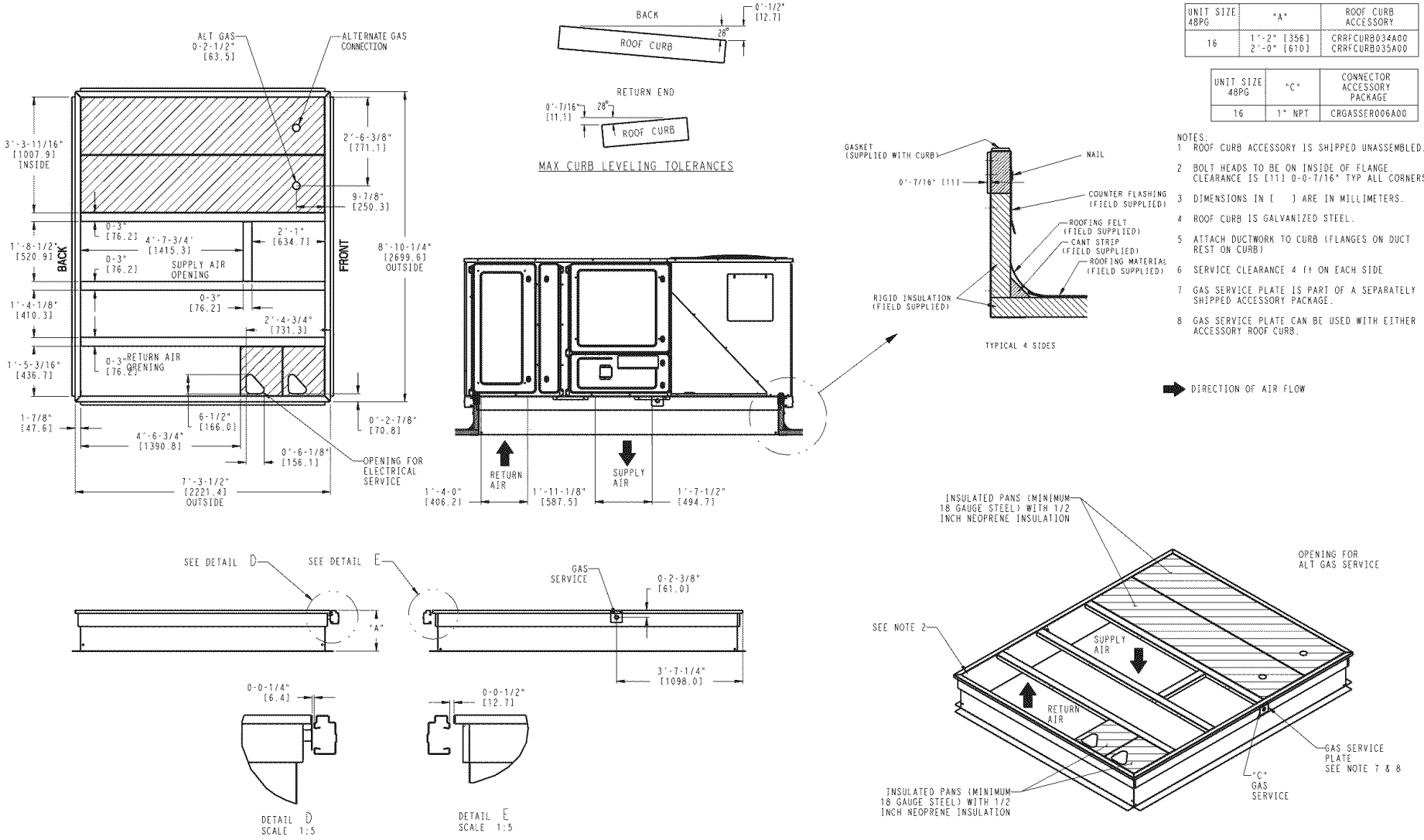
Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

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

Locate mechanical draft system flue assembly at least 4 ft from any opening through which combustion products could enter the building, and at least 4 ft from any adjacent building (or per local codes). When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade. Locate unit at least 10 ft away from adjacent units.

Roof Mount

Check building codes for weight distribution requirements. Unit operating weight is shown in Table 1.



UNIT SIZE 48PG	"A"	ROOF CURB ACCESSORY
16	1'-2" [356] 2'-0" [610]	CRRFCURB034A00 CRRFCURB035A00

UNIT SIZE 48PG	"C"	CONNECTOR ACCESSORY PACKAGE
16	1" NPT	CRGASSER006A00

NOTES:
1. ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
2. BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
3. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4. ROOF CURB IS GALVANIZED STEEL.
5. ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
6. SERVICE CLEARANCE 4 ft ON EACH SIDE
7. GAS SERVICE PLATE IS PART OF A SEPARATELY SHIPPED ACCESSORY PACKAGE.
8. GAS SERVICE PLATE CAN BE USED WITH EITHER ACCESSORY ROOF CURB.

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Fig. 1 – Roof Curb Details

Table 1—Physical Data

BASE UNIT 48PG		16
NOMINAL CAPACITY (Tons)		15
OPERATING WEIGHT (lb)		
Unit*		1895
Economizer		
Vertical		149
Horizontal		149
Humidi-MiZer™ System		64
Roof Curb		
14-in.		240
24-in.		360
COMPRESSOR		Fully Hermetic Scroll
Quantity		3
Oil Type Sys A		Copeland 3MA
Sys B		Copeland 3MA
Sys C		Copeland 3MA
Number of Refrigerant Circuits		3
Oil (oz) Sys A		66
Sys B		66
Sys C		66
REFRIGERANT TYPE		R-410A (Puron® Refrigerant)
Expansion Device		TXV
Operating Charge (lb) Sys A		13.5
Sys B		15.0
Sys C		15.0
Operating Charge Total All Systems (lb)		43.5
Unit with Humidi-MiZer System		
Operating Charge (lb) Sys A		18.8
Sys B		16.7
Sys C		18.8
Total All Systems (lb)		54.3
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins, Face Split
Condenser A (Outer)		
Rows...Fins/in.		2...17
Face Area (sq ft)		26.6
Condenser B (Inner)		
Rows...Fins/in.		2...17
Face Area (sq ft)		30.2
Humidi-MiZer Coil		Copper Enhanced Tubes with Aluminum Lanced Fins
Rows...Fins/in.		1...17
Face Area (sq ft)		22.2
CONDENSER FAN		Propeller
Quantity...Diameter (in.)		3...24
Nominal Cfm (Total, all fans)		12,500
Motor Hp		1/3
Nominal Rpm		1100
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face Split
Rows...Fins/in.		3...15
Face Area (sq ft)		22.2
EVAPORATOR FAN		Centrifugal Type, Belt Drive
Quantity...Size (in.)	Low	1...15x15, 1...12x12
	Mid-Low	1...15x15, 1...12x12
	High	1...15x15, 1...12x12
Type Drive	Low	Belt
	Mid-Low	Belt
	High	Belt
Nominal Cfm		6000
Maximum Continuous Bhp	Low	3.7
	Mid-Low	5.25
	High	7.5
Motor Frame Size	Low	56
	Mid-Low	56
	High	S213T
Fan Rpm Range	Low	710- 879
	Mid-Low	872-1066
	High	1066-1260
Motor Bearing Type		Ball
Motor Pulley Pitch Diameter Min (in.)	Low	4.2
	Mid-Low	4.2
	High	4.2
Motor Pulley Pitch Diameter Max (in.)	Low	5.2
	Mid-Low	5.2
	High	6.2
Fan Pulley Pitch Diameter (in.)	Low	10.2
	Mid-Low	8.5
	High	8.5
Nominal Motor Shaft Diameter (in.)	Low	7/8
	Mid-Low	7/8
	High	1 3/8
Belt...Pitch Length (in.)	Low	49.3
	Mid-Low	47.8
	High	43.8
Belt...Type	Low	AX
	Mid-Low	BX
	High	BX
Pulley Center Line Distance Min. (in.)	Low	14.2
	Mid-Low	10.8
	High	8.6
Pulley Center Line Distance Max. (in.)	Low	10.8
	Mid-Low	14.2
	High	12

