

# INSTALLATION INSTRUCTIONS

## R-410A Single Package Rooftop Electric Cooling

### RAS210-303

These instructions must be read and understood completely before attempting installation

### Safety Labeling and Signal Words

#### DANGER, WARNING, CAUTION, and NOTE

The signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTE** are used to identify levels of hazard seriousness. The signal word **DANGER** is only used on product labels to signify an immediate hazard. The signal words **WARNING**, **CAUTION**, and **NOTE** will be used on product labels and throughout this manual and other manual that may apply to the product.

**DANGER** – Immediate hazards which will result in severe personal injury or death.

**WARNING** – Hazards or unsafe practices which could result in severe personal injury or death.

**CAUTION** – Hazards or unsafe practices which may result in minor personal injury or product or property damage.

**NOTE** – Used to highlight suggestions which will result in enhanced installation, reliability, or operation.

#### Signal Words in Manuals

The signal word **WARNING** is used throughout this manual in the following manner:

 **WARNING**

The signal word **CAUTION** is used throughout this manual in the following manner:

 **CAUTION**

#### Signal Words on Product Labeling

Signal words are used in combination with colors and/or pictures or product labels.

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 **WARNING**

#### PERSONAL INJURY, AND/OR PROPERTY DAMAGE HAZARD

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

Installation or repairs made by unqualified persons could result in equipment malfunction, property damage, personal injury and/or death.

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

Installation must conform with local building codes and with the national Electrical Code NFPA70 current edition or Canadian Electrical Code part 1 CSA C.22.1.


## IMPORTANT – READ BEFORE INSTALLING

1. Read and become familiar with these installation instructions before installing this unit.
2. Be sure the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

## SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloths for brazing operations and have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and appropriate national electrical codes (in USA, ANSI/NFPA70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

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

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

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with

changing residential construction practices. We require these instructions as a minimum for a safe installation.



## WARNING

### 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. Unit may have more than one power switch.



## WARNING

### UNIT OPERATION AND SAFETY HAZARD

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

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



## WARNING

### PERSONAL INJURY AND ENVIRONMENTAL HAZARD

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

Relieve pressure and recover all refrigerant before system repair or final unit disposal.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.



## CAUTION



### CUT HAZARD

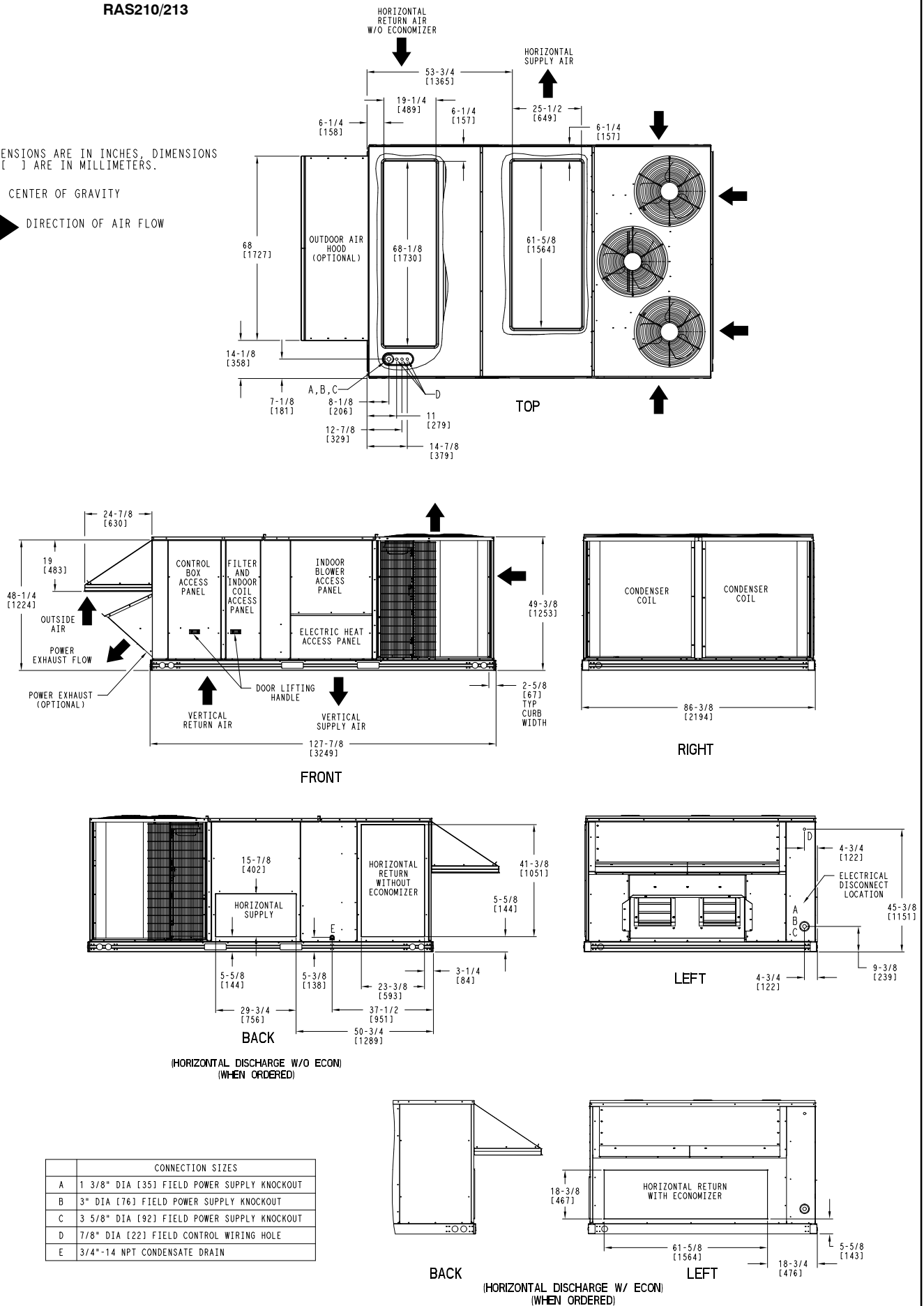
Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing units.

**FIGURE 1 Base Unit Dimensions: 17.5 Ton  
RAS210/213**

**NOTES:**

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW



**Fig. 1 – Unit Dimensional Drawing: 17.5 Ton  
RAS210/213**

| Unit Size | Unit Weight |     | Corner Weight (A) |     | Corner Weight (B) |     | Corner Weight (C) |     | Corner Weight (D) |     | C.G.          |               |              |
|-----------|-------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|---------------|---------------|--------------|
|           | Lb          | Kg  | Lb                | Kg  | Lb                | Kg  | Lb                | Kg  | Lb                | Kg  | X             | Y             | Z            |
| 17.5 Ton  | 1823        | 829 | 419               | 190 | 496               | 226 | 493               | 224 | 415               | 189 | 42-7/8 [1090] | 69-1/4 [1759] | 16-1/2 [419] |

