INSTALLATION INSTRUCTIONS

R-410A Single Package Rooftop Heat Pump
RHH072-102

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.

TABLE OF CONTENTS

⚠ 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.

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, always turn off main power switch to unit and install lockout tag. 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 damage 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 heat pump units.

MODEL NOMENCLATURE

MODEL SERIES	R	H	H	0	9	0	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)
H = Heat Pump
G = Gas/Electric — **Type**

H = High Efficiency — **Efficiency**

072 = 6 Tons
090 = 7.5 Tons
102 = 8.5 Tons — **Nominal Cooling Capacity**

H = 208/230-3-60
L = 460-3-60 — **Voltage**

0 = No Heat — **Heating Capacity**

A = Standard Static Option - Belt Drive
B = High Static Option (Belt Drive)
C = Medium Static Option (Belt Drive) — **Motor Option**

A = None
B = Economizer w/Bara-relief, OA Temp sensor
E = Economizer w/Bara-relief + CO2 Sensor, OA Temp sensor
H = Economizer w/Bara-relief, enthalpy sensor
L = Economizer w/Bara-relief + CO2 Sensor, enthalpy sensor
P = 2-Position damper w/Baro-relief — **Outdoor Air Options / Control**

0A = No Options
4B = Non-Fused Disconnect
AT = Non-powered 115v C.O.
BR = Supply Air Smoke Detector
7C = Non-Fused Disconnect + Non-Powered 115v C.O.
7K = Non-Fused Disconnect + Non-Powered 115v C.O.+ SA Smoke detector
8A = Non-Fused Disconnect + SA Smoke detector — **Factory Installed Options**

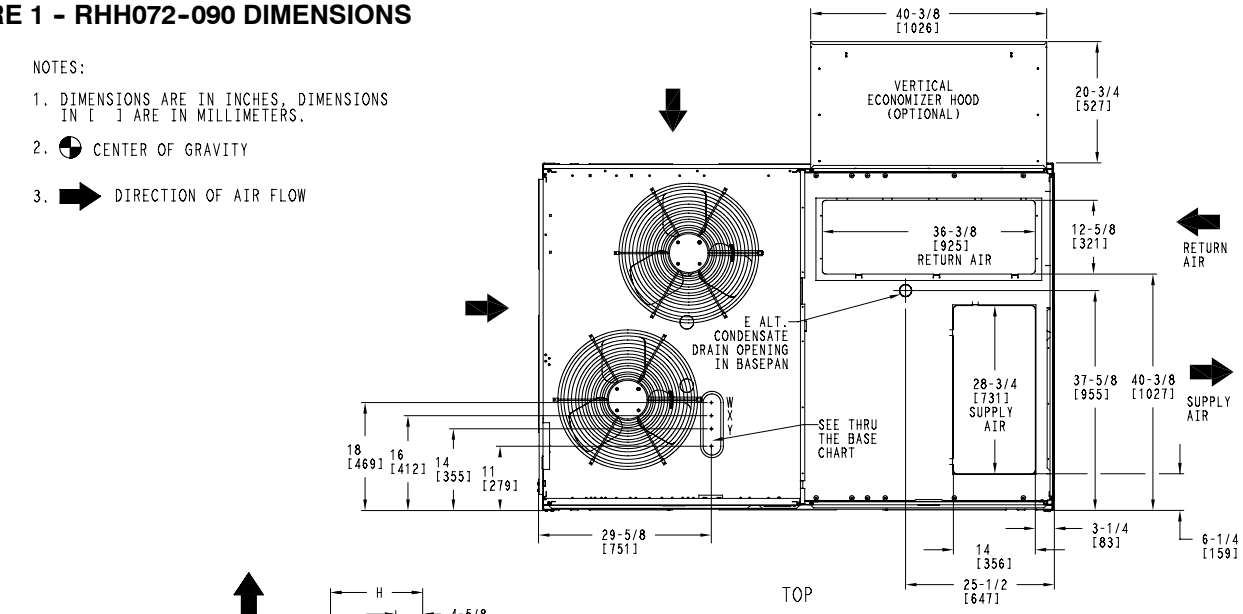
A = Aluminum / Copper Cond & Evap Coil
B = Precoat Alum/Copper Cond & Alum / Copper Evap
C = E-Coated Alum/Copper Cond & Alum / Copper Evap
D = E-Coated Alum / Copper Cond & Evap
F = Copper/Copper Cond & Evap — **Condenser / Evaporator Coil Configuration**

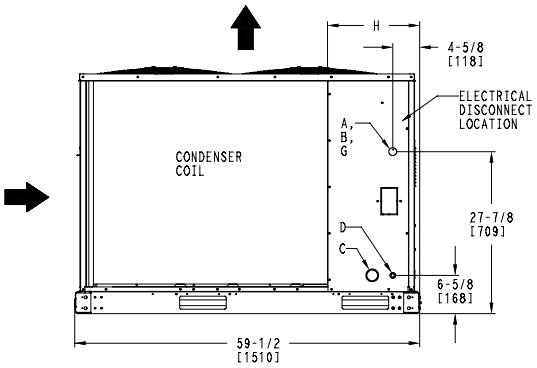
A = Sales Digit

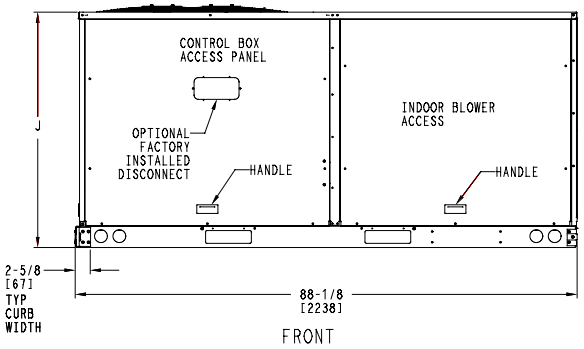
FIGURE 1 - RHH072-090 DIMENSIONS

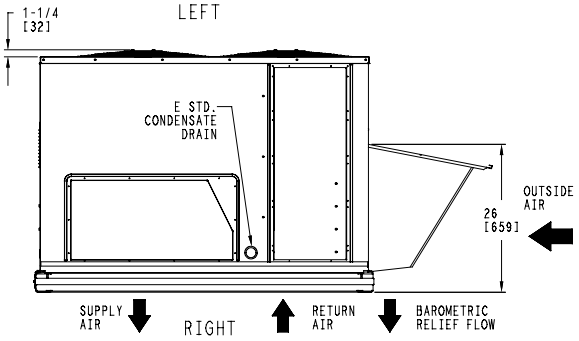
NOTES:

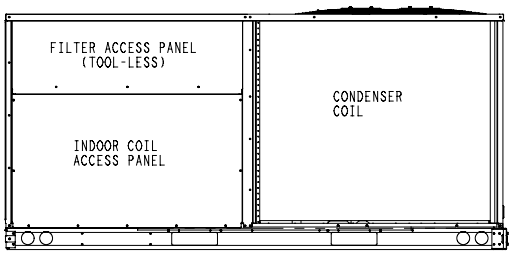
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



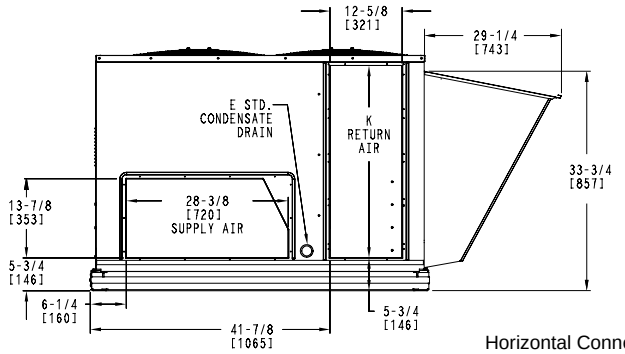


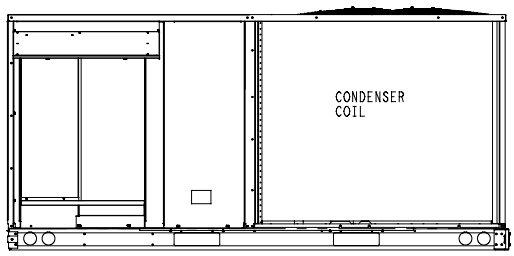






Vertical Connections / Economizer





Horizontal Connections / Economizer

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2 " [51] DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART (FIELD INST)

THESE HOLES REQUIRED FOR USE WITH ACCY KITS:
CRBTMPWR001A01: 072
CRBTMPWR002A01: 090

	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	3/4" (001) 1 1/4" (002)	POWER	1 1/8" [28.6] 1 3/4" [44.4]

THRU-THE-BASE CHART (FIOP)

FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED: (1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.

UNIT	J	K	H
RHH072	41 1/4 [1048]	33 [658]	15 7/8 [403]
RHH090	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]

FIGURE 1A - UNIT DIMENSIONS RHH072-090

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
RHH072	710	322	162	73.5	129	58.5	186	84.4	234	106	38 5/8 [481]	34 1/8 [867]	21 1/4 [540]
RHH090	875	397	190	86.2	160	72.6	253	114.8	284	128.8	40 [1016]	34 5/8 [879]	24 3/8 [619]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OPTIONS AND ACCESSORIES REFER TO THE PRODUCT **SPECIFICATIONS.**