Table 1 — Physical Data (cont)

BASE UNIT 48PG		16
Speed Change (rpm)	Low	34
	Mid-Low	41
	High	41
Movable Turns	Low	5
	Mid-Low	5
	High	5
Factory Pulley Setting (rpm)	Low	812
	Mid-Low	983
	High	1191
Fan Shaft Diameter at Pulley (in.)		$1^{3}/_{16}$
GAS HEAT SECTION		
Rollout Switch		
Open Temperature (F)	Low	195
	Med	195
	High	195
Closed Temperature (F)	Low	115
	Med	115
	High	115
Gas Input (Btuh) Stage 1/Stage 2	PGD/L	176,000/220,000
	PGE/M	248,000/310,000
	PGF/N	320,000/400,000
Burner Orifice Diameter (in. ...drill size)†		
Natural Gas	Std	0.1285...30
Liquid Propane	Alt	0.1015...38
Thermostat Heat Anticipator Setting (amps)		
First Stage		.14
Second Stage		.20
Manifold Pressure (in. wg)		
Natural Gas	Std	3.0
Liquid Propane	Alt	3.0
Gas Valve Quantity		1
Gas Supply Pressure Range (in. wg)		5.0-13.0
Field Gas Connection Size (in.)		$^{3}/_{4}$
HIGH-PRESSURE SWITCH (psig)		
Cutout		660 ± 10
Reset (Auto.)		505 ± 20
RETURN-AIR FILTERS		Throwaway
Quantity...Size (in)		8...20 x 20 x 2

LEGEND

TXV – Thermostatic Expansion Valve

*Aluminum Evaporator Coil/Aluminum Condenser Coil.

†For applications less than 2000 ft elevation.

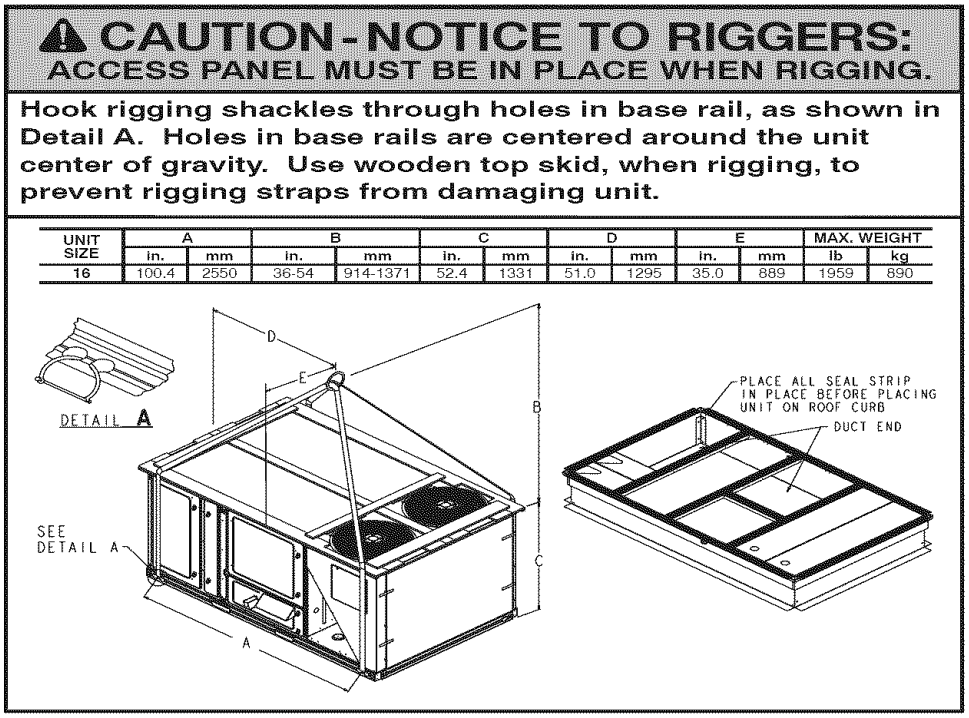

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Fig. 2 – 48PG Rigging Label

Installation Onto Curb

The 48PG units are designed to fit on the accessory full perimeter curb. Correct placement of the unit onto the curb is critical to operating performance. To aid in correct positioning, place unit on roof curb to maintain $^1/_4$-in. gap between the inside of rail and roof curb on long sides and a $^1/_2$-in. gap between the inside of rail and roof curb on both duct and condenser ends. Refer to Fig. 1 and 3, to assure proper duct opening alignment.

NOTE: Before positioning unit on curb, make sure bottom drain connection plug is tight. See Step 6 — Install External Trap for Condensate Drain concerning bottom drain connection plug.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Do not slide unit to position when it is sitting on the curb. Curb gasketing material may be damaged and leaks may result.

Step 3 —Field Fabricate Ductwork

On vertical units, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* 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 set-back 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 4 —Make Unit Duct Connections

Vertical Supply/Return Configuration

Unit is shipped in vertical supply/return configuration. Ductwork openings are shown in Fig. 1 and 3. Attach the ductwork to the roof curb. Do not attach duct directly to the unit.

⚠ WARNING

UNIT DAMAGE AND PERSONAL INJURY HAZARD

Failure to follow this warning could cause equipment damage and/or personal injury.

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree turn in the return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space.

Horizontal Applications

Horizontal units are shipped with an outer panel that allows for side by side horizontal duct connections. If specified during ordering, the unit will be shipped withe the vertical duct openings blocked off from the factory, ready for side supply installation. If the horizontal supply/return option was not specified at time of ordering the unit, a field-installed accessory kit is required to convert the vertical unit into a horizontal supply configuration.

NOTE: Follow instructions provided with accessory kit.

Installation of the duct block-off covers should be completed prior to placing the unit unless sufficient side clearance is available. A minimum of 66 in. is required between the unit and any obstruction to install the duct block-off covers. Install ductwork to horizontal duct flange connections on side of unit.

Step 5 —Install Flue Hood and Inlet Hood

Flue hood (smaller hood), inlet hood (larger hood), and screens are shipped inside the unit in the gas section. To install, open the heat section door. The flue hood is attached to the heat section panel from the outside using the screws provided. (See Fig. 4 and 5.)

The inlet hood is installed by inserting the hood through the back of the heat panel. Attach the hood by inserting the screws provided through the clearance holes in the heat panel and into the intake hood.

NOTE: When properly installed, the flue hood will line up with the combustion fan housing. (See Fig. 6.)

