

# INSTALLATION INSTRUCTIONS

## R-410A Single Package Gas Heating / Electric Cooling

### RGH072 - 120

**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

#### FIRE, EXPLOSION HAZARD

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

Disconnect gas piping from unit when leak testing at pressure greater than 0.5 psig (3450 Pa). Pressures greater than 0.5 psig (3450 Pa) will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig (3450 Pa), it must be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig (3450 Pa) or less, a unit connected to such piping must be isolated by closing the manual gas valve.

### 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)

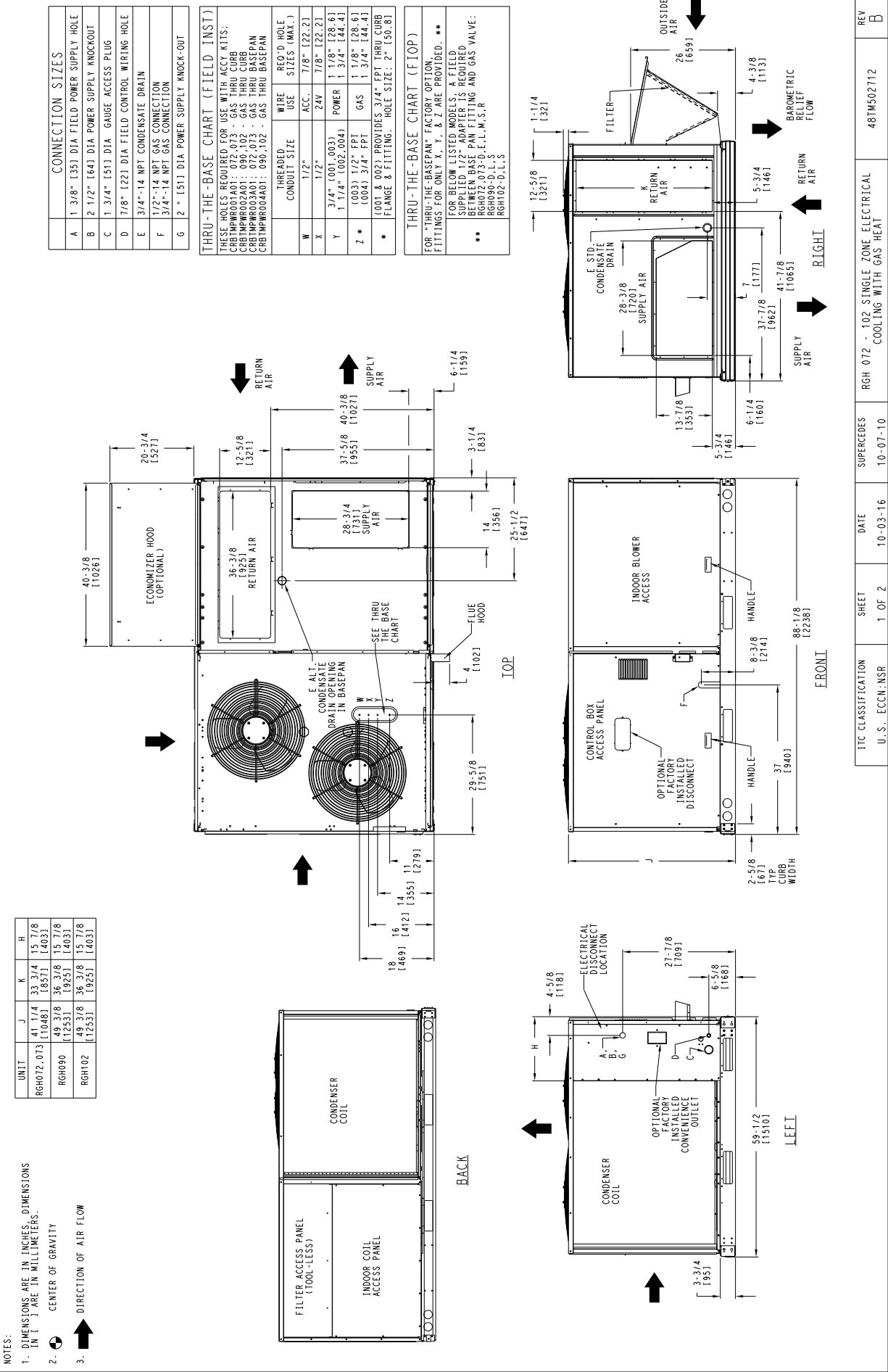
The table to the right lists the rated indoor airflow used for the AHRI efficiency rating for the units covered in this document.

Model Number	Full Load Airflow (cfm)
RGH072	2400
RGH073	2400
RGH090	3000
RGH102	3000
RGH110	3000
RGH120	3000

## MODEL NUMBER NOMENCLATURE

MODEL SERIES	R	G	H	0	9	0	H	D	A	A	0	A	A	A
Position Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
R = Rooftop														
G = Gas/Electric	<b>Type</b>													
H = High Efficiency	<b>Efficiency</b>													
072 = 72,000 = 6 tons (One Compressor) 073 = 73,000 = 6 tons (One Compressor) 090 = 90,000 = 7.5 tons (Two Compressors) 102 = 102,000 = 8.5 tons (Two Compressors) 110 = 110,000 = 10 tons (Two Compressors) 12 EER 120 = 120,000 = 10 tons (Two Compressors) 11.7 EER														
<b>Nominal Cooling Capacity</b>														
H= 208/230-3-60 L = 460-3-60 S = 575-3-60														
<b>Voltage</b>														
D = Low Heat E = Medium Heat F = High Heat S = Low Heat, Stainless Steel Heat Exchanger R = Medium Heat, Stainless Steel Heat Exchanger T = High Heat, Stainless Steel Heat Exchanger														
<b>Heating Capacity *</b>														
A = Standard Static Motor B = High Static Motor C = Medium Static Motor														
<b>Motor Options</b>														
A = None B = Economizer w/ Barometric Relief, OA Temp Sensor E = Economizer w/ Barometric Relief + CO <sub>2</sub> Sensor, OA Temp Sensor H = Economizer w/ Barometric Relief, Enthalpy Sensor L = Economizer w/ Barometric Relief + CO <sub>2</sub> Sensor, Enthalpy Sensor P = 2-Position Damper w/ Barometric Relief U = Temperature Ultra Low Leak Economizer w/ Barometric Relief W = Enthalpy Ultra Low Leak Economizer w/ Barometric Relief														
<b>Outdoor Air Options / Control</b>														
0A = No Options														
<b>Factory-Installed Options*</b>														
A = Aluminum / Copper Condenser and Evaporator Coils B = Pre-Coat Aluminum / Copper Condenser and Aluminum / Copper Evaporator Coils C = E-Coat Aluminum / Copper Condenser and Aluminum / Copper Evaporator Coils D = E-Coat Aluminum / Copper Condenser and E-Coat Aluminum / Copper Evaporator Coils E = Copper / Copper Condenser and Aluminum / Copper Evaporator Coils F = Copper / Copper Condenser and Copper / Copper Evaporator Coils														
<b>Condenser / Evaporator Coil Configuration</b>														
A = Standard Motor T = 2-Speed Indoor Fan VFD Controller (for 2-stage units only)														
<b>Indoor Fan Motor Speed</b>														

\* See RGH 3 to 12.5 ton Product Specification for details.



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

UNIT	J	K	H
RGH072-073	41-1/4 [1048]	33-3/4 [857]	15-7/8 [403]
RGH090	49-3/8 [1253]	36-3/8 [925]	15-7/8 [403]
RGH102	49-3/8 [1253]	36-3/8 [925]	15-7/8 [403]

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
F	1/2"-14 NPT GAS CONNECTION
G	3/4"-14 NPT GAS CONNECTION
H	2" [51] DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART (FIELD INST)	
THESE HOLES REQUIRED FOR USE WITH ACCY. KITS:	
CRB1MPWR001A01: 072-073 - GAS THRU CURB	
CRB1MPWR002A01: 090-102 - GAS THRU CURB	
CRB1MPWR003A01: 072-073 - GAS THRU BASEPAN	
CRB1MPWR004A01: 090-102 - GAS THRU BASEPAN	
THREADED CONDUIT SIZE	REQ'D HOLE SIZES (MAX.)
W 1/2"	ACC. 7/8" [22.2]
X 1/2"	24V 7/8" [22.2]
Y 3/4" (001,003)	POWER 1 1/8" [28.6]
1 1/4" (002,004)	POWER 1 3/4" [44.4]
Z* (003) 1/2" FPT	GAS 1 1/8" [28.6]
(004) 3/4" FPT	GAS 1 3/4" [44.4]
* (001 & 002) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING. HOLE SIZE: 2" [50.8]	

THRU-THE-BASE CHART (FIOP)  
 FOR "THRU-THE-BASEPAN" FACTORY OPTION.  
 FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED. \*\*  
 FOR BELOW LISTED MODELS, A FIELD SUPPLIED 1/2" ADAPTER IS REQUIRED BETWEEN BASE PAN FITTING AND GAS VALVE:  
 RGH072-073-D.E.L.M.S.R  
 RGH090-D.L.S  
 RGH102-D.L.S

Fig. 1 - RGH 072-102 Unit Dimensional Drawing, sheet 1 of 2

TIC CLASSIFICATION	SHEET	DATE	SUPERCEDES	REV
U.S. ECCN: NSR	1 OF 2	10-03-16	10-07-10	B
RGH 072 - 102 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT				48TW502712

\* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.  
 FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

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			
RGH072.013	765	347	185.3	75	152.7	69.3	274.7	97.4	232.3	105.4	42	374	1882.6	19	778	[505]
RGH090	925	419.3	204.1	92.6	190.9	86.6	286.1	116.2	273.9	124.2	42	578	17082	34	778	[867]
RGH102	925	419.3	204.1	92.6	190.9	86.6	286.1	116.2	273.9	124.2	42	578	17082	34	778	[867]

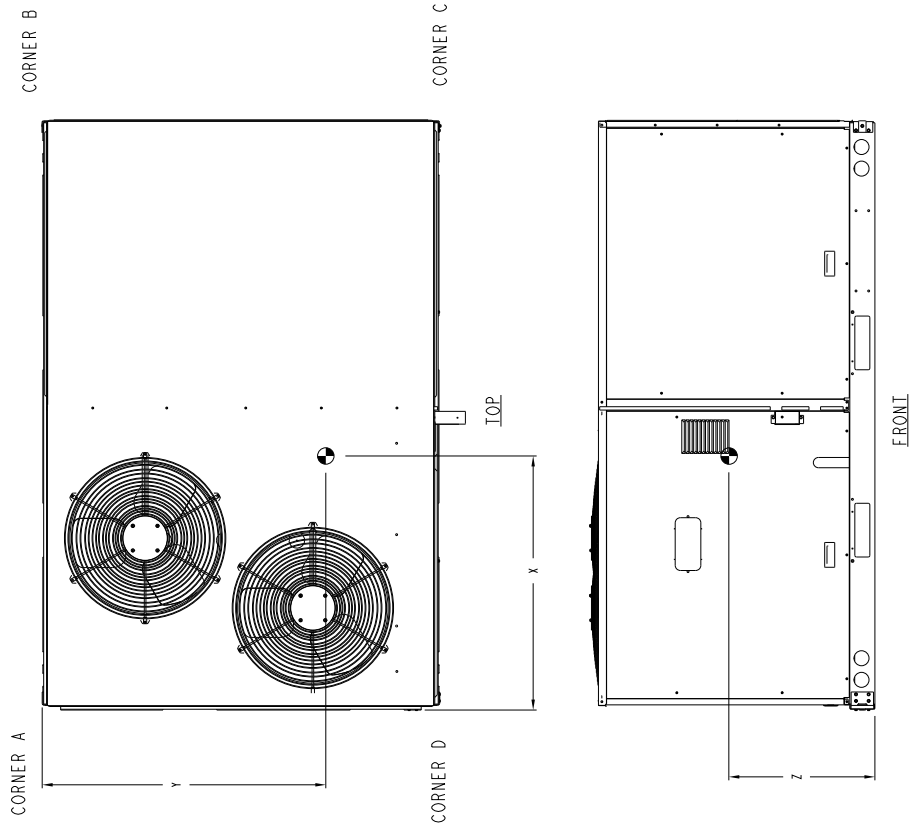


Fig. 1 - RGH 072-102 Unit Dimensional Drawing, sheet 2 of 2

REV	B
48TM502712	
RGH 072 - 102 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	
SUPERCEDES	10-07-10
DATE	10-03-16
SHEET	2 OF 2
TIC CLASSIFICATION	U.S. ECCN: NSR