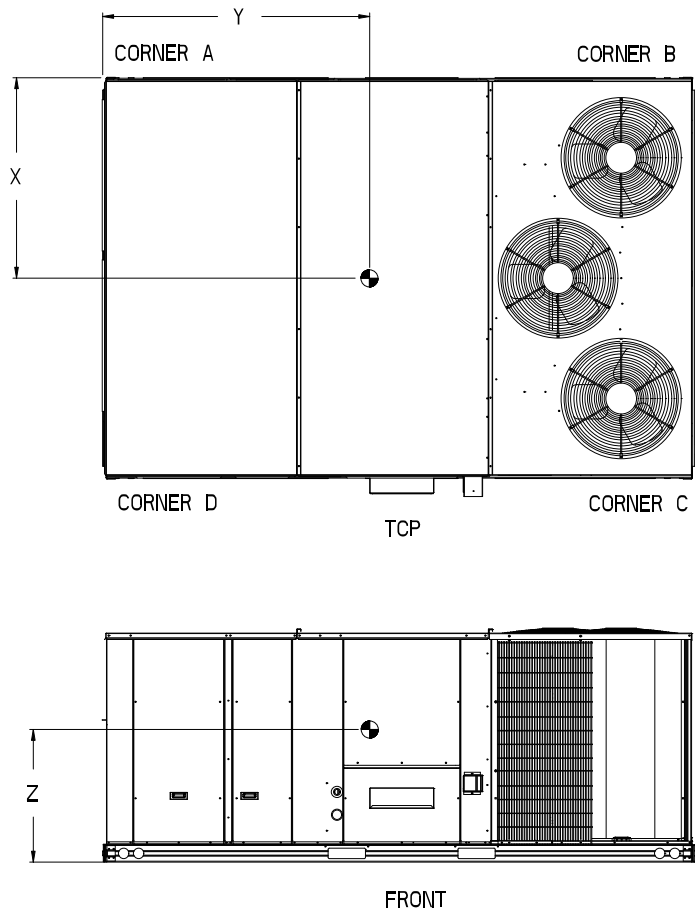


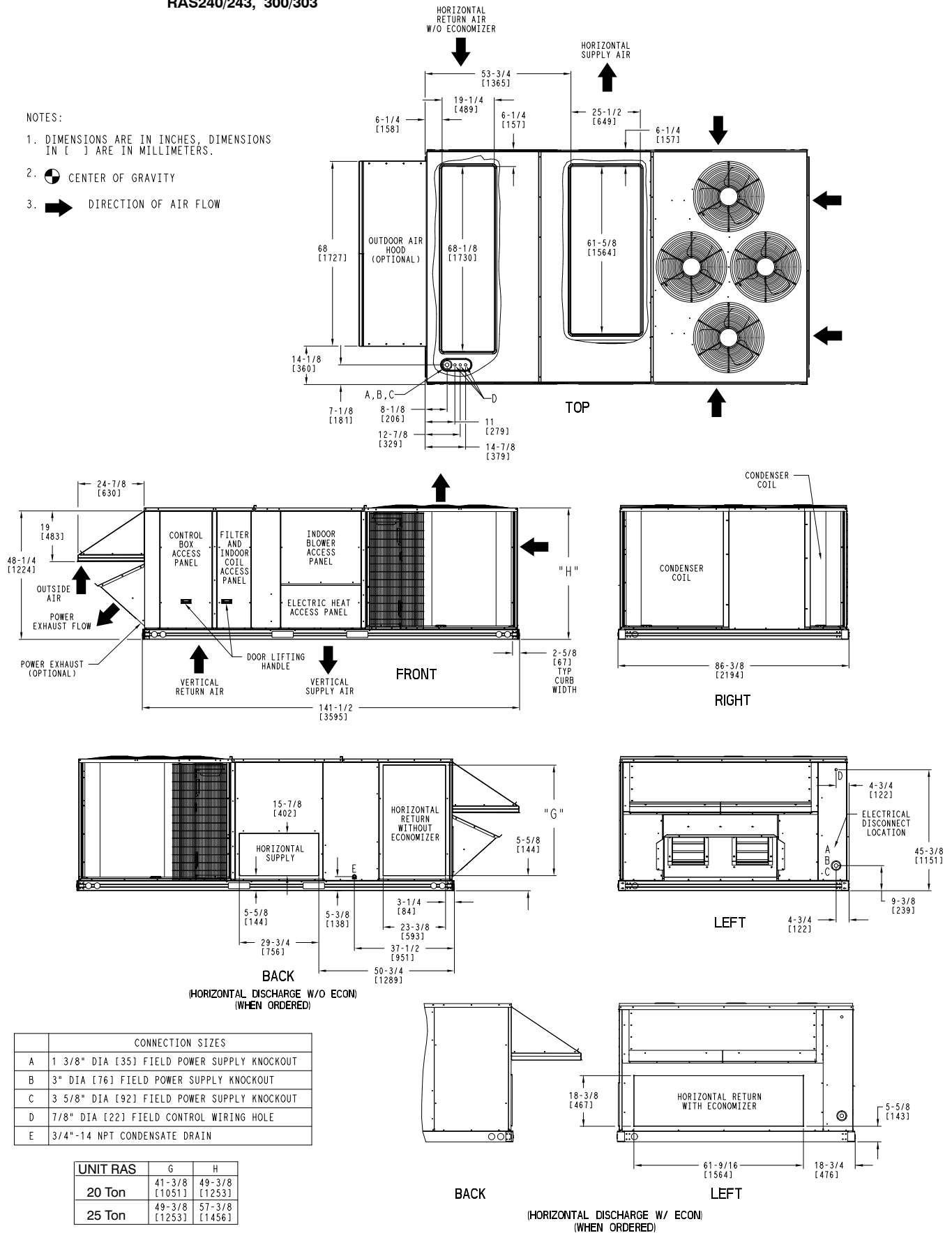


FIGURE 2

Base Unit Dimensions: 20 & 25 Ton  
RAS240/243, 300/303

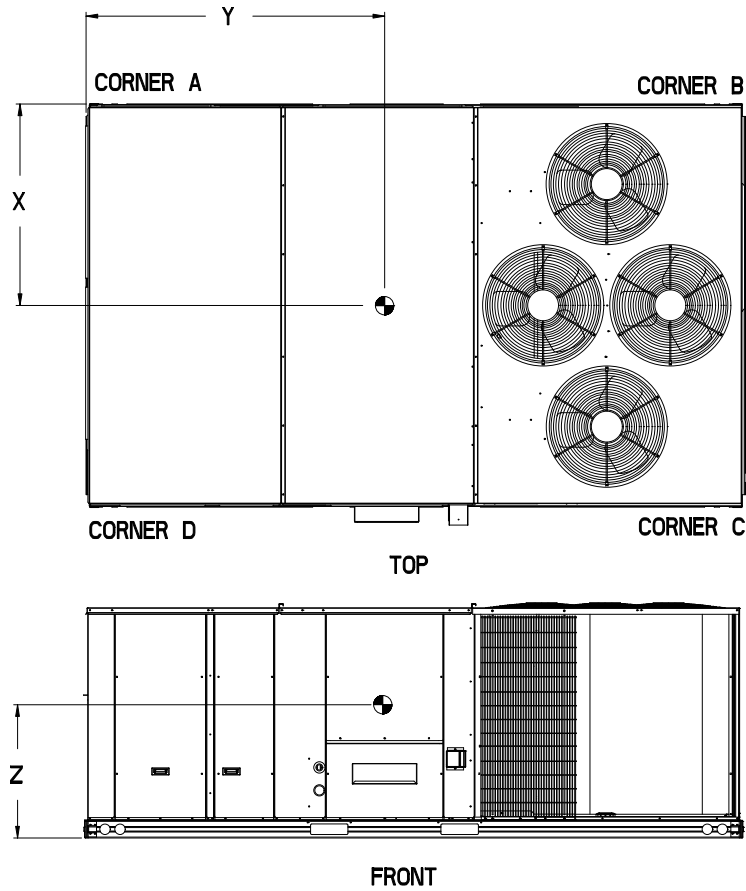
NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW



**Fig. 2 – Unit Dimensional Drawing: 20 & 25 Ton, RAS240/243, 300/303**

| Unit Size | Unit Weight |     | Corner Weight (A) |     | Corner Weight (B) |     | Corner Weight (C) |     | Corner Weight (D) |     | C.G.            |               |              |
|-----------|-------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-----------------|---------------|--------------|
|           | Lb          | Kg  | Lb                | Kg  | Lb                | Kg  | Lb                | Kg  | Lb                | Kg  | X               | Y             | Z            |
| 20 Ton    | 1973        | 897 | 532               | 242 | 522               | 237 | 456               | 207 | 464               | 211 | 40-1/8 [1020]   | 70 [1778]     | 16-1/2 [419] |
| 25 Ton    | 2098        | 954 | 545               | 248 | 539               | 245 | 504               | 229 | 510               | 232 | 41-11/16 [1058] | 70-1/4 [1784] | 19 [493]     |



# INSTALLATION

## Jobsite Survey

Complete the following checks before installation.

1. Consult local building codes and the NEC (National Electrical Code) ANSI/NFPA 70 for special installation requirements.
2. Determine unit location (from project plans) or select unit location.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

## Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 3.

**NOTE:** Consider also the effect of adjacent units.

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

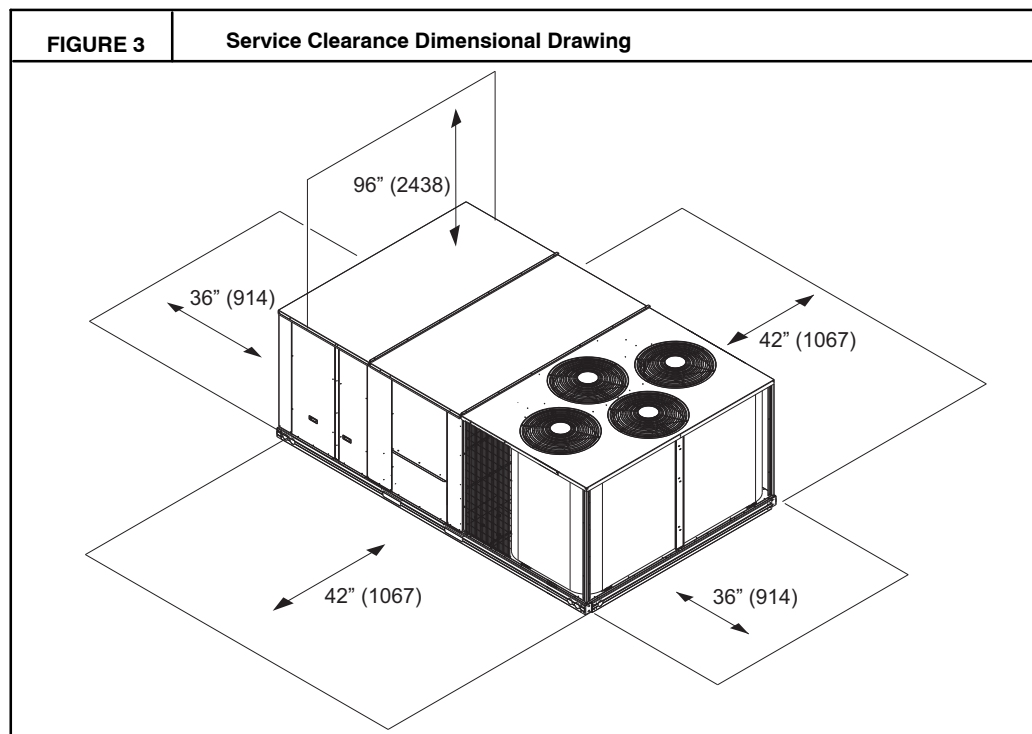
Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

Although unit is weatherproof, avoid locations that permit water from higher level runoff and overhangs to fall onto the unit.

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 9 — Install External Condensate Trap and Line — for required trap dimensions.

## Roof Mount —

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



**Table 1—Operating Weights**

| RAS            | UNIT LB (KG) |            |            |
|----------------|--------------|------------|------------|
| Component      | 210, 213     | 240, 243   | 300, 303   |
| Base Unit      | 1823 (827)   | 1973 (895) | 2098 (952) |
| Economizer     | 245 (111)    | 245 (111)  | 245 (111)  |
| Powered Outlet | 32 (15)      | 32 (15)    | 32 (15)    |
| Curb           |              |            |            |
| 14-in/356 mm   | 273 (124)    | 273 (124)  | 273 (124)  |
| 24-in/610 mm   | 350 (159)    | 350 (159)  | 350 (159)  |

Step 2 — Plan for Sequence of Unit Installation

The support method used for this unit will dictate different sequences for the steps of unit installation. For example, on curb-mounted units, some accessories must be installed on the unit before the unit is placed on the curb. Review the following for recommended sequences for installation steps.

Curb-mounted installation —

- Install curb
- Install field-fabricated ductwork inside curb
- Install field supplied thru-the-base service connection fittings (affects curb and unit)
- Rig and place unit
- Remove top skid
- Install outside air hood
- Install smoke detector tube
- Install condensate line trap and piping
- Make electrical connections
- Install other accessories

Pad-mounted installation —

- Prepare pad and unit supports
- Rig and place unit
- Remove duct covers and top skid
- Install field-fabricated ductwork at unit duct openings
- Install outside air hood
- Install condensate line trap and piping
- Make electrical connections
- Install other accessories

Frame-mounted installation —

Frame-mounted applications generally follow the sequence for a curb installation. Adapt as required to suit specific installation plan.

Step 3 — Inspect unit

Inspect unit for transportation damage. File any claim with transportation agency.

Confirm before installation of unit that voltage, amperage and circuit protection requirements listed on unit data plate agree with power supply provided.

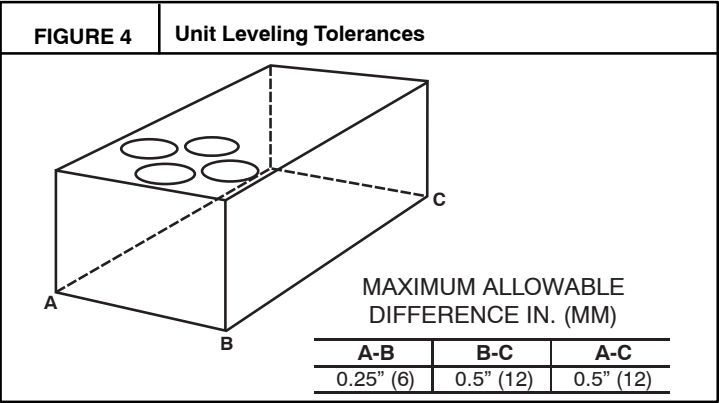
Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Figs. 6 and 7. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

**NOTE:**The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Figs. 6 and 7. Improperly applied gasket can also result in air leaks and poor unit performance.

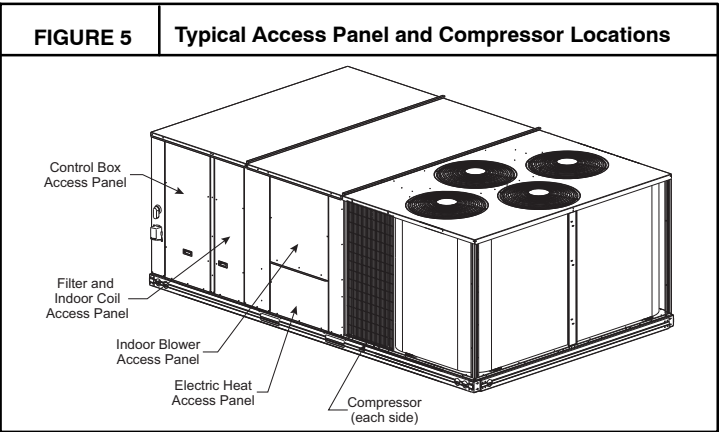
Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are show in Fig. 5. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb and not to the unit. Thru-the-base power connection, field supplied and field installed, must be installed before the unit is set on the roof curb.*

If electric and control wiring is to be routed through the basepan, remove knockouts in basepan located in control box area of access panel; see Fig. 1 or 2 for basepan knockout locations.. Attach the service connections to the basepans.

**IMPORTANT:** Make sure field supplied and field installed fittings for electric wiring create a water proof seal so water will not enter the building.



Slab Mount (Horizontal Units Only) —

Provide a level concrete slab that extends a minimum of 6-in. (150 mm) 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 (In Lieu of Curb or Slab Mount) —

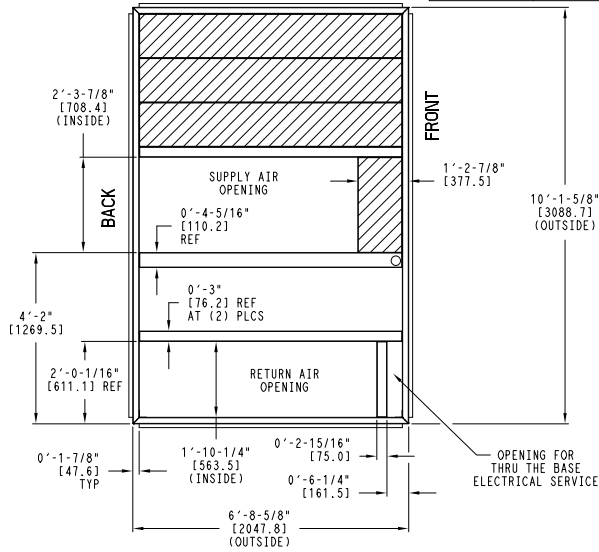
A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 4 equally spaced 4-in. x 4-in. (102 mm x 102 mm) pads on each side. Locate pads so that they support the rails. Make sure to avoid the fork openings.