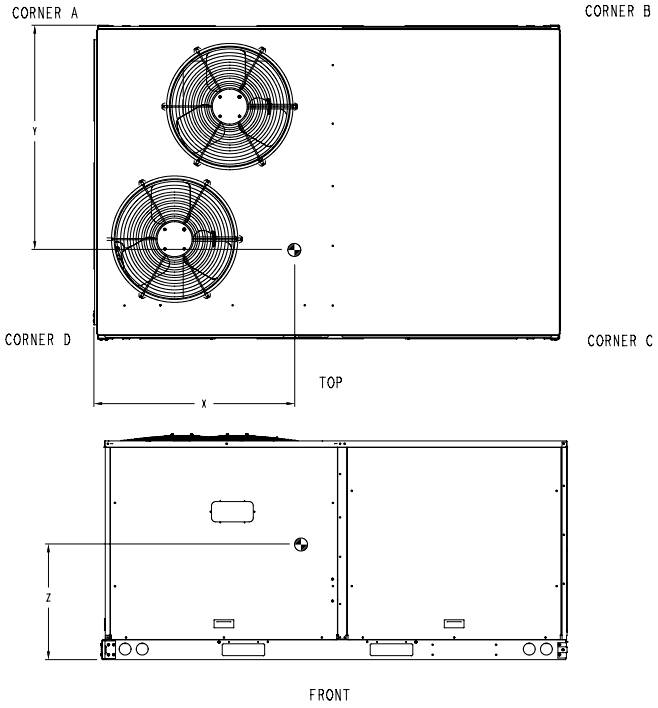
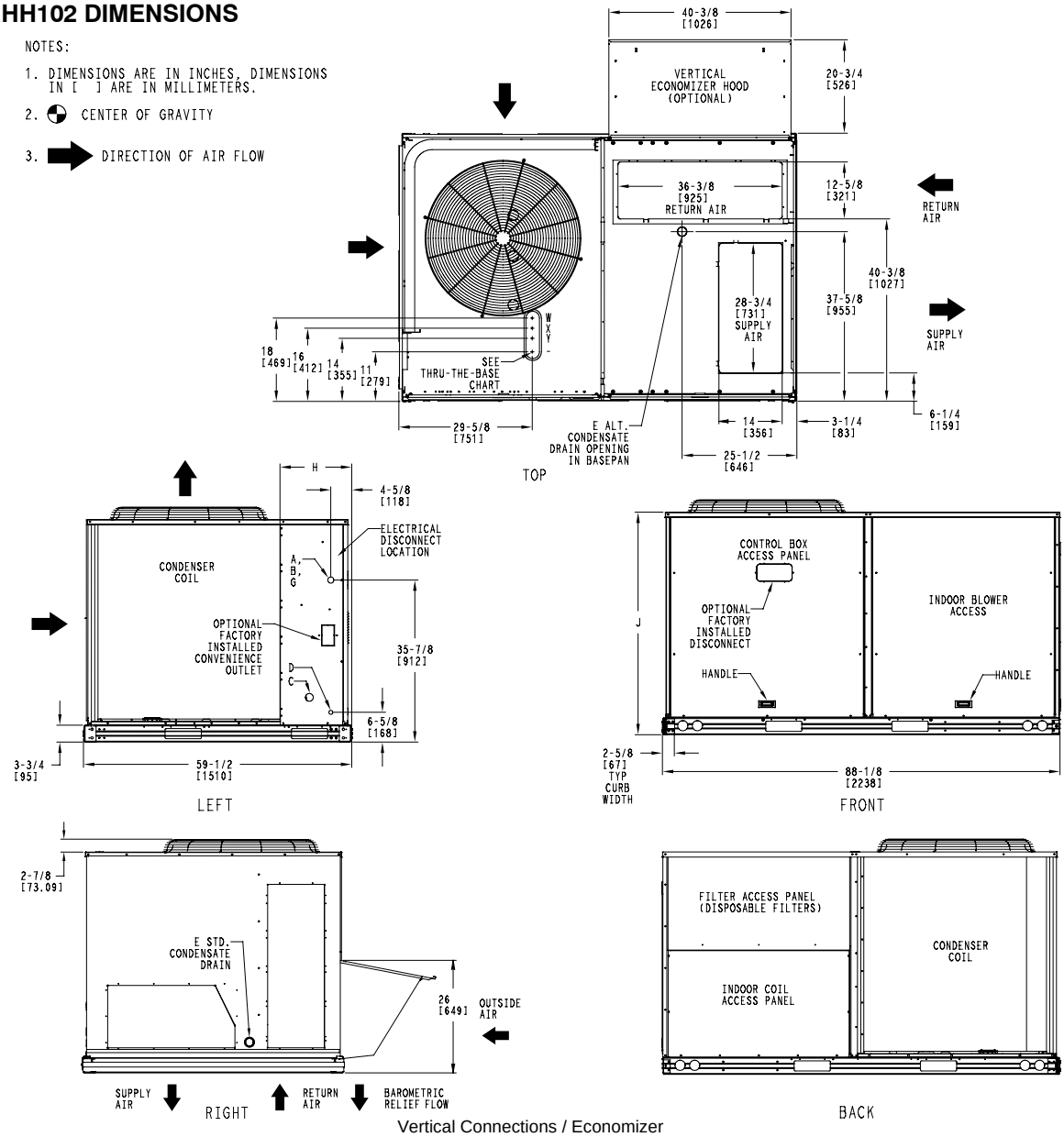


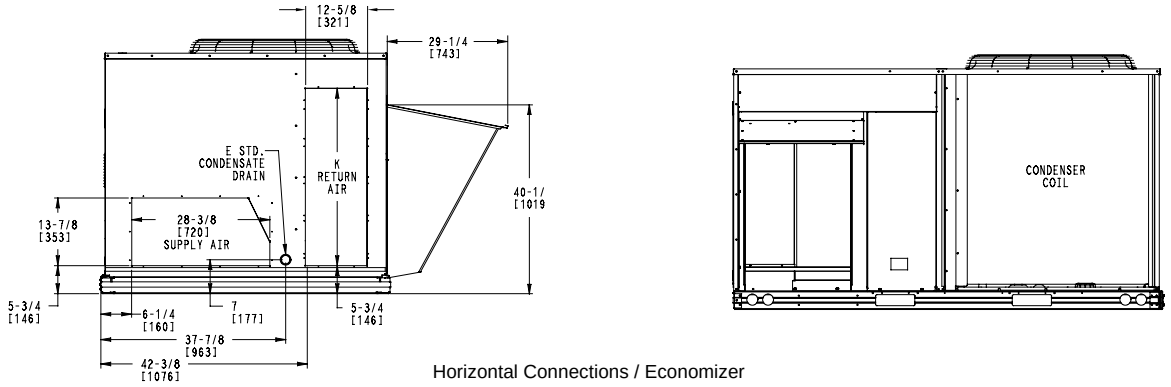
FIGURE 2 - RHH102 DIMENSIONS

NOTES:

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



Vertical Connections / Economizer



Horizontal Connections / Economizer

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2" [51] DIA POWER SUPPLY KNOCK-OUT

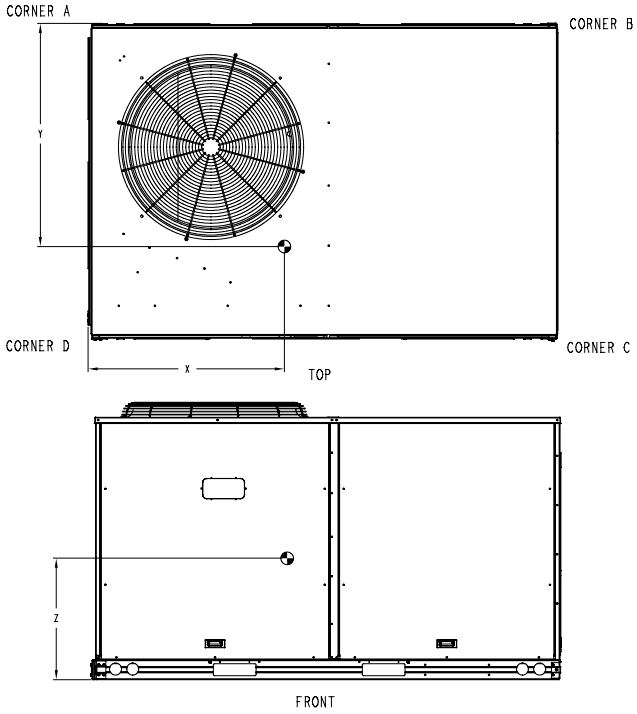
THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPWR002A01			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4"	POWER	1 3/4" [44.4]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED		

UNIT	H	J	K
RHH102	15 7/8 [403]	49 3/8 [1253]	36 3/8 [925]

FIGURE 2A - UNIT DIMENSIONS RHH102

UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
RHH102	1020	463	255	115.7	199	90.3	248	112.5	318	144.2	38 1/4 [972]	32 [813]	24 [610]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING. FOR OPTIONS AND ACCESSORIES REFER TO THE PRODUCT SPECIFICATIONS.



INSTALLATION

Jobsite Survey

Complete the following checks before installation.

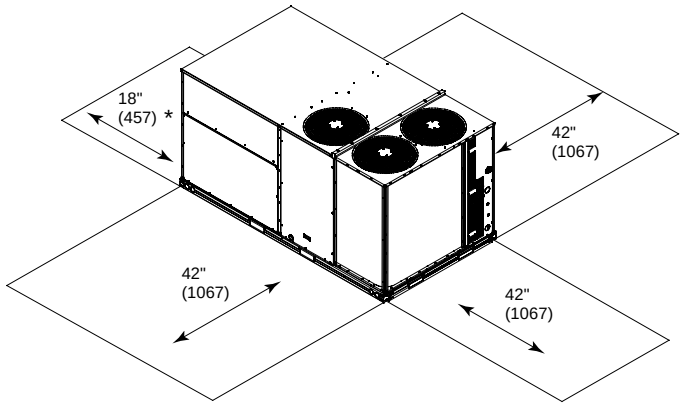
1. Consult local building codes and the NEC (National Electrical Code) ANSI/NFPA 70 for special installation requirements.
2. Determine unit location (from project plans) or select unit location.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

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. 1 and 2.

NOTE:Consider also the effect of adjacent units.

FIGURE 3 **Service Clearance Dimensional Drawing**



*Required bottom condensate drain connection. Otherwise, 36” (914) for condensate connection.

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 for removal and disposal of frost and ice that will form during the heating--defrost mode as well as 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.

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 roof curb

Install field-fabricated ductwork inside curb

Install accessory thru-base service connection package, if used, (affects curb and unit) (refer to accessory installation instructions for details)

Prepare 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. 4. 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 Fig. 4. 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. 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 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.

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

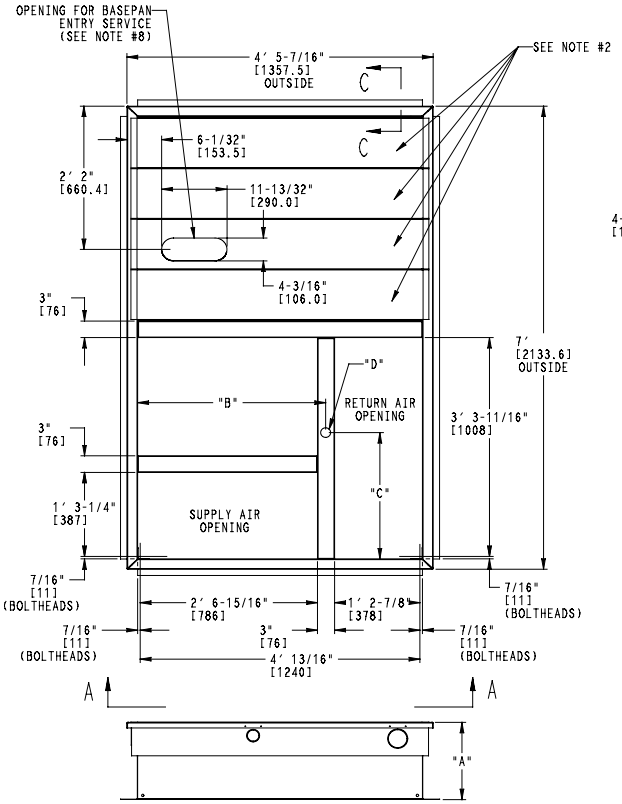
Table 1—Operating Weights

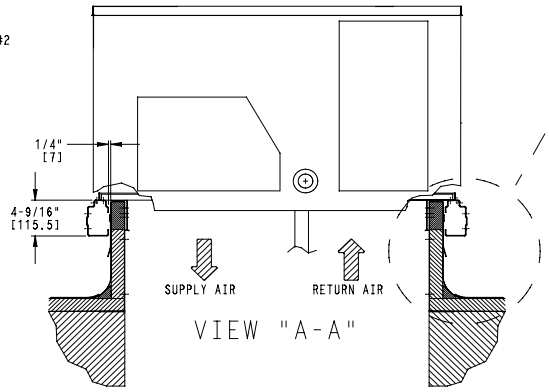
	UNIT RHH - LB (KG)		
	072	090	102
Base Unit	710 (322)	875 (397)	1020 (463)
Economizer			
Vertical	80 (36)	80 (36)	80 (36)
Horizontal	105 (48)	105 (48)	105 (48)
Curb			
14-in / 356 mm	110 (50)	110 (50)	110 (50)
24-in / 610 mm	145 (66)	145 (66)	145 (66)