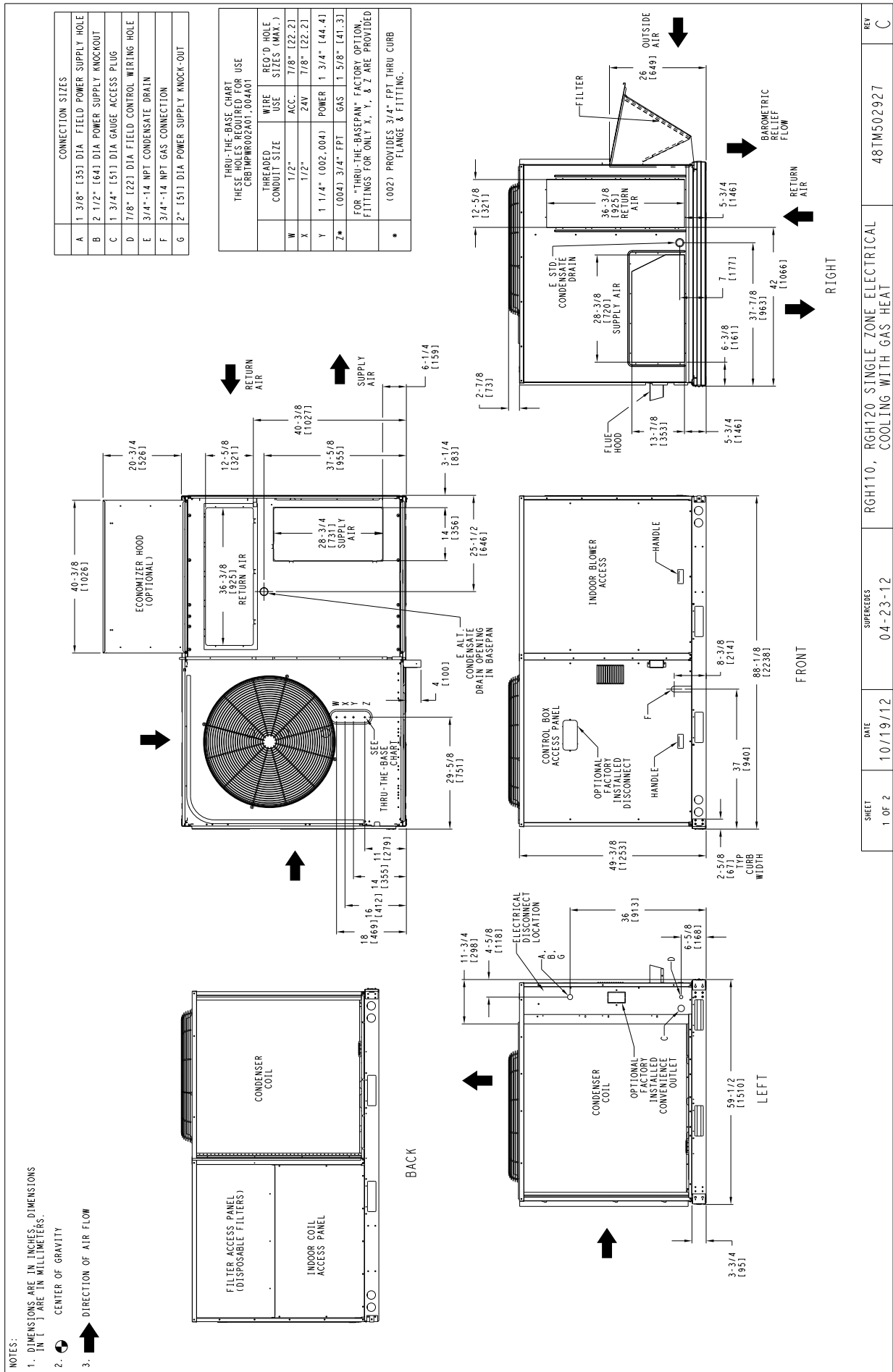


Fig. 2 - RGH 110-120 Unit Dimensional Drawing, sheet 1 of 2

SHEET 1 OF 2	DATE 10/19/12	SUPERSEDES 04-23-12	RGH110, RGH120 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	REV C
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UNIT	STD. WEIGHT * LBS. / KG.	CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C. G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
RGH120	1090 / 495	311	142	162	74	211	96	405	184	30.178 [766]	33.578 [855]	20.3/4 [528]
RGH110	1090 / 495	311	142	162	74	211	96	405	184	30.178 [766]	33.578 [855]	20.3/4 [528]

\* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING. FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

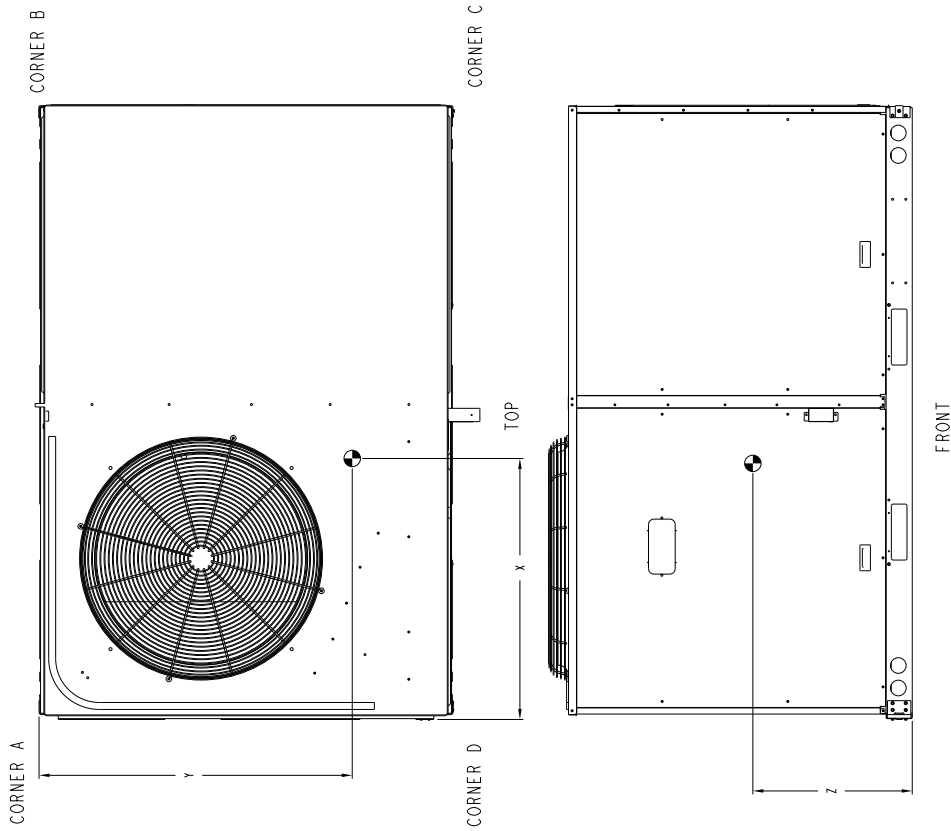
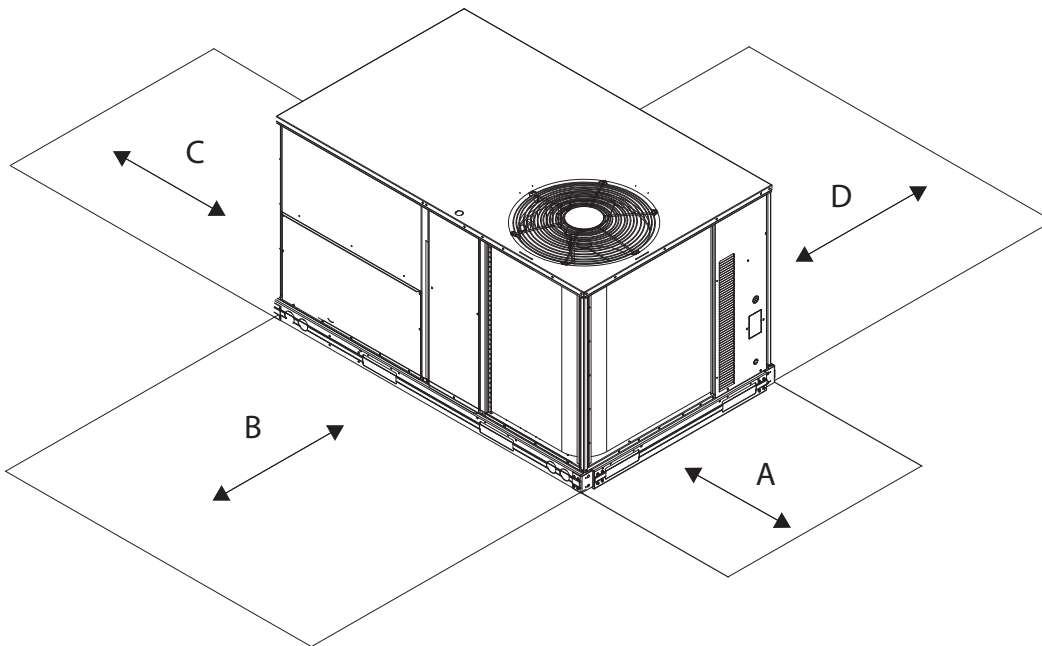


Fig. 2 - RGH 110-120 Unit Dimensional Drawing, sheet 2 of 2

SHEET 2 OF 2	DATE 10/19/12	SUPERSEDES 04-23-12	RGH110, RGH120 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM502927	REV C
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C08337

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	48-in (1219 mm) 42-in (1067 mm) 36-in (914 mm) Special	No flue discharge accessory installed, surface is combustible material Surface behind servicer is grounded (e.g., metal, masonry wall, another unit) Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass) Check for adjacent units or building fresh air intakes within 10-ft (3 m) of this unit's flue outlet

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

**Fig. 3 - 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 the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 3.

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

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

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

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute) and NFPA (National Fire Protection Association) 54 TIA--54--84--1. In Canada, installation must be in accordance with the CAN1--B149 installation codes for gas burning appliances.

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

Locate mechanical draft system flue assembly at least 4 ft (1.2 m) from any opening through which combustion products could enter the building, and at least 4 ft (1.2 m)

from any adjacent building (or per local code). Locate the flue assembly at least 10 ft (3.05 m) from an adjacent unit's fresh air intake hood if within 3 ft (0.91 m) of same elevation (or per local code). When unit is located adjacent to public walkways, flue assembly must be at least 7 ft (2.1 m) above grade.

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 11 — 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 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 11 for details)
- Rig and place unit
- Install outdoor air hood
- Install flue hood
- Install gas piping
- 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 flue hood
- Install gas piping
- 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.

On units with hinged panel option, check to be sure all latches are snug and in closed position.

Locate the carton containing the outside air hood parts; see Fig. 9 on page 13. Do not remove carton until unit has been rigged and located in final position.