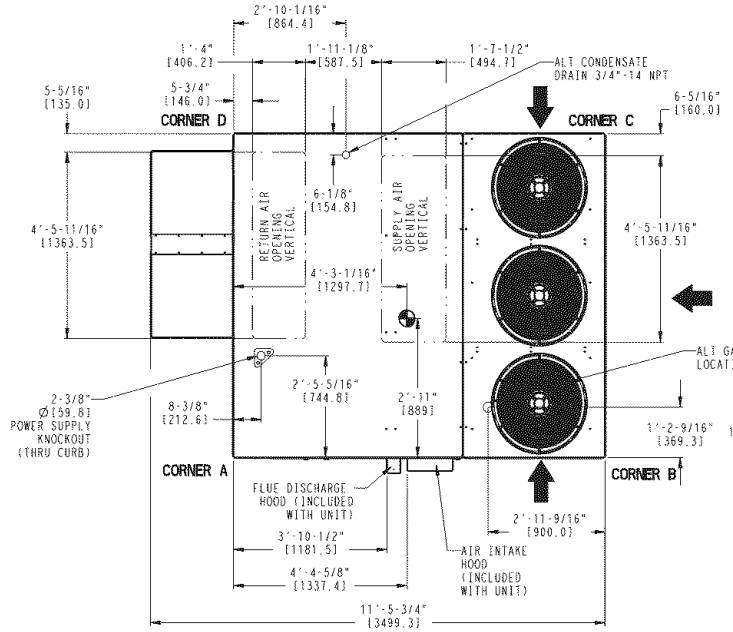
NOTES:

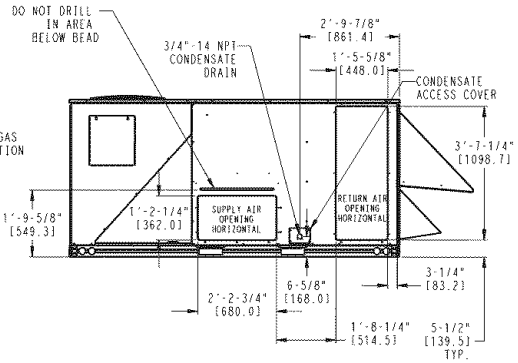
1. WEIGHTS SHOWN ARE FOR 48PG (HI HEAT) UNIT WITH ALUMINUM COILS, AND STANDARD DRIVE. FOR WEIGHTS OF OPTIONAL EQUIPMENT CONSULT PRODUCT DATA BOOK.
2. DO NOT LOCATE ADJACENT UNITS WITH FLUE DISCHARGE FACING ECONOMIZER INLET.
3. MINIMUM CLEARANCE (LOCAL CODES OR JUSISDICTIONS MAY PREVAIL):
   a. FRONT 48 INCHES TO COMBUSTIBLE SURFACES (18 INCHES WHEN USING ACCESSORY FLUE DISCHARGE DEFLECTOR).
   b. WHEN NOT USING ROOF CURB (1 INCH) BOTTOM OF BASE PAN TO COMBUSTIBLE SURFACES.
   c. WHEN NOT USING ROOF CURB (0 INCHES) TO BOTTOM OF BASE RAIL RIGHT SIDE, FRONT AND BACK SIDES (36 INCHES) FOR PROPER CONDENSER AIRFLOW.
   d. OVERHEAD (60 INCHES) TO ASSURE PROPER CONDENSER AIRFLOW.
   e. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   f. BETWEEN UNIT AND UNGROUNDED SURFACE CONTROL BOX SIDE (36 INCHES PER NEC)
   g. BETWEEN UNIT AND BLOCK OF CONCRETE WALL AND OTHER GROUNDED SURFACES CONTROL BOX SIDE (42 INCHES) PER NEC.
   h. CLEARANCE IN FRONT OF INDOOR MOTOR ACCESS FOR BLOWER SLED REMOVAL 8'2".
   i. CLEARANCE FOR COMPLETE CONDENSATE PAN REMOVAL 7'8".
   k. ON UNITS WITH ECONOMIZER ALLOW 4'0" FROM LEFT SIDE FOR SERVICE ACCESS TO ECONOMIZER.
   m. HORIZONTAL SUPPLY AND RETURN (0 INCHES)
4. DOWN SHOT DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. IF UNIT IS MOUNTED SIDE SUPPLY, IT IS RECOMMENDED THE DUCTS MUST BE SUPPORTED BY CROSS BRACES AS DONE ON ACCESSORY ROOF CURB.
5. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
6. WITH THE EXCEPTION OF CLEARANCE FOR THE CONDENSER COIL, COMBUSTIBLE SURFACES AND THE DAMPER/POWER EXHAUST AS STATED IN NOTE #2, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
7. DIMENSIONS ARE FROM OUTSIDE OF BASE RAIL. ALLOW 0' 5/16 [8] ON EACH SIDE FOR TOP COVER DRIP EDGE.
8. UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM CLASS A,B,C ROOF COVERING MATERIAL IF SET ON BASE RAILS.

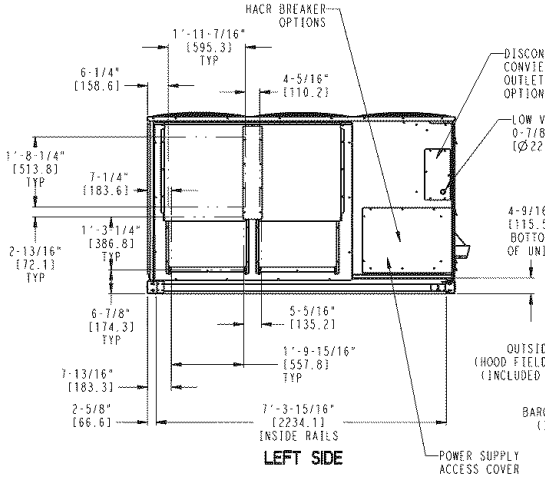
CENTER OF GRAVITY

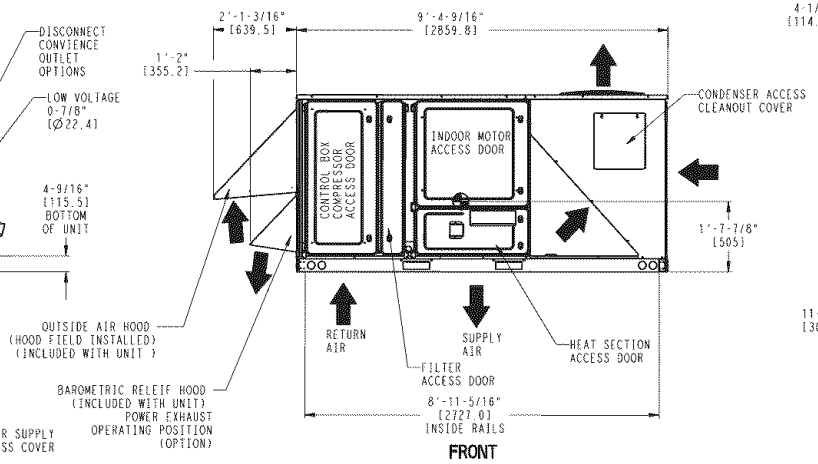
DIRECTION OF AIR FLOW

UNIT	STD. UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)	
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.
48PG16	1895	861	646.5	294	537.2	244	322.8	148	388.5	177
-	-	-	-	-	-	-	-	-	-	-









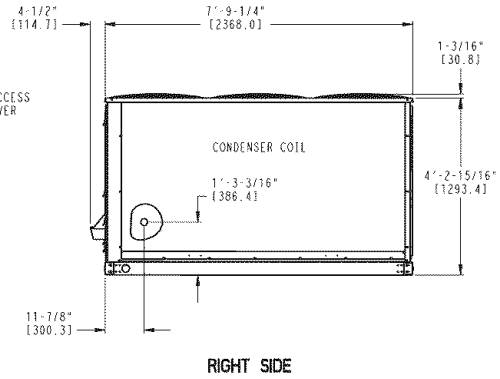


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Fig. 3 – Base Unit Dimensions