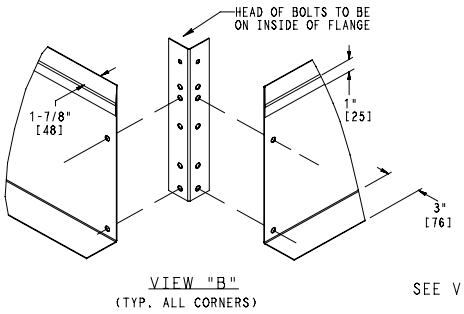
ROOF CURB ACCESSORY #	A	UNIT SIZE
CRRFCURB003A02	1′-2" [356]	RHH072
CRRFCURB004A02	2′-0" [610]	RHH090-102

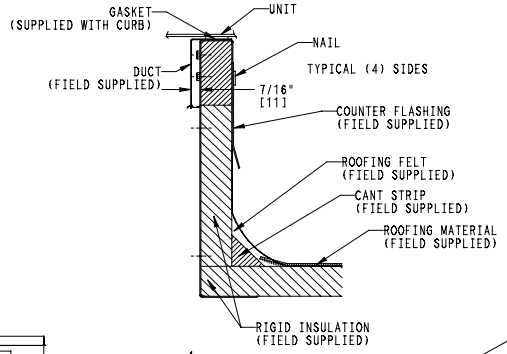
NOTES:
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
2. INSULATED PANELS: 1" THK. POLYURETHANE FOAM, 1-3/4 # DENSITY.
3. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4. ROOFCURB: 16 GAGE STEEL.
5. ATTACH DUCTWORK TO CURB. (FLANGES OF DUCT REST ON CURB).
6. SERVICE CLEARANCE 4" ON EACH SIDE.
7. ▨ DIRECTION OF AIR FLOW.
8. CONNECTOR PACKAGES CRBTMPWR001A01 AND 2A01 ARE FOR THRU-THE-CURB TYPE CONNECTIONS PACKAGES CRBTMPWR003A01 AND 4A01 ARE FOR THRU-THE-BOTTOM TYPE CONNECTIONS.

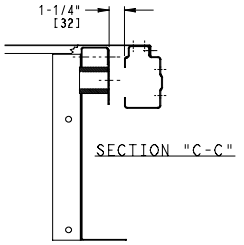
CONNECTOR PKG. ACC.	B	C	D (ALT. DRAIN HOLE)	POWER	CONTROL	ACCECCORY PWR
CRBTMPWR001A01	2′ 8-7/16" [827]	1′ 10-15/16" [583]	1-3/4" [44.5]	3/4" [19] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR002A01				1-1/4" [31.7] NPT		
CRBTMPWR003A01				3/4" [19] NPT		
CRBTMPWR004A01				1-1/4" [31.7] NPT		











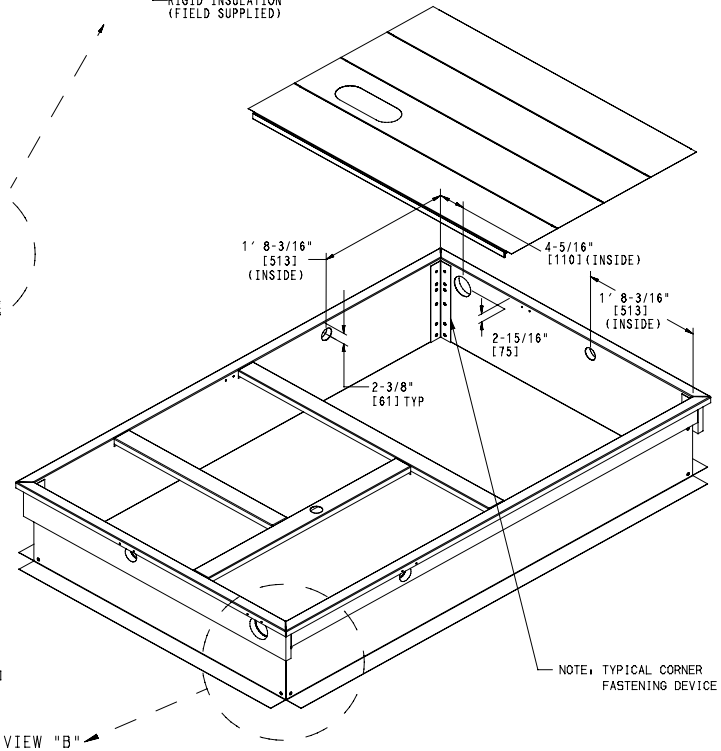
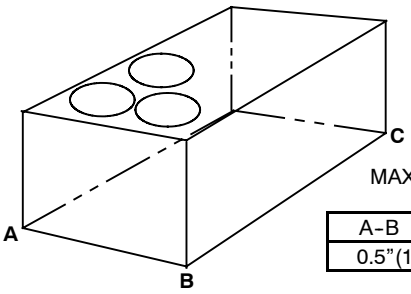


FIGURE 5 Unit Leveling Tolerances



MAXIMUM ALLOWABLE

A–B	B–C	A–C
0.5"(13)	1.0" (25)	1.0" (25)

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.*

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

Horizontal applications require a minimum clearance to combustible surfaces of 1–in (25 mm) from duct for first 12–in (305 mm) away from unit. Vertical applications do not require a minimum clearance.

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 install, then a grill 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 required. 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. 6. Refer to rigging instructions on unit.

⚠ CAUTION

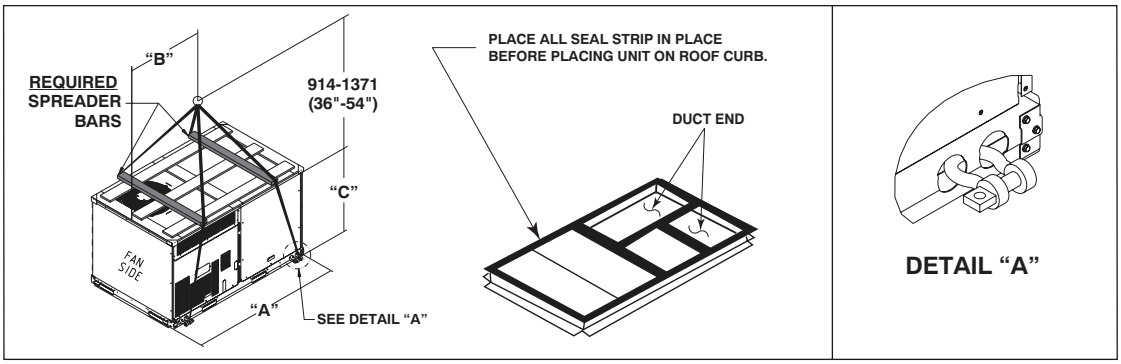
UNIT DAMAGE HAZARD

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.

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

FIGURE 6 Rigging Details



UNIT RHH	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
072	1100	500	88.0	2235	40.8	1035	41.5	1055
090	1315	598	88.0	2235	41.6	1057	49.5	1257
102	1505	684	88.0	2235	40.0	1015	49.5	1257

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.

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 equal to Fig. 4, section C–C.

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

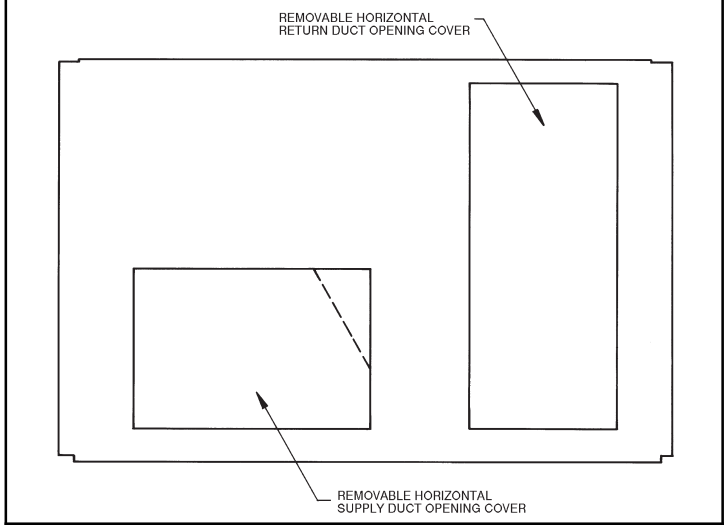
After unit is in position, remove the compressor access panel. Holding the blocking between compressors with one hand, cut the strapping. Carefully remove the blocking without damaging tubing, wiring, or controls. Remove the strapping and replace the access panel.

Remove all shipping materials and top skid. Recycle or dispose of all 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, 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. 7.

FIGURE 7 | **HORIZONTAL CONVERSION PANELS**



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.

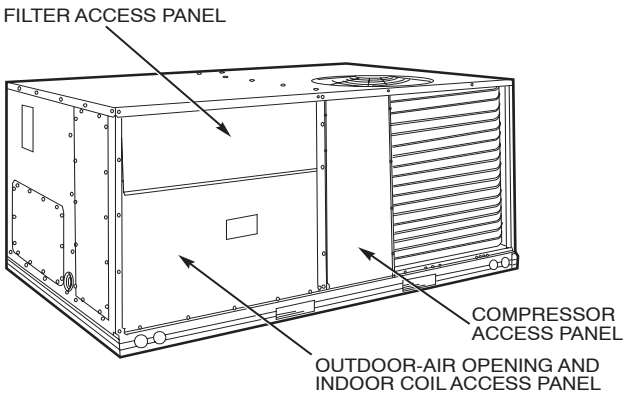
Do not cover or obscure visibility to the unit's informative data plate when insulating horizontal ductwork.

