

INSTALLATION INSTRUCTIONS

R-410A Single-Package Air Conditioner

RAS036-072

NOTE: Read the entire instruction manual before starting the installation


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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/NFPA 70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

It is important to recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and 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 severe personal injury or death. WARNING signifies hazards 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 lock(s) and lockout tag(s). 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 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 air conditioning equipment.

Rated Indoor Airflow (cfm)

The table to the right lists the rated indoor airflow used for the AHRI efficiency rating for the units covered in this document.

Model Number	Full Load Airflow (cfm)
RAS036	1275
RAS048	1400
RAS060	1800
RAS072	2200

MODEL NOMENCLATURE

MODEL SERIES	R	A	S	0	3	6	H	0	A	A	0	A	A	A
Position Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
R = Rooftop														
A = Air Conditioning (Cooling Only)			Type											
S = Standard ASHRAE 90.1-2010 Efficiency			Efficiency											
036 = 3 Tons														
048 = 4 Tons														
060 = 5 Tons														
072 = 6 Tons														
K = 208/230-1-60														
H = 208/230-3-60														
L = 460-3-60														
S = 575-3-60														
0 = No Heat														
A = Belt Drive, Standard Static Motor														
B = Belt Drive, High Static Motor														
C = Belt Drive, Medium Static Motor														
X = Direct Drive, Standard Static (3, 4, and 5 ton models only)														
A = None														
B = Economizer w/Baro-relief, OA Temp sensor														
E = Economizer w/Baro-relief + CO ₂ Sensor, OA Temp sensor														
H = Economizer w/Baro-relief, enthalpy sensor														
L = Economizer w/Baro-relief + CO ₂ Sensor, enthalpy sensor														
U = Temp Ultra Low Leak Economizer w/Baro-relief														
W = Enthalpy Ultra Low Leak Economizer w/Baro-relief														
P = 2-Position damper														
0A = No Options														
AT = Non-powered 115v C.O.														
4B = Non-Fused Disconnect														
BR = Supply Air Smoke Detector														
AA = Easy Access Hinged Panels														
A = Aluminum / Copper Cond & Evap Coil														
B = Precoat Alum/Copper Cond with Alum / Copper Evap (3 phase only)														
C = E-Coated Alum/Copper Cond with Alum / Copper Evap (3 phase only)														
D = E-Coated Alum / Copper Cond & Evap (3 phase only)														
E = Copper/Copper Cond & Alum/Copper Evap (3 phase only)														
F = Copper/Copper Cond & Evap (3 phase only)														
A = Standard Single Speed Indoor Fan Motor. For W7212 Controls														
B = Standard Single Speed Indoor Fan Motor. For W7220 Controls														

NOTE: Factory installed options are NOT available on single phase models. This includes economizers and 2 position dampers.

¹Combinations of FIOPS are available.

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Fig. 1 - Unit Dimensional Drawing

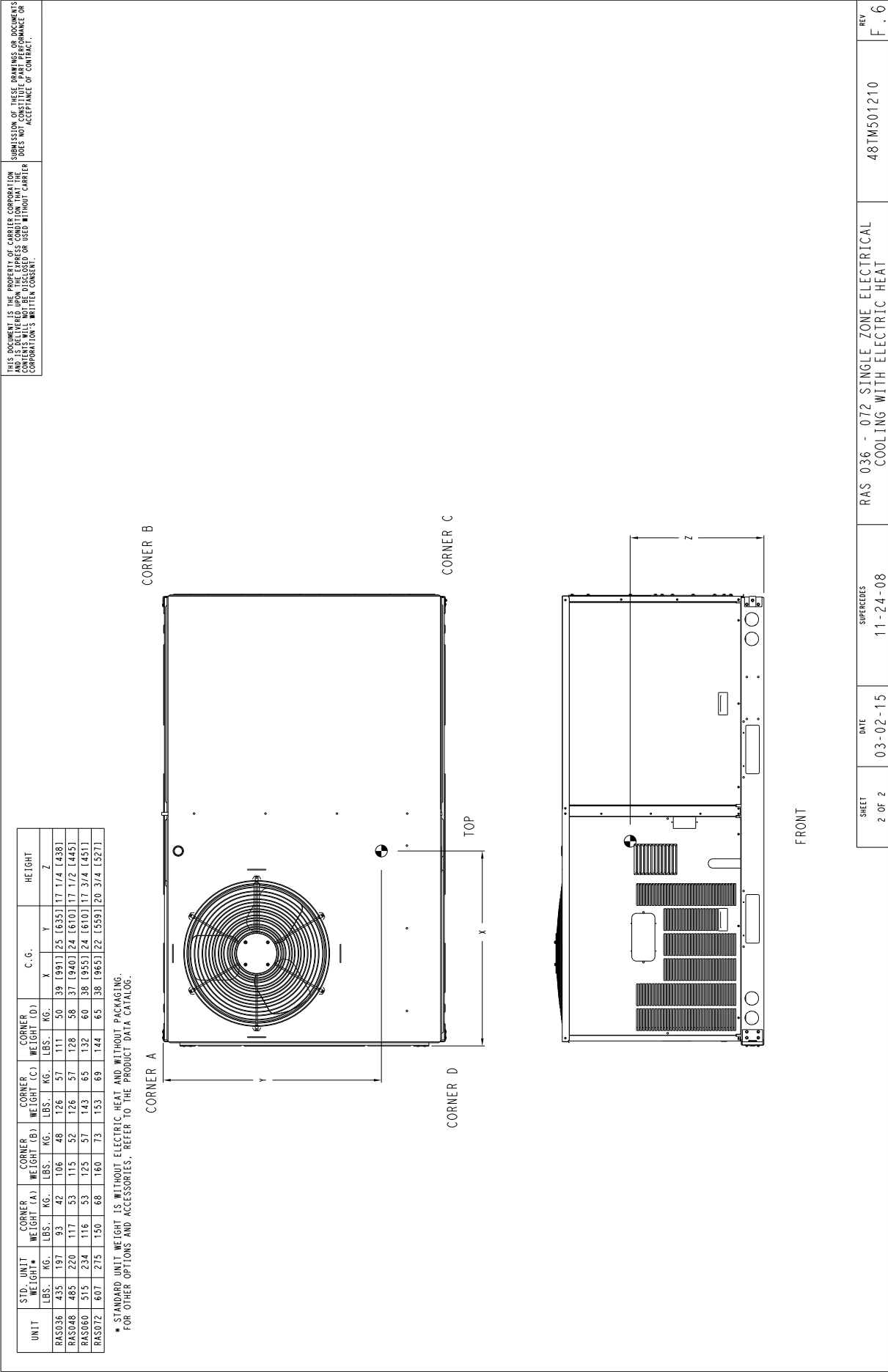
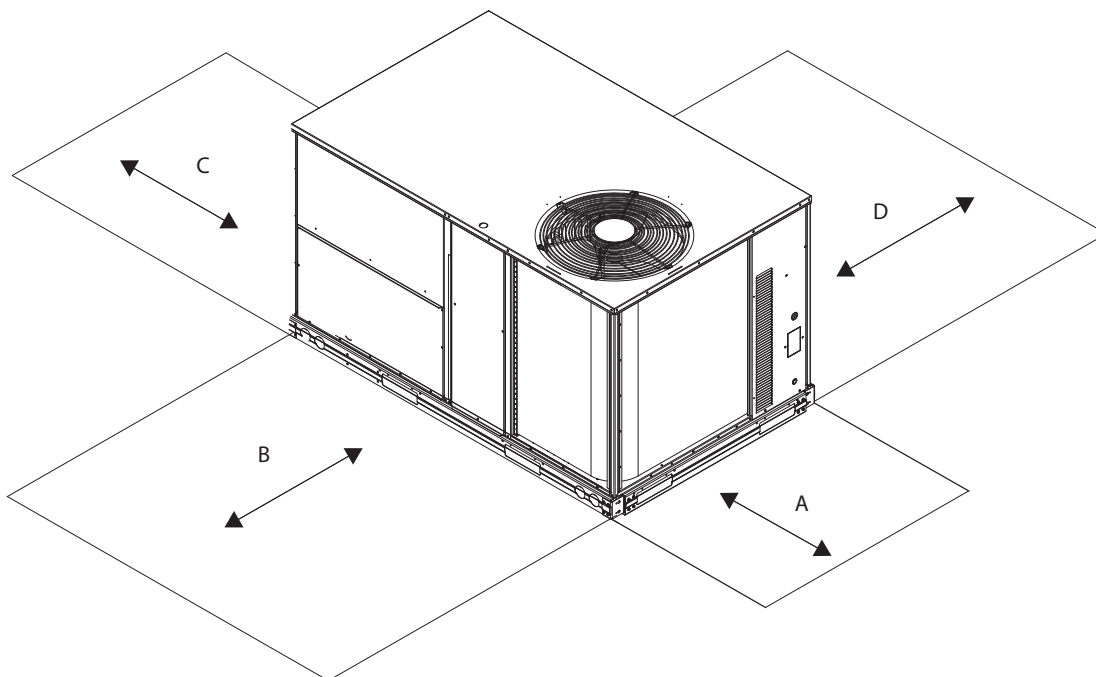


Fig. 1 - Unit Dimensional Drawing (cont.)

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LOCATION	DIMENSION	CONDITION
A	48-in (1219 mm) 18-in (457 mm) 18-in (457 mm) 12-in (305 mm)	Unit disconnect is mounted on panel No disconnect, convenience outlet option Recommended service clearance Minimum clearance
B	42-in (1067 mm) 36-in (914 mm) Special	Surface behind servicer is grounded (e.g., metal, masonry wall) Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass) Check sources of flue products within 10-ft of unit fresh air intake hood
C	36-in (914 mm) 18-in (457 mm)	Side condensate drain is used Minimum clearance
D	42-in (1067 mm) 36-in (914 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit) Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or for vertical clearances.

Fig. 2 - Service Clearance Dimensional Drawing

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 minimum clearances required for safety (including clearance to combustible surfaces), unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 1.

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 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	UNITS LB (KG)			
	036	048	060	072
Base Unit	438 (199)	494 (224)	524 (238)	607 (275)
Economizer				
Vertical	50 (23)	50 (23)	50 (23)	50 (23)
Horizontal	80 (36)	80 (36)	80 (36)	80 (36)
Hot Gas Re-Heat System	N/A	N/A	N/A	41 (15)
Cu Fins	25 (11)	43 (20)	56 (25)	73 (33)
Unpowered Outlet	32 (15)	32 (15)	32 (15)	32 (15)
Curb				
14-in/356 mm	110 (50)	110 (50)	110 (50)	110 (50)
24-in/610 mm	145 (66)	145 (66)	145 (66)	145 (66)

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 accessory thru-base service connection package (affects curb and unit) (refer to accessory installation instructions for details)
- Prepare bottom condensate drain connection to suit planned condensate line routing (refer to Step 9 for details)
- Rig and place unit
- Install outdoor air hood
- Install condensate line trap and piping
- Make electrical connections
- Install other accessories

Pad-mounted Installation —

- Prepare pad and unit supports
- Check and tighten the bottom condensate drain connection plug
- Rig and place unit
- Convert unit to side duct connection arrangement
- Install field-fabricated ductwork at unit duct openings
- Install outdoor 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 Fig. 3. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 4. 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. The accessory thru-the-base power and gas connection package must be installed before the unit is set on the roof curb.*

If electric and control wiring is to be routed through the basepan, attach the accessory thru-the-base service connections to the basepan in accordance with the accessory installation instructions.

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 Fig. 3. Improperly applied gasket can also result in air leaks and poor unit performance.