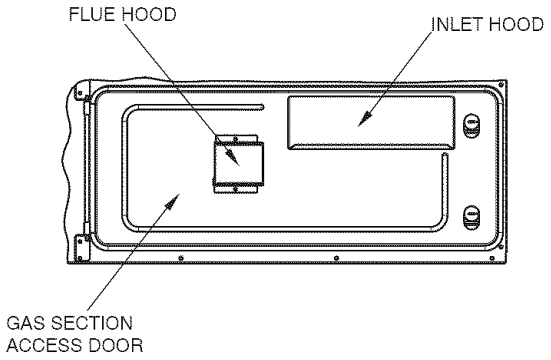

Fig. 4 – Flue and Inlet Hood Locations

Step 6 —Install External Trap for Condensate Drain

The unit's $^{3}/_{4}$-in. 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 applications. See Fig. 3 for locations.

When using the standard side drain connection, make sure the plug (red) in the alternate bottom connection is tight before installing the unit. (See Fig. 7.)

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. A $^{1}/_{2}$-in. socket extension can be used to remove the plug. (See Fig. 7.) 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 at least 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. 8 and 9.)

The 48PG units are provided with a removable condensate pan for ease of cleaning. It is recommended that a union be placed between the unit and condensate drainage to ease the removal of the pan during servicing. Adequate clearance should be allowed if removal of condensate pan is required. Allow 64-in. between condensate pan access panel and any obstruction for complete removal.

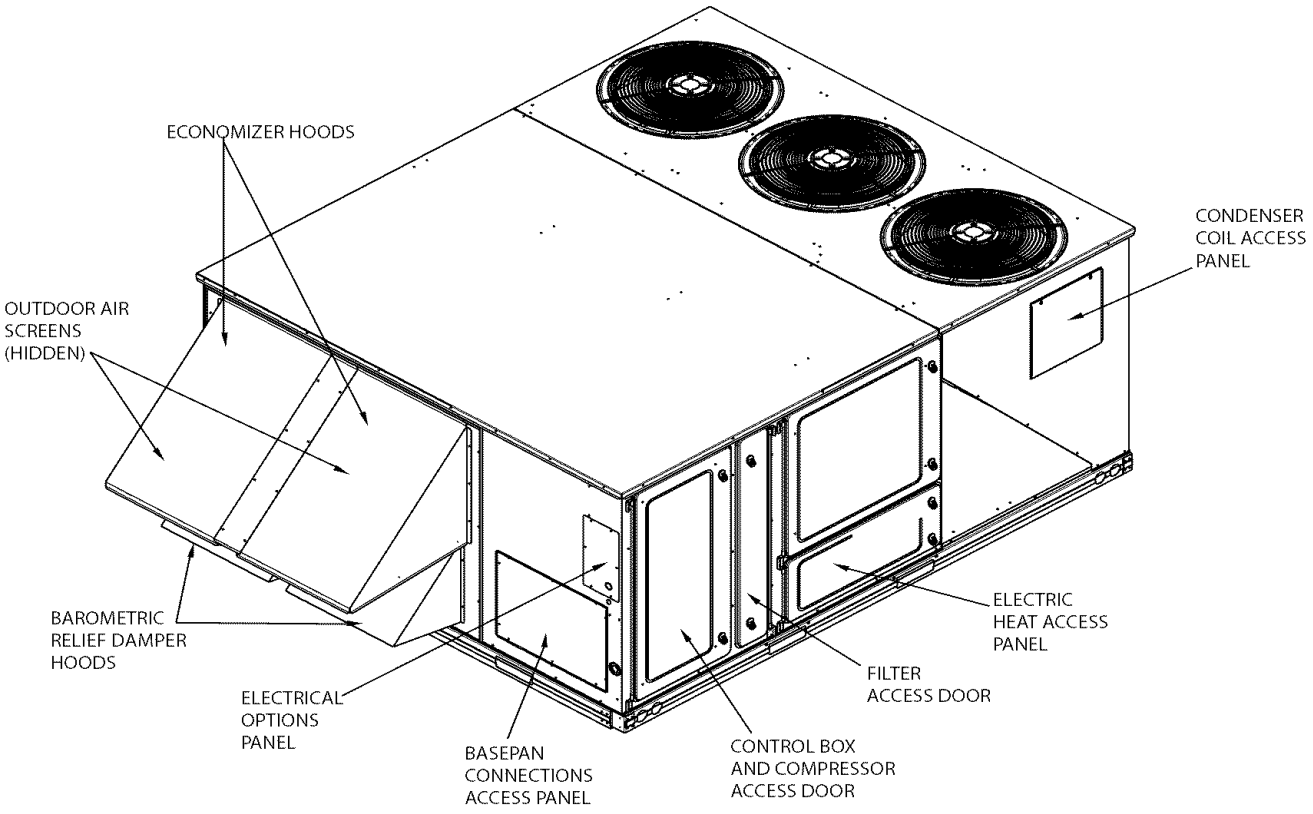

Fig. 5 – Panel and Filter Locations

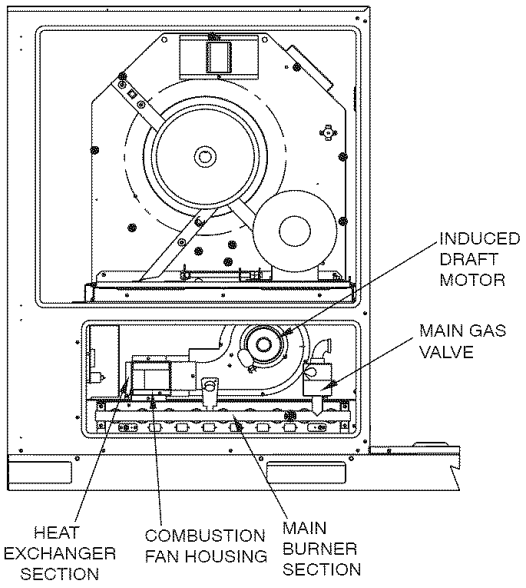

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Fig. 6 – Typical Gas Heating Section

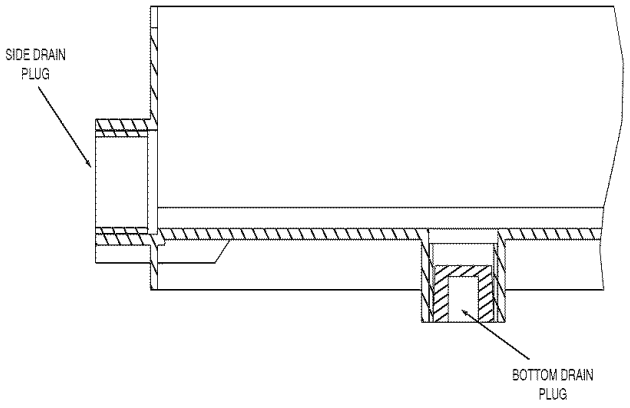

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Fig. 7 – Condensate Drain Pan

Step 7 —Orifice Change

This unit is factory assembled for heating operation using natural gas at an elevation from sea level to 2000 ft. This unit uses orifice type LH32RFnnn, where "nnn" indicates the orifice size based on drill size diameter in thousands of an inch.