Step 8 — Install Optional Outside Air Hood

Economizer Hood Removal and Setup - Factory Option

1. The hood is shipped in knock–down form and assembled to a metal support tray using plastic stretch wrap. Located in the return air compartment, the 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. 8.)
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. 10.) Be careful to not damage any wiring or cut tie–wraps securing any wiring.
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*.

FIGURE 8 | **Typical Access Panel Locations**



Two Position Damper Hood Removal and Setup — Factory Option

1. The hood is shipped in knock–down form and assembled to a metal support tray using plastic stretch wrap. Located in the return air compartment, the 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. 8.)
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. 10.) Be careful to not damage any wiring or cut tie–wraps securing any wiring.
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* on page 12.

FIGURE 9 **Economizer Wiring**

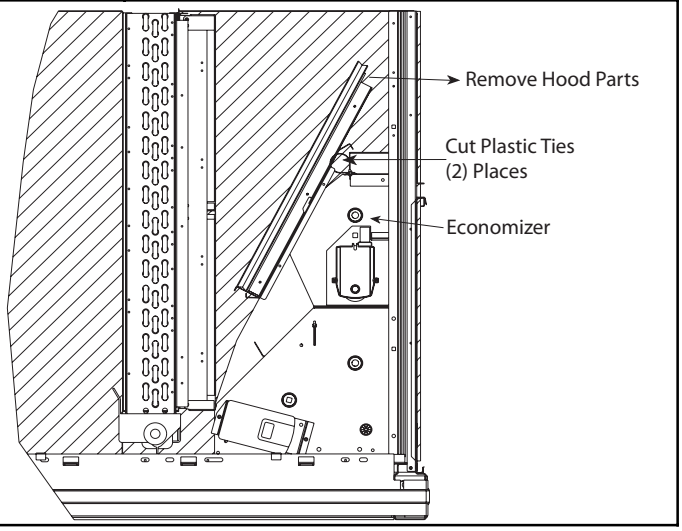
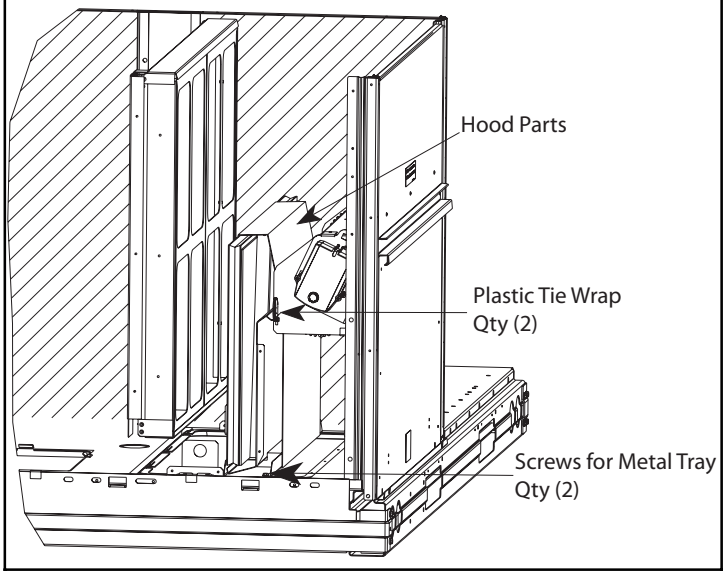


FIGURE 10 **Damper Assembly**

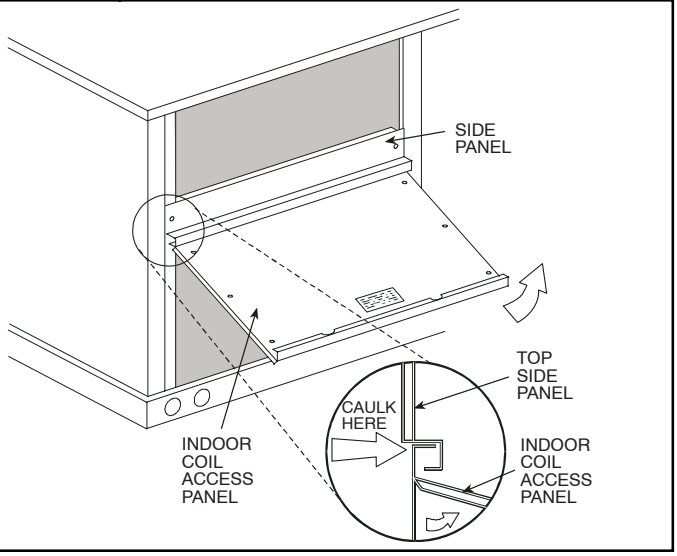


Economizer Hood and Two-Position Hood (Optional) —

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.

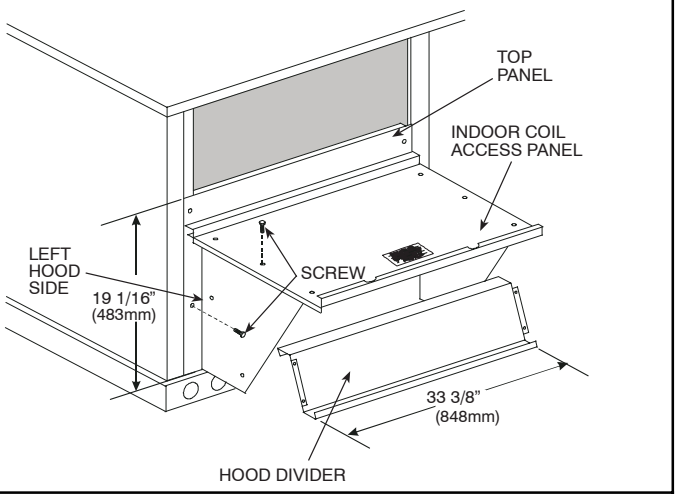
1. The indoor coil access panel will be used as the top of the hood. Remove the screws along the sides and bottom of the indoor coil access panel. See Fig. 11.

FIGURE 11 **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. 12.

FIGURE 12 **Economizer Hood Construction**

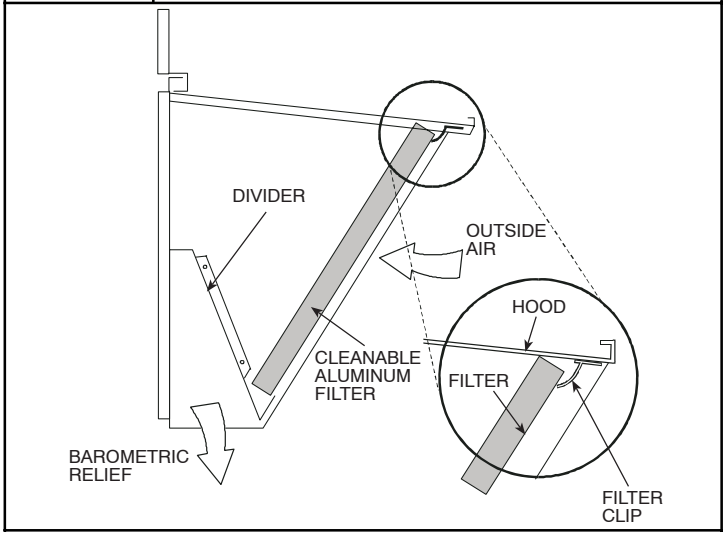


3. Remove the shipping tape holding the economizer barometric relief damper in place.
4. Insert the hood divider between the hood sides. See Fig. 12 and 13. Secure hood divider with 3 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Open the filter clips which are located underneath the hood top. Insert the aluminum filters into the bottom filter

rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filters into place. See Fig. 13.

6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.

FIGURE 13 | **Economizer Filter Installation**



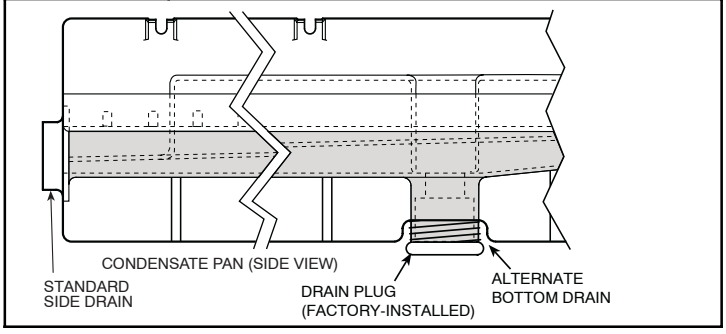
Step 9 — Install External Condensate Trap and Line

The unit has one $^3/_4$-in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 14. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

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 can be tightened with a 1/2–in. square socket drive extension.

To use the alternate bottom drain connection, remove the red drain plug from the bottom connection (use a 1/2–in. square socket drive extension) and install it in the side drain connection.

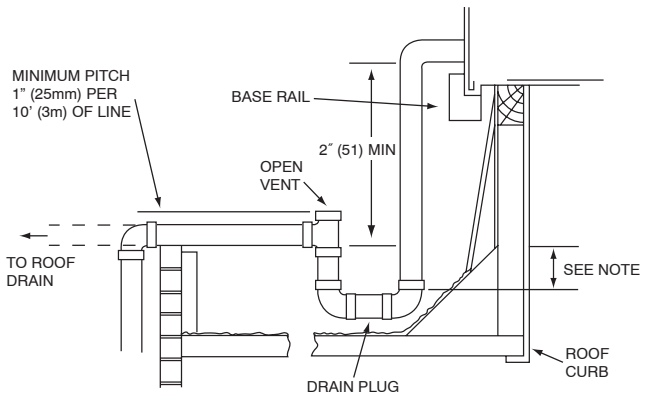
FIGURE 14 | **Condensate Drain Pan (Side View)**



The piping for the condensate drain and external trap can be completed after the unit is in place. 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 ($^3/_4$-in.).

FIGURE 15 | **Condensate Drain Piping Details**



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

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 —

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. Field power wires will be connected line–side pressure lugs on the power terminal block or at factory–installed option non–fused disconnect.

Field power wires are connected to the unit at line–side pressure lugs on compressor contactor C and indoor fan contactor IFC or terminal board (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. 17)

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.

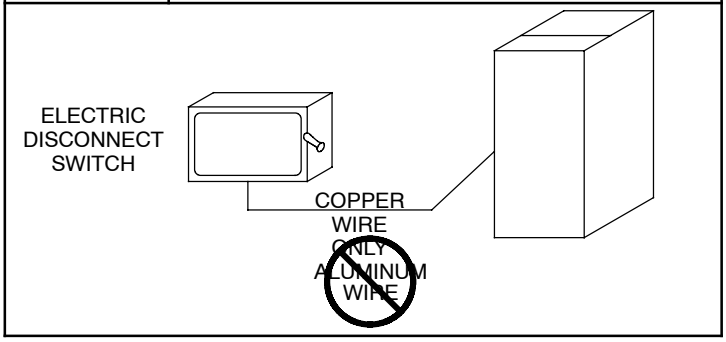
⚠ WARNING

FIRE HAZARD

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

Do not connect aluminum wire between disconnect switch and unit. Use only copper wire. See Fig. 16.