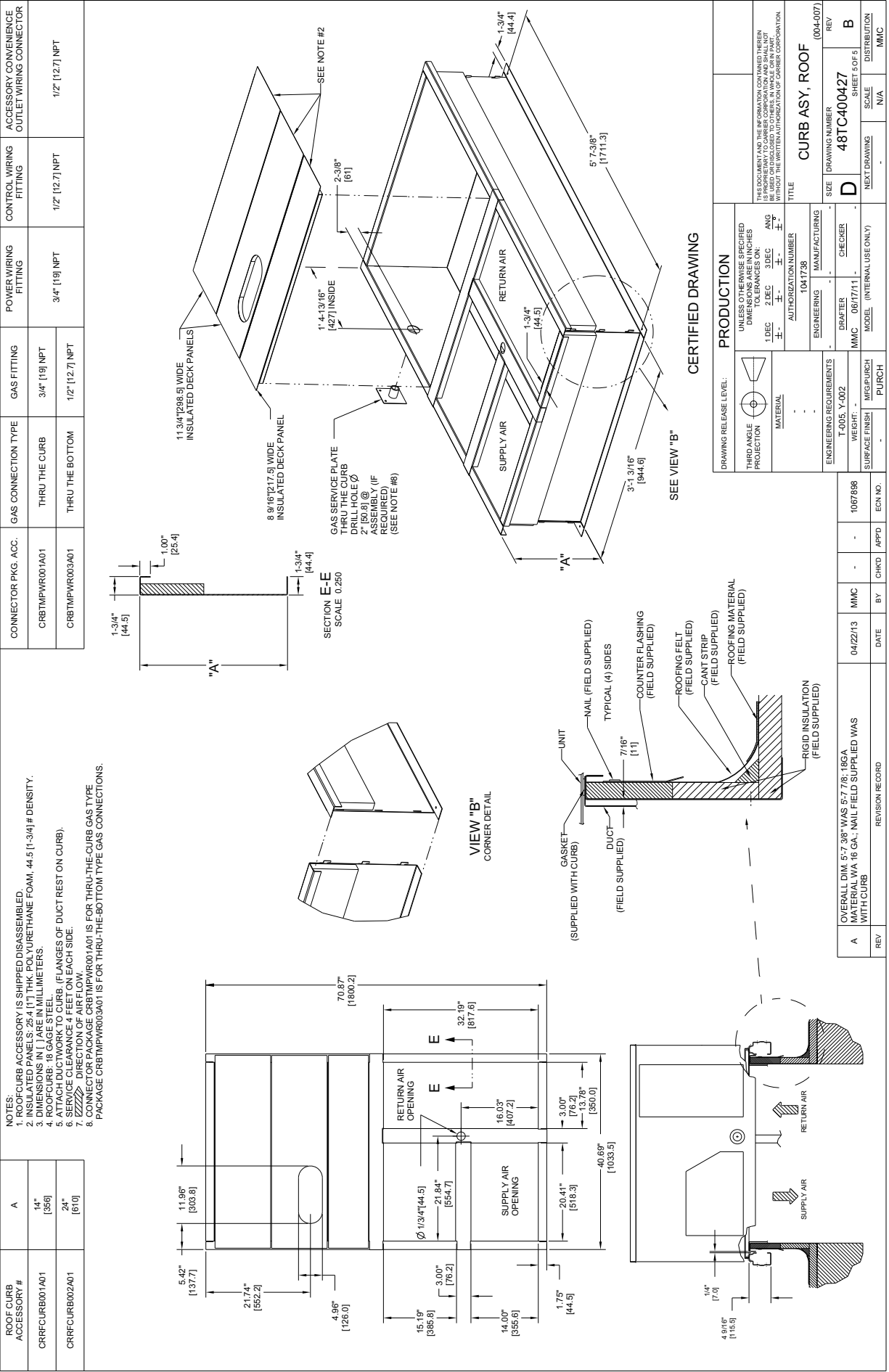
Slab Mount (Horizontal Units Only) —

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 3 equally spaced 4-in. x 4-in. (102 mm x 102 mm) pads on each side.



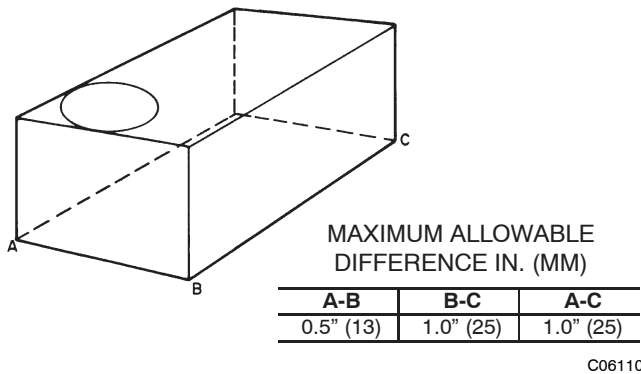


Fig. 4 - Unit Leveling Tolerances

Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.35 in. wg (87 Pa) with economizer or 0.45 in. wg (112 Pa) without economizer.

For vertical ducted applications, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.*

Fabricate supply ductwork so that the cross sectional dimensions are equal to or greater than the unit supply duct opening dimensions for the first 18 in. (458 mm) of duct length from the unit basepan.

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.

⚠ CAUTION

PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in damage to roofing materials.

Membrane roofs can be cut by sharp sheet metal edges. Be careful when placing any sheet metal parts on such roof.

For Units with Accessory Electric Heaters —

All installations require a minimum clearance to combustible surfaces of 1-in (25 mm) from duct for first 12-in (305 mm) away from unit.

Outlet grilles must not lie directly below unit discharge.

NOTE: A 90-degree elbow must be provided in the ductwork to comply with UL (Underwriters Laboratories) code for use with electric heat.

⚠ 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 and Fig. 5 for additional information.

Lifting holes are provided in base rails as shown in Fig. 5. Refer to rigging instructions on unit.

→ Rigging materials under unit (cardboard or wood to prevent base pan damage) must be removed PRIOR to placing the unit on the roof curb.

When using the standard side drain connection, ensure the red plug in the alternate bottom connection is tight. Do this before setting the unit in place. The red drain pan plug can be tightened with a 1/2-in. square socket drive extension. For further details see “Step 9 - Install External Condensate Trap and Line on page 12.

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

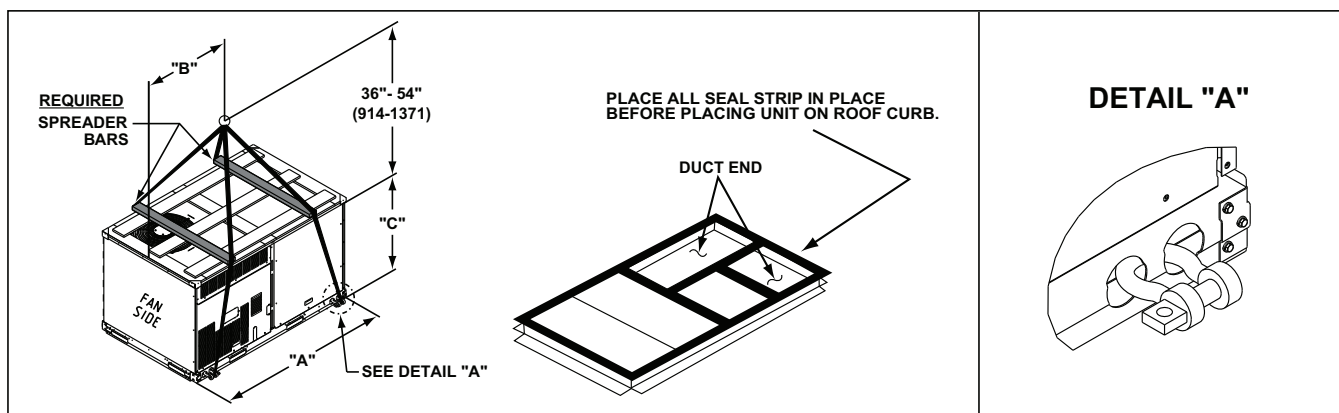
⚠ CAUTION

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.

If using top crate as spreader bar, once unit is set, carefully lower wooden crate off building roof top to ground. Ensure that no people or obstructions are below prior to lowering the crate.



C11292

UNIT	MAX WEIGHT		DIMENSION					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
RAS036	740	336	74.5	1890	38	965	33.5	850
RAS048	795	361	74.5	1890	38	965	33.5	850
RAS060	865	393	74.5	1890	38	965	33.5	850
RAS072	1040	473	74.5	1890	38	965	41.5	1055

NOTES:

1. SPREADER BARS REQUIRED — Top damage will occur if spreader bars are not used.
2. Dimensions in () are in millimeters.
3. Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top to prevent rigging straps from damaging unit.

Fig. 5 - Rigging Details

Positioning on Curb —

Position unit on roof curb so that the following clearances are maintained: 1/4 in. (6.4 mm) clearance between the roof curb and the base rail inside the front and rear, 0.0 in. clearance between the roof curb and the base rail inside on the duct end of the unit. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately 1/4 in. (6.4 mm).

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

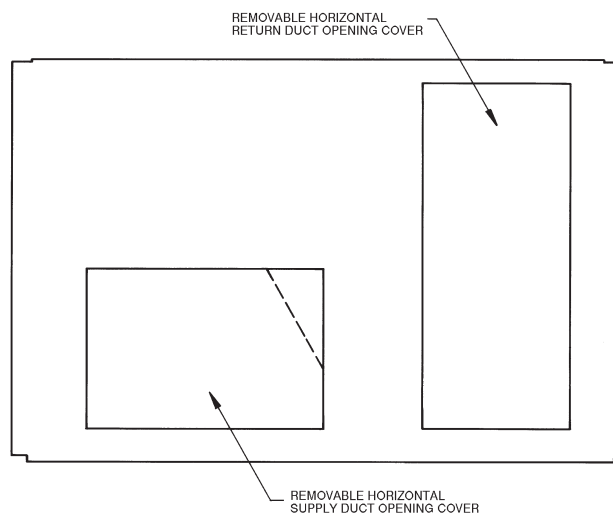
⚠ CAUTION

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.

remove screws from side duct opening covers and remove covers. Using the same screws, install covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight. See Fig. 6.



C06108

Fig. 6 - Horizontal Conversion Panels

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

Step 7 — Convert to Horizontal and Connect Ductwork (when required)

Unit is shipped in the vertical duct configuration. Unit without factory-installed economizer or return air smoke detector option may be field-converted to horizontal ducted configuration. To convert to horizontal configuration,

Field-supplied flanges should be attached to horizontal duct openings 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.

Do not cover or obscure visibility to the unit's informative data plate when insulating horizontal ductwork.

Step 8 — Install Outside Air Hood

Economizer and Two Position Damper Hood Package Removal and Setup - Factory Option

NOTE: Economizer and two position damper are not available as factory installed options for single phase (-K voltage code) models.

1. The hood is shipped in knock-down form and must be field assembled. The indoor coil access panel is used as the hood top while the hood sides, divider and filter are packaged together, attached to a metal support tray using plastic stretch wrap, and shipped in the return air compartment behind the indoor coil access panel. The hood assembly's metal tray is attached to the basepan and also attached to the damper using two plastic tie-wraps.
2. To gain access to the hood, remove the filter access panel. (See Fig. 7.)