FIGURE 6

Roof Curb Details – RAS210/213

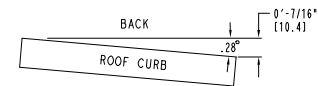
| Unit Size | "A"                            | ROOF CURB ACCESSORY              |
|-----------|--------------------------------|----------------------------------|
| 17.5 Ton  | 1'-2" [356.0]<br>2'-0" [610.0] | CRRFCURB045A00<br>CRRFCURB046A00 |



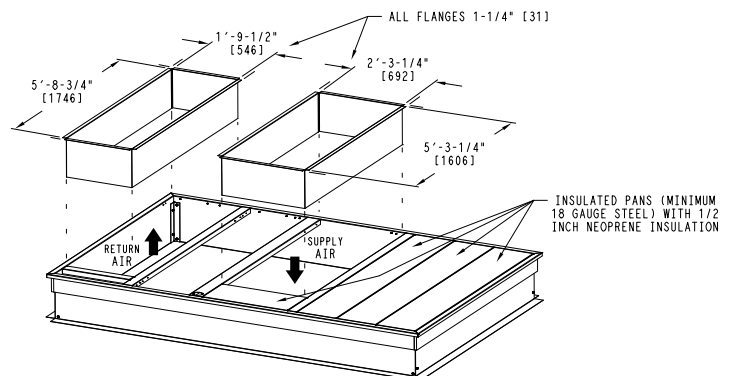
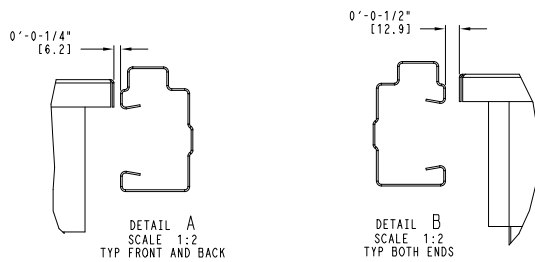
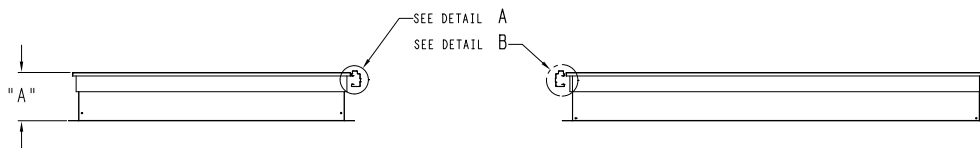
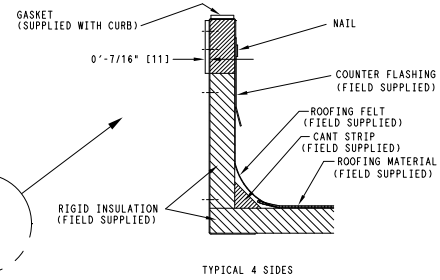
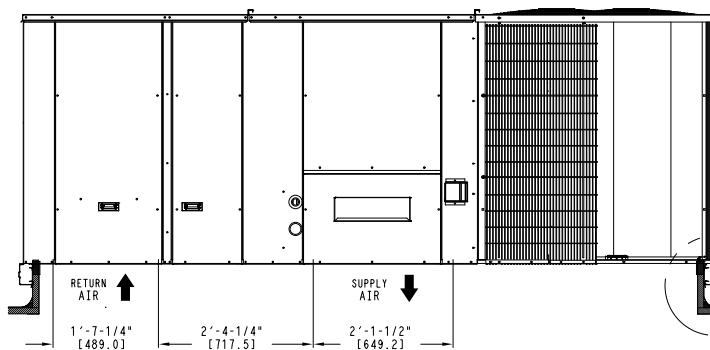
NOTES:

- 1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
- 2 DIMENSIONS IN ( ) ARE IN MILLIMETERS.
- 3 ROOF CURB GALVANIZED STEEL.
- 4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
- 5 SERVICE CLEARANCE 4 ft ON EACH SIDE

➔ DIRECTION OF AIR FLOW

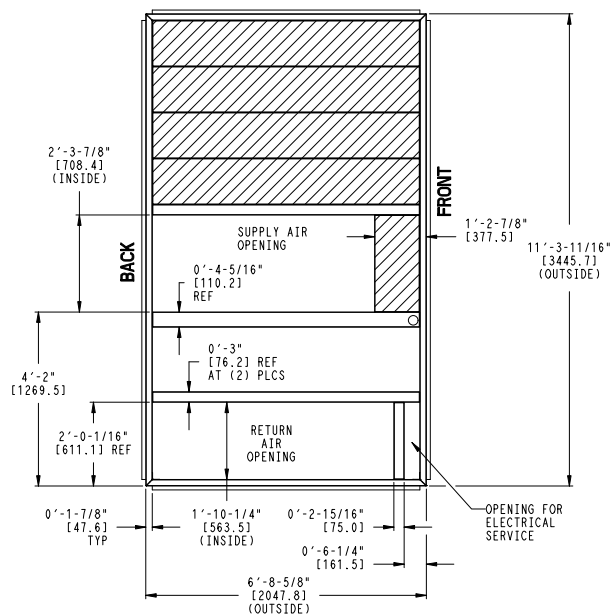


MAX CURB LEVELING TOLERANCES



**FIGURE 7**

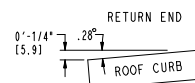
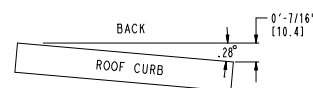
| Unit Size   | "A"           | ROOF CURB<br>ACCESSORY |
|-------------|---------------|------------------------|
| 20 & 25 Ton | 1'-2" [356.0] | CRRFCURB047A00         |
|             | 2'-0" [610.0] | CRRFCURB048A00         |



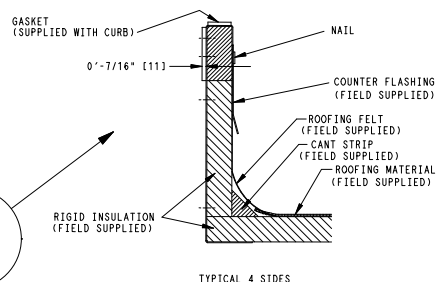
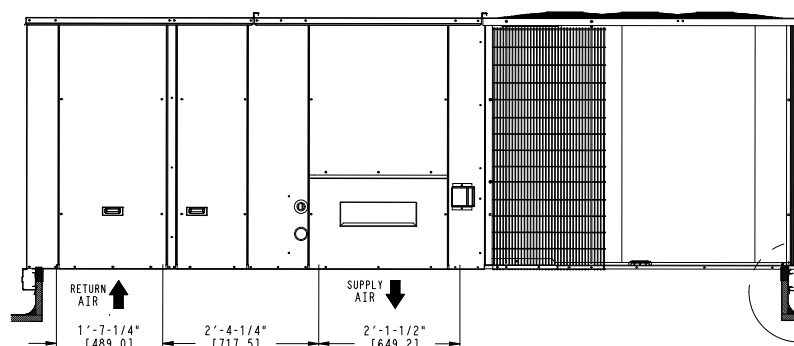
1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.  
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REST ON CURB)  
5 SERVICE CLEARANCE 4 ft ON EACH SIDE



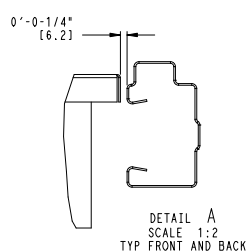
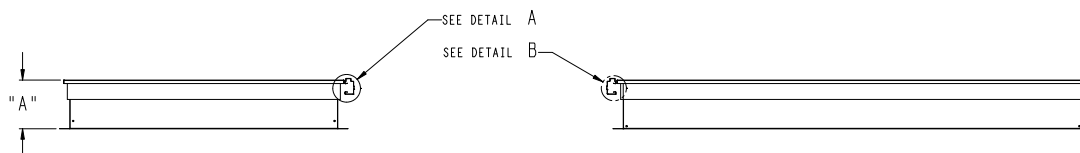
DIRECTION OF AIR FLOW



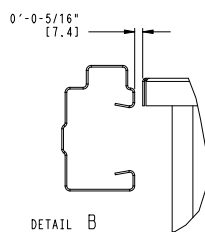
### MAX CURB LEVELING TOLERANCES



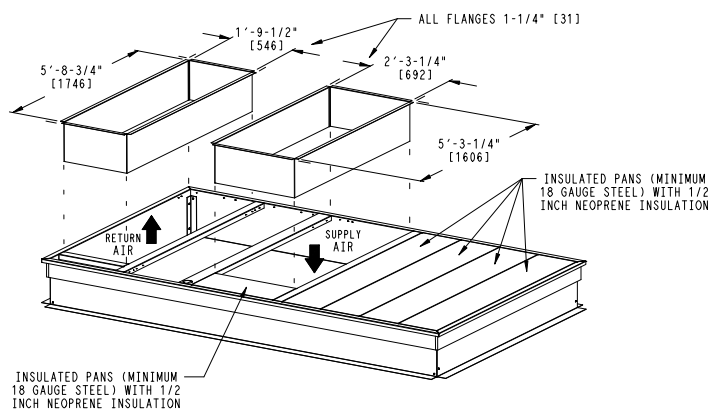
TYPICAL 4 SIDES



DETAIL A  
SCALE 1:2  
TYP FRONT AND BACK



DETAIL B  
SCALE 1:2  
TYP BOTH ENDS



## Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.5 in. wg (87 Pa) with economizer or without economizer.

For vertical ducted applications, 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 unconditioned spaces 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.

For units with accessory electric heaters:

Minimum clearance is not required around ductwork.

### WARNING

#### PERSONAL INJURY HAZARD

Failure to follow this warning could cause 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. Due to electric heater, supply duct will require 90-degree elbow.

## Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to

move unit across a roof. Level by using unit frame as a reference. See Table 1 (on page 9) and Fig. 10 for additional information.

Lifting holes are provided in base rails as shown in Fig. 10. Refer to rigging instructions on unit.

### CAUTION

#### UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

All panels must be in place when rigging. Unit is not designed for handling by fork truck when packaging is removed.

Before setting the unit onto the curb, recheck gasketing on curb.

#### Positioning on Curb —

Position unit on roof curb so that the following clearances are maintained:  $\frac{1}{4}$  in. (6 mm) clearance between the roof curb and the base rail inside the right and left,  $\frac{1}{2}$  in. (12 mm) clearance between the roof curb and the base rail inside the front and back. This will result in the distance between the roof curb and the base rail being approximately equal to Detail A and Detail B in Figs. 7, 8 and 9.

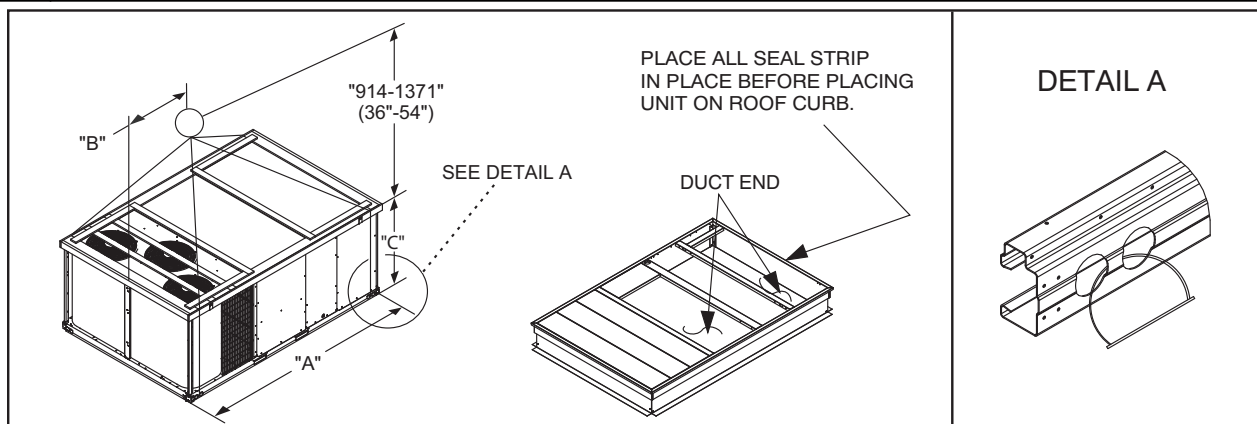
Do not attempt to slide unit on curb after unit is set. Doing so will result in damage to the roof curb seal.

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

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

FIGURE 8

## Rigging Details



| UNIT<br>RAS | MAX WEIGHT |      | DIMENSIONS |      |      |      |      |      |
|-------------|------------|------|------------|------|------|------|------|------|
|             |            |      | A          |      | B    |      | C    |      |
|             | LB         | KG   | IN         | MM   | IN   | MM   | IN   | MM   |
| 210, 213    | 2159       | 981  | 127.8      | 3249 | 58.7 | 1491 | 52.3 | 1328 |
| 240, 243    | 2197       | 999  | 141.5      | 3595 | 71.5 | 1816 | 52.3 | 1328 |
| 300, 303    | 2434       | 1106 | 141.5      | 3595 | 71.5 | 1816 | 60.3 | 1532 |

## NOTES:

1. Dimensions in ( ) are in millimeters.
2. 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 to prevent rigging straps from damaging unit.