FIGURE 16 | **Disconnect Switch and Unit**



⚠ 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.

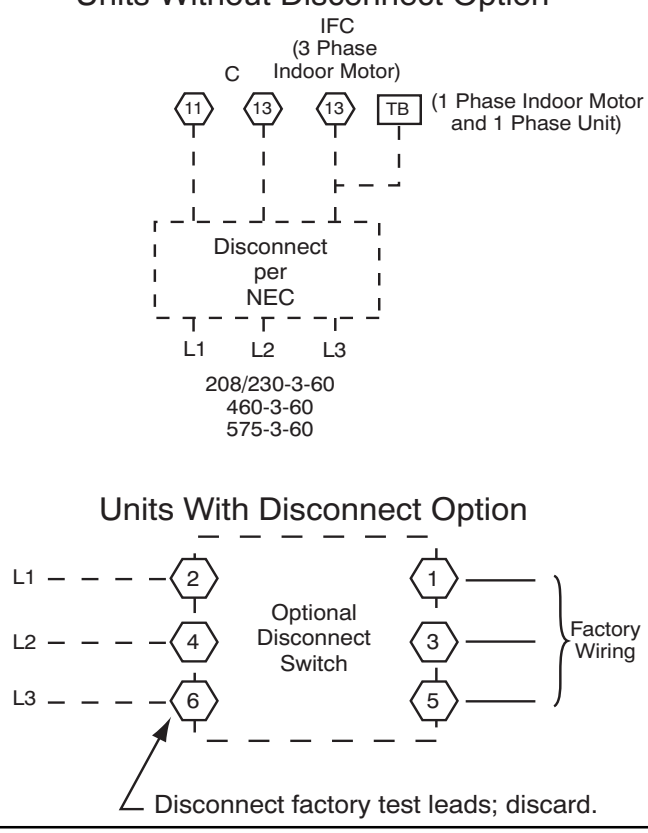
Units Without Factory-Installed Disconnect —

When installing units, provide a disconnect switch of adequate size per NEC (National Electrical Code). 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.

Units with Factory-Installed Disconnect —

The factory-installed option disconnect switch is located in a weatherproof enclosure located under the main control box. The manual switch handle is accessible through an opening in the access panel. Discard the factory test leads (see Fig. 17).

FIGURE 17 | **Power Wiring Connections**



All Units

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 17 and the unit label diagram for power wiring connections to the unit power terminal blocks 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.

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

Convenience Outlets —

⚠ WARNING

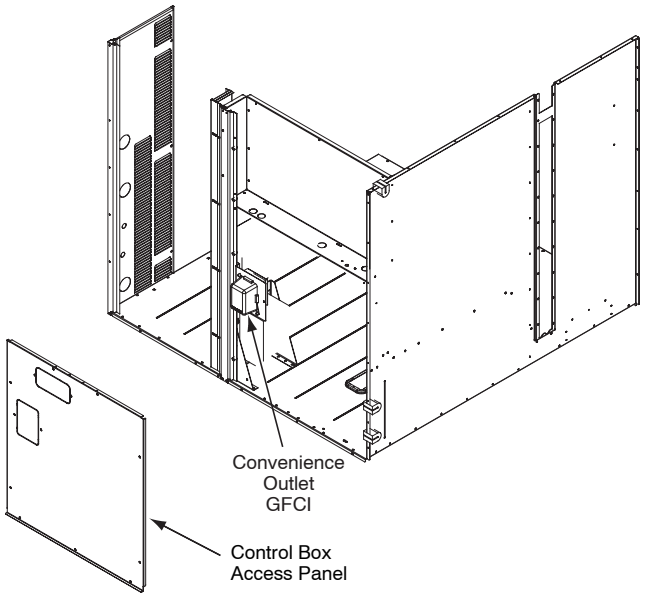
ELECTRICAL OPERATION HAZARD

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.

An optional non–powered convenience outlet 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 and conduit requirements, 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.

FIGURE 18 | **Convenience Outlet Location**



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.

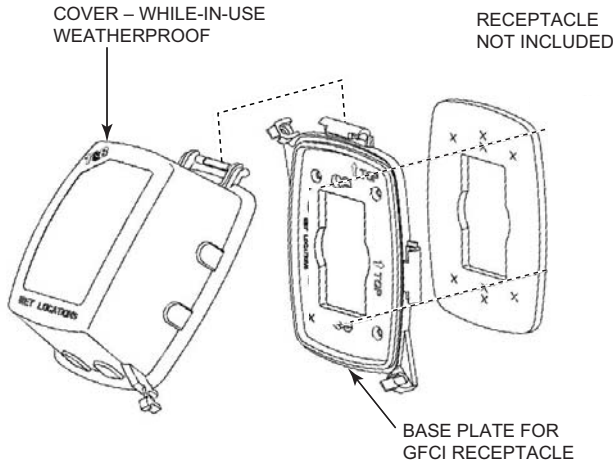
DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET.

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.

FIGURE 19 | **Weatherproof Cover Installation**

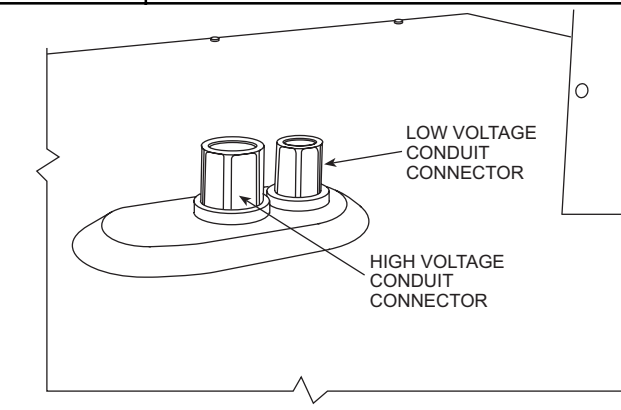


Optional Thru–Base Connections —

This service connection kit consists of a $^1/_2$-in electrical bulkhead connector and a $^3/_4$-in electrical bulkhead connector, all factory–installed in the embossed (raised) section of the unit basepan in the condenser section. The $^1/_2$-in bulkhead connector enables the low–voltage control wires to pass through the basepan. The $^3/_4$-in electrical bulkhead connector allows the high–voltage power wires to pass through the basepan. See Fig. 20.

Check tightness of connector lock nuts before connecting electrical conduits.

FIGURE 20 | **Thru–Base Connection Fittings**



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. 17.

All Units -

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 warranty.

Field Control Wiring —

The RHH unit requires an external temperature control device. This device typically applied with a commercial thermostat (field-supplied) with both occupied and unoccupied setpoints at a minimum.

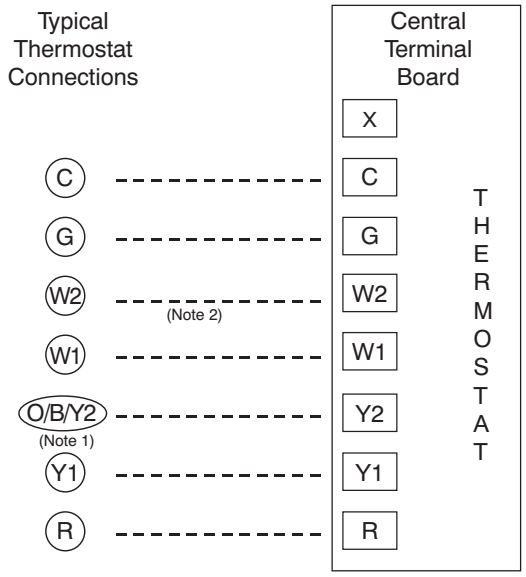
Thermostat —

Install an approved accessory commercial two-stage thermostat according to installation instructions included with the accessory. 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.

FIGURE 21 | **Typical Low Voltage Control Connections**



Note 1: Typical multi-function marking. Follow manufacturer’s configuration instructions to select Y2. Do not configure for O output.

Note 2: W2 connection not required on units without electric heating.

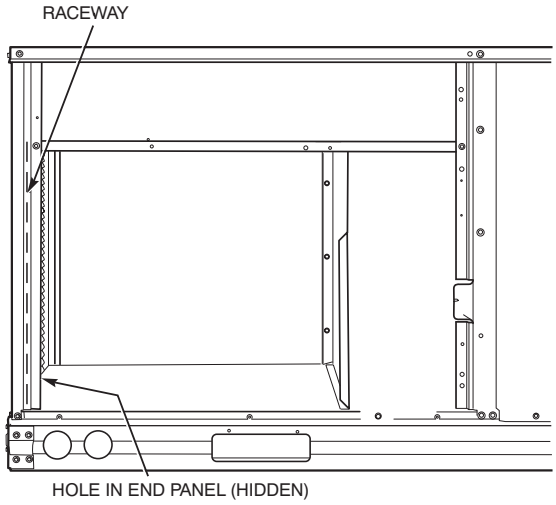
- - - Field Wiring

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 Central Terminal Board (CTB). See Fig. 22.

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

FIGURE 22 | **Field Control Wiring Raceway**



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

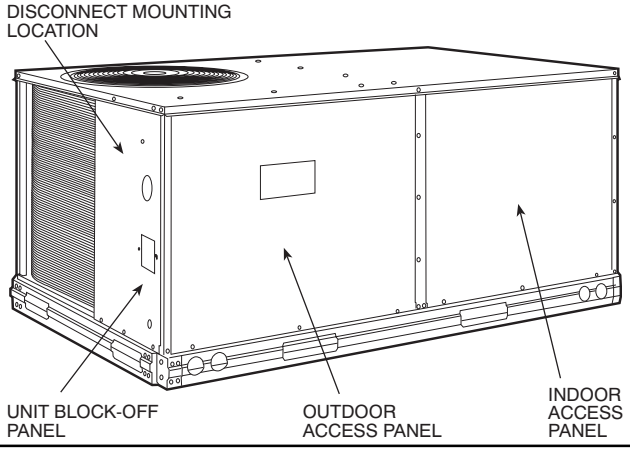
RHH units may be equipped with field-installed accessory electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor. One or two heater modules may be used in a unit.

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, 24 and 25.

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 or 3) and a bare heater model number (value is 0).

FIGURE 23 | **Typical Access Panel Locations**



⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Not all available heater modules and single point boxes 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.