FILTER ACCESS PANEL

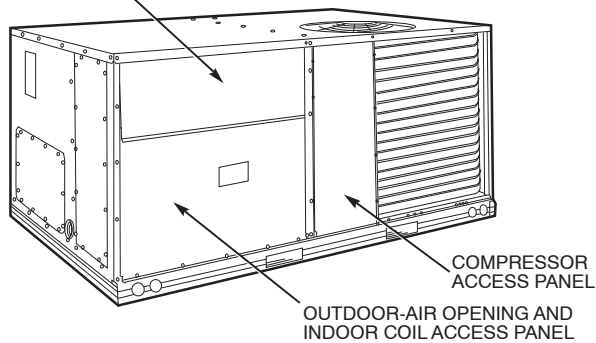
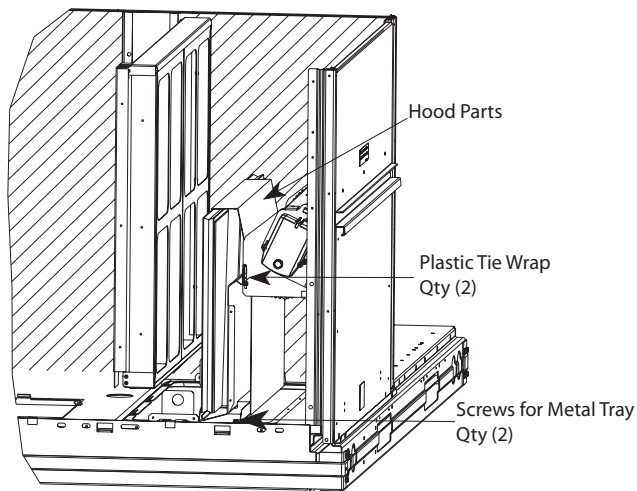


Fig. 7 - Typical Access Panel Locations

C06023

3. Locate the (2) screws holding the metal tray to the basepan and remove. Locate and cut the (2) plastic tie-wraps securing the assembly to the damper. (See Fig. 8) Be careful to not damage any wiring or cut tie-wraps securing any wiring.



**Fig. 8 - Economizer and Two-Position Damper
Hood Parts Location**

C08639

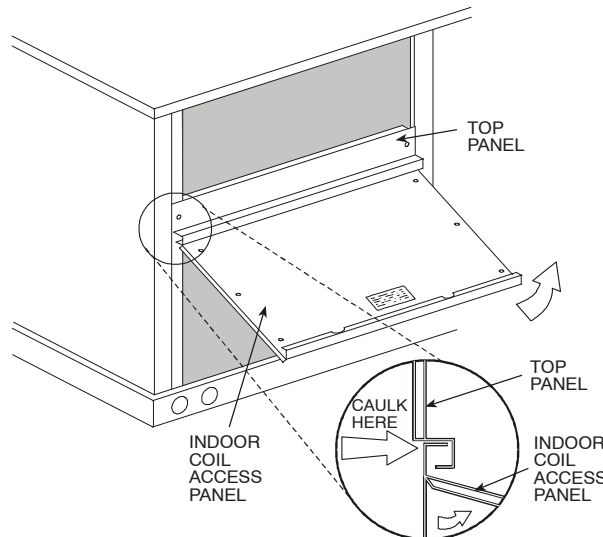
4. Carefully lift the hood assembly (with metal tray) through the filter access opening and assemble per the

steps outlined in *Economizer Hood and Two-Position Hood*, below.

Economizer Hood and Two-Position Hood —

NOTE: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be discarded. Save the aluminum filter for use in the power exhaust hood assembly.

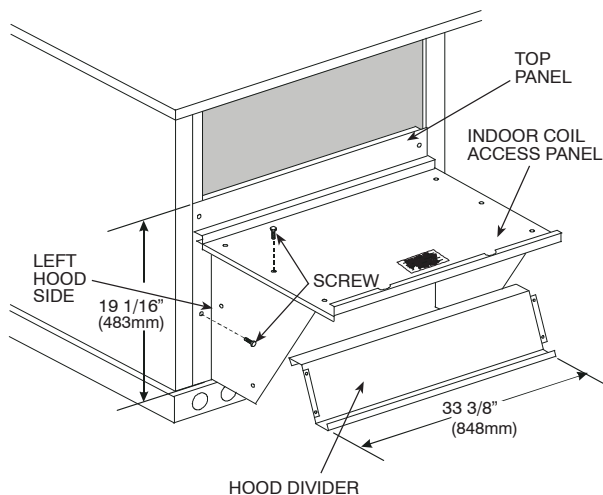
1. The indoor coil access panel will be used as the top of the hood. Remove the screws along the sides and bottom of the indoor coil access panel. See Fig. 9.



C06025

Fig. 9 - Indoor Coil Access Panel Relocation

2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 10.



C06026

Fig. 10 - Economizer Hood Construction

3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. Insert the hood divider between the hood sides. See Fig. 10 and 11. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.

5. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 11.
6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.

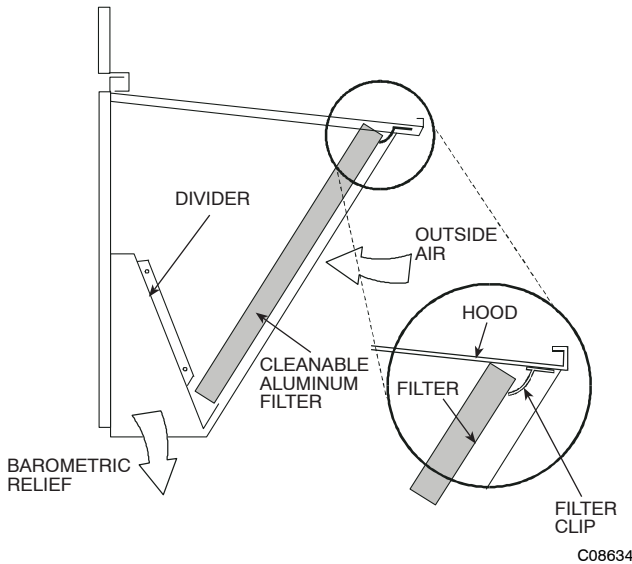


Fig. 11 - Economizer Filter Installation

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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 and an alternate connection on the bottom. See Fig. 12. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

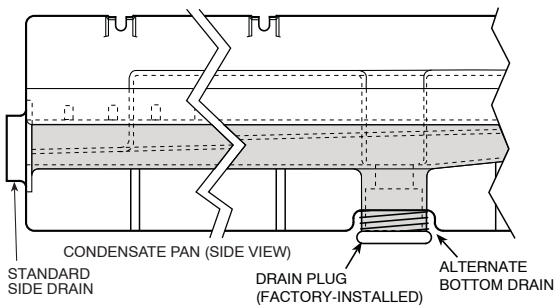


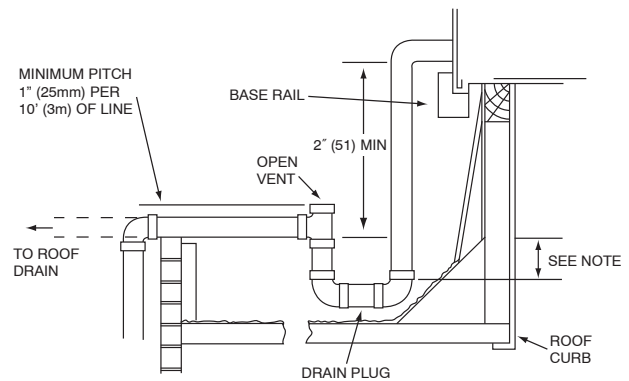
Fig. 12 - Condensate Drain Pan (Side View)

C08021

To use the alternate bottom drain connection, remove the red drain plug from the bottom connection (use a $\frac{1}{2}$ -in. square socket drive extension) and install it in the side drain connection.

The piping for the condensate drain and external trap can be completed after the unit is in place. See Fig. 13.

NOTE: If the alternate bottom drain is not used check the drain plug for tightness prior to setting the unit on the roof curb.



NOTE: Trap should be deep enough to offset maximum unit static difference. A 4" (102) trap is recommended

C08022

Fig. 13 - Condensate Drain Piping Details

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.

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; ANSI/NFPA 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.

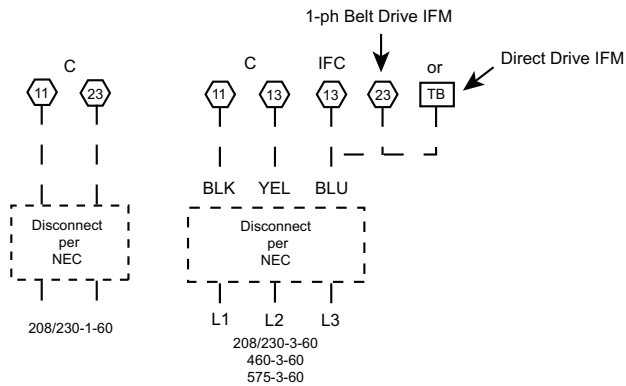
NOTE: Field-supplied wiring shall conform with the limitations of minimum 63°F (33°C) rise.

Field Power Supply —

Field power wires are connected to the unit at line-side pressure lugs on compressor contactor C and indoor fan contactor IFC (see wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch. Max wire size is #2 AWG (copper only). (See Fig. 14.)

NOTE: TEST LEADS - Unit may be equipped with short leads (pigtails) on the field line connection points on contactor C or optional disconnect switch. These leads are for factory run-test purposes only; remove and discard before connecting field power wires to unit connection points. Make field power connections directly to line connection pressure lugs only.

Units Without Disconnect Option



Units With Disconnect Option

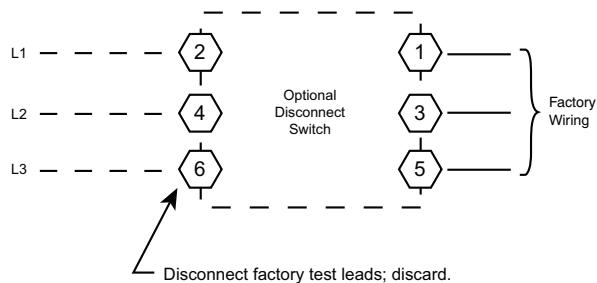


Fig. 14 - Power Wiring Connections

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⚠ 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 RAS unit. Use only copper wire. (See Fig. 15.)

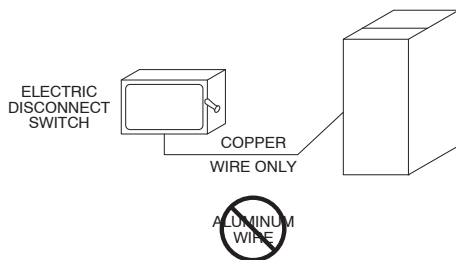


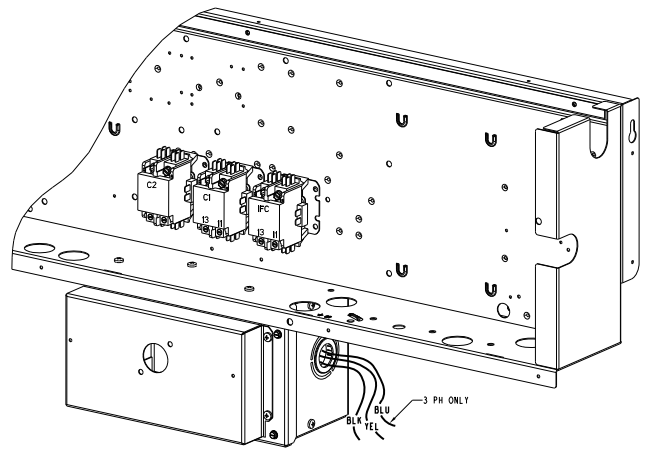
Fig. 15 - Disconnect Switch and Unit

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Units With Factory-Installed Non-Fused Disconnect —

The factory-installed option non-fused disconnect (NFD) switch is located in a weatherproof enclosure located under the main control box. The manual switch handle and shaft are shipped in the disconnect enclosure. Assemble the shaft and handle to the switch at this point. Discard the factory test leads (see Fig. 14).

Connect field power supply conductors to LINE side terminals when the switch enclosure cover is removed to attach the handle.