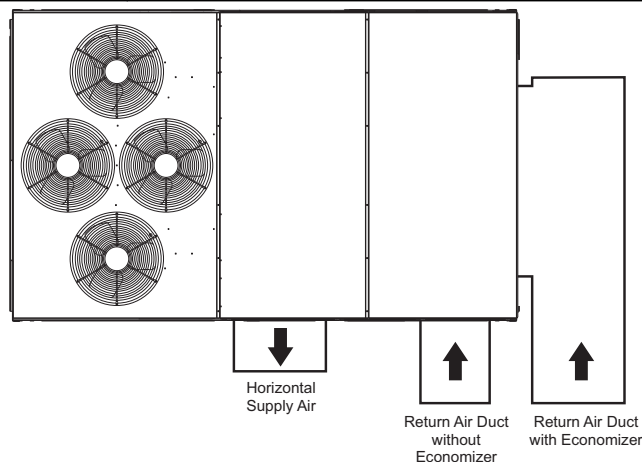
## Step 7 — Horizontal Duct Connection

Refer to Figs. 1 and 2 for locations and sizes of the horizontal duct connections. Note that there are two different return air duct connection locations – one for unit without an economizer (on back side of unit) and a different one for unit equipped with an economizer (on left end, under the economizer hood). The supply air duct connection is on the back side. See Fig. 9 for top view depicting typical horizontal duct arrangements.

Field-supplied ( $\frac{3}{4}$ -inch) flanges should be attached to horizontal duct openings (see Fig. 9) and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.

FIGURE 9

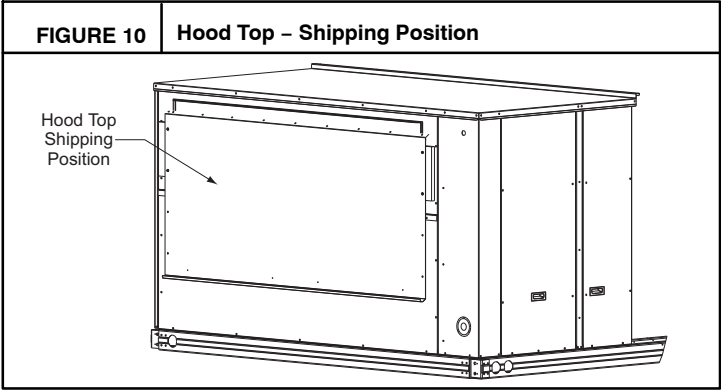
## Horizontal Duct Opening Positions



|                   | Supply                               | Return without Economizer             | Return with Economizer                |
|-------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| Location          | Back                                 | Back                                  | Left end                              |
| Height – In. (mm) | 15 <sup>7</sup> / <sub>8</sub> (402) | 49 <sup>3</sup> / <sub>8</sub> (1253) | 18 <sup>3</sup> / <sub>8</sub> (467)  |
| Width – in. (mm)  | 29 <sup>3</sup> / <sub>4</sub> (756) | 23 <sup>3</sup> / <sub>8</sub> (593)  | 61 <sup>5</sup> / <sub>8</sub> (1564) |

**Step 8 — Install Outside Air Hood — Factory Option**

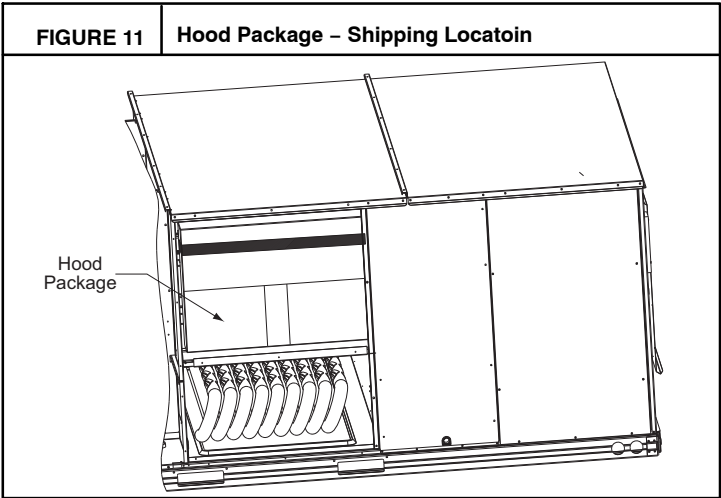
The outside air hood for factory-option economizer and two-position damper is shipped in knock-down form and requires field assembly. The panel for the hood top is shipped on the end of the unit (see Fig. 10). The remaining parts for the hood assembly (including side panels, filters and tracks) are shipped in a carton that is secured to the rear of the blower assembly. Access the carton location through rear panel (see Fig. 11).



**To remove the hood parts package:**

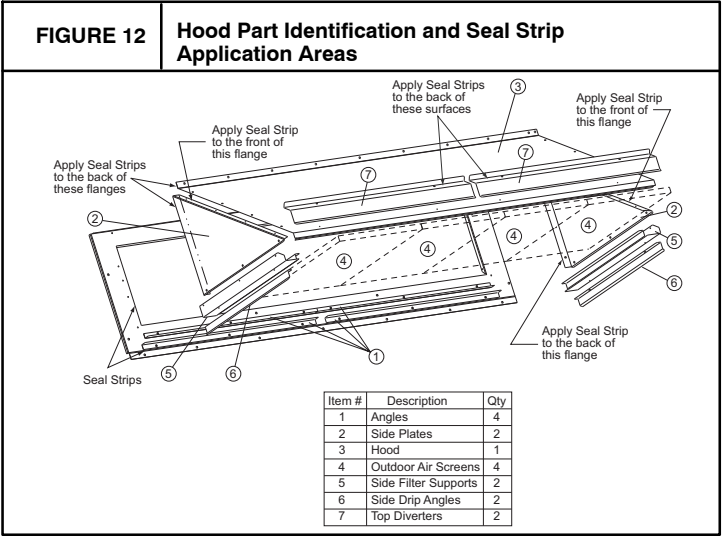
1. Remove the back blower access panel.
2. Locate and cut the strap, being careful to not damage any wiring.
3. Carefully lift the hood package carton through the back blower access opening.

See Fig. 12 for identification of the various parts of the hood assembly.

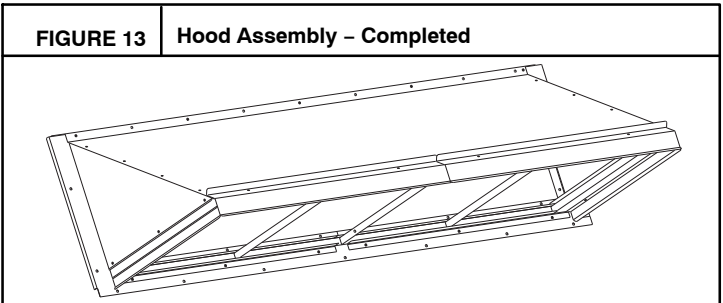


**To assemble the outside air hood:**

1. Remove hood top panel from shipping position on unit end.
2. Install four angles to the upper end panel using the screws provided
3. Apply seal strip to mating flanges on the side plates of the hood (see Fig. 12).

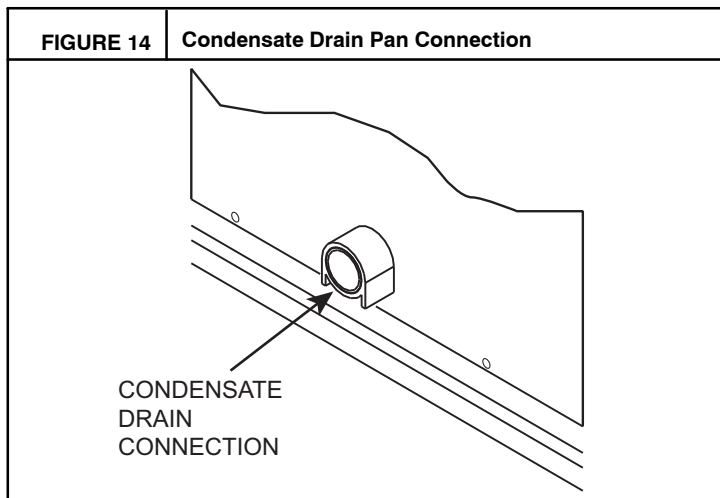


4. Secure side plates to panel using the screws provided.
5. Apply seal strip to mating flange of the hood (see Fig. 12).
6. Secure top flange using screws provided in kit.
7. Install outdoor air screens by sliding them into the channel formed by the four angles installed in step 2. Make sure that the screens extend across the entire length of the hood.
8. Install side filter supports using the screws provided
9. Install side drip angles using the screws provided.
10. Run a continuous length of seal strip across the hood covering the engagement holes in the lower hood.
11. Install top diverter using the screws provided.
12. On units with barometric relief, remove screws at bottom of relief damper. **Do not discard damper door.**

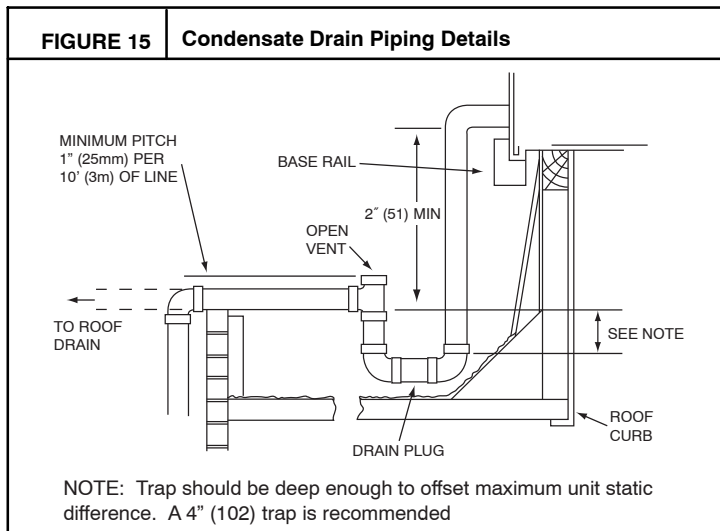


## Step 9 — Install External Condensate Trap and Line

The unit has one  $\frac{3}{4}$ -in. condensate drain connection on the end of the condensate pan (see Fig. 14). See Figs. 1 and 2, item “E”, in the view labeled “BACK (HORIZONTAL DISCHARGE W/O ECON)” for the location of the condensate drain connection.



The piping for the condensate drain and external trap can be completed after the unit is in place. Hand tighten fittings to the drain pan fitting. Provide adequate support for the drain line. Failure to do so can result in damage to the drain pan. See Fig. 15.



*All units must have an external trap for condensate drainage. Install a trap at least 4-in. (102 mm) 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 (25 mm in 3 m) of run. Do not use a pipe size smaller than the unit connection ( $\frac{3}{4}$ -in.).*

## Step 10 — Make Electrical Connections

### ⚠ WARNING

#### ELECTRICAL SHOCK HAZARD

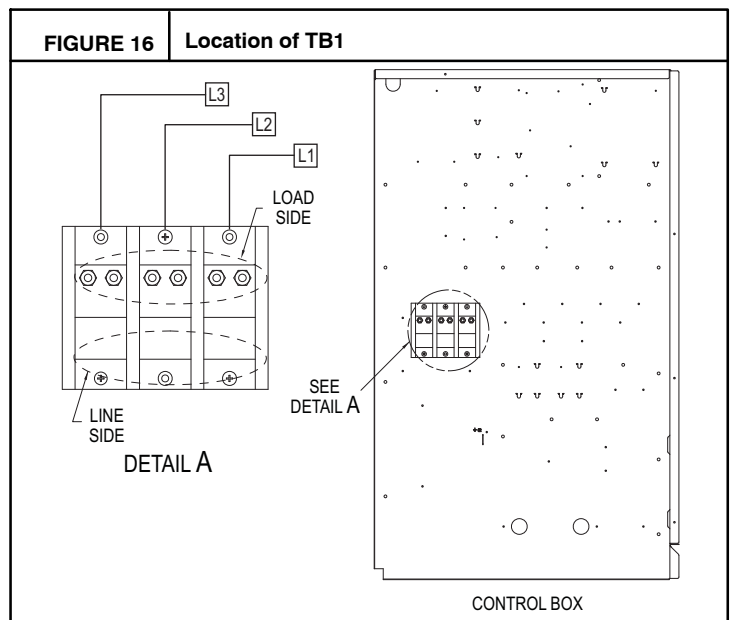
Failure to follow this warning could result in personal injury or death.

*Do not use gas piping as an electrical ground.* 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 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.

**NOTE:** Check all factory and field electrical connections for tightness. Field-supplied wiring shall conform with the limitations of 63°F (33°C) rise.

#### Field Power Supply —

On a unit without a unit-mounted disconnect, connect the source leads to the terminal block with unit field power leads. See Fig. 16.