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

FIGURE 24 | **Typical Component Location**

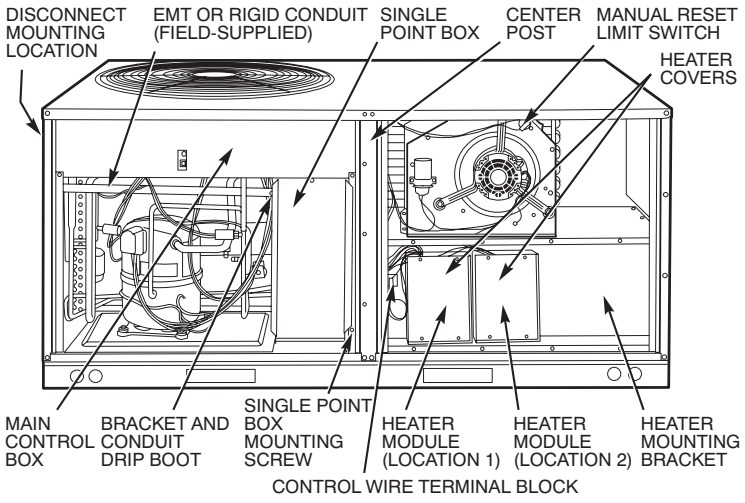


FIGURE 25 **Typical Module Installation**

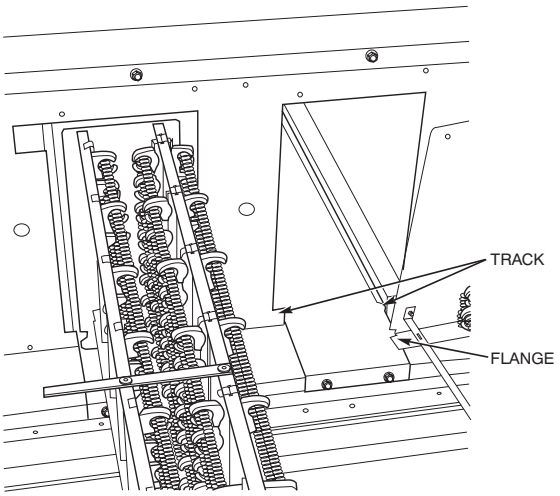
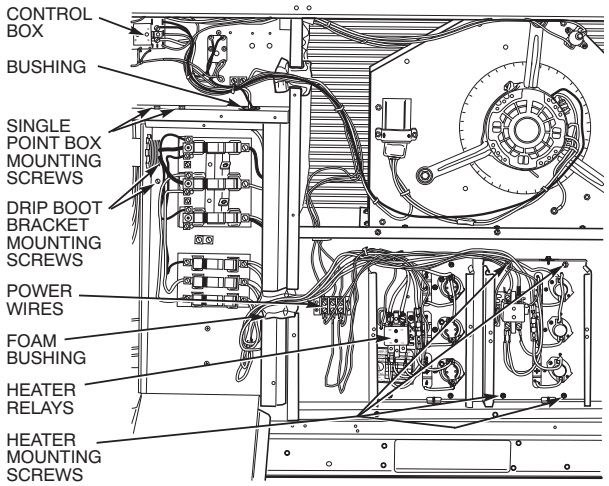


FIGURE 26 **Typical Single Point Installation**



Single Point Boxes and Supplementary Fuses

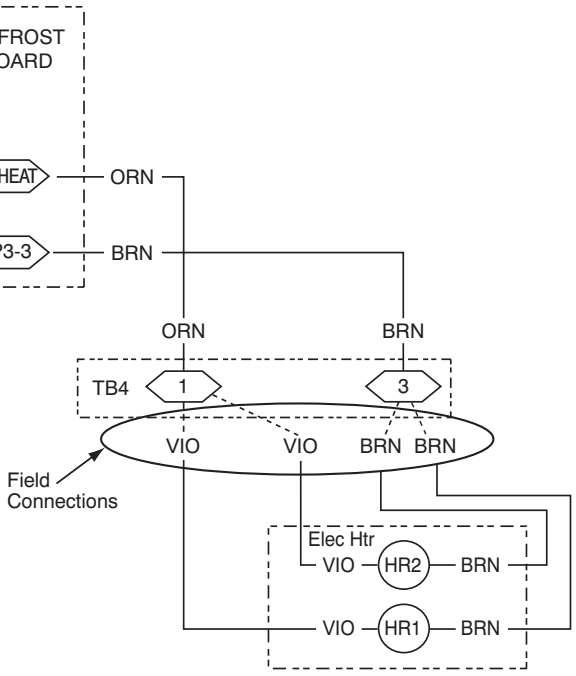
When the unit MOCP device value exceeds 60–A, unit–mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory Single Point Boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the 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 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

All fuses on RHH072–102 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 — Refer to accessory heater and Single Point Box installation instructions for details on tap connections.

Low–Voltage Control Connections— Run 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 leads from Heater #1 and Heater #2 to terminal TB4–1. Connect the BRN leads to terminal TB4–3. See Fig. 27.

FIGURE 27 **Accessory Electric Heater Control Connections**



HR1: On Heater 1 in Position #1
HR2: On Heater 2 in Position #2 (if installed)

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on RHH 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.

System

The smoke detector system consists of a four-wire controller and one or two sensors. Its primary function is to shut down the rooftop unit in order to prevent smoke from circulating throughout the building. It is not to be used as a life saving device.

Controller

The controller (see Fig. 28) includes a controller housing, a printed circuit board, and a clear plastic cover. The controller can be connected to one or two compatible duct smoke sensors. The clear plastic cover is secured to the housing with a single captive screw for easy access to the wiring terminals. The controller has three LEDs (for Power, Trouble and Alarm) and a manual test/reset button (on the cover face).

Sensor

The sensor (see Fig. 29) includes a plastic housing, a printed circuit board, a clear plastic cover, a sampling tube inlet and an exhaust tube. The sampling tube (when used) and exhaust tube are attached during installation. The sampling tube varies in length depending on the size of the rooftop unit. The clear plastic cover permits visual inspections without having to disassemble the sensor. The cover attaches to the sensor housing using four captive screws and forms an airtight chamber around the sensing electronics. Each sensor includes a harness with an RJ45 terminal for connecting to the controller. Each sensor has four LEDs (for Power, Trouble, Alarm and Dirty) and a manual test/reset button (on the left-side of the housing).

Air is introduced to the duct smoke detector sensor's sensing chamber through a sampling tube that extends into the HVAC duct and is directed back into the ventilation system through a (shorter) exhaust tube. The difference in air pressure between the two tubes pulls the sampled air through the sensing chamber. When a sufficient amount of smoke is detected in the sensing chamber, the sensor signals an alarm state and the controller automatically takes the appropriate action to shut down fans and blowers, change over air handling systems, notify the fire alarm control panel, etc.

The sensor uses a process called differential sensing to prevent gradual environmental changes from triggering false alarms. A rapid change in environmental conditions, such as smoke from a fire, causes the sensor to signal an alarm state but dust and debris accumulated over time does not.

For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition.

FIGURE 28 **Controller Assembly**

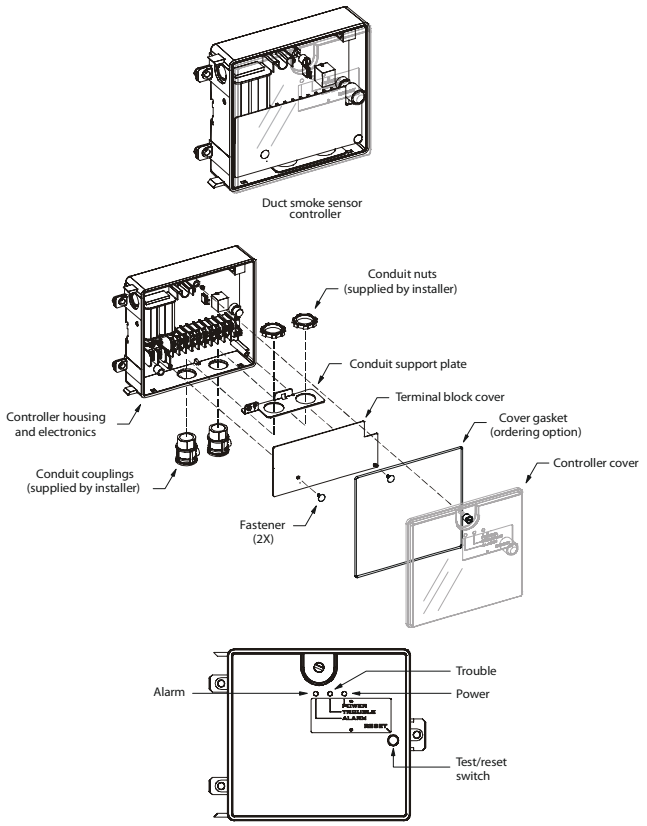
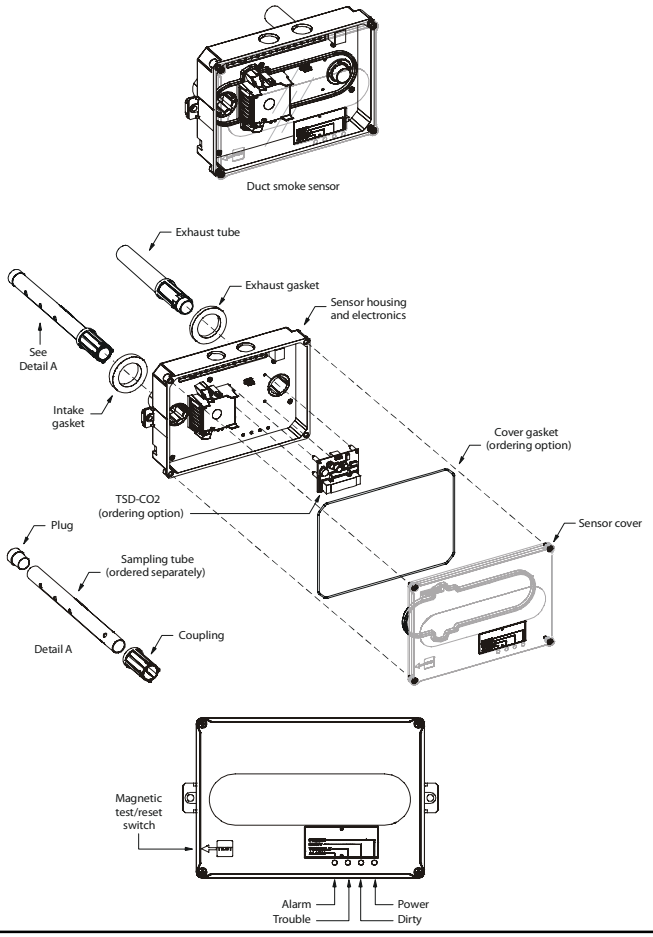


FIGURE 29 **Smoke Detector Sensor**



Smoke Detector Locations

Supply Air — The Supply Air smoke detector sensor is located to the left of the unit's indoor (supply) fan. See Fig. 30. Access is through the fan access panel. There is no sampling tube used at this location. The sampling tube inlet extends through the side plate of the fan housing (into a high pressure area). The controller is located on a bracket to the right of the return filter, accessed through the lift–off filter panel.