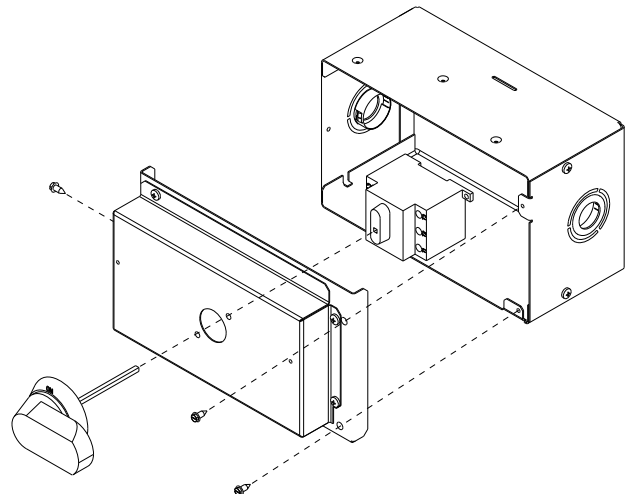


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Fig. 16 - Location of Non-Fused Disconnect Enclosure

To field install the NFD shaft and handle:

1. Remove the unit front pane (see Fig. 1).
2. Remove (3) hex screws on the NFD enclosure - (2) on the face of the cover and (1) on the left side cover.
3. Remove the front cover of the NFD enclosure.
4. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob is at OFF).
5. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
6. Measure from the tip of the shaft to the top surface of the black pointer; the measurement should be 3.75 - 3.88 in. (95 - 99 mm).
7. Tighten the locking screw to secure the shaft to the NFD.
8. Turn the handle to the OFF position with red arrow pointing at OFF.
9. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
10. Secure the handle to the painted cover with (2) screws and lock washers supplied.
11. Engaging the shaft into the handle socket, re-install (3) hex screws on the NFD enclosure.
12. Re-install the unit front panel.



C12279

Fig. 17 - Handle and Shaft Assembly for NFD

Units Without Factory-Installed Non-Fused 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.

All Units —

All field wiring must comply with NEC and all local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 14 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Maximum wire size is #2 ga 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.

All field wiring must comply with the NEC and local requirements.

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 200-v 1/4-in. male terminal on the primary side of the transformer.* Refer to unit label diagram for additional information. Field power wires will be connected line-side pressure lugs on the power terminal block or at factory-installed option non-fused disconnect.

NOTE: Check all factory and field electrical connections for tightness.

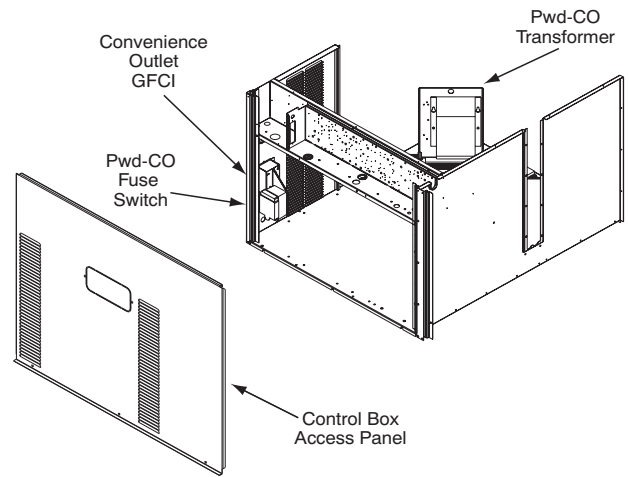
Convenience Outlets —

⚠ 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. Lock-out and tag-out this switch, if necessary.



C08128

Fig. 18 - Convenience Outlet Location

Non-powered Convenience Outlet: These outlets require 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.

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 its depth; it must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

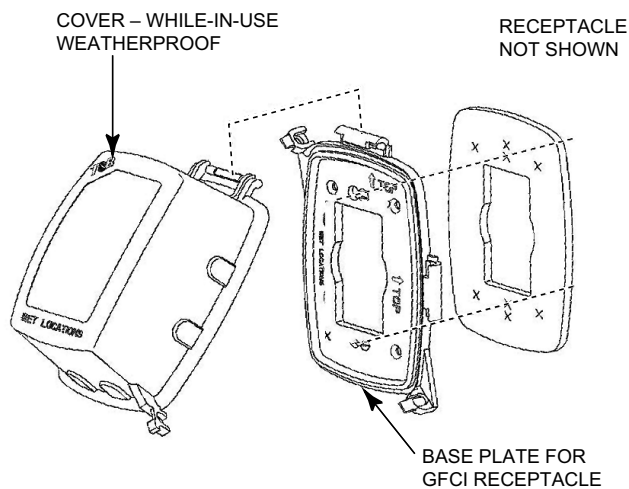
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET. LOCK-OUT AND TAG-OUT ALL POWER.

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

Loosen the two screws at the GFCI duplex outlet, until approximately 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. 19. 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.



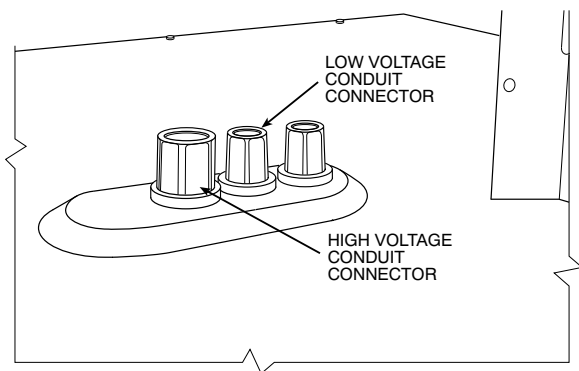
C09022

Fig. 19 - Weatherproof Cover Installation

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.

Factory-Option Thru-Base Connections —

This service connection kit consists of a $\frac{1}{2}$ -in electrical bulkhead connector and a $\frac{3}{4}$ -in electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section. The $\frac{3}{4}$ -in bulkhead connector enables the low-voltage control wires to pass through the basepan. The $\frac{1}{2}$ -in electrical bulkhead connector allows the high-voltage power wires to pass through the basepan. See Fig. 20.



C13412

Fig. 20 - Thru-Base Connection Fittings

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquid tight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage and low voltage through appropriate conduits. Connect the power conduit to the internal disconnect (if unit is so equipped) or to the external disconnect (through unit side panel). A hole must be field cut in the main control box bottom on the left side so the 24-v control connections can be made. Connect the control power conduit to the unit control box at this hole.

Units without Thru-Base Connections —

1. Install power wiring conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 14.

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

Field Control Wiring —

The RAS unit requires an external temperature control device. This device can be a thermostat emulation device provided as part of a third-party Building Management System.

Thermostat —

Install a 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 (95°F) minimum]. For 50 to 75 ft. (15 to 23 m), use no. 16 AWG insulated wire [35°C (95°F) minimum]. For over 75 ft. (23 m), use no. 14 AWG insulated wire [35°C (95°F) 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.

Unit without Thru-Base Connection Kit —

Pass the thermostat control wires through the hole provided in the corner post; then feed the wires through the raceway built into the corner post to the control box. Pull the wires over to the terminal strip on the upper-left corner of the Controls Connection Board. See Fig. 22.

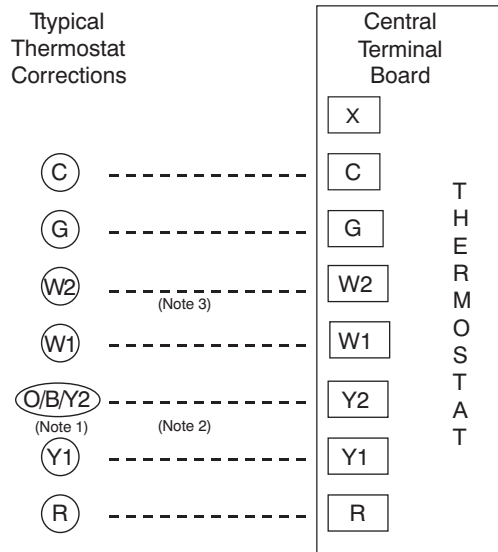


Fig. 21 - Low-Voltage Connections

C08575

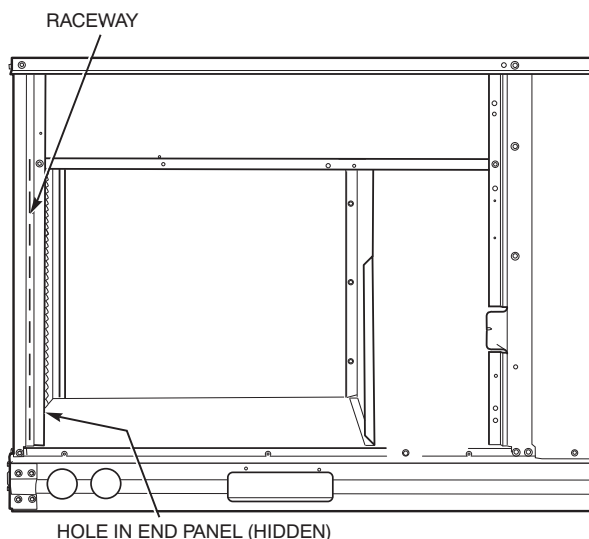


Fig. 22 - Field Control Wiring Raceway

C08027

NOTE: If thru-the-bottom connections accessory is used, refer to the accessory installation instructions for information on routing power and control wiring.

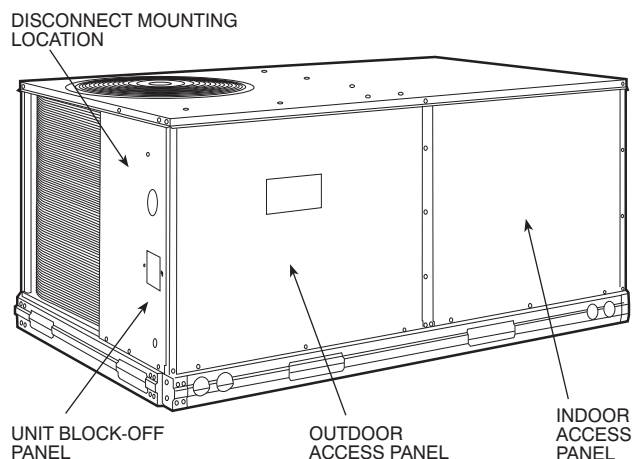
Heat Anticipator Settings —

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

Electric Heaters

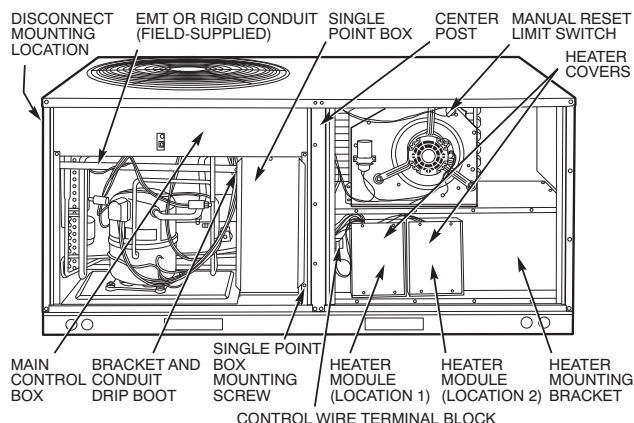
RAS units may be equipped with field-installed accessory electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor. One or two heater modules may be used in a unit.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor 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.