Field power wires are connected to the unit at line-side pressure lugs on the terminal block (see wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch. Use copper conductors only.

**NOTE:** Make field power connections directly to line connection pressure lugs only.

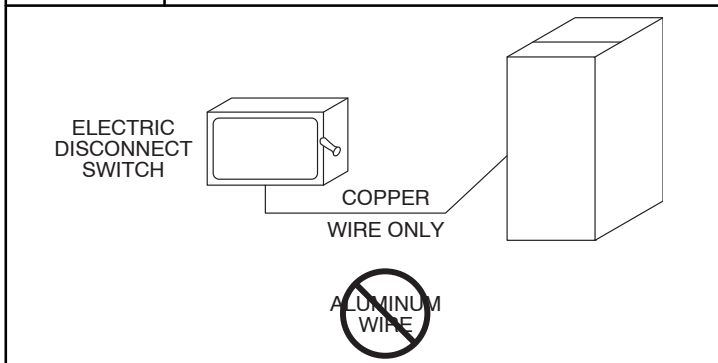
# ⚠ WARNING

## FIRE HAZARD

Failure to follow this warning could result in intermittent operation or performance satisfaction.

Do not connect aluminum wire between disconnect switch and air conditioning unit. Use only copper wire. (See Fig. 17.)

**FIGURE 17** Disconnect Switch and Unit



### Units Without Factory-Installed Disconnect —

When installing units, provide a disconnect switch per NEC (National Electrical Code) of adequate size. Disconnect sizing data is provided on the unit informative plate. Locate on unit cabinet or within sight of the unit per national or local codes. Do not cover unit informative plate if mounting the disconnect on the unit cabinet.

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 18.

### Units with Factory-Installed Disconnect —

The factory-installed option disconnect switch is located in the main control box. The manual switch handle is accessible on the corner post adjacent to the control box access panel.

### All Units –

All field wiring must comply with NEC and all local code requirements.

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 18 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is 2/0 AWG per pole.

Provide a ground-fault and short-circuit over-current protection device (fuse or breaker) per NEC Article 440 (or

local codes). Refer to unit informative data plate for MOCP (Maximum Over-current Protection) device size.

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 following formula to determine the percent of voltage imbalance.

# ⚠ CAUTION

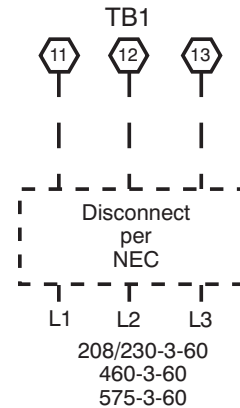
## UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

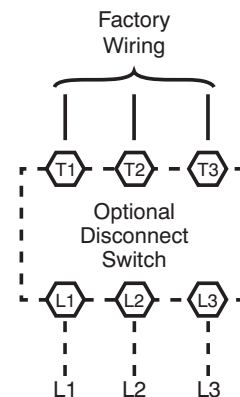
Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable warranty.

**FIGURE 18** Power Wiring Connections

### Units Without Disconnect Option



### Units With Disconnect Option



## Convenience Outlets —

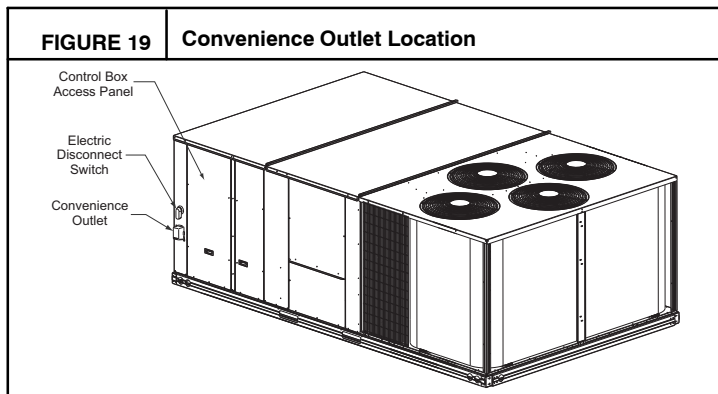
### **WARNING**

#### **ELECTRICAL OPERATION HAZARD**

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

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Tag-out this switch, if necessary.

Non-unit powered convenience outlets are offered on RAS models. It provides a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. See Fig. 19.



**Installing Weatherproof Cover:** A weatherproof while-in-use cover for the factory-installed convenience outlets is now required by UL standards. This cover cannot be factory-mounted due to its depth; it must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

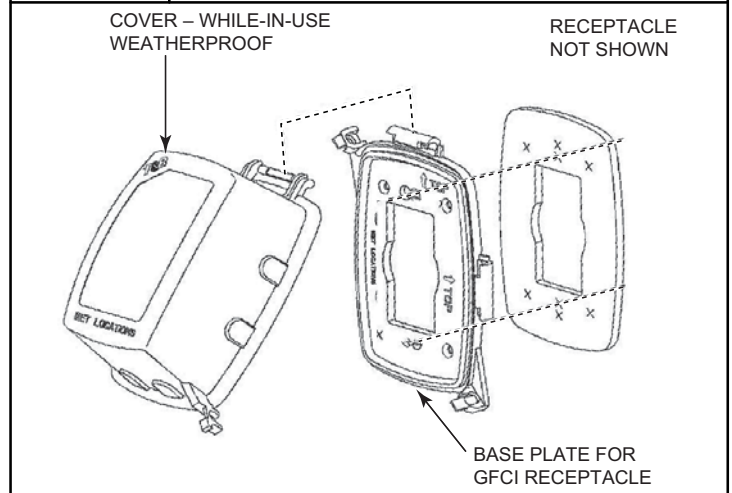
**DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET.**

Remove the blank cover plate at the convenience outlet; discard the blank cover.

Loosen the two screws at the GFCI duplex outlet, until approximately  $\frac{1}{2}$ -in (13 mm) under screw heads are exposed. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).

Mount the weatherproof cover to the backing plate as shown in Fig. 20. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.

**FIGURE 20** Waterproof Cover Installation



**Non-unit powered type:** This type requires the field installation of a general-purpose 125-volt 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size, fuse or breaker requirements and disconnect switch size and location. Route 125-v power supply conductors into the bottom of the utility box containing the duplex receptacle.

Test the GFCI receptacle by pressing the TEST button on the face of the receptacle to trip and open the receptacle. Check for proper grounding wires and power line phasing if the GFCI receptacle does not trip as required. Press the RESET button to clear the tripped condition.

Using unit-mounted convenience outlet: Units with unit-mounted convenience outlet circuits will often require that two disconnects be opened to de-energize all power to the unit. Treat all units as electrically energized until the convenience outlet power is also checked and de-energization is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

## **Field Control Wiring —**

The RAS unit requires an external temperature control device. This device can be a thermostat (field-supplied).

## **Thermostat —**

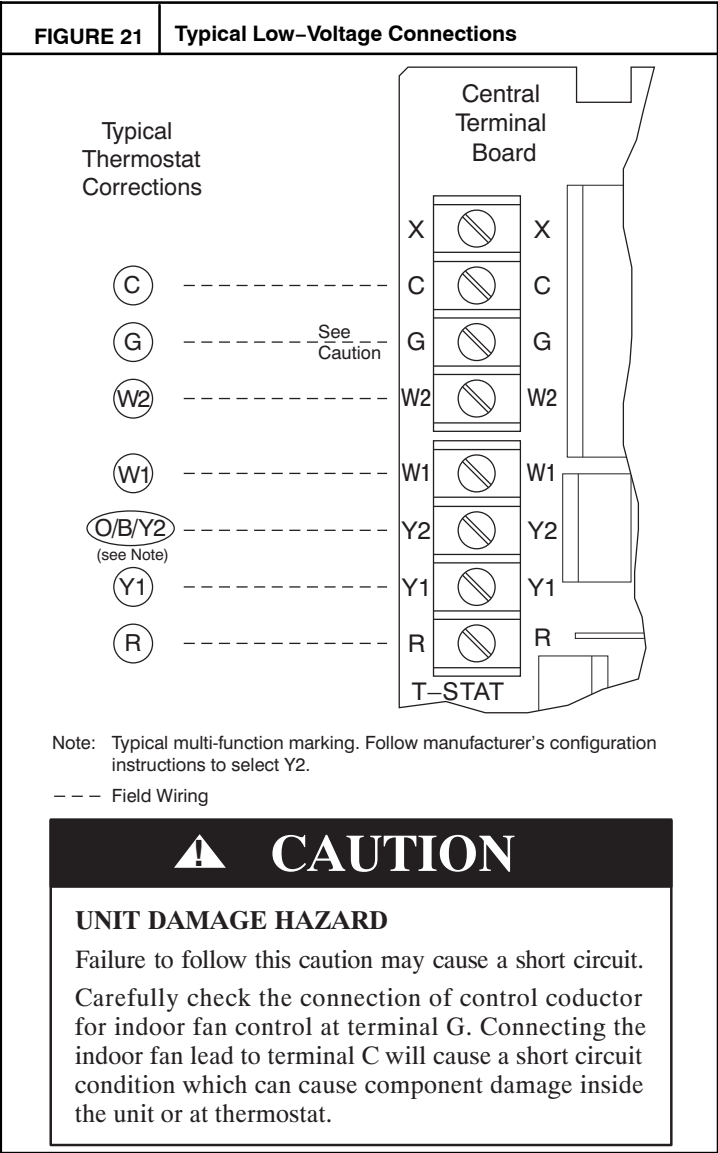
Install an approved accessory thermostat according to installation instructions included with the accessory. For complete economizer function, select a two-stage cooling thermostat. Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

If the thermostat contains a logic circuit requiring 24-v power, use a thermostat cable or equivalent single leads of different colors with minimum of seven leads. If the thermostat does not require a 24-v source (no "C" connection required), use a thermostat cable or equivalent with minimum of six leads. Check the thermostat installation



instructions for additional features which might require additional conductors in the cable.

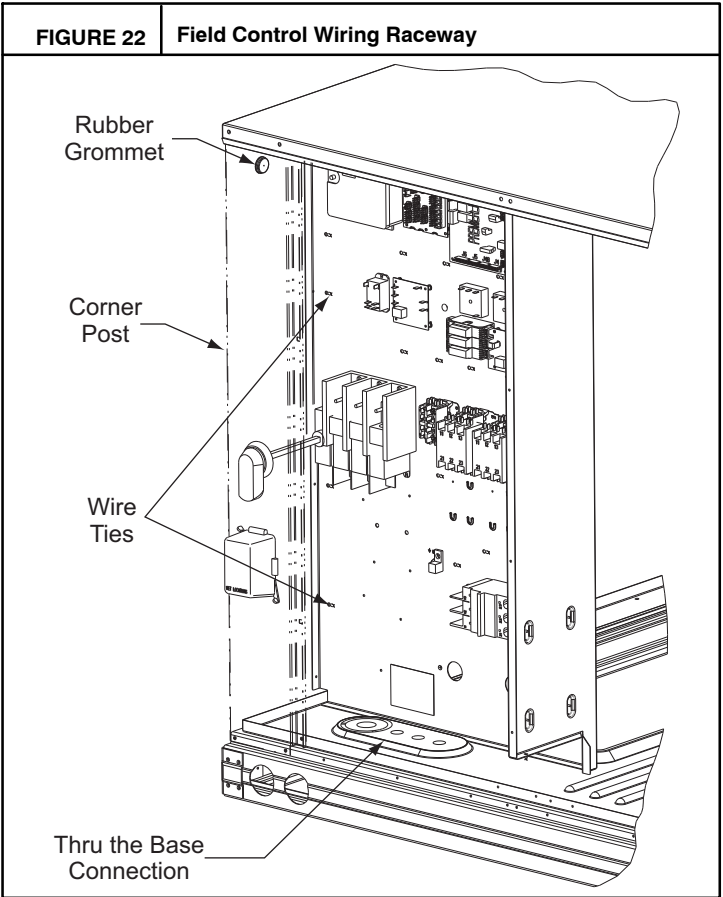
For wire runs up to 50 ft. (15 m), use no. 18 AWG (American Wire Gage) insulated wire (35°C minimum). For 50 to 75 ft. (15 to 23 m), use no. 16 AWG insulated wire (35°C minimum). For over 75 ft. (23 m), use no. 14 AWG insulated wire (35°C minimum). All wire sizes larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.



Correctly rated low voltage wire can be routed through the rubber grommet located on the corner post adjacent to the control box access panel. Route wire through the grommet and then route the wire behind the corner post utilizing the

factory provided wire ties secured to the control box. This will insure separation of the field low voltage wire and the high voltage circuit. Route the low voltage wire to the central terminal board. See Fig. 22.