FIGURE 30 **Typical Supply Air Smoke Detector Sensor Locations**

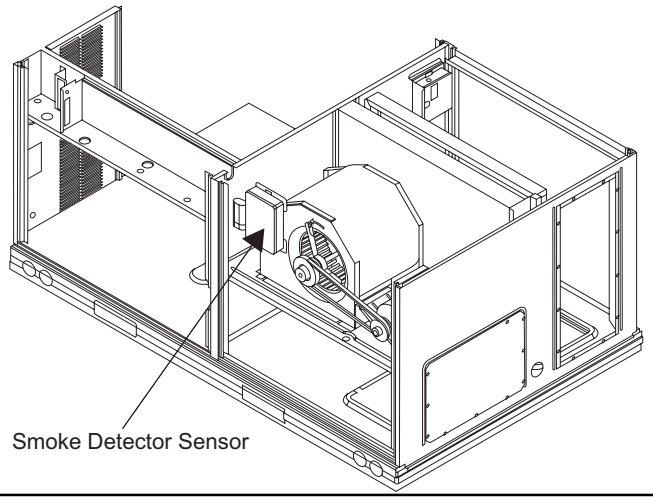


Table 3—Unit Wire/MOCP Sizing Data - RHH072

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			P.E.	NO C.O. or UNPWR C.O.							
							NO P.E.				w/ P.E. (pwrd fr/unit)			
									DISC. SIZE				DISC. SIZE	
			CRHEATER***	Nom (kW)	FLA	FLA	MCA	FUSE or HACR BRKR	FLA	LRA	MCA	FUSE or HACR BRKR	FLA	LRA
RHH072	208/230–3–60	STD	NONE	–	–	3.8	37.7	50	40	191	41.5	50	44	195
			117A00	7.8/10.4	21.7/25.0		64.8/68.9	70/70	65/68	213/216	68.6/72.7	70/80	69/73	217/220
			110A00	12.0/16.0	33.4/38.5		79.4/85.8	80/90	78/84	224/230	83.2/89.6	90/90	82/88	228/234
			111A00	18.6/24.8	51.7/59.7		102.3/112.3	110/125	99/108	243/251	106.1/116.1	110/125	103/113	247/255
			112A00	24.0/32.0	66.7/77.0		121.1/133.9	125/150	116/128	258/268	124.9/137.7	125/150	121/132	262/272
			112A00,117A00	31.8/42.4	88.4/102.0		148.2/165.2	150/175	141/157	368/395	152.0/169.0	175/175	146/161	372/399
		MED	NONE	–	–	3.8	37.7	50	40	202	41.5	50	44	206
			117A00	7.8/10.4	21.7/25.0		64.8/68.9	70/70	65/68	224/227	68.6/72.7	70/80	69/73	228/231
			110A00	12.0/16.0	33.4/38.5		79.4/85.8	80/90	78/84	235/241	83.2/89.6	90/90	82/88	239/245
			111A00	18.6/24.8	51.7/59.7		102.3/112.3	110/125	99/108	254/262	106.1/116.1	110/125	103/113	258/266
			112A00	24.0/32.0	66.7/77.0		121.1/133.9	125/150	116/128	269/279	124.9/137.7	125/150	121/132	273/283
			112A00,117A00	31.8/42.4	88.4/102.0		148.2/165.2	150/175	141/157	379/406	152.0/169.0	175/175	146/161	383/410
		HIGH	NONE	–	–	3.8	42.5	50	45	245	46.3	50	49	249
			117A00	7.8/10.4	21.7/25.0		69.6/73.7	70/80	70/74	267/270	73.4/77.5	80/80	74/78	271/274
			110A00	12.0/16.0	33.4/38.5		84.2/90.6	90/100	83/89	278/284	88.0/94.4	90/100	88/94	282/288
			111A00	18.6/24.8	51.7/59.7		107.1/117.1	110/125	105/114	297/305	110.9/120.9	125/125	109/118	301/309
			112A00	24.0/32.0	66.7/77.0		125.9/138.7	150/150	122/134	312/322	129.7/142.5	150/150	126/138	316/326
			112A00,117A00	31.8/42.4	88.4/102.0		153.0/170.0	175/175	147/162	422/449	156.8/173.8	175/175	151/167	426/453
	460–3–60	STD	NONE	–	–	1.8	17.9	20	19	95	19.7	25	21	97
			116A00	13.9	16.7		38.8	40	38	112	40.6	45	40	114
			113A00	16.5	19.8		42.7	45	42	115	44.5	45	44	117
			114A00	27.8	33.4		59.7	60	57	128	61.5	70	59	130
			115A00	33.0	39.7		67.6	70	65	135	69.4	70	67	137
			114A00,116A00	41.7	50.2		80.7	90	77	195	82.5	90	79	197
		MED	NONE	–	–	1.8	17.9	20	19	101	19.7	25	21	103
			116A00	13.9	16.7		38.8	40	38	118	40.6	45	40	120
			113A00	16.5	19.8		42.7	45	42	121	44.5	45	44	123
			114A00	27.8	33.4		59.7	60	57	134	61.5	70	59	136
			115A00	33.0	39.7		67.6	70	65	141	69.4	70	67	143
			114A00,116A00	41.7	50.2		80.7	90	77	201	82.5	90	79	203
		HIGH	NONE	–	–	1.8	19.7	25	21	123	21.5	25	23	125
			116A00	13.9	16.7		40.6	45	40	140	42.4	45	42	142
			113A00	16.5	19.8		44.5	45	44	143	46.3	50	46	145
			114A00	27.8	33.4		61.5	70	59	156	63.3	70	61	158
			115A00	33.0	39.7		69.4	70	67	163	71.2	80	69	165
			114A00,116A00	41.7	50.2		82.5	90	79	223	84.3	90	81	225
	575–3–60	STD	NONE	–	–	3.8	13.5	15	14	77	17.3	20	19	81
			118A00	17.0	20.4		39.0	40	38	97	42.8	45	42	101
			119A00	34.0	40.9		64.6	70	61	118	68.4	70	66	122
		MED	NONE	–	–	3.8	13.1	15	14	81	16.9	20	18	85
			118A00	17.0	20.4		38.6	40	37	101	42.4	45	42	105
			119A00	34.0	40.9		64.2	70	61	122	68.0	70	65	126
		HIGH	NONE	–	–	3.8	13.9	20	15	92	17.7	20	19	96
			118A00	17.0	20.4		39.4	40	38	112	43.2	45	43	116
			119A00	34.0	40.9		65.0	70	62	133	68.8	70	66	137

See Page 24 for table legend and notes.

Table 4—Unit Wire/MOCP Sizing Data - RHH090

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			P.E.	w/ PWRD C.O.							
							NO P.E.				w/ P.E. (pwrd fr/unit)			
			CRHEATER***	Nom (kW)	FLA	FLA	MCA	FUSE or HACR BRKR	DISC. SIZE		MCA	FUSE or HACR BRKR	DISC. SIZE	
									FLA	LRA			FLA	LRA
RHH090	208/230–3–60	STD	NONE	–	–	3.8	42.5	50	45	196	46.3	50	49	200
			117A00	7.8/10.4	21.7/25.0		69.6/73.7	70/80	70/74	218/221	73.4/77.5	80/80	74/78	222/225
			110A00	12.0/16.0	33.4/38.5		84.2/90.6	90/100	83/89	229/235	88.0/94.4	90/100	88/94	233/239
			111A00	18.6/24.8	51.7/59.7		107.1/117.1	110/125	105/114	248/256	110.9/120.9	125/125	109/118	252/260
			112A00	24.0/32.0	66.7/77.0		125.9/138.7	150/150	122/134	263/273	129.7/142.5	150/150	126/138	267/277
			112A00,117A00	31.8/42.4	88.4/102.0		153.0/170.0	175/175	147/162	373/400	156.8/173.8	175/175	151/167	377/404
		MED	NONE	–	–	3.8	42.5	50	45	207	46.3	50	49	211
			117A00	7.8/10.4	21.7/25.0		69.6/73.7	70/80	70/74	229/232	73.4/77.5	80/80	74/78	233/236
			110A00	12.0/16.0	33.4/38.5		84.2/90.6	90/100	83/89	240/246	88.0/94.4	90/100	88/94	244/250
			111A00	18.6/24.8	51.7/59.7		107.1/117.1	110/125	105/114	259/267	110.9/120.9	125/125	109/118	263/271
			112A00	24.0/32.0	66.7/77.0		125.9/138.7	150/150	122/134	274/284	129.7/142.5	150/150	126/138	278/288
			112A00,117A00	31.8/42.4	88.4/102.0		153.0/170.0	175/175	147/162	384/411	156.8/173.8	175/175	151/167	388/415
		HIGH	NONE	–	–	3.8	47.3	60	51	250	51.1	60	55	254
			117A00	7.8/10.4	21.7/25.0		74.4/78.5	80/80	76/79	272/275	78.2/82.3	80/90	80/84	276/279
			110A00	12.0/16.0	33.4/38.5		89.0/95.4	90/100	89/95	283/289	92.8/99.2	100/100	93/99	287/293
			111A00	18.6/24.8	51.7/59.7		111.9/121.9	125/125	110/119	302/310	115.7/125.7	125/150	114/124	306/314
			112A00	24.0/32.0	66.7/77.0		130.7/143.5	150/150	127/139	317/327	134.5/147.3	150/150	132/144	321/331
			112A00,117A00	31.8/42.4	88.4/102.0		157.8/174.8	175/175	152/168	427/454	161.6/178.6	175/200	157/172	431/458
	460–3–60	STD	NONE	–	–	1.8	20.1	25	21	97	21.9	25	23	99
			116A00	13.9	16.7		41.0	45	41	114	42.8	45	43	116
			113A00	16.5	19.8		44.9	45	44	117	46.7	50	46	119
			114A00	27.8	33.4		61.9	70	60	130	63.7	70	62	132
			115A00	33.0	39.7		69.8	70	67	137	71.6	80	69	139
			114A00,116A00	41.7	50.2		82.9	90	79	197	84.7	90	81	199
		MED	NONE	–	–	1.8	20.1	25	21	103	21.9	25	23	105
			116A00	13.9	16.7		41.0	45	41	120	42.8	45	43	122
			113A00	16.5	19.8		44.9	45	44	123	46.7	50	46	125
			114A00	27.8	33.4		61.9	70	60	136	63.7	70	62	138
			115A00	33.0	39.7		69.8	70	67	143	71.6	80	69	145
			114A00,116A00	41.7	50.2		82.9	90	79	203	84.7	90	81	205
		HIGH	NONE	–	–	1.8	21.9	25	23	125	23.7	30	26	127
			116A00	13.9	16.7		42.8	45	43	142	44.6	45	45	144
			113A00	16.5	19.8		46.7	50	46	145	48.5	50	48	147
			114A00	27.8	33.4		63.7	70	62	158	65.5	70	64	160
			115A00	33.0	39.7		71.6	80	69	165	73.4	80	71	167
			114A00,116A00	41.7	50.2		84.7	90	81	225	86.5	90	83	227
	575–3–60	STD	NONE	–	–	3.8	15.2	20	16	79	19.0	25	21	83
			118A00	17.0	20.4		40.7	45	40	99	44.5	45	44	103
			119A00	34.0	40.9		66.3	70	63	120	70.1	80	68	124
		MED	NONE	–	–	3.8	14.8	20	16	83	18.6	20	20	87
			118A00	17.0	20.4		40.3	45	39	103	44.1	45	44	107
			119A00	34.0	40.9		65.9	70	63	124	69.7	70	67	128
		HIGH	NONE	–	–	3.8	15.6	20	17	94	19.4	25	21	98
			118A00	17.0	20.4		41.1	45	40	114	44.9	45	45	118
			119A00	34.0	40.9		66.7	70	64	135	70.5	80	68	139

See Page 24 for table legend and notes.