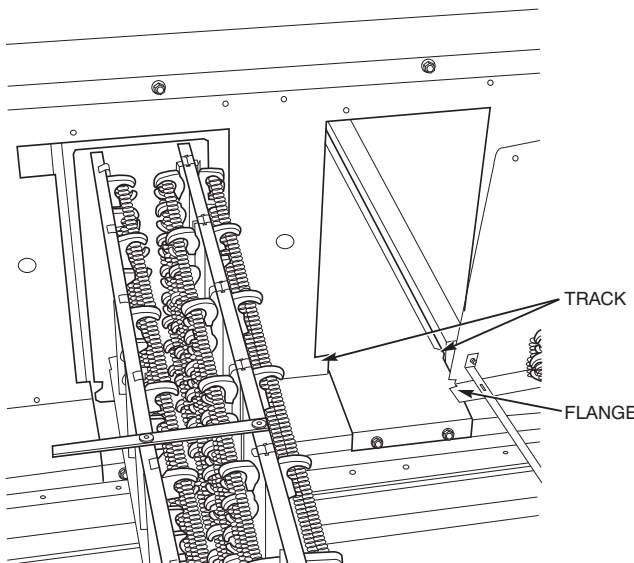
C08133

Fig. 23 - Typical Access Panel Location (3-6 Ton)



C08134

Fig. 24 - Typical Component Location



C08135

Fig. 25 - Typical Module Installation

Table 2 – Heater Model Number

Bare Heater Model Number	C	R	H	E	A	T	E	R	0	0	1	A	0	0
Heater Sales Package PNO Includes: Bare Heater Carton and packing materials Installation sheet	C	R	H	E	A	T	E	R	1	0	1	A	0	0

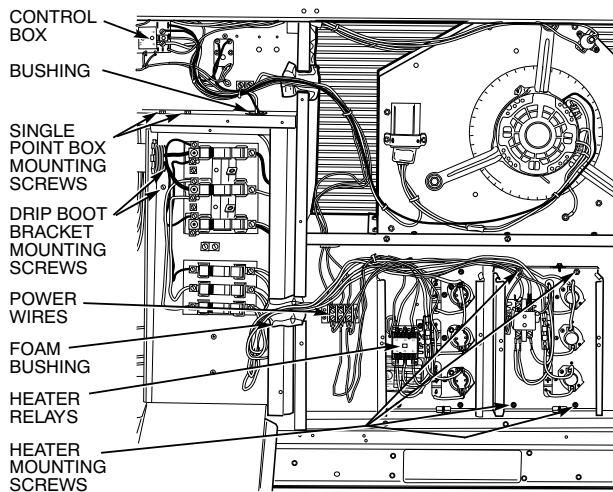
Not all available heater modules may be used in every unit. Use only those heater modules that are UL listed for use in a specific size unit. Refer to the label on the unit cabinet for the list of approved heaters.

Unit heaters are marked with Heater Model Numbers. But heaters are ordered as and shipped in cartons marked with a corresponding heater Sales Package part number. See Table 2 for correlation between heater Model Number and Sales Package part number.

NOTE: The value in position 9 of the part number differs between the sales package part number (value is 1) and a bare heater model number (value is 0).

Single Point Boxes and Supplementary Fuses —

When the unit MOCB device value exceeds 60-A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory Single Point Boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The Single Point Box has a hinged access cover. See Fig. 26. The Single Point Box also includes a set of power taps and pigtails to complete the wiring between the Single Point Box and the unit's main control box terminals. Refer to the accessory heater and Single Point Box installation instructions for details on tap connections.



C14253

Fig. 26 - Typical Single Point Installation

All fuses on RAS units are 60-A. (Note that all heaters are qualified for use with a 60-A fuse, regardless of actual heater ampacity, so only 60-A fuses are necessary.)

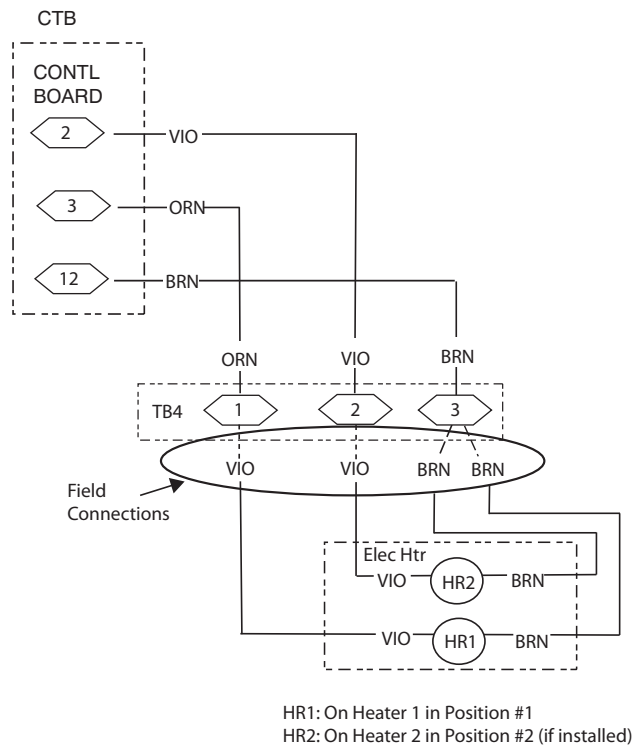
Single Point Boxes without Fuses —

Unit heater applications not requiring supplemental fuses require a special Single Point Box without any fuses. The

accessory Single Point Boxes contain a set of power taps and pigtails to complete the wiring between the Single Point Box and the unit's main control box terminals. Refer to accessory heater and Single Point Box installation instructions for details on tap connections.

Low-Voltage Control Connections —

Pull the low-voltage control leads from the heater module(s) - VIO and BRN (two of each if two modules are installed; identify for Module #1) - to the 4-pole terminal board TB4 located on the heater bulkhead to the left of Heater #1. Connect the VIO lead from Heater #1 to terminal TB4-1. For 2 stage heating, connect the VIO lead from Heater #2 to terminal TB4-2. For 1 stage heating with 2 heater modules connect the VIO lead from both Heater #1 and #2 to terminal TB4-1. Connect both BRN leads to terminal TB4-3. See Fig. 27.



C08331

Fig. 27 - Accessory Electric Heater Control Connections

EconoMi\$er X (Factory-Installed Option) —

For details on operating RGS units equipped with the factory-installed EconoMi\$er X option, refer to *Factory-Installed Economizers for RGH/RAH/RHH/RGS/RAS/RHS Rooftop Units, 3 to 27.5 Nominal Tons. Economizer Supplement Related to California Title 24* (Literature number: 50901170301SS, or later).

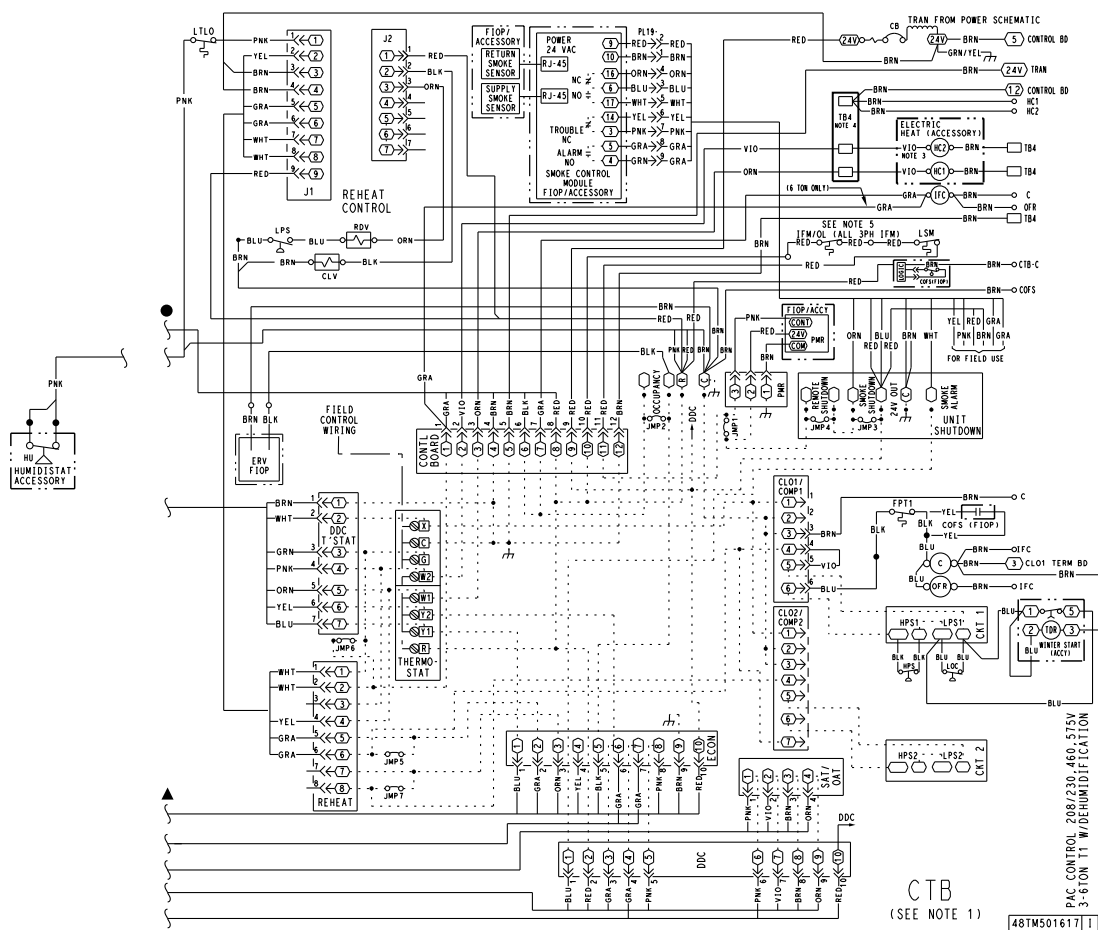
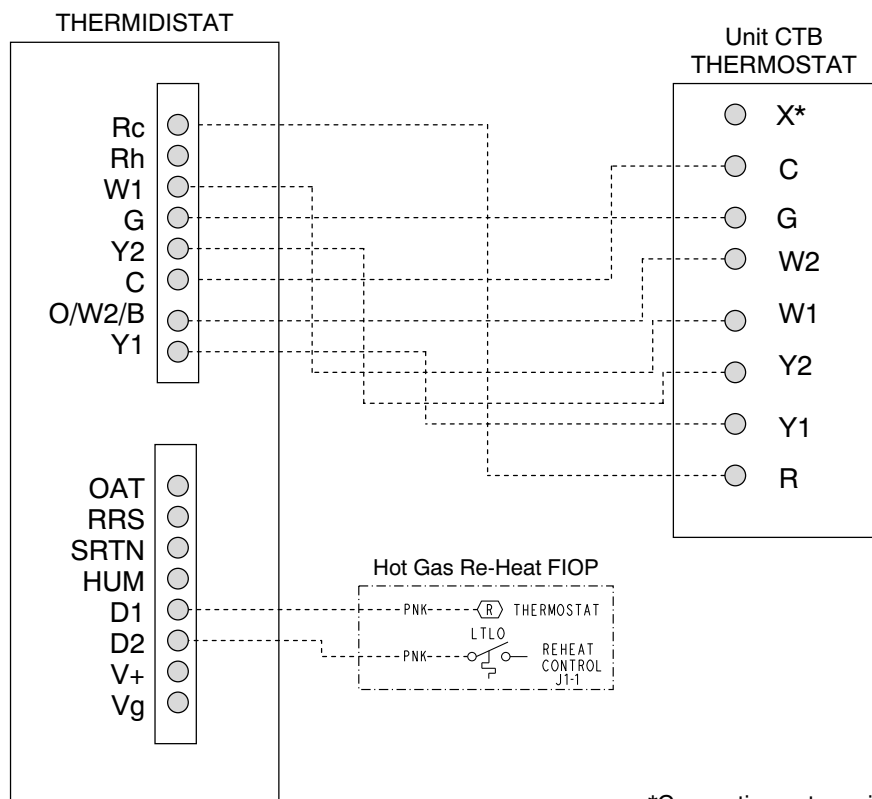


Fig. 30 - Humidistat Wiring - RAS072 with Hot Gas Re-Heat Dehumidification System

C150155



*Connection not required.