### 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.

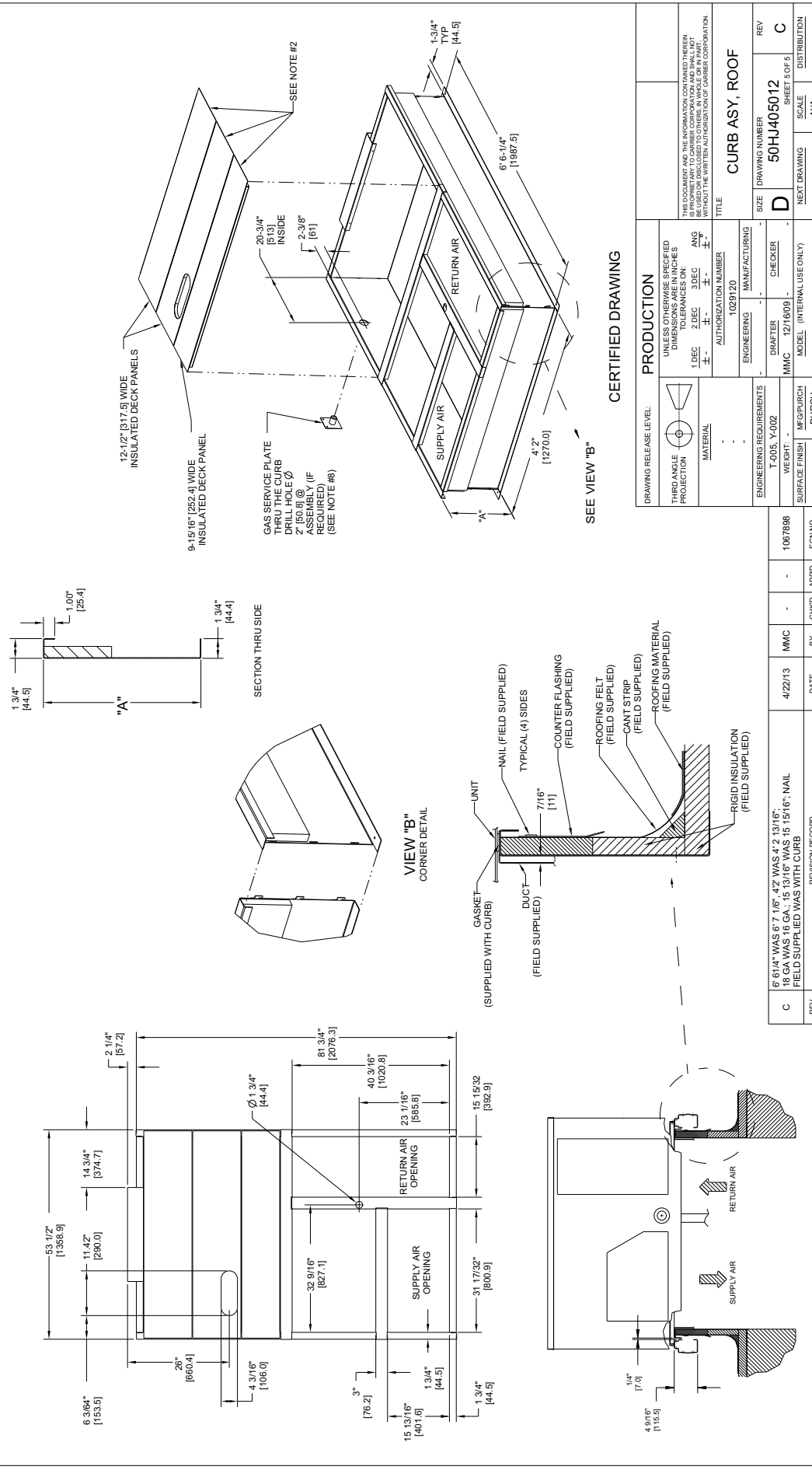
Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 5. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

**Table 1 – Operating Weights**

RGS	UNITS LB (KG)			
	072/073	090	102	110/120
Base Unit	765 (347)	925 (419.5)	925 (419.5)	1090 (495)
Economizer				
Vertical	75 (34)	75 (34)	75 (34)	75 (34)
Horizontal	122 (55)	122 (55)	122 (55)	122 (55)
Hot Gas Re-Heat System <sup>1</sup>	80 (36)	80 (36)	80 (36)	85 (39)
Cu Fins	25 (11)	43 (20)	56 (25)	73 (33)
Powered Outlet	35 (16)	35 (16)	35 (16)	35 (16)
Curb				
14-in/356 mm	143 (65)	143 (65)	143 (65)	143 (65)
24-in/610 mm	245 (111)	245 (111)	245 (111)	245 (111)

<sup>1</sup> Not available for size 110 units.

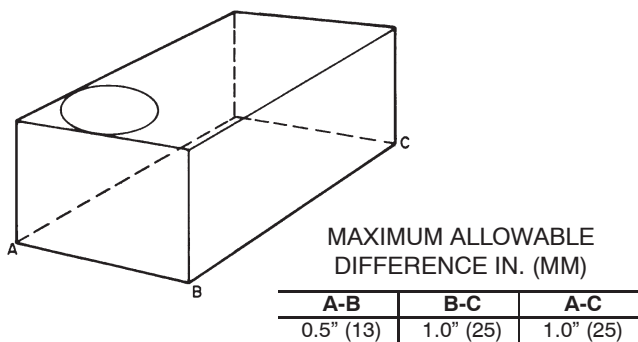
ROOF CURB ACCESSORY #	A	NOTES: 1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED. 2. INSULATED PANELS: .25" (1") THK. POLYURETHANE FOAM, 44.5 (1.341) # DENSITY. 3. DIMENSIONS IN ( ) ARE IN MILLIMETERS. 4. ROOF CURB IS 18 GAGE STEEL. (FLANGES OF DUCT REST ON CURB). 5. ROOF CURB IS 18 GAGE STEEL. (FLANGES OF DUCT REST ON CURB). 6. SERVICE CLEARANCE 4 FEET ON EACH SIDE. 7. DIRECTION OF AIR FLOW. 8. CONNECTOR PACKAGE CRBTMPWR002A01 IS FOR THRU-THE-CURB GAS TYPE PACKAGE CRBTMPWR004A01 IS FOR THRU-THE-BOTTOM TYPE GAS CONNECTIONS.				CONNECTOR PKG. ACC.	GAS CONNECTION TYPE	GAS FITTING	POWER WIRING FITTING	CONTROL WIRING FITTING	ACCESSORY CONVENIENCE OUTLET WIRING CONNECTOR
CRRFCURB003A01	1.4" [356]	CRBTMPWR002A01	THRU-THE-CURB	3/4" [19]	1 1/4" [31.7] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT			
CRRFCURB004A01	2.4" [610]	CRBTMPWR004A01	THRU-THE-BOTTOM								



DRAWING RELEASE LEVEL:		PRODUCTION	
THIS DRAWING IS THE PROPERTY OF THE COMPANY AND SHALL NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT THE WRITTEN AUTHORIZATION OF THE COMPANY.	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE TO BE TAKEN TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED	1 DEC 2 DEC 3 DEC	ANG ± ± ±
MATERIAL	ENGINEERING REQUIREMENTS	ENGINEERING	MANUFACTURING
	T-005, Y-002	1029120	
SURFACE FINISH	DRUGHTER	CHECKER	REV
PURCH	MMC	12/16/09	D
	MODEL (INTERNAL USE ONLY)		50HJ405012
			SCALE
			N/A
			DISTRIBUTION
			C

REVISION RECORD	DATE	BY	CHKD	APFD	ED NO.
C	4/22/13	MMC			1067898
6' 6 1/4" WAS 6' 7 1/8", 4" WAS 4' 2 13/16", 16 GA. WAS 16 GA., 15 13/16" WAS 15 15/16", NAIL FIELD SUPPLIED WAS WITH CURB					

Fig. 4 - Roof Curb Details



**Fig. 5 - Unit Leveling Tolerances**

C06110

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 field-installed thru-the-roof curb gas connections are desired, use factory-supplied pipe coupling and gas plate assembly to mount the thru-the-roof curb connection to the roof curb. Gas connections and power connections to the unit must be field-installed after the unit is installed 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 3 equally spaced 4-in. x 4-in. (102 mm x 102 mm) pads on each side.

**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.

A minimum clearance is not required around ductwork.

**▲ 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.

**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. 6 for additional information.

Lifting holes are provided in base rails as shown in Fig. 6. Refer to rigging instructions on unit.

Rigging materials under unit (cardboard 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 11 - Install External Condensate Trap and Line on page 17.

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

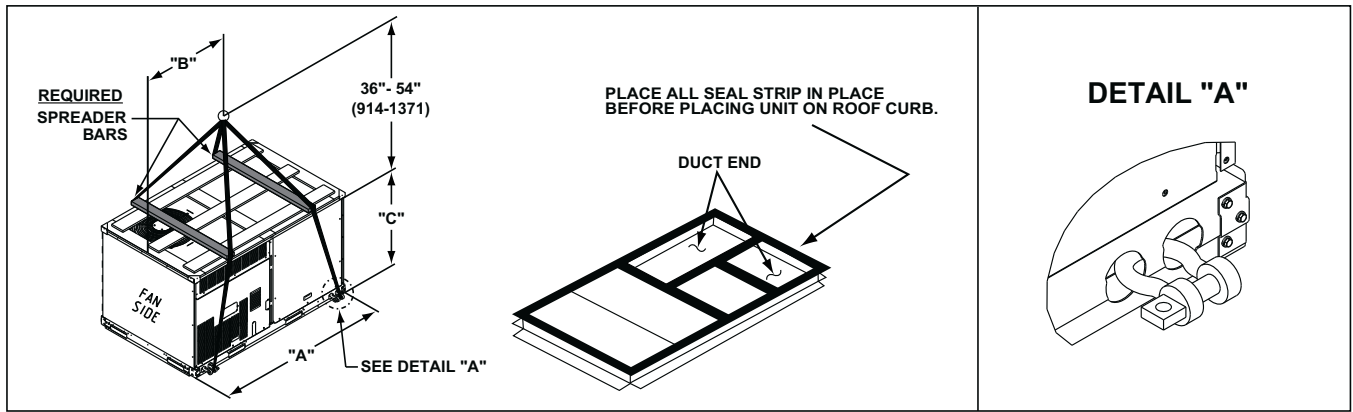
**▲ CAUTION**

**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		DIMENSIONS					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
RGH072/073	1200	545	88.0	2235	44.0	1120	41.5	1055
RGH090	1420	645	88.0	2235	44.0	1120	49.5	1255
RGH102	1420	645	88.0	2235	44.0	1120	49.5	1255
RGH110/120	1665	757	88.0	2235	32.0	815	49.5	1255

**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. 6 - 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 3-5/16 in (84 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 when panels or packaging are removed.

Flue vent discharge must have a minimum horizontal clearance of 4 ft (1220 mm) from electric and gas meters, gas regulators, and gas relief equipment. Minimum distance between unit and other electrically live parts is 48 inches (1220 mm).

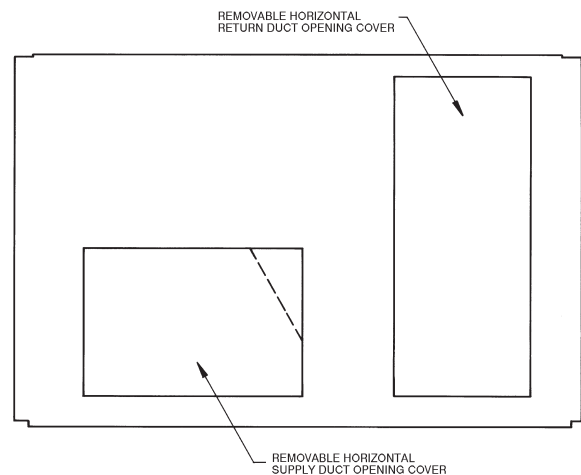
Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

**NOTE:** Installation of accessory flue discharge deflector kit will reduce the minimum clearance to combustible material to 18 in. (460 mm).