**NOTE:**If utilizing the through the base connections, route the low voltage wire through the wire ties to the central terminal board.



**Heat Anticipator Settings —**

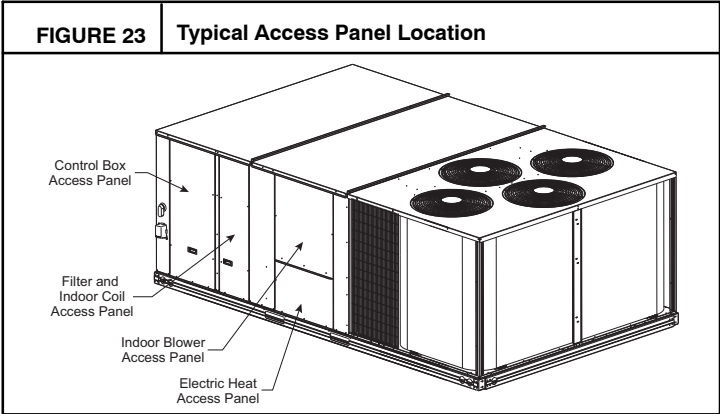
Set heat anticipator settings at 0.14 amp for the first stage and 0.14 amp for second-stage heating.

**Transformer Connection for 208-v Power Supply —**

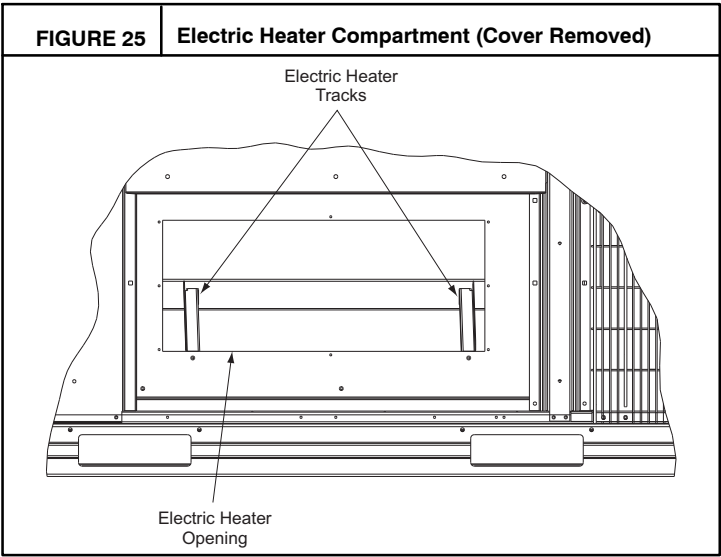
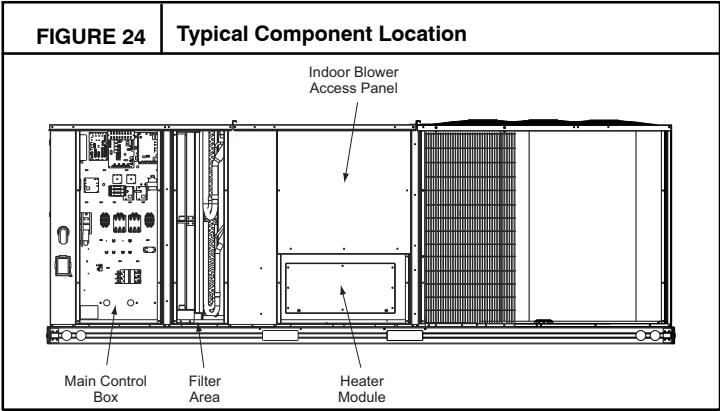
All units except 208/230-v units are factory wired for the voltage shown on the nameplate. *If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the 1/4-in. female spade connector from the 230-v connection and moving it to the 208-v 1/4-in. male terminal on the primary side of the transformer.* Refer to unit label diagram for additional information.

**Electric Heaters**

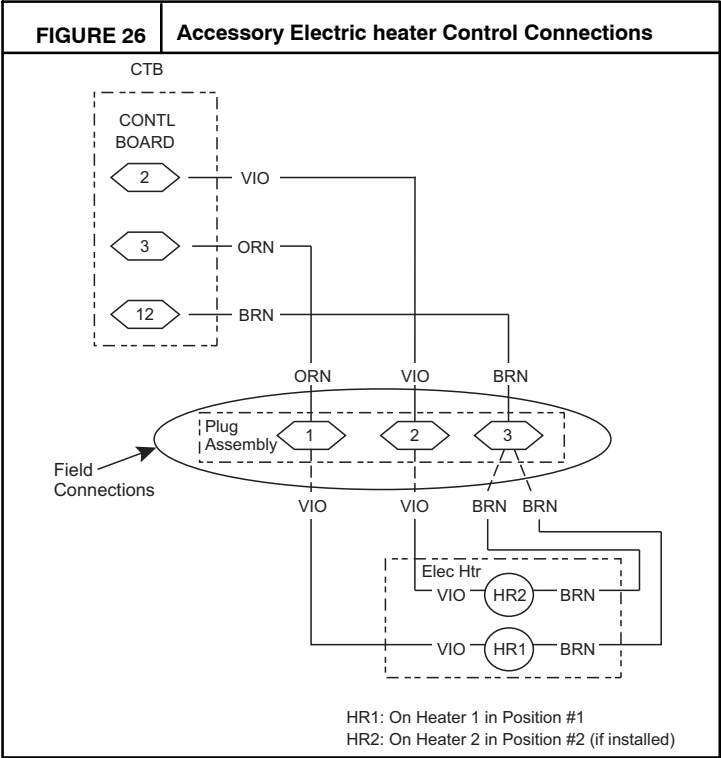
RAS units may be equipped with field-installed accessory electric heaters. The heaters are modular in design. Heater modules are installed in the compartment below the indoor blower access panel. Access is through the electric heat access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. See Fig. 23, Fig. 24 and Fig. 25. Refer to the Electric Heater Kit Installation Instructions for complete details.



Not all available heater modules may be used in every unit. Use only those heater modules that are ETL listed for use in a specific size unit. Refer to the label on the unit cabinet for the list of approved heaters.



**Low-Voltage Control Connections —**  
Locate the plug assembly in the electric heater section of the main unit. Connect the plug with the mating low voltage plug located on the heater.



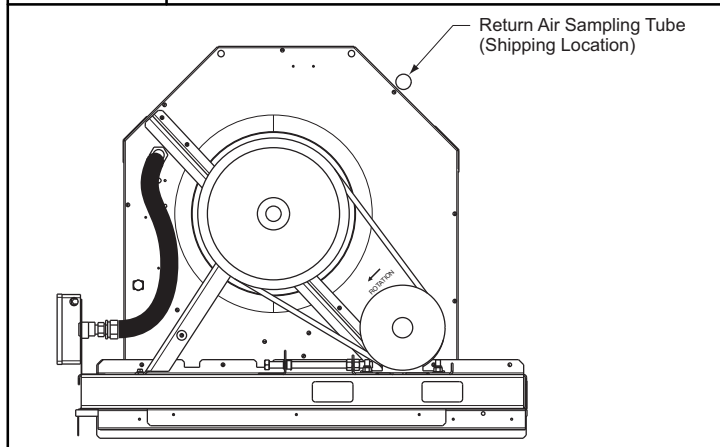
## Smoke Detectors

Smoke detectors are available as factory-installed options on RAS models. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. Return Air smoke detectors are arranged for vertical return configurations only. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

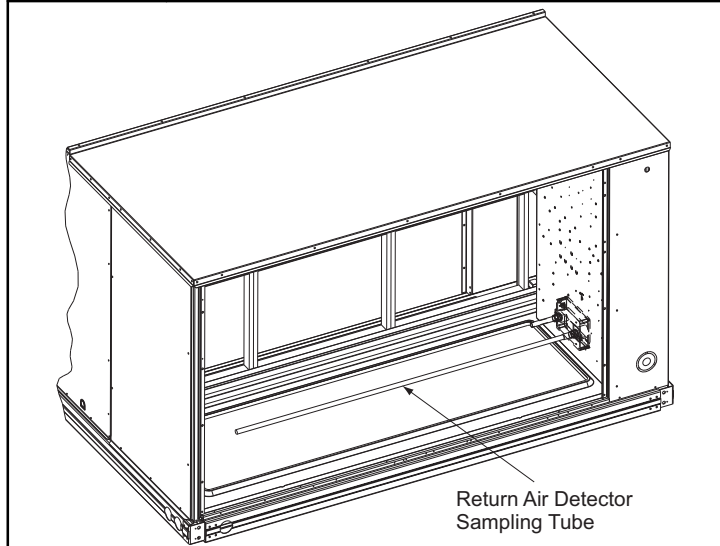
### Return Air Sensor Tube Installation –

The return air sampling tube is shipped in the unit's supply fan section, attached to the blower housing (see Fig. 27). Its operating location is in the return air section of the unit (see Fig. 28, unit without economizer, or Fig. 29, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.

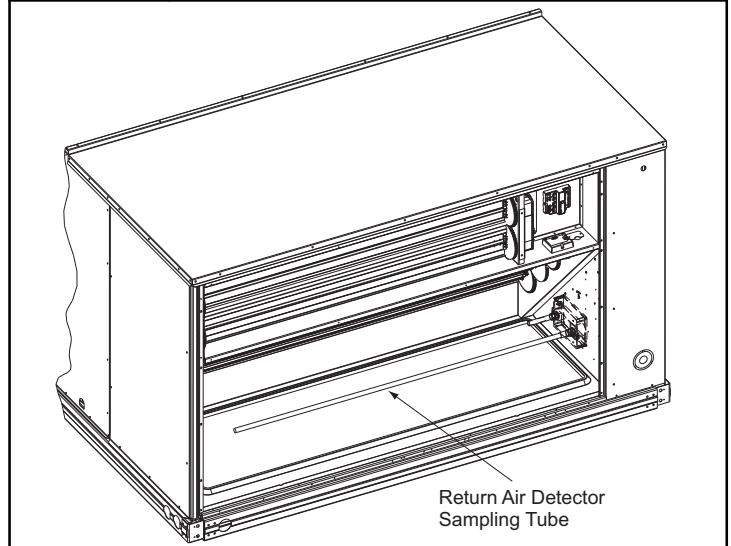
**FIGURE 27** Typical Supply Air Smoke Detector Sensor Location



**FIGURE 28** Return Air Sampling Tube Location in Unit Without Economizer



**FIGURE 29** Return Air Sampling Tube Location in Unit With Economizer



### To install the return air sensor sampling tube:

1. Remove the tube from its shipping location.
2. Open the unit end to access the return air sensor (located on right-hand partition)
3. Orient the tube's sampling holes into the return air flow direction. For vertical application, position the sampling holes on the bottom of the tube, facing into the bottom return duct opening. For horizontal application, position the sampling holes on the side of the tube, facing the unit's end panel.
4. Insert the sampling tube into the return air sensor module until the tube snaps into position.
5. Replace end panel or outside air hood.

### Smoke Detector Test Magnet —

Locate the magnet; it is shipped in the control box area.