Fig. 31 - Thermostat Device Connections for RAS072 with Hot Gas Re-Heat Dehumidification System

C092981

Smoke Detectors

Smoke detectors are available as factory-installed options on RAS models. Smoke detectors may be specified for Supply Air only without or with economizer. All components necessary for operation are factory-provided and mounted. 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.

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. 32 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
- Thru-base connection kit (must be installed before unit is set on curb)
- Manual outside air damper
- Two-Position motorized outside air damper
- EconoMi\$er IV (with control and integrated barometric relief)
- EconoMi\$er2 (without control/for external signal and integrated barometric relief)
- Power Exhaust
- Differential dry-bulb sensor (EconoMi\$er IV)
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Electric Heaters
- Single Point kits
- Thermostat / Sensors
- CO₂ sensor
- Louvered hail guard
- Phase monitor control

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 Manual for detailed Pre-Start and Start-up instructions.

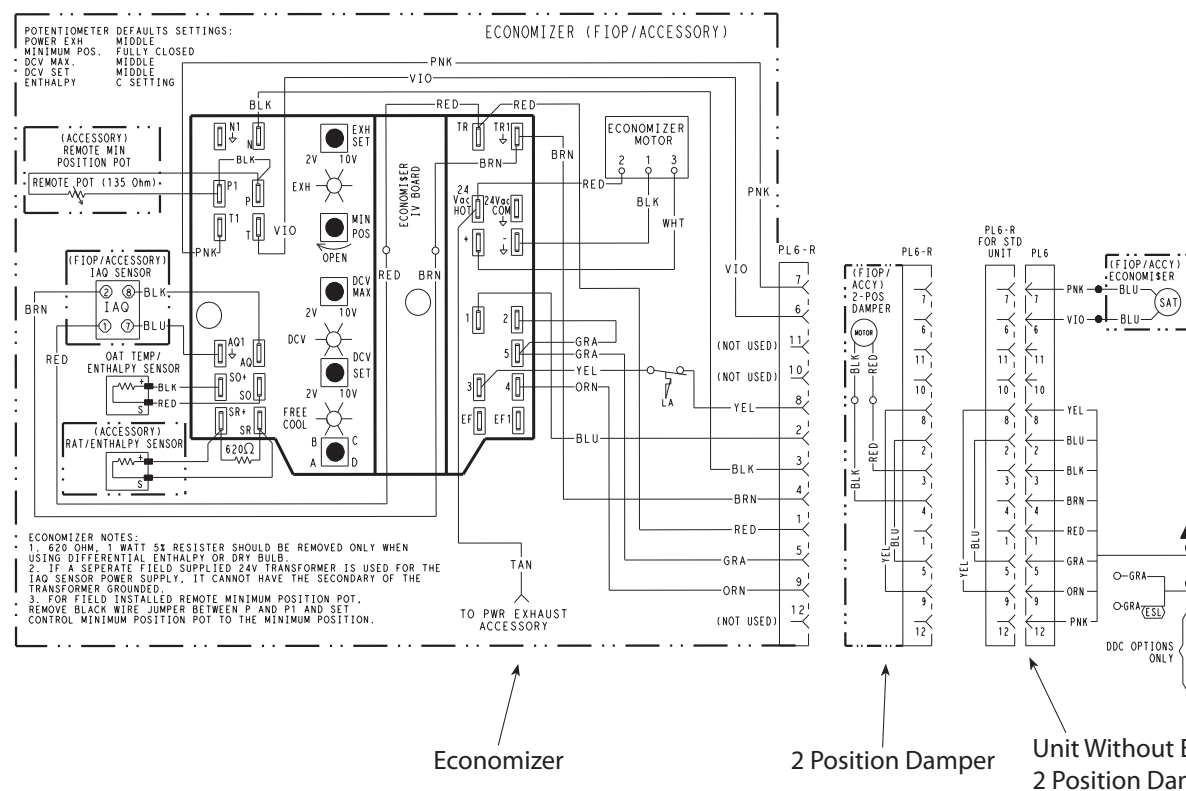


Fig. 32 - EconoMi\$er™ IV Wiring

C08631

Table 3 – Unit Wire/Fuse or HACR Breaker Sizing Data

UNIT	NO M. V-Ph-HZ	IFM TYPE	ELEC. HTR		ELEC. HTR	NO C.O. or UNPWR C.O.							
			CRHEATER***A00	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwr d fr/unit)			
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
								FLA	LRA			FLA	LRA
RAS036	208/230-1-60	STD	NONE	-	-	28	40	26	95	30	45	29	97
			101A	3.3/4.4	15.9/18.3	28/29	40/40	26/27	95/95	30/32	45/45	29/29	97/97
			102A	4.9/6.5	23.5/27.1	36/40	40/45	33/37	95/95	38/43	45/45	35/39	97/97
			103B	6.5/8.7	31.4/36.3	46/52	50/60	42/47	95/95	48/54	50/60	44/50	97/97
			104B	7.9/10.5	37.9/43.8	54/61	60/70	49/56	95/95	56/64	60/70	51/58	97/97
			102A+102A	9.8/13.0	46.9/54.2	65/74	70/80	60/68	95/95	68/77	70/80	62/70	97/97
		MED	NONE	-	-	28	40	26	95	30	45	29	97
			101A	3.3/4.4	15.9/18.3	28/29	40/40	26/27	95/95	30/32	45/45	29/29	97/97
			102A	4.9/6.5	23.5/27.1	36/40	40/45	33/37	95/95	38/43	45/45	35/39	97/97
			103B	6.5/8.7	31.4/36.3	46/52	50/60	42/47	95/95	48/54	50/60	44/50	97/97
			104B	7.9/10.5	37.9/43.8	54/61	60/70	49/56	95/95	56/64	60/70	51/58	97/97
			102A+102A	9.8/13.0	46.9/54.2	65/74	70/80	60/68	95/95	68/77	70/80	62/70	97/97
	208/230-3-60	DD-STD	NONE	-	-	21	30	21	83	23	30	23	85
			101A	3.3/4.4	9.2/10.6	21/21	30/30	21/21	83/83	23/24	30/30	23/23	85/85
			102A	4.9/6.5	13.6/15.6	25/27	30/30	23/25	83/83	27/30	30/30	25/27	85/85
			103B	6.5/8.7	18.1/20.9	31/34	35/35	28/31	83/83	33/36	35/40	30/33	85/85
			104B	7.9/10.5	21.9/25.3	35/40	35/40	32/36	83/83	38/42	40/45	34/38	85/85
			105A	12.0/16.0	33.4/38.5	50/56	50/60	45/51	83/83	52/58	60/60	47/53	85/85
		STD	NONE	-	-	20	30	20	96	22	30	22	98
			101A	3.3/4.4	9.2/10.6	20/20	30/30	20/20	96/96	22/23	30/30	22/22	98/98
			102A	4.9/6.5	13.6/15.6	24/26	30/30	22/24	96/96	26/29	30/30	24/26	98/98
			103B	6.5/8.7	18.1/20.9	30/33	30/35	27/30	96/96	32/35	35/40	29/32	98/98
			104B	7.9/10.5	21.9/25.3	34/39	35/40	31/35	96/96	37/41	40/45	33/37	98/98
			105A	12.0/16.0	33.4/38.5	49/55	50/60	44/50	96/96	51/57	60/60	47/52	98/98
		MED	NONE	-	-	20	30	20	96	22	30	22	98
			101A	3.3/4.4	9.2/10.6	20/20	30/30	20/20	96/96	22/23	30/30	22/22	98/98
			102A	4.9/6.5	13.6/15.6	24/26	30/30	22/24	96/96	26/29	30/30	24/26	98/98
			103B	6.5/8.7	18.1/20.9	30/33	30/35	27/30	96/96	32/35	35/40	29/32	98/98
			104B	7.9/10.5	21.9/25.3	34/39	35/40	31/35	96/96	37/41	40/45	33/37	98/98
			105A	12.0/16.0	33.4/38.5	49/55	50/60	44/50	96/96	51/57	60/60	47/52	98/98
		HIGH	NONE	-	-	22/22	30/30	22/21	134	24/24	30/30	24/24	136
			101A	3.3/4.4	9.2/10.6	22/22	30/30	22/21	134/134	24/24	30/30	24/24	136/136
			102A	4.9/6.5	13.6/15.6	26/28	30/30	24/26	134/134	28/31	30/35	26/28	136/136
			103B	6.5/8.7	18.1/20.9	32/35	35/35	29/32	134/134	34/37	35/40	31/34	136/136
			104B	7.9/10.5	21.9/25.3	36/40	40/40	33/37	134/134	39/43	40/45	35/39	136/136
			105A	12.0/16.0	33.4/38.5	51/57	60/60	46/52	134/134	53/59	60/60	49/54	136/136
	460-3-60	STD	NONE	-	-	11	15	11	49	12	15	12	50
			106A	6.0	7.2	13	15	11	49	14	15	12	50
			107A	8.8	10.6	17	20	15	49	18	20	16	50
			108A	11.5	13.8	21	25	19	49	22	25	20	50
			109A	14.0	16.8	25	25	22	49	26	30	23	50
		MED	NONE	-	-	11	15	11	49	12	15	12	50
			106A	6.0	7.2	13	15	11	49	14	15	12	50
			107A	8.8	10.6	17	20	15	49	18	20	16	50
			108A	11.5	13.8	21	25	19	49	22	25	20	50
			109A	14.0	16.8	25	25	22	49	26	30	23	50
		HIGH	NONE	-	-	12	15	12	68	13	15	13	69
			106A	6.0	7.2	14	15	12	68	15	15	13	69
			107A	8.8	10.6	18	20	16	68	19	20	17	69
			108A	11.5	13.8	22	25	20	68	23	25	21	69
			109A	14.0	16.8	26	30	23	68	27	30	24	69
575-3-60		STD	NONE	-	-	8	15	8	46	10	15	10	48
		MED	NONE	-	-	8	15	8	46	10	15	10	48
		HIGH	NONE	-	-	8	15	7	50	10	15	10	52

See "Legend and Notes for Table 3 on page 26.