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, 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.



C06108

**Fig. 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 Outside Air Hood

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

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. 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. 9.) 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*, 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. 10.
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. 11.
3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. 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. 12.
5. Insert the hood divider between the hood sides. See Fig. 11 and 12. 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.

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

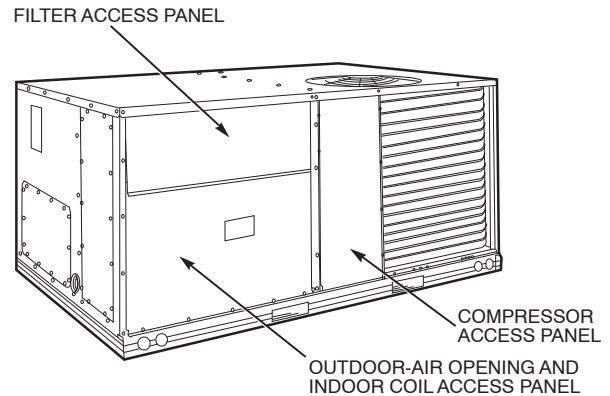


Fig. 8 - Typical Access Panel Locations

C06023

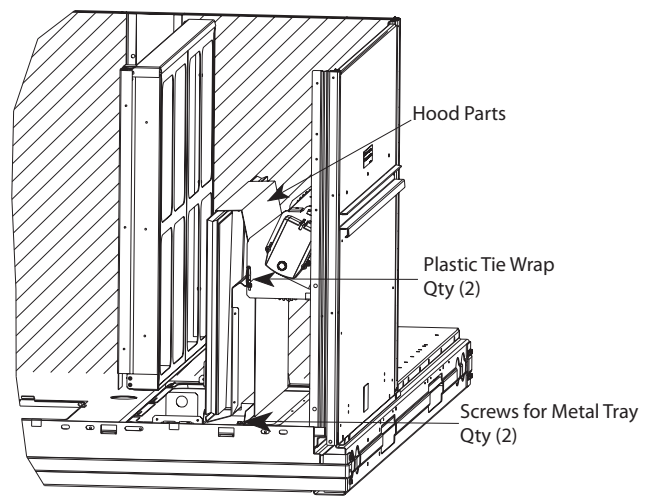


Fig. 9 - Economizer and Two-Position Damper Hood Parts Location

C08639

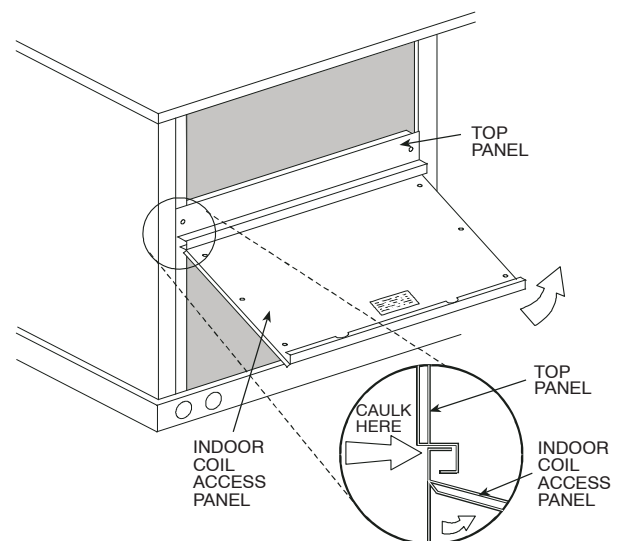
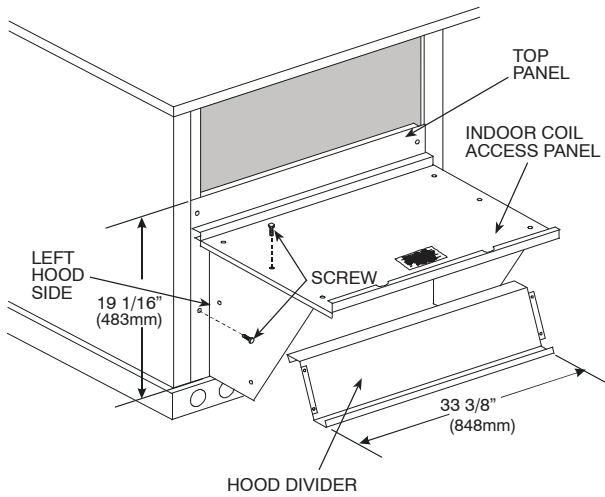


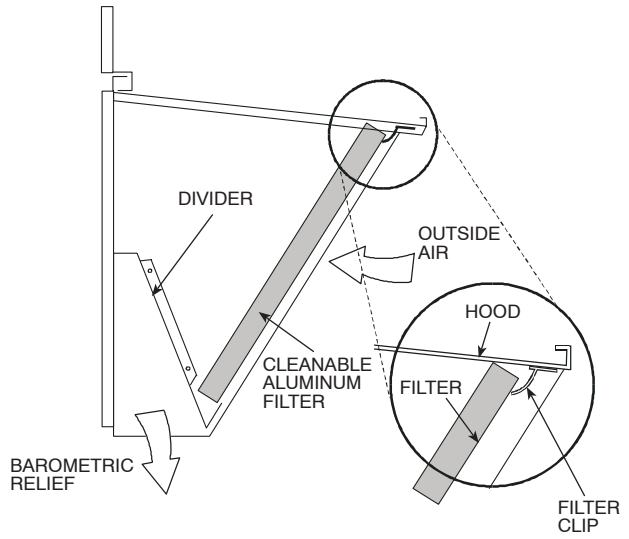
Fig. 10 - Indoor Coil Access Panel Relocation

C06025



**Fig. 11 - Economizer Hood Construction**

C06026

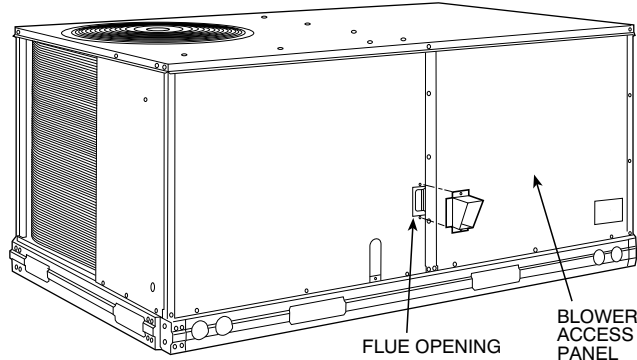


**Fig. 12 - Economizer Filter Installation**

C08634

**Step 9 — Install Flue Hood**

Flue hood is shipped screwed to the basepan beside the burner compartment access panel. Remove from shipping location and using screws provided, install flue hood and screen in location shown in Fig. 13. Insert the flue hood's side flange through the access panel cutout, then rotate the flue hood until the top and bottom flanges contact the outside of the access panel; secure flue hood with screws.



**Fig. 13 - Flue Hood Details**

C12757

**Step 10 — Install Gas Piping**

Installation of the gas piping must be accordance with local building codes and with applicable national codes. In U.S.A., refer to NFPA 54/ANSI Z223.1 National Fuel Gas Code (NFGC). In Canada, installation must be accordance with the CAN/CSA B149.1 and CAN/CSA B149.2 installation codes for gas burning appliances.

This unit is factory equipped for use with Natural Gas fuel at elevations up to 2000 ft (610 m) above sea level. Unit may be field converted for operation at elevations above 2000 ft (610 m) and/or for use with liquefied petroleum fuel. See accessory kit installation instructions regarding these accessories.

**NOTE:** Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. The input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level.

*For natural gas applications, gas pressure at unit gas connection must not be less than 4 in. wg (996 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating. For liquefied petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13 in. wg (3240 Pa) at the unit connection.*

The gas supply pipe enters the unit at the burner access panel on the front side of the unit, through the long slot at the bottom of the access panel. The gas connection to the unit is made to the 1/2-in. or 3/4-in. FPT gas inlet port on the unit gas valve.

**Table 2 – Natural Gas Supply Line Pressure Ranges**

UNIT MODEL	UNIT SIZE	MIN	MAX
RGH	072, 073, 102, 110, 120	4.0 in. wg (996 Pa)	13.0 in. wg (3240 Pa)

**Table 3 – Liquid Propane Supply Line Pressure Ranges**

UNIT MODEL	UNIT SIZE	MIN	MAX
RGH	072, 073, 102, 110, 120	11.0 in. wg (2740 Pa)	13.0 in. wg (3240 Pa)

Manifold pressure is factory-adjusted for NG fuel use. Adjust as required to obtain best flame characteristics.

**Table 4 – Natural Gas Manifold Pressure Ranges**

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE <sup>‡</sup>
RGH	072, 073, 102, 110, 120	3.5 in. wg (872 Pa)	2.0 in. wg (498 Pa)
<sup>‡</sup> NOTE – LOW FIRE, 1.7 in. wg (423 Pa), applies to the following units only: RGH072*D/S, RGH073*D/S, RGH090*D/S, and RGH102*D/S			

Manifold pressure for LP fuel use must be adjusted to specified range. Follow instructions in the accessory kit to make initial readjustment.

**Table 5 – Liquid Propane Manifold Pressure Ranges**

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE <sup>‡</sup>
RGH	072, 073, 102, 110, 120	10.0 in. wg (2490 Pa)	5.7 in. wg (1420 Pa)
<sup>‡</sup> NOTE – LOW FIRE, 5.0 in. wg (1420 Pa), applies to the following units only: RGH072*D/S, RGH073*D/S, RGH090*D/S, and RGH102*D/S			

# ⚠ CAUTION

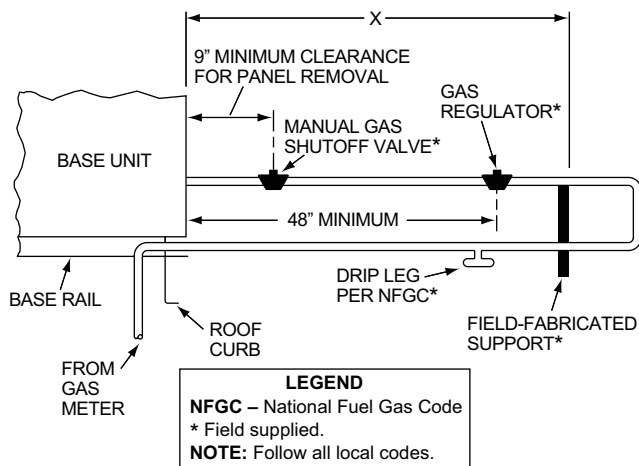
## EQUIPMENT DAMAGE HAZARD

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

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

Install a gas supply line that runs to the unit heating section. Refer to the NFPA 54/NFPA or equivalent code for gas pipe sizing data. Do not use a pipe smaller than the size specified. Size the gas supply line to allow for a maximum pressure drop of 0.5-in wg (124 Pa) between gas regulator source and unit gas valve connection when unit is operating at high-fire flow rate.

The gas supply line can approach the unit in three ways: horizontally from outside the unit (across the roof), thru-curb/under unit basepan (accessory kit required) or through unit basepan (factory-option or accessory kit required). Consult accessory kit installation instructions for details on these installation methods. Observe clearance to gas line components per Fig. 14.