**Table 2—Unit Wire/Fuse or HACR Breaker Sizing Data**

| UNIT<br>RAS | NOM. V—Ph—HZ | IFM TYPE | ELEC. HTR      |             |             | P.E.    | NO C.O. or UNPWR C.O. |                            |            |         |                        |                            |            |         |
|-------------|--------------|----------|----------------|-------------|-------------|---------|-----------------------|----------------------------|------------|---------|------------------------|----------------------------|------------|---------|
|             |              |          | CRHEATER***A00 | Nom<br>(kW) | FLA         | FL<br>A | NO P.E.               |                            |            |         | w/ P.E. (pwrd fr/unit) |                            |            |         |
|             |              |          |                |             |             |         | MCA                   | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         | MCA                    | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         |
|             |              |          |                |             |             |         |                       |                            | FLA        | LRA     |                        |                            | FLA        | LRA     |
| 210, 213    | 208/230—3—60 | STD      | NONE           | —           | —           | 5.9     | 81.8                  | 100.0                      | 85         | 502     | 93.6                   | 110.0                      | 99         | 502     |
|             |              |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 81.8/87.9             | 100/100                    | 85/85      | 502/502 | 93.6/102.6             | 110/110                    | 99/99      | 502/502 |
|             |              |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 143.0/133.1           | 150/150                    | 132/150    | 502/502 | 157.8/147.8            | 175/175                    | 145/164    | 502/502 |
|             |              |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 169.2/193.2           | 200/225                    | 192/219    | 502/502 | 183.9/207.9            | 200/225                    | 205/233    | 502/502 |
|             |              | MED      | NONE           | —           | —           | 5.9     | 86.6                  | 100                        | 91         | 511     | 98.4                   | 125                        | 105        | 511     |
|             |              |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 86.6/93.9             | 100/100                    | 91/91      | 511/511 | 98.6/108.6             | 125/125                    | 105/105    | 511/511 |
|             |              |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 149.0/139.1           | 150/175                    | 137/156    | 511/511 | 163.8/153.8            | 175/175                    | 151/169    | 511/511 |
|             |              |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 175.2/199.2           | 200/225                    | 197/225    | 511/511 | 189.9/213.9            | 200/250                    | 211/238    | 511/511 |
|             |              | HIGH     | NONE           | —           | —           | 5.9     | 84.4                  | 100.0                      | 88         | 513     | 96.2                   | 125.0                      | 102        | 513     |
|             |              |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 84.4/91.1             | 100/100                    | 88/88      | 513/513 | 96.2/105.9             | 125/125                    | 102/102    | 513/513 |
|             |              |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 146.3/136.3           | 150/150                    | 135/153    | 513/513 | 161.0/151.1            | 175/175                    | 148/167    | 513/513 |
|             |              |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 172.4/196.4           | 200/225                    | 195/222    | 513/513 | 187.2/211.2            | 200/225                    | 208/236    | 513/513 |
|             | 460—3—60     | STD      | NONE           | —           | —           | 3.1     | 43.1                  | 50.0                       | 45         | 252     | 49.3                   | 60.0                       | 52         | 252     |
|             |              |          | 273A00         | 25.0        | 30.1        |         | 43.6                  | 50                         | 45         | 252     | 51.4                   | 60                         | 52         | 252     |
|             |              |          | 274A00         | 50.0        | 60.1        |         | 66.1                  | 80                         | 75         | 252     | 73.9                   | 80                         | 82         | 252     |
|             |              |          | 275A00         | 75.0        | 90.2        |         | 96.2                  | 100                        | 109        | 252     | 104.0                  | 110                        | 116        | 252     |
|             |              | MED      | NONE           | —           | —           | 3.1     | 45.7                  | 60                         | 48         | 256     | 51.9                   | 60                         | 55         | 256     |
|             |              |          | 273A00         | 25.0        | 30.1        |         | 46.9                  | 60                         | 48         | 256     | 54.6                   | 60                         | 55         | 256     |
|             |              |          | 274A00         | 50.0        | 60.1        |         | 69.4                  | 80                         | 78         | 256     | 77.1                   | 80                         | 85         | 256     |
|             |              |          | 275A00         | 75.0        | 90.2        |         | 99.5                  | 110                        | 112        | 256     | 107.2                  | 125                        | 119        | 256     |
|             |              | HIGH     | NONE           | —           | —           | 3.1     | 44.7                  | 60.0                       | 47         | 257     | 50.9                   | 60.0                       | 54         | 257     |
|             |              |          | 273A00         | 25.0        | 30.1        |         | 45.6                  | 60                         | 47         | 257     | 53.4                   | 60                         | 54         | 257     |
|             |              |          | 274A00         | 50.0        | 60.1        |         | 68.1                  | 80                         | 76         | 257     | 75.9                   | 80                         | 84         | 257     |
|             |              |          | 275A00         | 75.0        | 90.2        |         | 98.2                  | 100                        | 111        | 257     | 106.0                  | 125                        | 118        | 257     |
|             | 575—3—60     | STD      | NONE           | —           | —           | 2.4     | 32.1                  | 40.0                       | 33         | 188     | 36.9                   | 45.0                       | 39         | 188     |
|             |              |          | 276A00         | 24.8        | 23.9        |         | 33.4                  | 40                         | 33         | 188     | 39.4                   | 45                         | 39         | 188     |
|             |              |          | 277A00         | 49.6        | 47.7        |         | 63.1                  | 70                         | 58         | 188     | 69.1                   | 70                         | 64         | 188     |
|             |              |          | 278A00         | 74.4        | 71.6        |         | 75.1                  | 80                         | 86         | 188     | 81.1                   | 90                         | 91         | 188     |
|             |              | MED      | NONE           | —           | —           | 2.4     | 34.9                  | 45                         | 37         | 202     | 39.7                   | 50                         | 42         | 202     |
|             |              |          | 276A00         | 24.8        | 23.9        |         | 36.9                  | 45                         | 37         | 202     | 42.9                   | 50                         | 42         | 202     |
|             |              |          | 277A00         | 49.6        | 47.7        |         | 66.6                  | 70                         | 61         | 202     | 72.6                   | 80                         | 67         | 202     |
|             |              |          | 278A00         | 74.4        | 71.6        |         | 78.6                  | 90                         | 89         | 202     | 84.6                   | 90                         | 94         | 202     |
|             |              | HIGH     | NONE           | —           | —           | 2.4     | 34.4                  | 45.0                       | 36         | 191     | 39.2                   | 50.0                       | 42         | 191     |
|             |              |          | 276A00         | 24.8        | 23.9        |         | 36.3                  | 45                         | 36         | 191     | 42.3                   | 50                         | 42         | 191     |
|             |              |          | 277A00         | 49.6        | 47.7        |         | 66.0                  | 70                         | 61         | 191     | 72.0                   | 80                         | 66         | 191     |
|             |              |          | 278A00         | 74.4        | 71.6        |         | 78.0                  | 90                         | 88         | 191     | 84.0                   | 90                         | 94         | 191     |

**NOTE:**See page 23 for table legend and notes.

**Table 2 – Unit Wire/Fuse or HACR Breaker Sizing Data (cont)**

| UNIT<br>RAS | NO M. V—Ph—HZ | IFM TYPE | ELEC. HTR      |             |             | P.E.    | NO C.O. or UNPWR C.O. |                            |            |         |                        |                            |            |         |
|-------------|---------------|----------|----------------|-------------|-------------|---------|-----------------------|----------------------------|------------|---------|------------------------|----------------------------|------------|---------|
|             |               |          | CRHEATER***A00 | Nom<br>(kW) | FLA         | FL<br>A | NO P.E.               |                            |            |         | w/ P.E. (pwrd fr/unit) |                            |            |         |
|             |               |          |                |             |             |         | MCA                   | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         | MCA                    | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         |
|             |               |          |                |             |             |         |                       |                            | FLA        | LRA     |                        |                            | FLA        | LRA     |
| 240, 243    | 208/230—3—60  | STD      | NONE           | —           | —           | 5.9     | 110.6                 | 150.0                      | 113        | 534     | 122.4                  | 150.0                      | 127        | 534     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 110.6/110.6           | 150/150                    | 113/113    | 534/534 | 122.4/122.4            | 150/150                    | 127/127    | 534/534 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 149.0/139.1           | 150/175                    | 137/156    | 534/534 | 163.8/153.8            | 175/175                    | 151/169    | 534/534 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 175.2/199.2           | 200/225                    | 197/225    | 534/534 | 189.9/213.9            | 200/250                    | 211/238    | 534/534 |
|             |               | MED      | NONE           | —           | —           | 5.9     | 108.4                 | 150                        | 111        | 536     | 120.2                  | 150                        | 124        | 536     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 108.4/108.4           | 150/150                    | 111/111    | 536/536 | 120.2/120.2            | 150/150                    | 124/124    | 536/536 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 146.3/136.3           | 150/150                    | 135/153    | 536/536 | 161.0/151.1            | 175/175                    | 148/167    | 536/536 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 172.4/196.4           | 200/225                    | 195/222    | 536/536 | 187.2/211.2            | 200/225                    | 208/236    | 536/536 |
|             |               | HIGH     | NONE           | —           | —           | 5.9     | 115.0                 | 150.0                      | 118        | 572     | 126.8                  | 150.0                      | 132        | 572     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |         | 115.0/115.0           | 150/150                    | 118/118    | 572/572 | 126.8/126.8            | 150/150                    | 132/132    | 572/572 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |         | 154.5/144.6           | 175/175                    | 142/161    | 572/572 | 169.3/159.3            | 175/175                    | 156/174    | 572/572 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |         | 180.7/204.7           | 200/225                    | 202/230    | 572/572 | 195.4/219.4            | 200/250                    | 216/243    | 572/572 |
|             | 460—3—60      | STD      | NONE           | —           | —           | 3.1     | 49.0                  | 60.0                       | 51         | 269     | 55.2                   | 60.0                       | 58         | 269     |
|             |               |          | 273A00         | 25.0        | 30.1        |         | 49.0                  | 60                         | 51         | 269     | 55.2                   | 60                         | 58         | 269     |
|             |               |          | 274A00         | 50.0        | 60.1        |         | 69.4                  | 80                         | 78         | 269     | 77.1                   | 80                         | 85         | 269     |
|             |               |          | 275A00         | 75.0        | 90.2        |         | 99.5                  | 110                        | 112        | 269     | 107.2                  | 125                        | 119        | 269     |
|             |               | MED      | NONE           | —           | —           | 3.1     | 48                    | 60                         | 50         | 270     | 54.2                   | 60                         | 57         | 270     |
|             |               |          | 273A00         | 25.0        | 30.1        |         | 48.0                  | 60                         | 50         | 270     | 54.2                   | 60                         | 57         | 270     |
|             |               |          | 274A00         | 50.0        | 60.1        |         | 68.1                  | 80                         | 76         | 270     | 75.9                   | 80                         | 84         | 270     |
|             |               |          | 275A00         | 75.0        | 90.2        |         | 98.2                  | 100                        | 111        | 270     | 106.0                  | 125                        | 118        | 270     |
|             |               | HIGH     | NONE           | —           | —           | 3.1     | 51.3                  | 60.0                       | 54         | 288     | 57.5                   | 70.0                       | 61         | 288     |
|             |               |          | 273A00         | 25.0        | 30.1        |         | 51.3                  | 60                         | 54         | 288     | 57.5                   | 70                         | 61         | 288     |
|             |               |          | 274A00         | 50.0        | 60.1        |         | 72.2                  | 80                         | 80         | 288     | 80.0                   | 90                         | 87         | 288     |
|             |               |          | 275A00         | 75.0        | 90.2        |         | 102.3                 | 125                        | 115        | 288     | 110.1                  | 125                        | 122        | 288     |
|             | 575—3—60      | STD      | NONE           | —           | —           | 2.4     | 38.6                  | 50.0                       | 40         | 224     | 43.4                   | 50.0                       | 46         | 224     |
|             |               |          | 276A00         | 24.8        | 23.9        |         | 38.6                  | 50                         | 40         | 224     | 43.4                   | 50                         | 46         | 224     |
|             |               |          | 277A00         | 49.6        | 47.7        |         | 66.6                  | 70                         | 61         | 224     | 72.6                   | 80                         | 67         | 224     |
|             |               |          | 278A00         | 74.4        | 71.6        |         | 78.6                  | 90                         | 89         | 224     | 84.6                   | 90                         | 94         | 224     |
|             |               | MED      | NONE           | —           | —           | 2.4     | 38.1                  | 50                         | 40         | 213     | 42.9                   | 50                         | 45         | 213     |
|             |               |          | 276A00         | 24.8        | 23.9        |         | 38.1                  | 50                         | 40         | 213     | 42.9                   | 50                         | 45         | 213     |
|             |               |          | 277A00         | 49.6        | 47.7        |         | 66.0                  | 70                         | 61         | 213     | 72.0                   | 80                         | 66         | 213     |
|             |               |          | 278A00         | 74.4        | 71.6        |         | 78.0                  | 90                         | 88         | 213     | 84.0                   | 90                         | 94         | 213     |
|             |               | HIGH     | NONE           | —           | —           | 2.4     | 40.8                  | 50.0                       | 43         | 239     | 45.6                   | 60.0                       | 48         | 239     |
|             |               |          | 276A00         | 24.8        | 23.9        |         | 40.8                  | 50                         | 43         | 239     | 45.6                   | 60                         | 48         | 239     |
|             |               |          | 277A00         | 49.6        | 47.7        |         | 69.4                  | 70                         | 64         | 239     | 75.4                   | 80                         | 69         | 239     |
|             |               |          | 278A00         | 74.4        | 71.6        |         | 81.4                  | 90                         | 91         | 239     | 87.4                   | 90                         | 97         | 239     |