High Elevation (Above 2000 ft)

Use accessory high altitude kit when installing this unit at an elevation of 2000 to 7000 ft. For elevations above 7000 ft, refer to Table 2 to identify the correct orifice size for the elevation. See Table 3 for the number of orifices required for each unit size. Purchase these orifices from your local Carrier dealer. Follow instructions in accessory Installation Instructions to install the correct orifices.

Table 2—Altitude Compensation*

ELEVATION (ft)	NATURAL GAS ORIFICE†
0-1,999	30
2,000	30
3,000	31
4,000	31
5,000	31
6,000	31
7,000	32
8,000	32
9,000	32
10,000	35
11,000	36
12,000	37
13,000	38
14,000	39

*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. Includes a 4% input reduction per each 1000 ft.
†Orifices available through your Carrier dealer.

Table 3—Orifice Quantity

UNIT	ORIFICE QUANTITY
Low Heat (48PGD/L)	5
Medium Heat (48PGE/M)	7
High Heat (48PGF/N)	9

Conversion to Propane Gas

Use accessory propane gas conversion kit when converting this unit for use with propane fuel usage for elevations up to 7000 ft. For elevations above 7000 ft, refer to Table 4 to identify the correct orifice size for the elevation. See Table 3 for the number of orifices required for each unit size. Purchase these orifices from your local Carrier dealer. Follow instructions in accessory Installation Instructions to install the correct orifices.

Table 4—Propane Gas Conversion*

ELEVATION (ft)	PROPANE GAS ORIFICE†
0-1,999	38
2,000	40
3,000	40
4,000	41
5,000	41
6,000	42
7,000	42
8,000	43
9,000	43
10,000	44
11,000	44
12,000	45
13,000	46
14,000	47

*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. Includes a 4% input reduction per each 1000 ft.
†Orifices available through your Carrier dealer.

Step 8 —Install Gas Piping

Unit is equipped for use with natural gas. Refer to local building codes, or in the absence of local codes, to ANSI Z223.1-latest year and addendum Z223.1A-latest year entitled HFGC. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances.

Support gas piping as shown in the table in Fig. 10. 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. See Fig. 10 for typical pipe guide and locations of external manual gas shutoff valve.

Install field-supplied manual gas shutoff valve with a $^1/_8$-in. NPT pressure tap for test gage connection at unit. The pressure tap is located on the gas manifold, adjacent to the gas valve. Field gas piping must include sediment trap and union. (See Fig. 11.) Install a field-supplied gas regulator.

⚠ WARNING

UNIT DAMAGE AND PERSONAL INJURY HAZARD

Failure to follow this warning could result in damage to equipment and/or personal injury.

Do not pressure test gas supply while connected to unit. Always disconnect union before servicing. High pressures can cause gas valve damage resulting in a hazardous condition.

IMPORTANT: Natural gas pressure at unit gas connection must not be less than 5.0 in. wg or greater than 13.0 in. wg for all heat sizes.

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

Step 9 —Make Electrical Connections

(For more details, refer to the Controls, start-up, operation, and troubleshooting manual)

Field Power Supply

All 208/230-v units are factory wired for 230-v power supply. If the 208/230-v unit is to be connected to a 208-v power supply, transformers (TRAN1 and TRAN2) must be rewired by moving the black wire with the $^1/_4$-in. female quick connect from the 230-volt connection and moving to the 200-volt $^1/_4$-in. male terminal on the primary side of the transformer.

Refer to unit label diagram for additional information. Leads are provided for field wire connections. Use UL (Underwriters Laboratories) approved copper/aluminum connector.

When installing units, provide disconnect per NEC (National Electrical Code) Article 440 or local codes. For non-fused disconnects, size the disconnect according to the sizing data provided in the electrical data tables. If a fused disconnect is used, determine the minimum size for the switch based on the disconnect sizing data provided in the electrical data tables and then coordinate the disconnect housing size to accommodate the Maximum Overcurrent Protection (MOCP) device size as marked on the unit informative plate. (See Tables 5 and 6.) All field wiring must comply with NEC and local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 12 for power wiring connection to the unit leads and equipment ground.

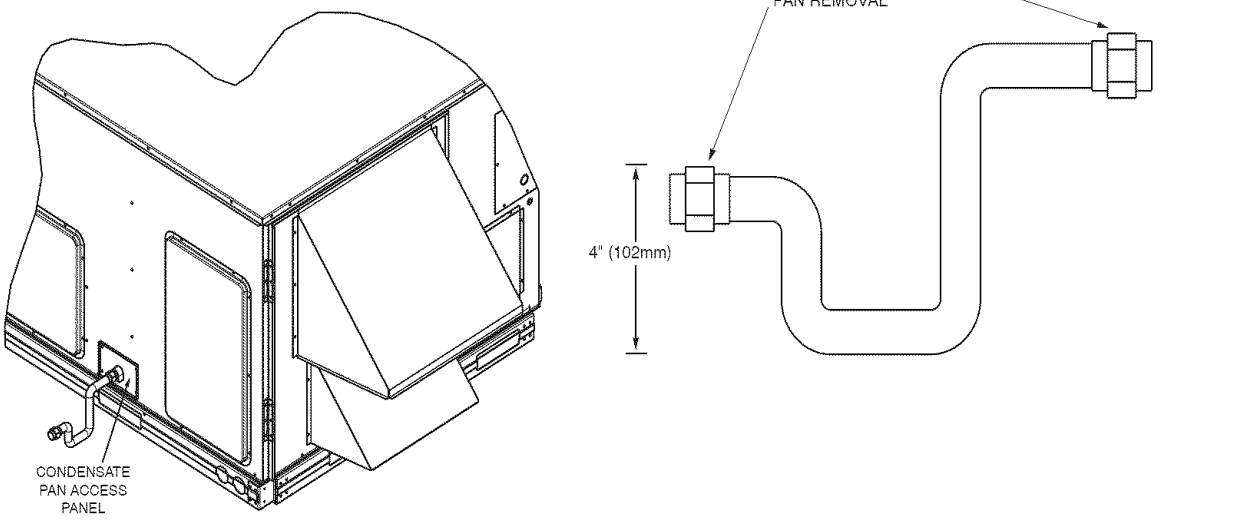
Route power and ground lines through control box end panel or unit basepan (see Fig. 3) to connections as shown on unit wiring diagram and Fig. 12. Factory leads may be wired directly to the disconnect.

⚠ CAUTION

UNIT DAMAGE HAZARD

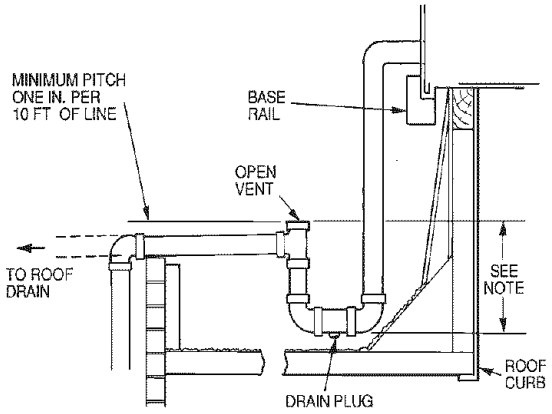
Failure to follow this caution may result in damage to unit.

The correct power phasing is critical to the operation of the scroll compressors. An incorrect phasing will result in an alarm being generated and compressor operation lockout. Should this occur, power phase correction must be made to the incoming power.