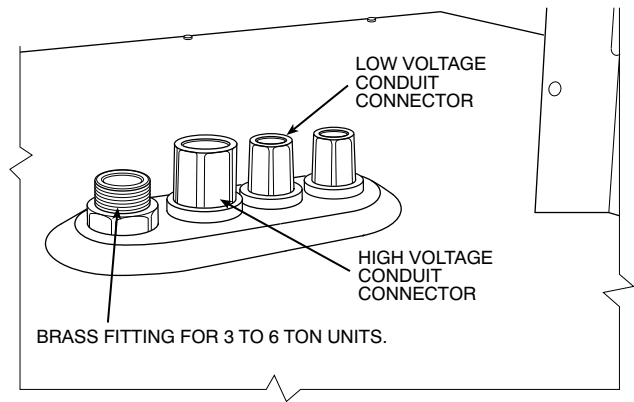
STEEL PIPE NOMINAL DIAMETER (in.)	SPACING OF SUPPORTS X DIMENSION (ft)
1/2	6
3/4 or 1	8
1 1/4 or larger	10

C11091

**Fig. 14 - Gas Piping Guide (with Accessory Thru-the-Curb Service Connections)**

### Optional Thru-Base Connections (Gas Connections) —

This accessory service connection kit (field-installed) consists of a NPT gas adapter fitting, an 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. See Fig. 15.



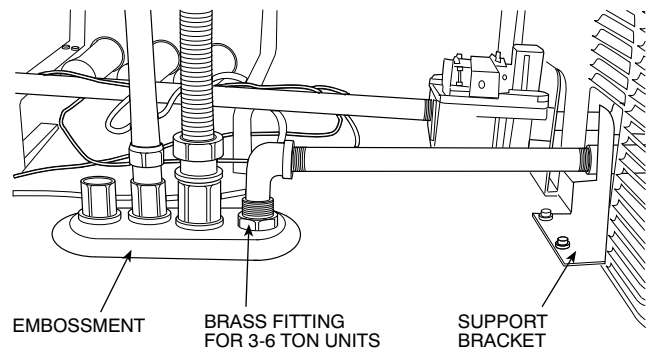
C13410

**Fig. 15 - Thru-Base Connection Fittings**

The thru-base gas connector has male and female threads. The male threads protrude above the basepan of the unit; the female threads protrude below the basepan.

Check tightness of connector lock nuts before connecting gas piping.

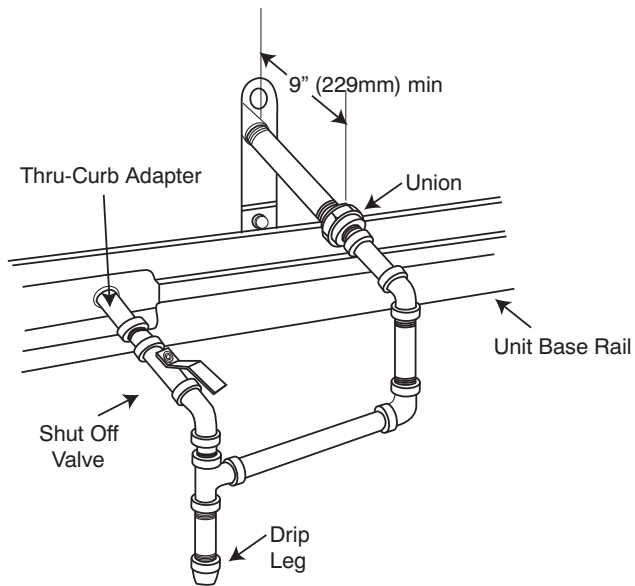
Gas Line: Install a 1/2-in (090 and 102 size Low Gas units only) or 3/4-in (for all other units) NPT street elbow on the thru-base gas fitting. Attach an appropriate size pipe nipple with minimum length of 16-in (406 mm) (field-supplied) to the street elbow and extend it through the access panel at the gas support bracket. See Fig. 16.



C13411

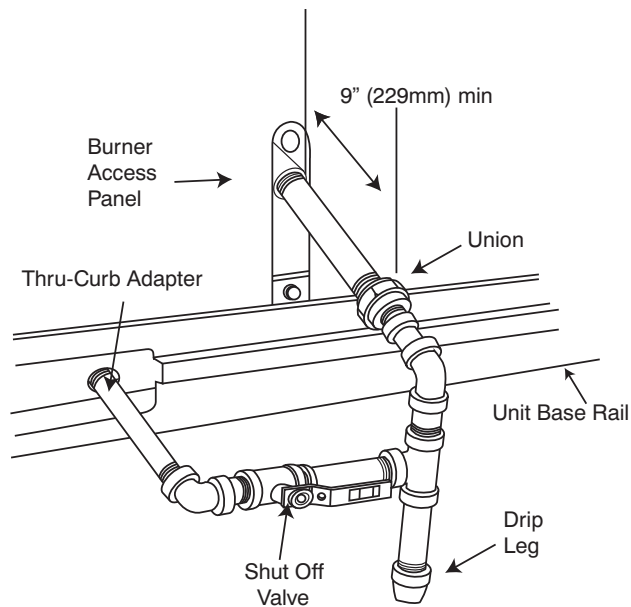
**Fig. 16 - Gas Line Piping**

Other hardware required to complete the installation of the gas supply line will include a manual shutoff valve, a sediment trap (drip leg) and a ground-joint union. A pressure regulator valve may also be required (to convert gas pressure from pounds to inches of pressure). The manual shutoff valve must be located within 6-ft (1.83 m) of the unit. The union, located in the final leg entering the unit, must be located at least 9-in (230 mm) away from the access panel to permit the panel to be removed for service. If a regulator valve is installed, it must be located a minimum of 4-ft (1220 mm) away from the unit's flue outlet. Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 17 and Fig. 18 for typical piping arrangements for gas piping that has been routed through the sidewall of the curb. See Fig. 19 for typical piping arrangement when thru-base is used. Ensure that all piping does not block access to the unit's main control box or limit the required working space in front of the control box.



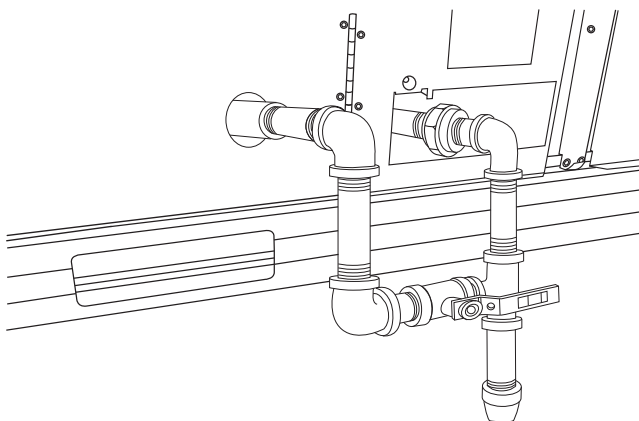
C07469

**Fig. 17 - Gas Piping with Thru-Curb Accessory**



C07470

**Fig. 18 - Gas Piping with Thru-Curb Accessory (alternate layout)**



C08018

**Fig. 19 - Gas Piping with Thru-Base Accessory**

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to the NFPA 54/ANSI Z223.1 NFGC latest edition (in Canada, CAN/CSA B149.1). In the absence of local building codes, adhere to the following pertinent recommendations:

1. Avoid low spots in long runs of pipe. Grade all pipe  $\frac{1}{4}$ -in. in every 15 ft (7 mm in every 5 m) to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft (1.8 m). For pipe sizes larger than  $\frac{1}{2}$ -in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. If using PTFE (Teflon\*) tape, ensure the material is Double Density type and is labeled for use on gas lines. Apply tape per manufacturer's instructions.
4. Pressure-test all gas piping in accordance with local and national plumbing and gas codes before connecting piping to unit.

**NOTE:** Pressure test the gas supply system after the gas supply piping is connected to the gas valve. The supply piping must be disconnected from the gas valve during the testing of the piping systems when test pressure is in excess of 0.5 psig (3450 Pa). Pressure test the gas supply piping system at pressures equal to or less than 0.5 psig (3450 Pa). The unit heating section must be isolated from the gas piping system by closing the external main manual shutoff valve and slightly opening the ground-joint union.

Check for gas leaks at the field-installed and factory-installed gas lines after all piping connections have been completed. Use soap-and-water solution (or method specified by local codes and/or regulations).

## ⚠ WARNING

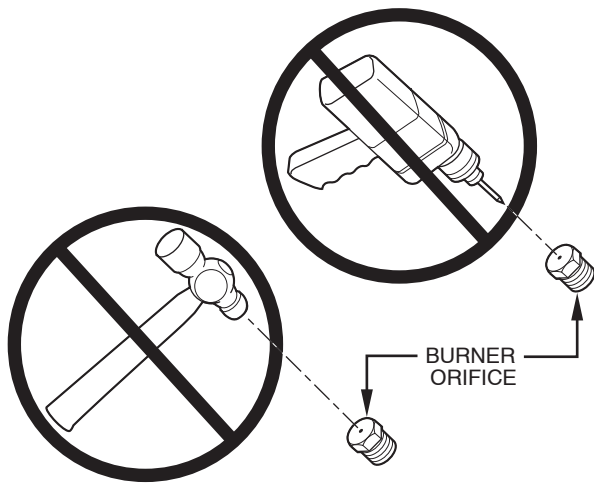
### FIRE OR EXPLOSION HAZARD

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

- Connect gas pipe to unit using a backup wrench to avoid damaging gas controls.
- Never purge a gas line into a combustion chamber.
- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections.
- Use proper length of pipe to avoid stress on gas control manifold.

**NOTE:** If orifice hole appears damaged or it is suspected to have been redrilled, check orifice hole with a numbered drill bit of correct size. Never redrill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

\* Teflon is a registered trademark of DuPont.

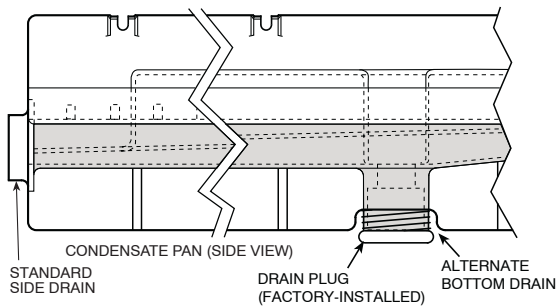


**Fig. 20 - Orifice Hole**

A93059

### Step 11 — 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. 21. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

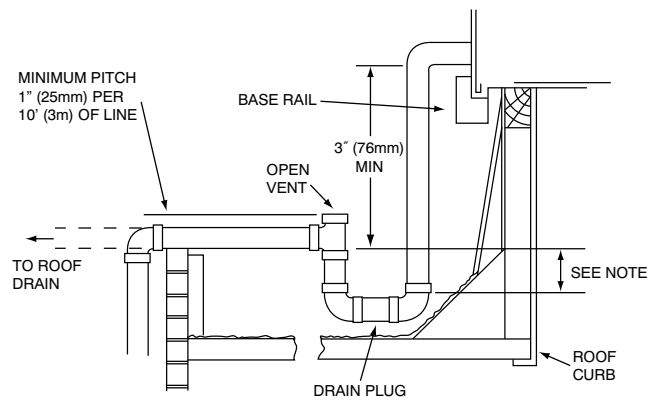


**Fig. 21 - Condensate Drain Pan (Side View)**

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. 22.