Table 3 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

UNIT	NO M. V - Ph - HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
			CRHEATER***A00	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwrd fr/unit)			
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
								FLA	LRA			FLA	LRA
RAS048	208/230-1-60	STD	NONE	—	—	34	50	32	133	36	50	35	135
			101A	3.3/4.4	15.9/18.3	34/34	50/50	32/32	133/133	36/36	50/50	35/35	135/135
			103B	6.5/8.7	31.4/36.3	46/52	50/60	42/47	133/133	48/54	50/60	44/50	135/135
			102A+102A	9.8/13.0	46.9/54.2	65/74	70/80	60/68	133/133	68/77	70/80	62/70	135/135
			103B+103B	13.1/17.4	62.8/72.5	85/97	90/100	78/89	133/133	87/100	90/100	80/91	135/135
			104B+104B	15.8/21.0	75.8/87.5	101/116	110/125	93/106	133/133	104/118	110/125	95/108	135/135
		MED	NONE	—	—	34	50	32	133	36	50	35	135
			101A	3.3/4.4	15.9/18.3	34/34	50/50	32/32	133/133	36/36	50/50	35/35	135/135
			103B	6.5/8.7	31.4/36.3	46/52	50/60	42/47	133/133	48/54	50/60	44/50	135/135
			102A+102A	9.8/13.0	46.9/54.2	65/74	70/80	60/68	133/133	68/77	70/80	62/70	135/135
			103B+103B	13.1/17.4	62.8/72.5	85/97	90/100	78/89	133/133	87/100	90/100	80/91	135/135
	208/230-3-60	DD-STD	NONE	—	—	25	30	24	93	27	30	27	95
			102A	4.9/6.5	13.6/15.6	25/27	30/30	24/25	93/93	27/30	30/30	27/27	95/95
			103B	6.5/8.7	18.1/20.9	31/34	35/35	28/31	93/93	33/36	40/40	30/33	95/95
			105A	12.0/16.0	33.4/38.5	50/56	50/60	45/51	93/93	52/58	60/60	47/53	95/95
			104B+104B	15.8/21.0	43.8/50.5	63/71	70/80	57/65	93/93	65/73	70/80	59/67	95/95
		STD	NONE	—	—	24	30	23	106	26	30	26	108
			102A	4.9/6.5	13.6/15.6	24/26	30/30	23/24	106/106	26/29	30/30	26/26	108/108
			103B	6.5/8.7	18.1/20.9	30/33	30/35	27/30	106/106	32/35	35/40	29/32	108/108
			105A	12.0/16.0	33.4/38.5	49/55	50/60	44/50	106/106	51/57	60/60	47/52	108/108
			104B+104B	15.8/21.0	43.8/50.5	62/70	70/70	56/64	106/106	64/72	70/80	59/66	108/108
		MED	NONE	—	—	24	30	23	106	26	30	26	108
			102A	4.9/6.5	13.6/15.6	24/26	30/30	23/24	106/106	26/29	30/30	26/26	108/108
			103B	6.5/8.7	18.1/20.9	30/33	30/35	27/30	106/106	32/35	35/40	29/32	108/108
			105A	12.0/16.0	33.4/38.5	49/55	50/60	44/50	106/106	51/57	60/60	47/52	108/108
			104B+104B	15.8/21.0	43.8/50.5	62/70	70/70	56/64	106/106	64/72	70/80	59/66	108/108
		HIGH	NONE	—	—	26/26	30/30	25/25	144	28/28	40/40	28/27	146
			102A	4.9/6.5	13.6/15.6	26/28	30/30	25/26	144/144	28/31	40/40	28/28	146/146
			103B	6.5/8.7	18.1/20.9	32/35	35/35	29/32	144/144	34/37	40/40	31/34	146/146
			105A	12.0/16.0	33.4/38.5	51/57	60/60	46/52	144/144	53/59	60/60	49/54	146/146
			104B+104B	15.8/21.0	43.8/50.5	64/72	70/80	58/66	144/144	66/74	70/80	60/68	146/146
	480-3-60	STD	NONE	—	—	12	15	11	52	13	15	12	53
			106A	6.0	7.2	13	15	11	52	14	15	12	53
			108A	11.5	13.8	21	25	19	52	22	25	20	53
			109A	14.0	16.8	25	25	22	52	26	30	23	53
			108A+108A	23.0	27.7	38	40	35	52	40	40	36	53
		MED	NONE	—	—	12	15	11	52	13	15	12	53
			106A	6.0	7.2	13	15	11	52	14	15	12	53
			108A	11.5	13.8	21	25	19	52	22	25	20	53
			109A	14.0	16.8	25	25	22	52	26	30	23	53
			108A+108A	23.0	27.7	38	40	35	52	40	40	36	53
		HIGH	NONE	—	—	12	15	12	71	13	15	13	72
			106A	6.0	7.2	14	15	12	71	15	15	13	72
			108A	11.5	13.8	22	25	20	71	23	25	21	72
			109A	14.0	16.8	26	30	23	71	27	30	24	72
			108A+108A	23.0	27.7	39	40	36	71	41	45	37	72
	575-3-60	STD	NONE	—	—	9	15	9	42	11	15	11	44
		MED	NONE	—	—	9	15	9	42	11	15	11	44
		HIGH	NONE	—	—	9	15	9	46	11	15	11	48

See "Legend and Notes for Table 3 on page 26.

Table 3 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

UNIT	NO M. V - Ph - HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
			CRHEATER***A00	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwrdr fr/unit)			
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
								FLA	LRA			FLA	LRA
RAS060	208/230-1-60	STD	NONE	-	-	40	60	37	150	42	60	40	152
			102A	4.9/6.5	23.5/27.1	40/40	60/60	37/37	150/150	42/43	60/60	40/40	152/152
			103B	6.5/8.7	31.4/36.3	46/52	60/60	42/47	150/150	48/54	60/60	44/50	152/152
			102A+102A	9.8/13.0	46.9/54.2	65/74	70/80	60/68	150/150	68/77	70/80	62/70	152/152
			103B+103B	13.1/17.4	62.8/72.5	85/97	90/100	78/89	150/150	87/100	90/100	80/91	152/152
			104B+104B	15.8/21.0	75.8/87.5	101/116	110/125	93/106	150/150	104/118	110/125	95/108	152/152
		MED	NONE	-	-	42	60	40	175	44	60	42	177
			102A	4.9/6.5	23.5/27.1	42/43	60/60	40/40	175/175	44/45	60/60	42/42	177/177
			103B	6.5/8.7	31.4/36.3	48/55	60/60	44/50	175/175	51/57	60/60	46/52	177/177
			102A+102A	9.8/13.0	46.9/54.2	68/77	70/80	62/70	175/175	70/79	70/80	64/73	177/177
			103B+103B	13.1/17.4	62.8/72.5	88/100	90/100	80/91	175/175	90/102	90/110	82/94	177/177
			104B+104B	15.8/21.0	75.8/87.5	104/119	110/125	95/109	175/175	106/121	110/125	97/111	177/177
	208/230-3-60	DD-STD	NONE	-	-	29	40	28	122	31	45	31	124
			102A	4.9/6.5	13.6/15.6	29/29	40/40	28/28	122/122	31/32	45/45	31/31	124/124
			104B	7.9/10.5	21.9/25.3	37/42	40/45	34/38	122/122	40/44	45/45	36/40	124/124
			105A	12.0/16.0	33.4/38.5	52/58	60/60	47/53	122/122	54/60	60/60	49/55	124/124
			104B+104B	15.8/21.0	43.8/50.5	65/73	70/80	59/67	122/122	67/75	70/80	61/69	124/124
			104B+105A	19.9/26.5	55.2/63.8	79/90	80/90	72/82	122/122	81/92	90/100	74/84	124/124
		STD	NONE	-	-	27	40	26	133	29	40	28	135
			102A	4.9/6.5	13.6/15.6	27/27	40/40	26/26	133/133	29/29	40/40	28/28	135/135
			104B	7.9/10.5	21.9/25.3	34/39	40/40	31/35	133/133	37/41	40/45	33/37	135/135
			105A	12.0/16.0	33.4/38.5	49/55	50/60	44/50	133/133	51/57	60/60	47/52	135/135
			104B+104B	15.8/21.0	43.8/50.5	62/70	70/70	56/64	133/133	64/72	70/80	59/66	135/135
			104B+105A	19.9/26.5	55.2/63.8	76/87	80/90	69/79	133/133	78/89	80/90	72/82	135/135
		MED	NONE	-	-	28/28	40/40	28/27	171	30/30	45/45	30/30	173
			102A	4.9/6.5	13.6/15.6	28/28	40/40	28/27	171/171	30/31	45/45	30/30	173/173
			104B	7.9/10.5	21.9/25.3	36/40	40/40	33/37	171/171	39/43	45/45	35/39	173/173
			105A	12.0/16.0	33.4/38.5	51/57	60/60	46/52	171/171	53/59	60/60	49/54	173/173
			104B+104B	15.8/21.0	43.8/50.5	64/72	70/80	58/66	171/171	66/74	70/80	60/68	173/173
			104B+105A	19.9/26.5	55.2/63.8	78/89	80/90	71/81	171/171	80/91	90/100	74/83	173/173
		HIGH	NONE	-	-	30/30	45/40	29/29	186	32/32	45/45	32/31	188
			102A	4.9/6.5	13.6/15.6	30/30	45/40	29/29	186/186	32/33	45/45	32/31	188/188
			104B	7.9/10.5	21.9/25.3	38/42	45/45	35/39	186/186	41/45	45/45	37/41	188/188
			105A	12.0/16.0	33.4/38.5	53/59	60/60	48/54	186/186	55/61	60/70	50/56	188/188
			104B+104B	15.8/21.0	43.8/50.5	66/74	70/80	60/68	186/186	68/76	70/80	62/70	188/188
			104B+105A	19.9/26.5	55.2/63.8	80/91	80/100	73/83	186/186	82/93	90/100	75/85	188/188
	460-3-60	STD	NONE	-	-	13	20	13	63	14	20	14	64
			106A	6.0	7.2	13	20	13	63	14	20	14	64
			108A	11.5	13.8	21	25	19	63	22	25	20	64
			109A	14.0	16.8	25	25	22	63	26	30	23	64
			108A+108A	23.0	27.7	38	40	35	63	40	40	36	64
			108A+109A	25.5	30.7	42	45	38	63	43	45	39	64
		MED	NONE	-	-	14	20	14	82	15	20	15	83
			106A	6.0	7.2	14	20	14	82	15	20	15	83
			108A	11.5	13.8	22	25	20	82	23	25	21	83
			109A	14.0	16.8	26	30	23	82	27	30	24	83
			108A+108A	23.0	27.7	39	40	36	82	41	45	37	83
			108A+109A	25.5	30.7	43	45	39	82	44	45	40	83
		HIGH	NONE	-	-	15	20	15	90	16	20	16	91
			106A	6.0	7.2	15	20	15	90	16	20	16	91
			108A	11.5	13.8	23	25	21	90	24	25	22	91
			109A	14.0	16.8	27	30	24	90	28	30	25	91
			108A+108A	23.0	27.7	40	40	37	90	42	45	38	91
			108A+109A	25.5	30.7	44	45	40	90	45	45	41	91
	575-3-60	STD	NONE	-	-	11	15	10	48	13	15	12	50
		MED	NONE	-	-	10	15	10	52	12	15	12	54
		HIGH	NONE	-	-	11	15	11	63	13	15	13	65

See "Legend and Notes for Table 3 on page 26.