C06234

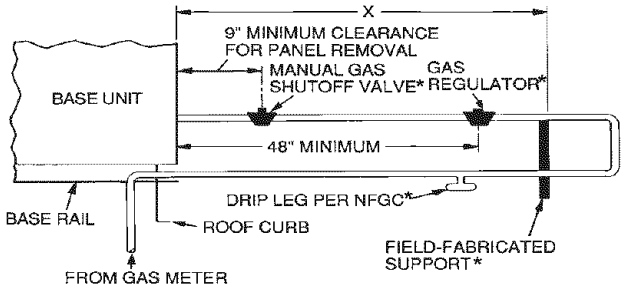
Fig. 8 – External Trap for Condensate Drain



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

C06291

Fig. 9 – Condensate Drain Piping Details



LEGEND

NFGC — National Fuel Gas Code

*Field supplied.

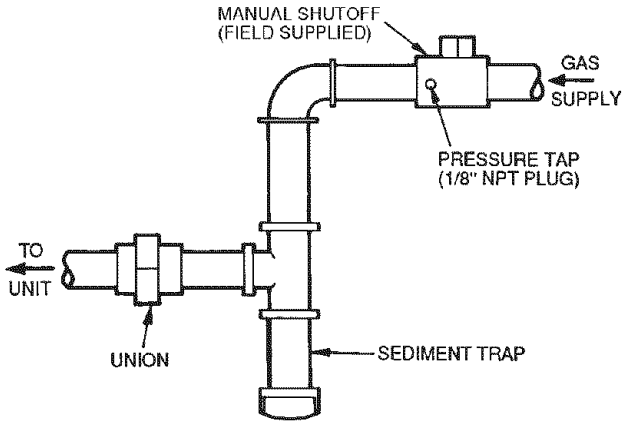
NOTE: Follow all local codes.

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

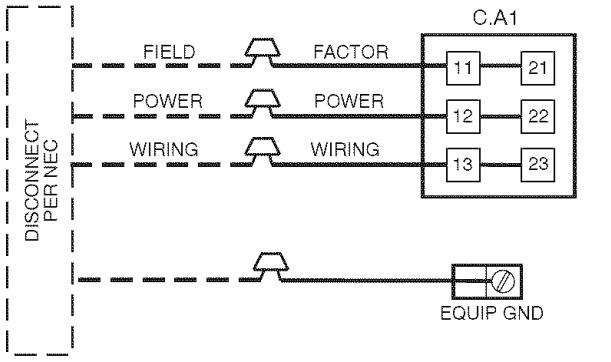
C06115

Fig. 10 – Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)



C06236

Fig. 11 – Field Gas Piping



C06237

Fig. 12 – Field Power Wiring Connections

⚠ WARNING

ELECTRICAL SHOCK AND FIRE HAZARD

Failure to follow this warning coud result in electrical shock, fire, or death.

The cabinet MUST have an uninterrupted or unbroken ground according to NEC ANSI/NFPA 70-2002 and Canadian Electrical Code CSA C22.1 or local codes to minimize personal injury if an electrical fault should occur. This may consist of electrical wire or conduit approved for electrical ground when installed in accordance with existing electrical codes. Do not use gas piping as an electrical ground.

Field wiring must conform to temperature limitations for type "T" wire. All field wiring must comply with NEC and local requirements.

Operating voltage to compressor must be within voltage range indicated on unit nameplate. Voltages between phases must be balanced within 2%.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

Field Control Wiring (Units Without Optional Humidi-MiZer™ Adaptive Dehumidification System)

Unit can be controlled with either a Carrier-approved accessory thermostat or a Carrier-approved space temperature sensor. Install thermostat according to the installation instructions included with accessory. Locate thermostat assembly or space temperature sensor on a solid interior wall in the conditioned space to sense average temperature.

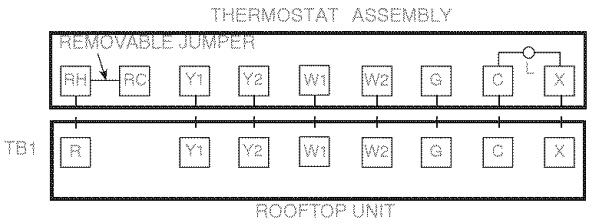
Route thermostat or space temperature sensor cable or equivalent single leads of colored wire from subbase terminals through conduit into unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 13 or 14.

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 at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

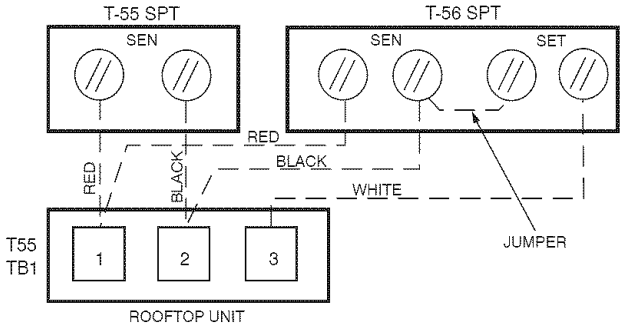
VOLTAGE	STAGE 1 (W1) ON	STAGE 1 AND 2 (W1 AND W2) ON
All	0.14	0.20

Settings may be changed slightly to provide a greater degree of comfort for a particular installation.



C06292

Fig. 13 – Field Control Thermostat Wiring



SPT — Space Temperature Sensor

C06239

Fig. 14 – Field Control Space Temperature Sensor Wiring

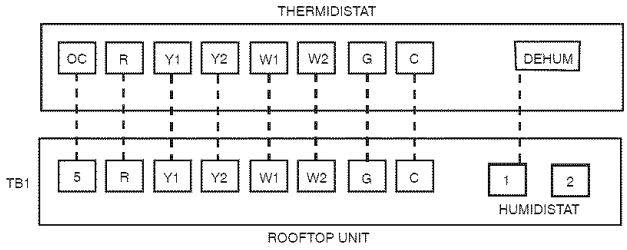
Field Control Wiring (Units With Optional Humidi-MiZer™ Adaptive Dehumidification System)

Units require temperature control inputs for cooling and heating operation and humidity control inputs for Humidi-MiZer operation.

Temperature Control

The unit can be controlled with either a Carrier-approved space temperature sensor, a Carrier accessory Thermidistat™ device, or a Carrier-approved accessory thermostat. Install the temperature control device according to the installation instructions included with the accessory. Locate the device on a solid interior wall in the conditioned space to sense average temperature. Carrier space temperature sensor wiring connections are shown in Fig. 14. General thermostat field control wiring connections are shown in Fig. 13. Carrier Thermidistat device wiring connections are shown in Fig. 15. Configuration of the unit control is required to specify the control input type before unit operation.

Route thermostat or space temperature sensor cable or equivalent single leads of colored wire from subbase terminals through conduit into unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 13-15.