Table 5—Unit Wire/MOCP Sizing Data - RHH102

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			P.E.	NO C.O. or UNPWR C.O.							
							NO P.E.				w/ P.E. (pwrd fr/unit)			
									DISC. SIZE				DISC. SIZE	
			CRHEATER***	Nom (kW)	FLA	FLA	MCA	FUSE or HACR BRKR	FLA	LRA	MCA	FUSE or HACR BRKR	FLA	LRA
RHH102	208/230–3–60	STD	NONE	–	–	3.8	41.9	50	44	201	45.7	60	48	205
			117A00	7.8/10.4	21.7/25.0		69.0/73.2	70/80	69/72	223/226	72.8/77.0	80/80	73/77	227/230
			110A00	12.0/16.0	33.4/38.5		83.7/90.0	90/100	82/88	234/240	87.5/93.8	90/100	86/92	238/244
			111A00	18.6/24.8	51.7/59.7		106.5/116.5	110/125	103/112	253/261	110.3/120.3	125/125	107/117	257/265
			112A00	24.0/32.0	66.7/77.0		125.3/138.2	150/150	120/132	268/278	129.1/142.0	150/150	125/137	272/282
			112A00,117A00	31.8/42.4	88.4/102.0		152.4/169.4	175/175	145/161	378/405	156.2/173.2	175/175	150/165	382/409
		MED	NONE	–	–	3.8	44.2	60	46	238	48.0	60	51	242
			117A00	7.8/10.4	21.7/25.0		71.3/75.5	80/80	71/75	260/263	75.1/79.3	80/80	76/79	264/267
			110A00	12.0/16.0	33.4/38.5		86.0/92.3	90/100	85/91	271/277	89.8/96.1	90/100	89/95	275/281
			111A00	18.6/24.8	51.7/59.7		108.8/118.8	110/125	106/115	290/298	112.6/122.6	125/125	110/119	294/302
			112A00	24.0/32.0	66.7/77.0		127.6/140.5	150/150	123/135	305/315	131.4/144.3	150/150	127/139	309/319
			112A00,117A00	31.8/42.4	88.4/102.0		154.7/171.7	175/175	148/164	415/442	158.5/175.5	175/200	152/168	419/446
		HIGH	NONE	–	–	3.8	44.2	60	46	238	48.0	60	51	242
			117A00	7.8/10.4	21.7/25.0		71.3/75.5	80/80	71/75	260/263	75.1/79.3	80/80	76/79	264/267
			110A00	12.0/16.0	33.4/38.5		86.0/92.3	90/100	85/91	271/277	89.8/96.1	90/100	89/95	275/281
			111A00	18.6/24.8	51.7/59.7		108.8/118.8	110/125	106/115	290/298	112.6/122.6	125/125	110/119	294/302
			112A00	24.0/32.0	66.7/77.0		127.6/140.5	150/150	123/135	305/315	131.4/144.3	150/150	127/139	309/319
			112A00,117A00	31.8/42.4	88.4/102.0		154.7/171.7	175/175	148/164	415/442	158.5/175.5	175/200	152/168	419/446
	460–3–60	STD	NONE	–	–	1.8	19.2	25	20	100	21.0	25	22	102
			116A00	13.9	16.7		40.0	45	39	117	41.8	45	41	119
			113A00	16.5	19.8		43.9	45	43	120	45.7	50	45	122
			114A00	27.8	33.4		60.9	70	58	133	62.7	70	60	135
			115A00	33.0	39.7		68.8	70	66	140	70.6	80	68	142
			114A00,116A00	41.7	50.2		81.9	90	78	200	83.7	90	80	202
		MED	NONE	–	–	1.8	20.0	25	21	119	21.8	25	23	121
			116A00	13.9	16.7		40.8	45	40	136	42.6	45	42	138
			113A00	16.5	19.8		44.7	45	44	139	46.5	50	46	141
			114A00	27.8	33.4		61.7	70	59	152	63.5	70	61	154
			115A00	33.0	39.7		69.6	70	67	159	71.4	80	69	161
			114A00,116A00	41.7	50.2		82.7	90	79	219	84.5	90	81	221
		HIGH	NONE	–	–	1.8	20.0	25	21	119	21.8	25	23	121
			116A00	13.9	16.7		40.8	45	40	136	42.6	45	42	138
			113A00	16.5	19.8		44.7	45	44	139	46.5	50	46	141
			114A00	27.8	33.4		61.7	70	59	152	63.5	70	61	154
			115A00	33.0	39.7		69.6	70	67	159	71.4	80	69	161
			114A00,116A00	41.7	50.2		82.7	90	79	219	84.5	90	81	221
	575–3–60	STD	NONE	–	–	3.8	15.4	20	16	81	19.2	25	20	85
			118A00	17.0	20.4		40.9	45	40	101	44.7	45	44	105
			119A00	34.0	40.9		66.5	70	63	122	70.3	80	68	126
		MED	NONE	–	–	3.8	15.8	20	17	96	19.6	25	21	100
			118A00	17.0	20.4		41.3	45	40	116	45.1	50	44	120
			119A00	34.0	40.9		66.9	70	64	137	70.7	80	68	141
		HIGH	NONE	–	–	3.8	15.8	20	17	96	19.6	25	21	100
			118A00	17.0	20.4		41.3	45	40	116	45.1	50	44	120
			119A00	34.0	40.9		66.9	70	64	137	70.7	80	68	141

See Page 24 for table legend and notes.

LEGEND:

BRKR	–	Circuit Breaker
CO	–	Convenient outlet
DISC	–	Disconnect
DISC	–	Direct Drive indoor fan motor
FLA	–	Full load amps
IFM	–	Indoor fan motor
LRA	–	Locked rotor amps
MCA	–	Minimum circuit amps
MOCP	–	Maximum over current protection
PE	–	Power exhaust
UNPWRD 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 v
BC = 231 v
AC = 226 v

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

$$= 227$$

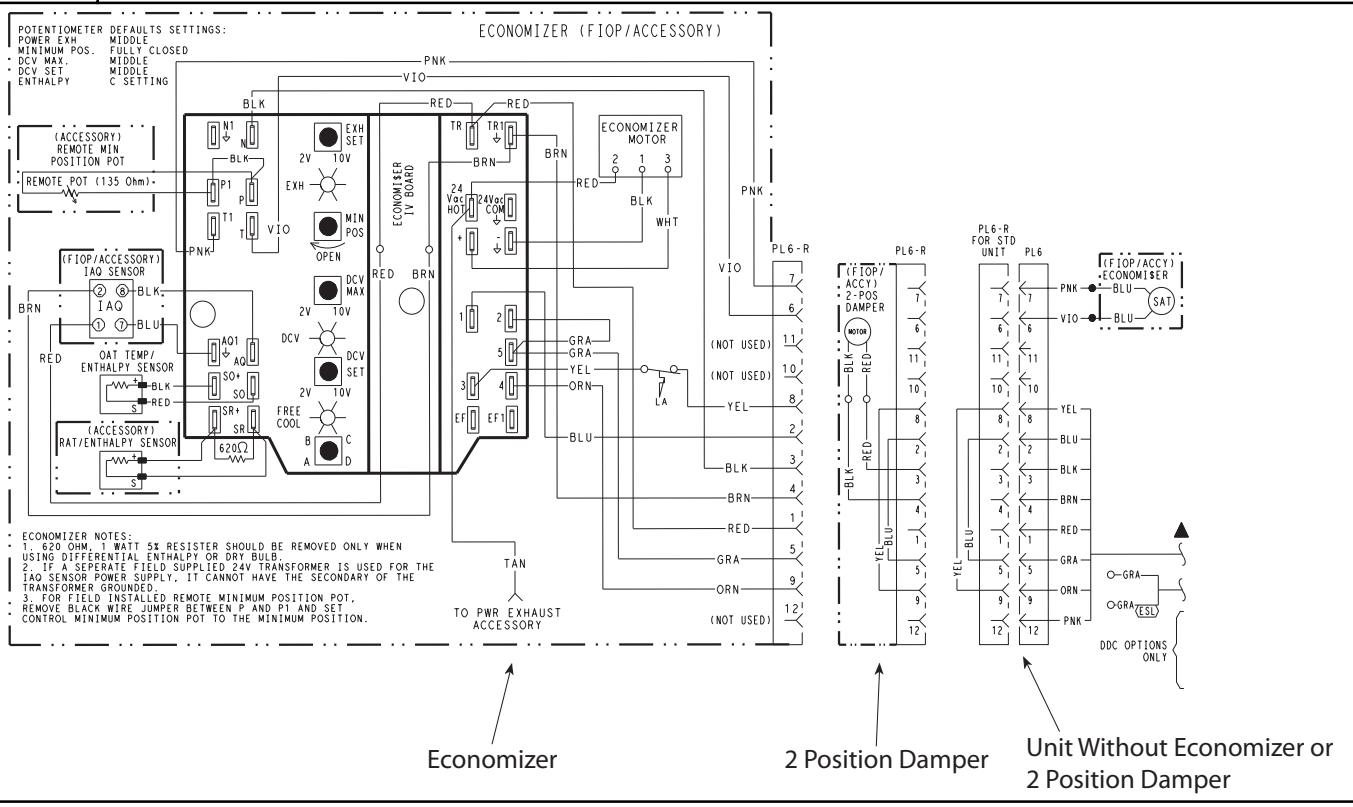
Determine maximum deviation from average voltage.
(AB) 227 – 224 = 3 v
(BC) 231 – 227 = 4 v
(AC) 227 – 226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

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

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

FIGURE 31 **Wiring for Optional Economizer**



Step 11 — Adjust Factory-Installed Options

Smoke Detector —

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

Economizer Occupancy Switch —

Refer to Fig. 31 for general Economizer wiring. External occupancy control is managed through a connection on the Controls Connections 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, As Required

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
- Economizer (with control and integrated barometric relief)
- Winter start kit
- Power exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Electric Heaters
- Single Point Kits
- Thermostats / Sensors
- Hood-type hail guard
- Phase monitor control

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