**NOTE:**See page 23 for table legend and notes.

**Table 2 – Unit Wire/Fuse or HACR Breaker Sizing Data (cont)**

| UNIT<br>RAS | NO M. V—Ph—HZ | IFM TYPE | ELEC. HTR      |             |             | P.E.<br><br>FL<br>A | NO C.O. or UNPWR C.O. |                            |            |         |                         |                            |            |         |
|-------------|---------------|----------|----------------|-------------|-------------|---------------------|-----------------------|----------------------------|------------|---------|-------------------------|----------------------------|------------|---------|
|             |               |          | CRHEATER***A00 | Nom<br>(kW) | FLA         |                     | NO P.E.               |                            |            |         | w/ P.E. (pwrdr fr/unit) |                            |            |         |
|             |               |          |                |             |             |                     | MCA                   | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         | MCA                     | FUSE<br>or<br>HACR<br>BRKR | DISC. SIZE |         |
|             |               |          |                |             |             |                     |                       |                            | FLA        | LRA     |                         |                            | FLA        | LRA     |
| 300, 303    | 208/230—3—60  | STD      | NONE           | —           | —           | 5.9                 | 129.2                 | 175.0                      | 135        | 584     | 141.0                   | 175.0                      | 148        | 584     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |                     | 129.2/129.2           | 175/175                    | 135/135    | 584/584 | 141.0/141.0             | 175/175                    | 148/148    | 584/584 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |                     | 149.0/139.1           | 175/175                    | 137/156    | 584/584 | 163.8/153.8             | 175/175                    | 151/169    | 584/584 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |                     | 175.2/199.2           | 200/225                    | 197/225    | 584/584 | 189.9/213.9             | 200/250                    | 211/238    | 584/584 |
|             |               | MED      | NONE           | —           | —           | 5.9                 | 127.0                 | 175.0                      | 132        | 586     | 138.8                   | 175.0                      | 146        | 586     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |                     | 127.0/127.0           | 175/175                    | 132/132    | 586/586 | 138.8/138.8             | 175/175                    | 146/146    | 586/586 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |                     | 146.3/136.3           | 175/175                    | 135/153    | 586/586 | 161.0/151.1             | 175/175                    | 148/167    | 586/586 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |                     | 172.4/196.4           | 200/225                    | 195/222    | 586/586 | 187.2/211.2             | 200/225                    | 208/236    | 586/586 |
|             |               | HIGH     | NONE           | —           | —           | 5.9                 | 133.6                 | 175.0                      | 140        | 622     | 145.4                   | 175.0                      | 153        | 622     |
|             |               |          | 270A00         | 18.8/25.0   | 52.1/60.1   |                     | 133.6/133.6           | 175/175                    | 140/140    | 622/622 | 145.4/145.4             | 175/175                    | 153/153    | 622/622 |
|             |               |          | 271A00         | 37.6/50.0   | 104.2/120.3 |                     | 154.5/144.6           | 175/175                    | 142/161    | 622/622 | 169.3/159.3             | 175/175                    | 156/174    | 622/622 |
|             |               |          | 272A00         | 56.3/75.0   | 156.4/180.4 |                     | 180.7/204.7           | 200/225                    | 202/230    | 622/622 | 195.4/219.4             | 200/250                    | 216/243    | 622/622 |
|             | 460—3—60      | STD      | NONE           | —           | —           | 3.1                 | 52.9                  | 60.0                       | 55         | 299     | 59.1                    | 70.0                       | 63         | 299     |
|             |               |          | 273A00         | 25.0        | 30.1        |                     | 52.9                  | 60.0                       | 55         | 299     | 59.1                    | 70.0                       | 63         | 299     |
|             |               |          | 274A00         | 50.0        | 60.1        |                     | 69.4                  | 80.0                       | 78         | 299     | 77.1                    | 80.0                       | 85         | 299     |
|             |               |          | 275A00         | 75.0        | 90.2        |                     | 99.5                  | 110                        | 112        | 299     | 107.2                   | 125                        | 119        | 299     |
|             |               | MED      | NONE           | —           | —           | 3.1                 | 51.9                  | 60.0                       | 54         | 300     | 58.1                    | 70.0                       | 61         | 300     |
|             |               |          | 273A00         | 25.0        | 30.1        |                     | 51.9                  | 60.0                       | 54         | 300     | 58.1                    | 70.0                       | 61         | 300     |
|             |               |          | 274A00         | 50.0        | 60.1        |                     | 68.1                  | 80.0                       | 76         | 300     | 75.9                    | 80.0                       | 84         | 300     |
|             |               |          | 275A00         | 75.0        | 90.2        |                     | 98.2                  | 100                        | 111        | 300     | 106.0                   | 125                        | 118        | 300     |
|             |               | HIGH     | NONE           | —           | —           | 3.1                 | 55.2                  | 60.0                       | 58         | 318     | 61.4                    | 70.0                       | 65         | 318     |
|             |               |          | 273A00         | 25.0        | 30.1        |                     | 55.2                  | 60.0                       | 58         | 318     | 61.4                    | 70.0                       | 65         | 318     |
|             |               |          | 274A00         | 50.0        | 60.1        |                     | 72.2                  | 80.0                       | 80         | 318     | 80.0                    | 90.0                       | 87         | 318     |
|             |               |          | 275A00         | 75.0        | 90.2        |                     | 102.3                 | 125                        | 115        | 318     | 110.1                   | 125                        | 122        | 318     |
|             | 575—3—60      | STD      | NONE           | —           | —           | 2.4                 | 41.1                  | 50.0                       | 43         | 244     | 45.9                    | 60.0                       | 49         | 244     |
|             |               |          | 276A00         | 24.8        | 23.9        |                     | 41.1                  | 50.0                       | 43         | 244     | 45.9                    | 60.0                       | 49         | 244     |
|             |               |          | 277A00         | 49.6        | 47.7        |                     | 66.6                  | 70.0                       | 61         | 244     | 72.6                    | 80.0                       | 67         | 244     |
|             |               |          | 278A00         | 74.4        | 71.6        |                     | 78.6                  | 90                         | 89         | 244     | 84.6                    | 90                         | 94         | 244     |
|             |               | MED      | NONE           | —           | —           | 2.4                 | 40.6                  | 50.0                       | 42         | 233     | 45.4                    | 60.0                       | 48         | 233     |
|             |               |          | 276A00         | 24.8        | 23.9        |                     | 40.6                  | 50.0                       | 42         | 233     | 45.4                    | 60.0                       | 48         | 233     |
|             |               |          | 277A00         | 49.6        | 47.7        |                     | 66.0                  | 70.0                       | 61         | 233     | 72.0                    | 80.0                       | 66         | 233     |
|             |               |          | 278A00         | 74.4        | 71.6        |                     | 78.0                  | 90                         | 88         | 233     | 84.0                    | 90                         | 94         | 233     |
|             |               | HIGH     | NONE           | —           | —           | 2.4                 | 43.3                  | 50.0                       | 46         | 259     | 48.1                    | 60.0                       | 51         | 259     |
|             |               |          | 276A00         | 24.8        | 23.9        |                     | 43.3                  | 50.0                       | 46         | 259     | 48.1                    | 60.0                       | 51         | 259     |
|             |               |          | 277A00         | 49.6        | 47.7        |                     | 69.4                  | 70.0                       | 64         | 259     | 75.4                    | 80.0                       | 69         | 259     |
|             |               |          | 278A00         | 74.4        | 71.6        |                     | 81.4                  | 90                         | 91         | 259     | 87.4                    | 90                         | 97         | 259     |

**NOTE:**See page 23 for table legend and notes.

Legend and Notes for Table 2

LEGEND:

- BRKR - Circuit breaker
- CO - Convenience outlet
- DISC - Disconnect
- FLA - Full load amps
- LRA - Locked rotor amps
- MCA - Minimum circuit amps
- PE - Power exhaust
- UNPWR CO - Unpowered convenient outlet



NOTES:

- 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.
- 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.

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

Example: Supply voltage is 230-3-60



- AB = 224 v
- BC = 231 v
- AC = 226 v

Average Voltage =  $\frac{(224 + 231 + 226)}{3} = \frac{681}{3}$   
= 227

Determine maximum deviation from average voltage.

- (AB) 227 - 224 = 3 v
- (BC) 231 - 227 = 4 v
- (AC) 227 - 226 = 1 v

Maximum deviation is 4 v.

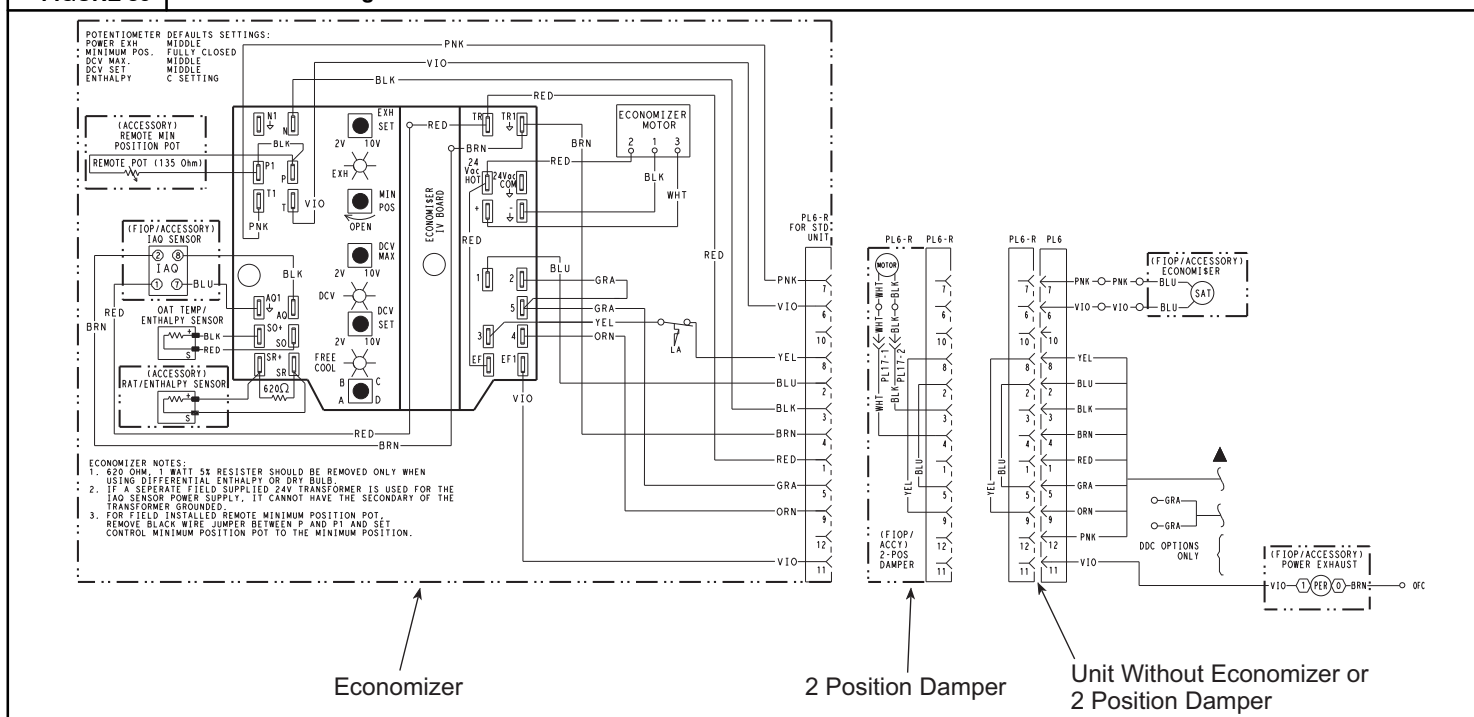
Determine percent of voltage imbalance.

% Voltage Imbalance = 100 x  $\frac{4}{227}$   
= 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.

**FIGURE 30 Economizer Wiring**



## Step 11 — Adjust Factory-Installed Options

### Smoke Detectors —

Smoke detector(s) will be connected at the Controls Connections Board, at terminals marked “Smoke Shutdown”. Remove jumper JMP 3 when ready to energize unit.

### EconoMi\$er IV Occupancy Switch —

Refer to Fig. 66 for general EconoMi\$er IV wiring. External occupancy control is managed through a connection on the Central Terminal Board.

If external occupancy control is desired, connect a time clock or remotely controlled switch (closed for Occupied, open for Unoccupied sequence) at terminals marked OCCUPANCY on CTB. Remove or cut jumper JMP 2 to complete the installation.

## Step 12 — Install Accessories

Available accessories include:

- Roof Curb
- Manual outside air damper
- Two-Position motorized outside air damper

EconoMi\$er IV (with control and integrated barometric relief)

Power Exhaust

Differential dry-bulb sensor (EconoMi\$er IV)

Outdoor enthalpy sensor

Differential enthalpy sensor

Electric Heaters

Single Point kits

Low Ambient Controls

Thermostat / Sensors

CO<sub>2</sub> sensor

Louvered hail guard

Phase monitor control

Winter Start kit

Refer to separate installation instructions for information on installing these accessories.

### Pre-Start and Start-Up

This completes the mechanical installation of the unit. Refer to the unit's Service and Maintenance manual for detailed Pre-Start and Start-up instructions.