C07055

Fig. 15 – Field Control Thermidistat Wiring

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 at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

VOLTAGE	STAGE 1 (W1) ON	STAGE 1 AND 2 (W1 AND W2) ON
All	0.14	0.20

Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Humidity Control

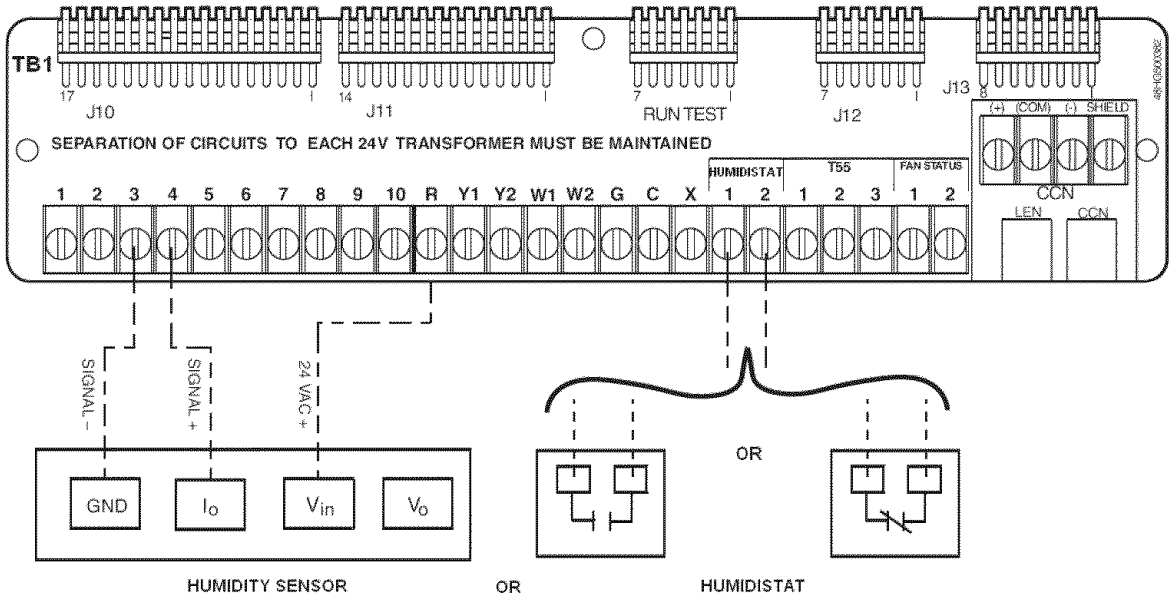
Unit can be controlled with either a Carrier accessory Thermidistat device or a Carrier-approved accessory humidistat (switch output). The input for an accessory humidity sensor with 4 to 20 mA output is another option available when an economizer board is installed. Install the humidity control device according to the installation instructions included with the accessory. Locate the device on a solid interior wall in the conditioned space to sense average humidity. Carrier Thermidistat device wiring connections are shown in Fig. 15. General humidistat wiring connections are shown in Fig. 16. Configuration of the unit control is required to specify the control input type before unit operation. Refer to the controls, start-up, operation and troubleshooting manual for configuration.

Units with the Humidi-MiZer option receive a discrete input from a field-installed device (such as from the Carrier humidi-stat or Thermidistat device). The discrete input is connected to the TB1 terminal strip points labeled Humidistat 1 and 2. As this is a discrete input, one of the connection points is for power to the switch and the other is the return path. (See Fig. 16.)

A space relative humidity sensor input (SP.RH) is only available if an economizer board (ECB) is installed in the unit and then the sensor can be connected to the OAQ point TB1-4. (See Fig. 16.) This input is used instead of the discrete humidistat or thermidistat inputs. The input controls the Humidi-MiZer using the 4-20mA as percent humidity. The relative humidity value (measured by the relative humidity sensor) can be displayed on the Scrolling Marquee, in the space through a System Pilot™ device, or can be read by other CCN devices where it can be used to perform more advanced functions. The humidity sensor must be configured correctly; refer to the Controls, start-up, operation, and troubleshooting manual for details.

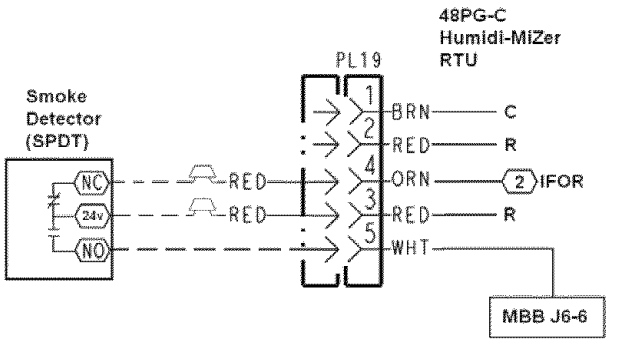
If the customer also wishes to install a smoke detector into a Humidi-MiZer equipped 48PG unit, the fire shutdown connection points are on Plug PL-19, located in the economizer section. See the unit wiring schematic for wiring. For third-party smoke detector, refer to Fig. 17.

Point 19-3 is the 24 vac power source for the detector. Point 19-4 is 24 vac power for the indoor fan contactor control. Point 19-5 is the 24 vac signal input for fire shutdown. If an immediate fan shutdown is desired, install a normally closed contactor between 19-3 and 19-4.



C07045

Fig. 16 – Humidi-MiZer Low-Voltage Terminal Strip - Humidity Sensor/Humidistat Wiring



C07046

Fig. 17 – Third-Party Smoke Detector

More information is available in the third party control section of the controls, start-up, operation, and troubleshooting manual.

Step 10 —Install Outdoor-Air Hoods (Units with Economizer)

Perform the following procedure to install the outdoor-air hoods:

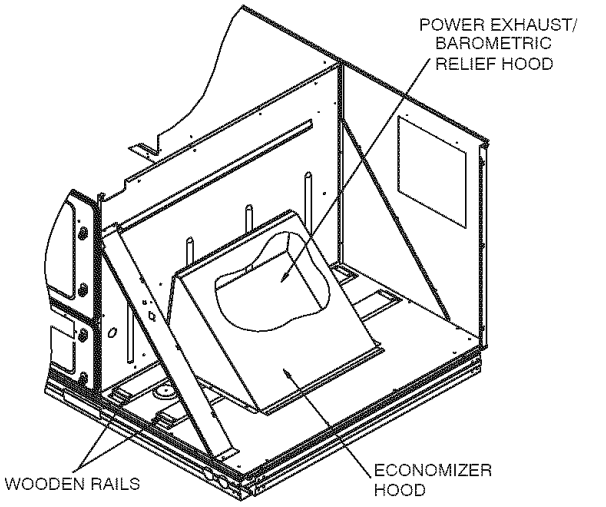
1. Economizer and barometric relief hoods are located in the condenser section under the slanted coil for shipping. (See Fig. 18.) Barometric relief/power exhaust hoods are shipped inside of economizer hoods. Remove screws that secure the wooden rails of the hood assemblies to the unit. Save screws. Slide complete assembly from condenser section.
2. Remove the screws that secure the economizer and barometric relief/power exhaust hoods to the wooden railing. Discard or recycle wooden rails. Save screws.
3. The barometric relief dampers are secured to the economizer panel for shipping. Remove the screw holding the barometric relief damper to the panel for each damper. Dampers should be free to swing open during operation. (See Fig. 19.)
4. Hang the barometric relief/power exhaust hood on the mounting flange on the economizer panel. Secure hood to panel with screws saved from Step 2. Repeat for second hood. (See Fig. 19 and 20.)
5. Align hole in flange of economizer panel with left edge of hood. Hang economizer hood on the top flange of the economizer panel by rotating hood until top flange of the economizer hood engages the bent flange on the economizer panel. Rotate hood until hood is flush with the economizer panel. Hood will support itself from flange. Align holes in hood with holes in panel and secure hood to panel with screws saved from Step 2. Repeat for second hood. (See Fig. 19 and 21.)
6. Loosen screws securing clip on top of the flange of each opening. Rotate clip 180 degress and tighten screw. Install 1-in. filter provided by inserting under the clip on the flange and letting filter drop behind bracket holding barometric relief hoods. Repeat for second hood. Install baffle between the outdoor air hoods with screws saved form Step 1. (See Fig. 19.)