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

**Fig. 22 - Condensate Drain Piping Details**

C11291

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 12 — Make Electrical Connections

## ⚠ WARNING

### ELECTRICAL SHOCK HAZARD

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

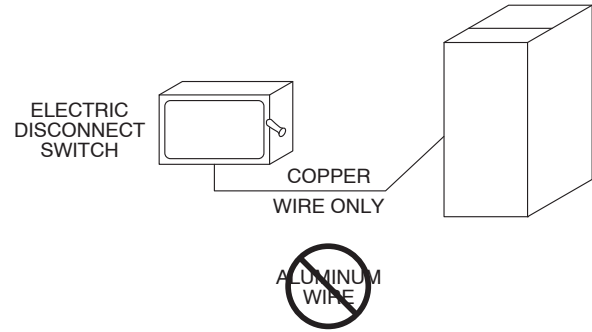
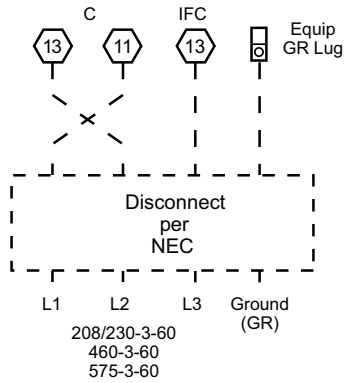
Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed 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 —

If equipped with optional Powered Convenience Outlet: The power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of the unit-mounted disconnect. (Check with local codes to ensure this method is acceptable in your area.) If a de-energize via unit disconnect switch operation of the convenience outlet is desired, connect the source leads to the load side of the unit disconnect. On a unit without a unit-mounted disconnect, connect the source leads to compressor contactor C and indoor fan contactor IFC pressure lugs with unit field power leads (see Fig. 23).

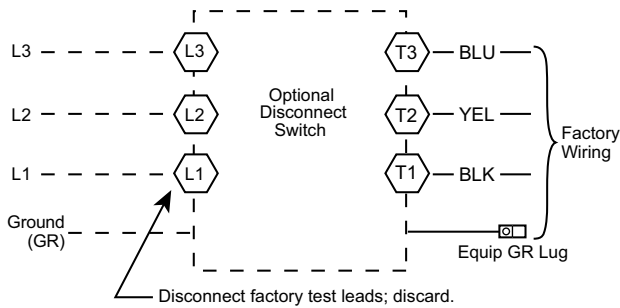
### Units Without Disconnect Option



**Fig. 24 - Disconnect Switch and Unit**

A93033

### Units With Disconnect Option



**Fig. 23 - Power Wiring Connections**

C12741

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 (see wiring diagram label for control box component arrangement), at factory-installed option non-fused disconnect switch. Max wire size is #4 AWG (copper only) per pole on contactors and #2ga AWG (copper only) per pole on optional non-fused disconnect. See Fig. 23 and the unit label diagram for field power wiring connections.

**NOTE: TEST LEADS** - Unit may be equipped with short leads (pigtailed) 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 personal injury, death, or property damage.

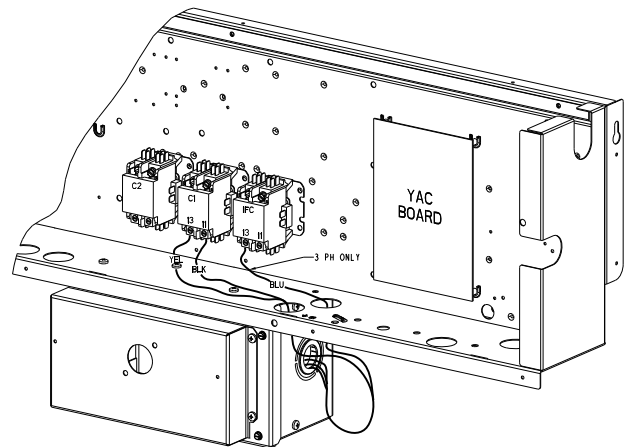
Do not connect aluminum wire between disconnect switch and RGS unit. Use only copper wire.

(See Fig. 24.)

### 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. 23).

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



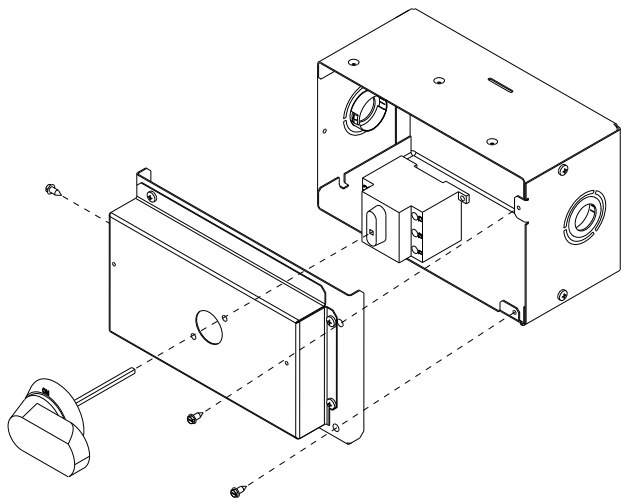
**Fig. 25 - Location of Non-Fused Disconnect Enclosure**

C12278

### To field install the NFD shaft and handle:

1. Remove the unit front panel (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. See Fig. 26.
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. 26 - 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. 23 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Maximum wire size is #4 ga AWG (copper only) per pole on contactors and #2ga AWG (copper only) per pole on optional non-fused disconnect.

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 MOC (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.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. See Tables 6 and 7. 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 Tables 6 and 7, Note 3 (see page 30) 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.

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

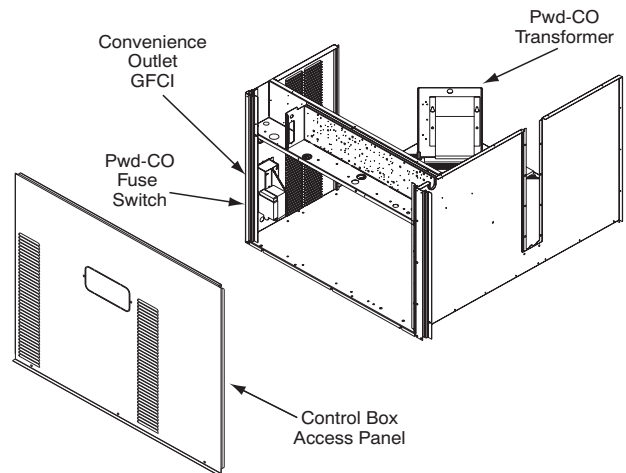
**Convenience Outlets —**

**⚠ 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. 27 - Convenience Outlet Location**

Two types of convenience outlets are offered on RGH units: non-powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the end panel of the unit. See Fig. 27.

**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. 28. 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.

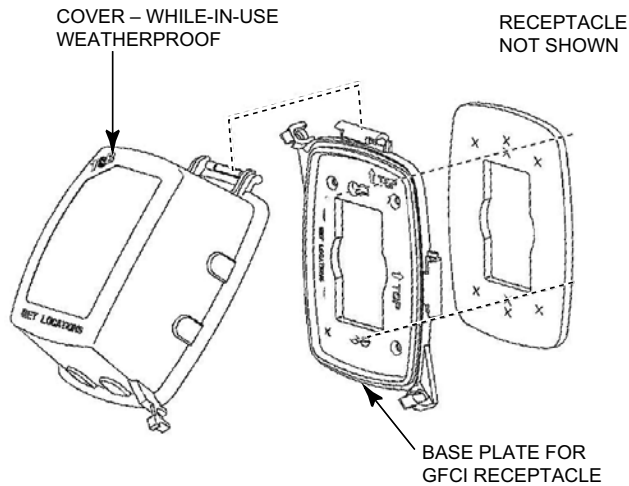
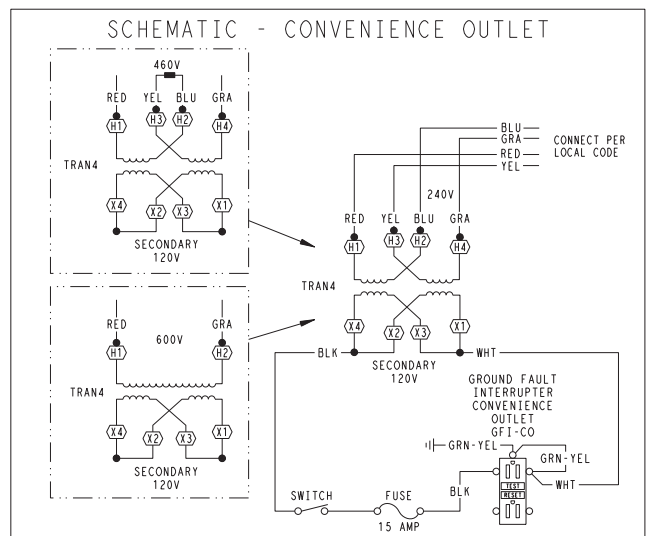


Fig. 28 - Weatherproof Cover Installation

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

**Unit-powered type:** A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 27.

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer-option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect switch; this will provide service power to the unit when the unit disconnect switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect switch is open. See Fig. 29.



UNIT VOLTAGE	CONNECT AS	PRIMARY CONNECTIONS	TRANSFORMER TERMINALS
208, 230	240	L1: RED + YEL L2: BLU + GRA	H1 + H3 H2 + H4
460	480	L1: RED L2: Splice BLU + YEL L3: GRA	H1 H2 + H3 H4
575	600	L1: RED L2: GRA	H1 H2

Fig. 29 - Powered Convenience Outlet Wiring

**Duty Cycle:** the unit-powered convenience outlet has a duty cycle limitation. The transformer is intended to provide power on an intermittent basis for service tools, lamps, etc; it is not intended to provide 15-amps loading for continuous duty loads (such as electric heaters for overnight use). Observe a 50% limit on circuit loading above 8-amps (i.e., limit loads exceeding 8-amps to 30 minutes of operation every hour).

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.

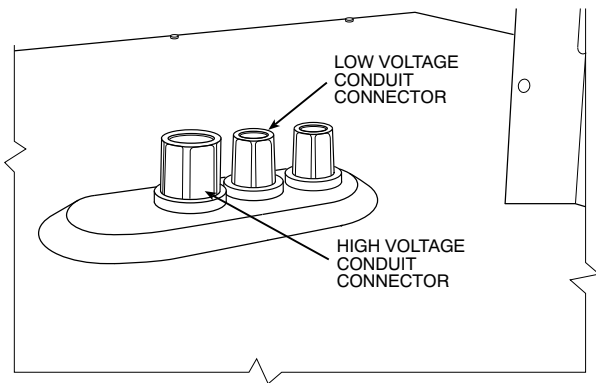
**Fuse on power type:** The factory fuse is a Bussman "Fusetron" T-15, non-renewable screw-in (Edison base) type plug fuse.

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

**Optional Thru-Base Connections (Electrical Connections) —**

This accessory (field-installed) 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 3/4-in bulkhead connector enables the low-voltage control wires to pass through the basepan. The 1/2-in electrical bulkhead connector allows the high-voltage power wires to pass through the basepan. See Fig. 30.



C13412

**Fig. 30 - 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. 23.

**Field Control Wiring —**

The RGS 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.

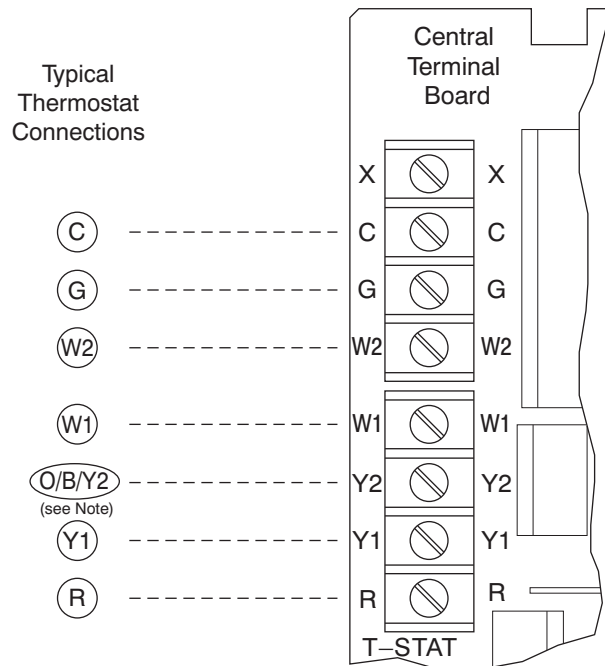
**Thermostat —**

Select an approved accessory 2-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.