Table 3 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

UNIT	NO M. V - Ph - HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
			CRHEATER***A00	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwr fr/unit)			
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
								FLA	LRA			FLA	LRA
RAS072 - Units produced on or after 02/09/2015	208/230-3-60	STD	NONE	-	-	33/33	50/50	32/32	197	35/35	50/50	34/34	199
			102A	4.9/6.5	13.6/15.6	33/33	50/50	32/32	197/197	35/35	50/50	34/34	199/199
			104B	7.9/10.5	21.9/25.3	36/40	50/50	33/37	197/197	39/43	50/50	35/39	199/199
			105A	12.0/16.0	33.4/38.5	51/57	60/60	46/52	197/197	53/59	60/60	49/54	199/199
			104B+104B	15.8/21.0	43.8/50.5	64/72	70/80	58/66	197/197	66/74	70/80	60/68	199/199
			104B+105A	19.9/26.5	55.2/63.8	78/89	80/90	71/81	197/197	80/91	90/100	74/83	199/199
		MED	NONE	-	-	35/35	50/50	34/34	212	37/37	50/50	36/36	214
			102A	4.9/6.5	13.6/15.6	35/35	50/50	34/34	212/212	37/37	50/50	36/36	214/214
			104B	7.9/10.5	21.9/25.3	38/42	50/50	35/39	212/212	41/45	50/50	37/41	214/214
			105A	12.0/16.0	33.4/38.5	53/59	60/60	48/54	212/212	55/61	60/70	50/56	214/214
			104B+104B	15.8/21.0	43.8/50.5	66/74	70/80	60/68	212/212	68/76	70/80	62/70	214/214
			104B+105A	19.9/26.5	55.2/63.8	80/91	80/100	73/83	212/212	82/93	90/100	75/85	214/214
		HIGH	NONE	-	-	37	50	36	226	39	50	39	228
			102A	4.9/6.5	13.6/15.6	37/37	50/50	36/36	226/226	39/39	50/50	39/39	228/228
			104B	7.9/10.5	21.9/25.3	41/45	50/50	37/41	226/226	43/48	50/50	40/43	228/228
			105A	12.0/16.0	33.4/38.5	55/62	60/70	51/56	226/226	58/64	60/70	53/59	228/228
			104B+104B	15.8/21.0	43.8/50.5	68/77	70/80	63/70	226/226	71/79	80/80	65/72	228/228
			104B+105A	19.9/26.5	55.2/63.8	83/93	90/100	76/86	226/226	85/96	90/100	78/88	228/228
	460-3-60	STD	NONE	-	-	15	20	14	96	16	20	15	97
			106A	6.0	7.2	15	20	14	96	16	20	15	97
			108A	11.5	13.8	22	25	20	96	23	25	21	97
			109A	14.0	16.8	26	30	23	96	27	30	24	97
			108A+108A	23.0	27.7	39	40	36	96	41	45	37	97
			108A+109A	25.5	30.7	43	45	39	96	44	45	40	97
		MED	NONE	-	-	16	20	15	104	17	20	16	105
			106A	6.0	7.2	16	20	15	104	17	20	16	105
			108A	11.5	13.8	23	25	21	104	24	25	22	105
			109A	14.0	16.8	27	30	24	104	28	30	25	105
			108A+108A	23.0	27.7	40	40	37	104	42	45	38	105
			108A+109A	25.5	30.7	44	45	40	104	45	45	41	105
		HIGH	NONE	-	-	17	20	16	111	18	25	18	112
			106A	6.0	7.2	17	20	16	111	18	25	18	112
			108A	11.5	13.8	24	25	22	111	26	30	23	112
			109A	14.0	16.8	28	30	25	111	29	30	27	112
			108A+108A	23.0	27.7	42	45	38	111	43	45	39	112
			108A+109A	25.5	30.7	45	50	41	111	47	50	43	112
	575-3-60	STD	NONE	-	-	11	15	11	68	13	15	13	70
		MED	NONE	-	-	12	15	12	79	14	20	14	81
		HIGH	NONE	-	-	12	15	12	79	14	20	14	81

See "Legend and Notes for Table 3 on page 26.

Table 3 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

UNIT	NO M. V - Ph - HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
			CRHEATER***A00	Nom (kW)	FLA	NO P.E.				w/ P.E. (pwr fr/unit)			
						MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
								FLA	LRA			FLA	LRA
RAS072 - Units produced on or prior to 02/08/2015	208/230 - 3-60	STD	NONE	-	-	33/32	50/50	32/31	184	35/34	50/50	34/33	186
			102A	4.9/6.5	13.6/15.6	33/32	50/50	32/31	184/184	35/34	50/50	34/33	186/186
			104B	7.9/10.5	21.9/25.3	36/40	50/50	33/37	184/184	39/43	50/50	35/39	186/186
			105A	12.0/16.0	33.4/38.5	51/57	60/60	46/52	184/184	53/59	60/60	49/54	186/186
			104B+104B	15.8/21.0	43.8/50.5	64/72	70/80	58/66	184/184	66/74	70/80	60/68	186/186
			104B+105A	19.9/26.5	55.2/63.8	78/89	80/90	71/81	184/184	80/91	90/100	74/83	186/186
		MED	NONE	-	-	34/34	50/50	33/33	199	36/36	50/50	35/35	201
			102A	4.9/6.5	13.6/15.6	34/34	50/50	33/33	199/199	36/36	50/50	35/35	201/201
			104B	7.9/10.5	21.9/25.3	38/42	50/50	35/39	199/199	41/45	50/50	37/41	201/201
			105A	12.0/16.0	33.4/38.5	53/59	60/60	48/54	199/199	55/61	60/70	50/56	201/201
			104B+104B	15.8/21.0	43.8/50.5	66/74	70/80	60/68	199/199	68/76	70/80	62/70	201/201
			104B+105A	19.9/26.5	55.2/63.8	80/91	80/100	73/83	199/199	82/93	90/100	75/85	201/201
		HIGH	NONE	-	-	36	50	36	213	38	50	38	215
			102A	4.9/6.5	13.6/15.6	36/36	50/50	36/36	213/213	38/38	50/50	38/38	215/215
			104B	7.9/10.5	21.9/25.3	41/45	50/50	37/41	213/213	43/48	50/50	40/43	215/215
			105A	12.0/16.0	33.4/38.5	55/62	60/70	51/56	213/213	58/64	60/70	53/59	215/215
			104B+104B	15.8/21.0	43.8/50.5	68/77	70/80	63/70	213/213	71/79	80/80	65/72	215/215
			104B+105A	19.9/26.5	55.2/63.8	83/93	90/100	76/86	213/213	85/96	90/100	78/88	215/215
	460 - 3-60	STD	NONE	-	-	17	25	16	92	18	25	17	93
			106A	6.0	7.2	17	25	16	92	18	25	17	93
			108A	11.5	13.8	22	25	20	92	23	25	21	93
			109A	14.0	16.8	26	30	23	92	27	30	24	93
			108A+108A	23.0	27.7	39	40	36	92	41	45	37	93
			108A+109A	25.5	30.7	43	45	39	92	44	45	40	93
		MED	NONE	-	-	18	25	17	100	19	25	18	101
			106A	6.0	7.2	18	25	17	100	19	25	18	101
			108A	11.5	13.8	23	25	21	100	24	25	22	101
			109A	14.0	16.8	27	30	24	100	28	30	25	101
			108A+108A	23.0	27.7	40	40	37	100	42	45	38	101
			108A+109A	25.5	30.7	44	45	40	100	45	45	41	101
		HIGH	NONE	-	-	19	25	18	107	20	25	19	108
			106A	6.0	7.2	19	25	18	107	20	25	19	108
			108A	11.5	13.8	24	25	22	107	26	30	23	108
			109A	14.0	16.8	28	30	25	107	29	30	27	108
			108A+108A	23.0	27.7	42	45	38	107	43	45	39	108
			108A+109A	25.5	30.7	45	50	41	107	47	50	43	108
	575 - 3-60	STD	NONE	-	-	12	15	12	63	14	20	14	65
		MED	NONE	-	-	13	20	12	74	15	20	15	76
		HIGH	NONE	-	-	13	20	12	74	15	20	15	76

See "Legend and Notes for Table 3 on page 26.

Legend and Notes for Table 3 1

LEGEND:

BRKR	–	Circuit breaker
CO	–	Convenient outlet
DD	–	Direct drive (indoor fan motor)
DISC	–	Disconnect
FLA	–	Full load amps
IFM	–	Indoor fan motor
LRA	–	Locked rotor amps
MCA	–	Minimum circuit amps
MOCB	–	MAX FUSE or HACR Breaker
PE	–	Power exhaust
PWRD CO	–	Powered convenient outlet
UNPWR CO	–	Unpowered convenient outlet

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 230-3-60



$$AB = 224 \text{ v}$$

$$BC = 231 \text{ v}$$

$$AC = 226 \text{ v}$$

$$\begin{aligned} \text{Average Voltage} &= \frac{(224 + 231 + 226)}{3} = \frac{681}{3} \\ &= 227 \end{aligned}$$

Determine maximum deviation from average voltage.

$$(AB) 227 - 224 = 3 \text{ v}$$

$$(BC) 231 - 227 = 4 \text{ v}$$

$$(AC) 227 - 226 = 1 \text{ v}$$

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{4}{227} \\ &= 1.76\% \end{aligned}$$

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.

UNIT START-UP CHECKLIST

(Remove and Store in Job File)

MODEL NO.: _____

SERIAL NO.: _____

I. PRE-START-UP

- ☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY INSTALLATION OF OUTDOOR AIR HOOD
- ☐ VERIFY INSTALLATION OF FLUE EXHAUST AND INLET HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ CHECK THAT OUTDOOR AIR INLET SCREENS ARE IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEELS AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND VERIFY SETSCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SCROLL COMPRESSORS ARE ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY INSTALLATION OF THERMOSTAT

II. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS 1	L1	_____	L2	_____	L3	_____
COMPRESSOR AMPS 2	L1	_____	L2	_____	L3	_____
SUPPLY FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ °F DB (DRY BULB)

RETURN-AIR TEMPERATURE _____ °F DB _____ °F WB (WET BULB)

COOLING SUPPLY AIR TEMPERATURE _____ °F

PRESSURES

REFRIGERANT SUCTION	CIRCUIT A	_____	PSIG
	CIRCUIT B	_____	PSIG
REFRIGERANT DISCHARGE	CIRCUIT A	_____	PSIG
	CIRCUIT B	_____	PSIG

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS (IF EQUIPPED)
- ☐ VERIFY SMOKE DETECTOR UNIT SHUTDOWN BY UTILIZING MAGNET TEST

III. HOT GAS RE-HEAT START-UP

STEPS

- ☐ 1. CHECK CTB FOR JUMPER 5, 6, 7
JUMPER 5, 6, 7 MUST BE CUT AND OPEN
- ☐ 2. OPEN HUMIDISTAT CONTACTS
- ☐ 3. START UNIT IN COOLING (CLOSE Y1)

OBSERVE AND RECORD

- A. SUCTION PRESSURE _____ PSIG
 - B. DISCHARGE PRESSURE _____ PSIG
 - C. ENTERING AIR TEMPERATURE _____ °F
 - D. LIQUID LINE TEMPERATURE
AT OUTLET OR REHEAT COIL _____ °F
 - E. CONFIRM CORRECT ROTATION FOR COMPRESSOR
 - F. CHECK FOR CORRECT RAMP-UP OF OUTDOOR FAN MOTOR AS CONDENSER COIL WARMS
- ☐ 4. CHECK UNIT CHARGE PER CHARGING CHART
 - ☐ 5. SWITCH UNIT TO HIGH-LATENT MODE (SUBCOOLER) BY CLOSING HUMIDISTAT WITH Y1 CLOSED

OBSERVE

- ☐ A. REDUCTION IN SUCTION PRESSURE (5 TO 7 PSI EXPECTED)
 - ☐ B. DISCHARGE PRESSURE UNCHANGED
 - ☐ C. LIQUID TEMPERATURE DROPS TO 50 TO 55°F RANGE
 - ☐ D. LSV SOLENOID ENERGIZED (VALVE CLOSURES)
- ☐ 6. SWITCH UNIT TO DEHUMID (REHEAT) BY OPENING Y1

OBSERVE

- ☐ A. SUCTION PRESSURE INCREASES TO NORMAL COOLING LEVEL
 - ☐ B. DISCHARGE PRESSURE DECREASES (35 TO 50 PSI)
 - ☐ C. LIQUID TEMPERATURE RETURNS TO NORMAL COOLING LEVEL
 - ☐ D. LSV SOLENOID ENERGIZED (VALVE CLOSURES)
 - ☐ E. DSV SOLENOID ENERGIZED, VALVE OPENS
- ☐ 7. WITH UNIT IN DEHUMID MODE CLOSE W1
COMPRESSOR AND OUTDOOR FAN STOP; LSV AND DSV SOLENOIDS DE-ENERGIZED
 - ☐ 8. OPEN W1 RESTORE UNIT TO DEHUMID MODE
 - ☐ 9. OPEN HUMIDISTAT INPUT
COMPRESSOR AND OUTDOOR FAN STOP; LSV AND DSV SOLENOIDS DE-ENERGIZED
 - ☐ 10. RESTORE SETPOINTS FOR THERMOSTAT AND HUMIDISTAT