Step 11 —Install All Accessories

After all of the factory-installed options have been adjusted, install all field-installed accessories. Refer to the accessory installation instructions included with each accessory.

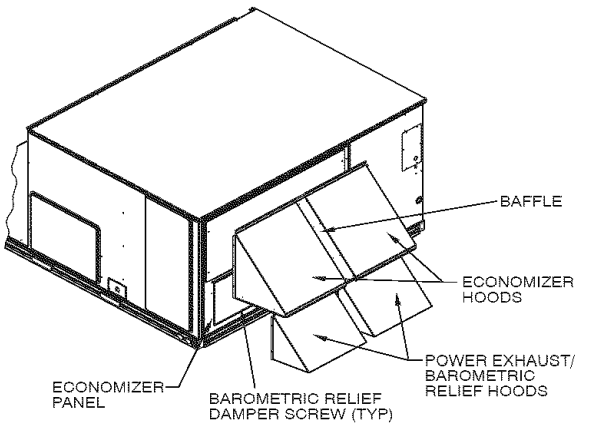
Step 12 —Configure Controls

Refer to unit Controls and Troubleshooting book for information on configuring controls.



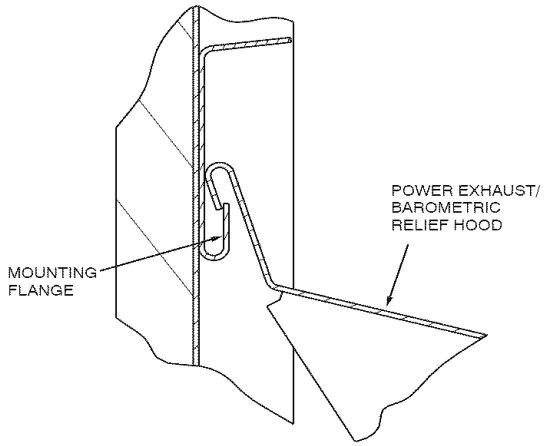
C06290

Fig. 18 – Economizer and Barometric Relief/Power Exhaust Hoods Shipping Positions



C06261

Fig. 19 – Hood Installation



C06262

Fig. 20 – Barometric Relief/Power Exhaust Hood Flange

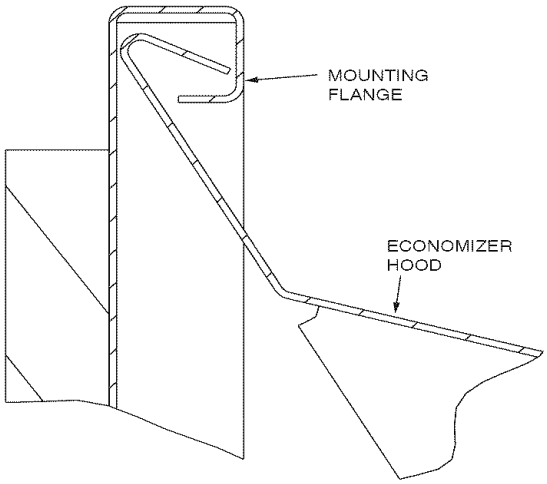


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Fig. 21 – Economizer Flange

Table 5—Electrical Data — Units Without Optional Convenience Outlet

UNIT 48PG	NOMINAL POWER SUPPLY (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 1		COMPRESSOR No. 1		OFM FLA		COMBUTION FAN MOTOR FLA	PWR EXH FLA*	IFM TYPE	IFM FLA	POWER SUPPLY		DISCONNECT SIZE	
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA (ea)					MCA	MOCP	FLA	LRA
16	208/230-3-60	187	253	18.1	137	18.1	137	17.6	123	3	1.9	0.52	—	Low	10.2	74.2/74.2	90/90	80/80	482/482
														Mid-Low	15.0	79.0/79.0	90/90	86/86	491/491
														High	19.4	83.8/83.8	100/100	91/91	529/529
													3.0	Low	10.2	77.2/77.2	90/90	84/84	486/486
														Mid-Low	15.0	82.0/82.0	100/100	89/89	495/495
														High	19.4	86.8/86.8	100/100	94/94	533/533
	460-3-60	414	506	9.0	62	9.0	62	7.7	50	3	1.0	0.30	—	Low	4.8	35.8	40	39	217
														Mid-Low	7.4	38.4	45	42	221
														High	9.7	40.8	50	44	240
													1.2	Low	4.8	37	45	40	220
														Mid-Low	7.4	39.6	45	43	224
														High	9.7	42	50	46	243
	575-3-60	518	633	6.8	50	6.8	50	6.1	40	3	0.8	0.24	—	Low	2.8	26.6	30	29	168
														Mid-Low	5.6	29.4	35	32	182
														High	7.8	31.9	35	34	197
													3.0	Low	2.8	29.6	35	32	172
														Mid-Low	5.6	32.4	35	35	186
														High	7.8	34.9	40	38	201

LEGEND

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

* Power exhaust FLA is the sum of the FLA of two power exhaust motors.

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60

Determine maximum deviation from average voltage.
(AB) 227 – 223 = 3 v
(BC) 231 – 227 = 4 v
(AC) 227 – 226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 6—Electrical Data — Units With Optional Convenience Outlet

UNIT 48PG	NOMINAL POWER SUPPLY (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 1		COMPRESSOR No. 1		OFM FLA		COMBUTION FAN MOTOR FLA	PWR EXH FLA*	IFM TYPE	IFM FLA	POWER SUPPLY		DISCONNECT SIZE	
		Min	Max	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA (ea)					MCA	MOCP	FLA	LRA
16	208/230-3-60	187	253	18.1	137	18.1	137	17.6	123	3	1.9	0.52	—	Low	10.2	79.0/79.0	90/90	86/ 86	487/487
														Mid-Low	15.0	83.8/83.8	100/100	91/ 91	496/496
														High	19.4	88.6/88.6	100/100	96/ 96	534/534
													3.0	Low	10.2	82.0/82.0	100/100	89/ 89	491/491
														Mid-Low	15.0	86.8/86.8	100/100	95/ 95	500/500
														High	19.4	91.6/91.6	100/100	100/100	538/538
16	460-3-60	414	506	9.0	62	9.0	62	7.7	50	3	1.0	0.30	—	Low	4.8	38.0	45	41	219
														Mid-Low	7.4	40.6	45	44	223
														High	9.7	43.0	50	47	242
													1.2	Low	4.8	39.2	45	42	222
														Mid-Low	7.4	41.8	50	45	226
														High	9.7	44.2	50	48	245
16	575-3-60	518	633	6.8	50	6.8	50	6.1	40	3	0.8	0.24	—	Low	2.8	28.3	35	31	170
														Mid-Low	5.6	31.1	35	34	184
														High	7.8	33.6	40	36	199
													3.0	Low	2.8	31.3	35	34	174
														Mid-Low	5.6	34.1	40	37	188
														High	7.8	36.6	40	40	203

LEGEND

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

* Power exhaust FLA is the sum of the FLA of two power exhaust motors.

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60

Determine maximum deviation from average voltage.
(AB) 227 – 223 = 3 v
(BC) 231 – 227 = 4 v
(AC) 227 – 226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227}$$

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.