Note : Typical multi-function marking. Follow manufacturer's configuration instructions to select Y2.

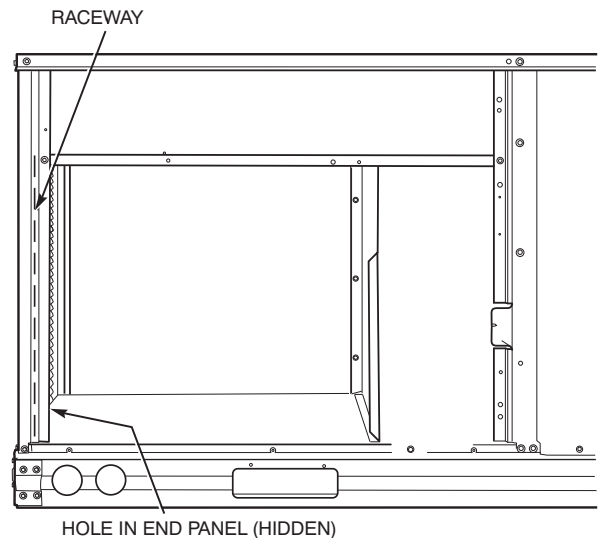
--- Field Wiring

C09350

**Fig. 31 - Typical Low-Voltage Connections**

**Unit without Thru-Base Connection Kit —**

Pass the thermostat control wires through the hole provided in the corner post (see item “D” in the view labeled “LEFT” in Fig. 1 or Fig. 2); 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. 31 and Fig. 32.



C08027

**Fig. 32 - Field Control Wiring Raceway**

**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.

#### **EconoMiSer X (Factory-Installed Option)**

For details on operating RGS units equipped with the factory-installed EconoMiSer 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* .

#### **2-Speed Indoor Fan Motor System with VFD (Factory-Installed Option)**

For details on operating RGH 2 stage cooling units equipped with the factory-installed 2-Speed Indoor Fan Motor System with VFD (Variable Frequency Drive) option, refer to the *Installation, Setup & Instructions Variable Frequency Drive (VFD)*.

#### **Hot Gas Re-Heat Control Connections**

##### **Hot Gas Re-Heat - Space RH Controller —**

**NOTE:** Hot Gas Re-Heat dehumidification system is a factory-installed option which is only available for units equipped with belt-drive motors.

The Hot Gas Re-Heat dehumidification system requires a field-supplied and installed space relative humidity control device. This device may be a separate humidistat control (contact closes on rise in space RH above control setpoint) or a combination thermostat-humidistat control device with isolated contact set for dehumidification control. The humidistat is normally used in applications where a temperature control is already provided.

##### **To connect a field-supplied humidistat:**

1. Route the humidistat 2-conductor cable (field-supplied) through the hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 32) to the 24-v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Use wire nuts to connect humidistat cable to two PINK leads in the low-voltage wiring as shown in Fig. 33. Refer to the instructions for the field-supplied humidistat for more information.

##### **To connect a field-installed programmable thermidistat:**

1. Route the programmable thermidistat multi-conductor cable (field-supplied) through the hole provided in the unit corner post.
2. Feed wires through the raceway build into the corner post (see Fig. 32) to the 24-v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. The programmable thermostat has dry contacts at terminals D1 and D2 for dehumidification operation (see Fig. 34). The dry contacts must be wired between CTB terminal R and the PNK/BLK lead to the LTLO switch with field-supplied wire nuts. Refer to the installation instructions included with the programmable thermidistat device for more information.

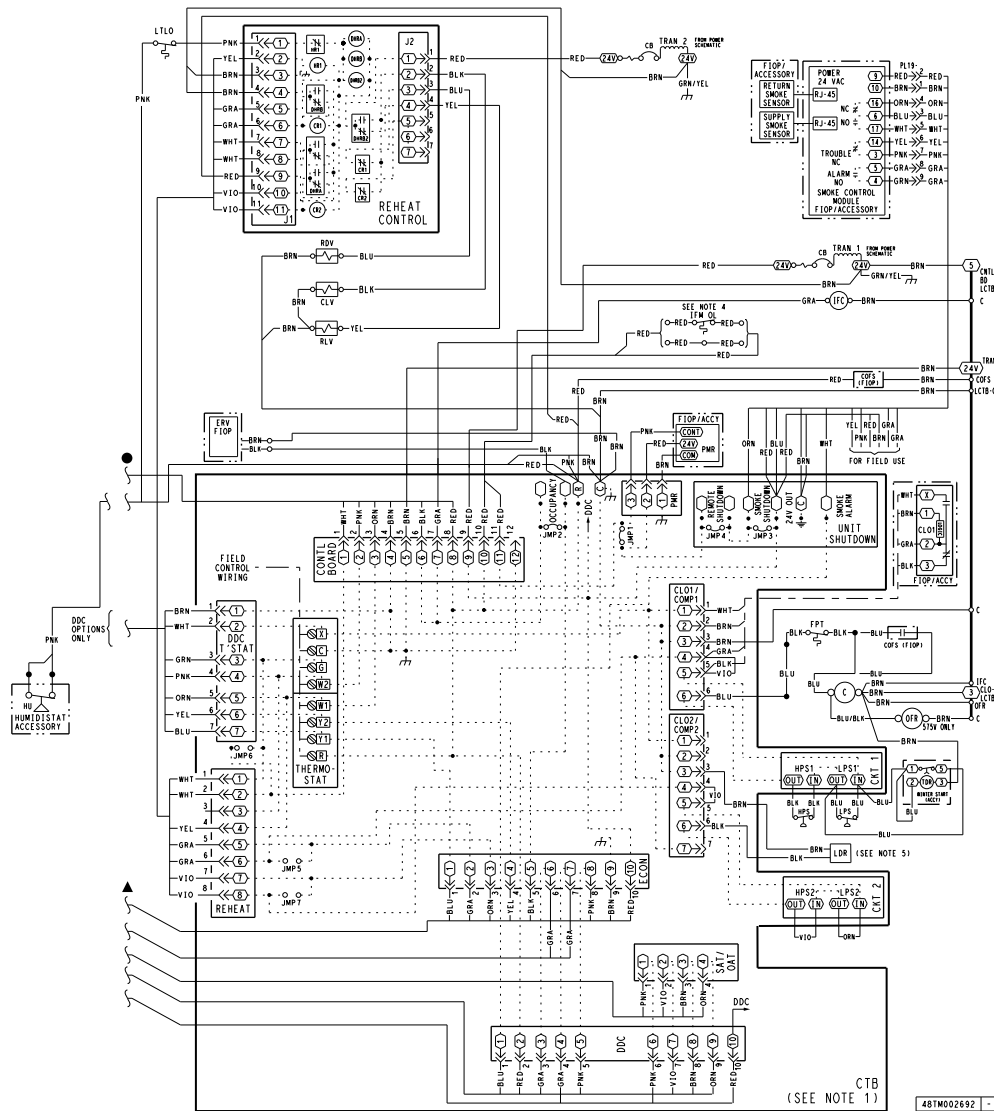
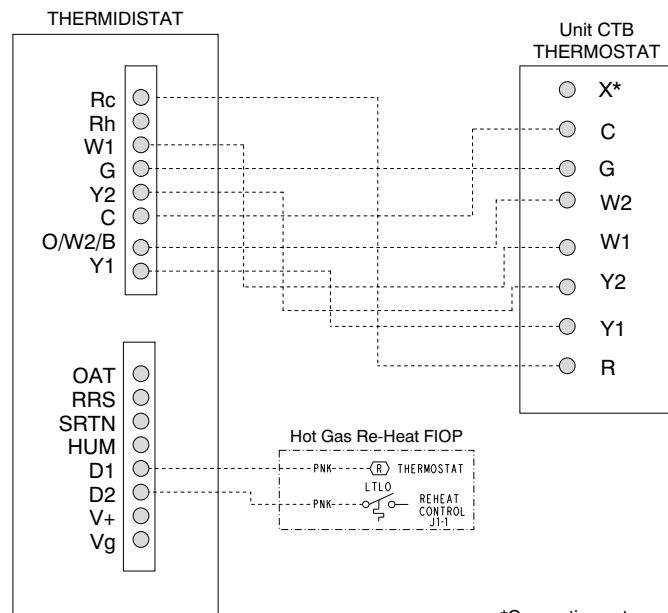


Fig. 33 - Typical Humidistat Wiring for Hot Gas Re-Heat Dehumidification System

C160109



\*Connection not required.

Fig. 34 - Thermostat Device Connections for RGH Unit with Hot Gas Re-Heat Dehumidification System

C092981

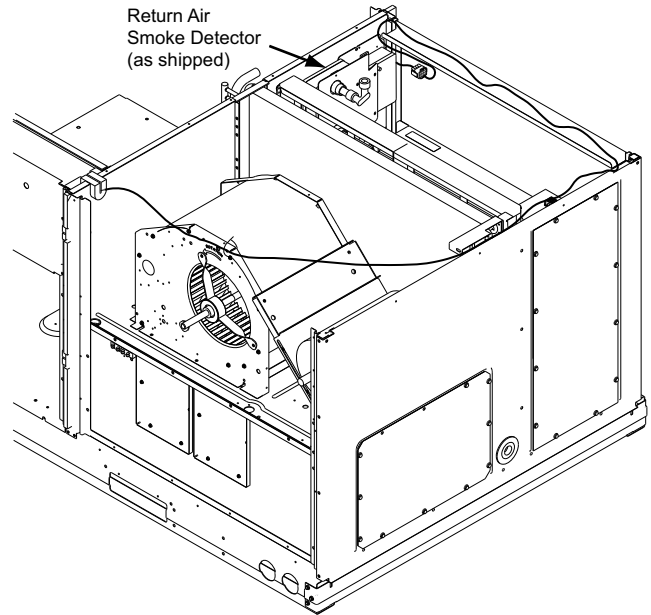
## Smoke Detectors

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

Units equipped with factory-optional Return Air smoke detectors require a relocation of the sensor module at unit installation. See Fig. 35 for the as shipped location.

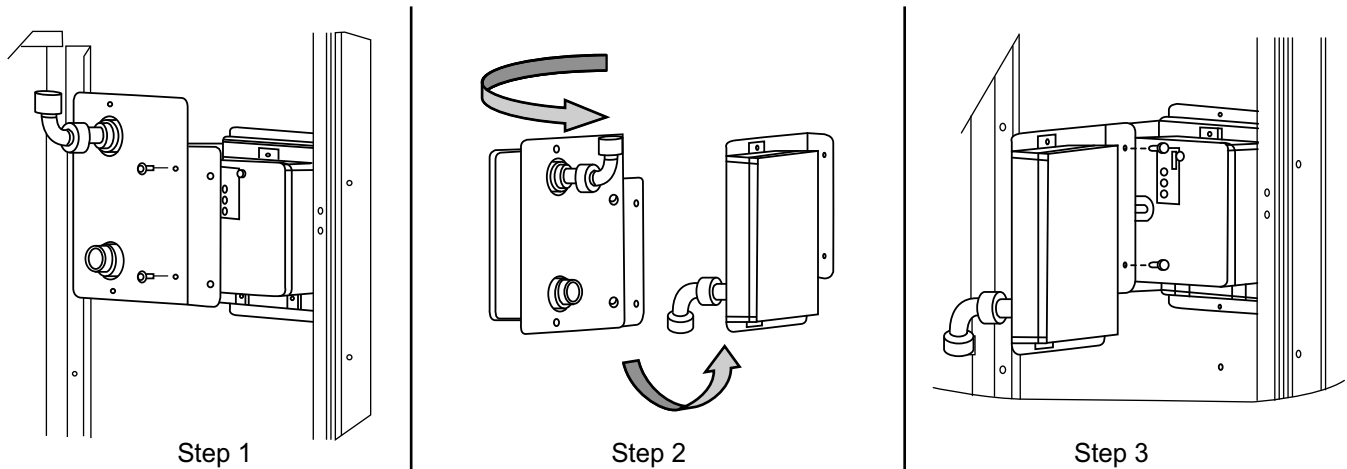
### **Completing Installation of Return Air Smoke Sensor:**

1. Unscrew the two screws holding the Return Air Smoke Detector assembly. See Fig. 36, Step 1. Save the screws.
2. Turn the assembly 90 degrees and then rotate end to end. Make sure that the elbow fitting is pointing down. See Fig. 36, Step 2.
3. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 36, Step 3.
4. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.



C12282

**Fig. 35 - Return Air Smoke Detector, Shipping Position**



C12283

**Fig. 36 - Completing Installation of Return Air Smoke Sensor**

## Step 13 — 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.

### Economizer Occupancy Switch —

Refer to Fig. 37 for general economizer wiring. External occupancy control is managed through a connection on the Central Terminal Board.

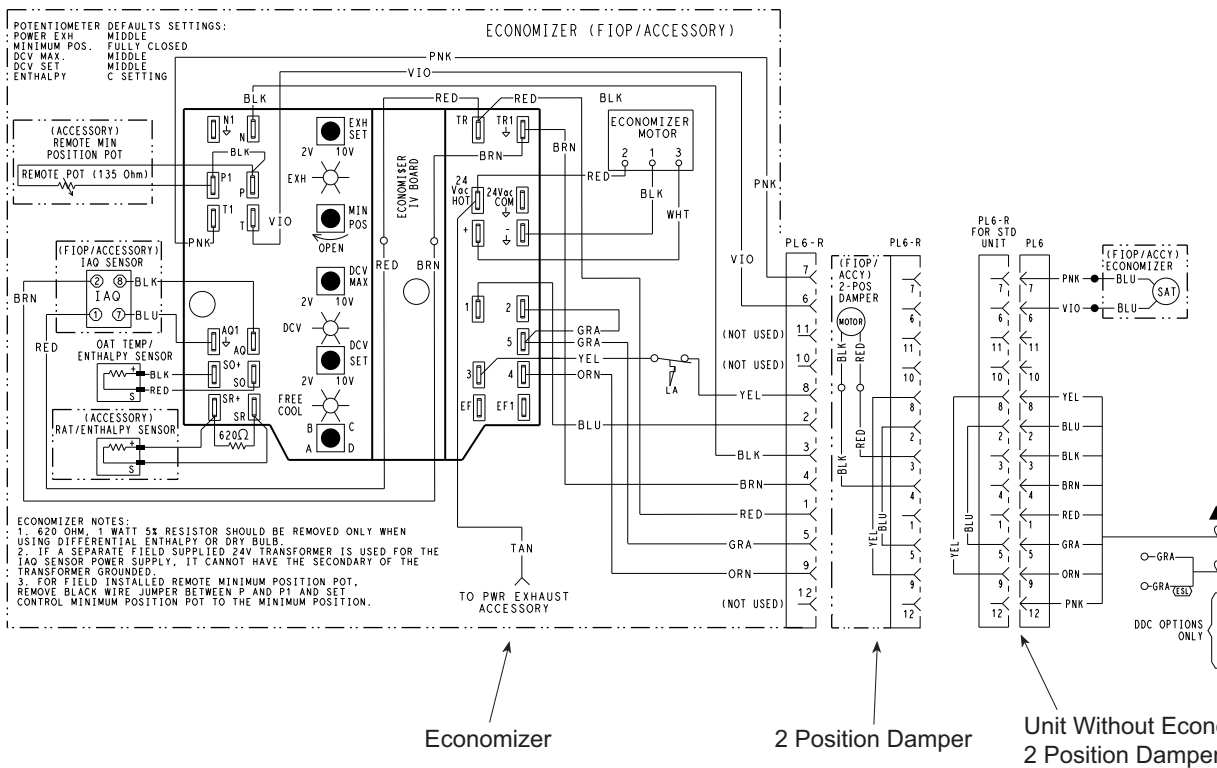
If external occupancy control is desired, connect a time clock or remotely controlled switch (closed for Occupied, open for Unoccupied sequence) at terminals marked OCCUPANCY on CTB. Remove or cut jumper JMP 2 to complete the installation.

## Step 14 — Install Accessories

Available accessories include:

- Roof Curb
- Thru-base connection kit (must be installed before unit is set on curb)
- LP conversion kit
- Manual outside air damper
- High Altitude Gas kits
- Flue Discharge Deflector
- Flue Exhaust Heat Shield
- Two-Position motorized outside air damper
- Economizer (with control and integrated barometric relief)
- Barometric relief
- Power Exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- CO<sub>2</sub> sensor
- Louvered hail guard
- Phase monitor control

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



**Fig. 37 - Wiring for Optional Economizer**

C160115

**Table 6 – Unit Wire/Fuse or HACR Breaker Sizing Data with Single Speed Indoor Fan Motor**

UNIT	NOM.V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.							
			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
RGH072 (1-stage cool)	208/230-3-60	STD	33	50	32	161	37	50	36	165
		MED	36/36	50/50	36/36	214	40/40	50/50	40/40	218
		HIGH	42/41	60/50	42/41	230	45/44	60/60	46/45	234
	460-3-60	STD	15	20	14	79	17	20	16	81
		MED	17	20	16	106	18	25	18	108
		HIGH	19	25	19	114	21	25	21	116
	575-3-60	STD	12	15	11	66	15	20	15	70
		MED	13	15	12	81	17	20	17	85
		HIGH	16	20	15	95	19	25	20	99
RGH073 (2-stage cool)	208/230-3-60	STD	31	45	30	161	34	50	34	165
		MED	34/34	50/50	33/33	214	38/37	50/50	38/37	218
		HIGH	39/38	50/50	39/38	230	43/42	50/50	44/43	234
	460-3-60	STD	15	20	14	79	17	20	17	81
		MED	17	20	16	106	19	25	18	108
		HIGH	19	25	19	114	21	25	21	116
	575-3-60	STD	11	15	10	66	15	20	15	70
		MED	12	15	12	81	16	20	16	85
		HIGH	15	20	15	95	19	25	19	99
RGH090 (2-stage cool)	208/230-3-60	STD	39	50	41	191	43	50	45	195
		MED	41/41	50/50	43/42	229	45/45	50/50	47/47	233
		HIGH	45	50	47	258	48	60	51	262
	460-3-60	STD	18	20	19	95	20	25	21	97
		MED	19	25	20	114	21	25	22	116
		HIGH	21	25	22	129	23	25	24	131
	575-3-60	STD	13	15	13	77	17	20	17	81
		MED	13	15	13	81	17	20	18	85
		HIGH	14	15	14	92	18	20	19	96
RGH102 (2-stage cool)	208/230-3-60	STD	39	50	41	191	43	50	45	195
		MED	41/41	50/50	43/43	229	45/45	50/50	47/47	233
		HIGH	45	50	47	258	49	60	52	262
	460-3-60	STD	19	20	19	95	20	25	21	97
		MED	19	25	20	114	21	25	22	116
		HIGH	21	25	22	129	23	25	24	131
	575-3-60	STD	14	15	14	77	18	20	19	81
		MED	14	20	15	81	18	20	19	85
		HIGH	15	20	16	92	19	20	20	96
RGH110 (2-stage cool)	208/230-3-60	STD	49	60	51	257	53	60	55	261
		MED	54	60	57	313	58	70	62	317
		HIGH	57/56	70/60	61/60	315	61/60	70/70	65/64	319
	460-3-60	STD	22	25	23	123	24	30	25	125
		MED	25	30	26	151	27	30	28	153
		HIGH	26	30	28	152	28	30	30	154
	575-3-60	STD	18	20	18	95	21	25	23	99
		MED	18	20	19	106	22	25	23	110
		HIGH	21	25	22	120	25	30	27	124
RGH120 (2-stage cool)	208/230-3-60	STD	48	60	50	282	51	60	54	286
		MED	53	60	56	338	57	70	60	342
		HIGH	56/55	60/60	59/58	340	60/59	70/70	64/63	344
	460-3-60	STD	23	30	24	135	25	30	26	137
		MED	26	30	27	163	28	30	29	165
		HIGH	27	30	29	164	29	35	31	166
	575-3-60	STD	18	20	18	105	22	25	23	109
		MED	19	20	19	116	22	25	24	120
		HIGH	21	25	22	130	25	30	27	134

See "Legend and Notes for Tables 6 and 7 on page 30.

**Table 6 - Unit Wire/Fuse or HACR Breaker Sizing Data with Single Speed Indoor Fan Motor (cont)**

UNIT	NOM.V-Ph-Hz	IFM TYPE	w/ PWRD C.O.							
			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
RGH072 (1-stage cool)	208/230-3-60	STD	38	50	37	166	42	60	42	170
		MED	41/41	60/60	41/41	219	45/45	60/60	46/45	223
		HIGH	46/45	60/60	47/46	235	50/49	60/60	52/50	239
	460-3-60	STD	17	20	17	81	19	25	19	83
		MED	19	25	19	108	21	25	21	110
		HIGH	21	25	21	116	23	30	23	118
	575-3-60	STD	13	15	13	68	17	20	17	72
		MED	14	20	14	83	18	20	19	87
		HIGH	17	20	17	97	21	25	22	101
RGH073 (2-stage cool)	208/230-3-60	STD	35	50	35	166	39	50	39	170
		MED	39/38	50/50	39/39	219	42/42	50/50	43/43	223
		HIGH	44/43	60/50	45/44	235	48/47	60/60	49/48	239
	460-3-60	STD	17	25	17	81	19	25	19	83
		MED	19	25	19	108	21	25	21	110
		HIGH	21	25	21	116	23	30	23	118
	575-3-60	STD	13	15	12	68	17	20	17	72
		MED	14	20	14	83	18	20	18	87
		HIGH	17	20	17	97	21	25	21	101
RGH090 (2-stage cool)	208/230-3-60	STD	44	50	46	196	48	60	51	200
		MED	46/46	50/50	48/48	234	50/49	60/60	53/52	238
		HIGH	49	60	52	263	53	60	57	267
	460-3-60	STD	21	25	21	97	22	25	23	99
		MED	21	25	22	116	23	25	24	118
		HIGH	23	25	24	131	25	30	27	133
	575-3-60	STD	14	15	15	79	18	20	19	83
		MED	15	20	15	83	19	20	20	87
		HIGH	16	20	16	94	19	25	21	98
RGH102 (2-stage cool)	208/230-3-60	STD	44	50	46	196	48	60	51	200
		MED	46/46	50/50	48/48	234	50/50	60/60	53/53	238
		HIGH	50	60	53	263	53	60	57	267
	460-3-60	STD	21	25	22	97	23	25	24	99
		MED	22	25	23	116	23	25	25	118
		HIGH	24	25	25	131	25	30	27	133
	575-3-60	STD	16	20	16	79	20	25	21	83
		MED	16	20	17	83	20	25	21	87
		HIGH	17	20	18	94	21	25	22	98
RGH110 (2-stage cool)	208/230-3-60	STD	54	60	57	262	57	70	61	266
		MED	59	70	63	318	63	70	67	322
		HIGH	62/61	70/70	66/65	320	66/65	80/80	71/70	324
	460-3-60	STD	25	30	26	125	26	30	28	127
		MED	27	30	29	153	29	35	31	155
		HIGH	28	30	30	154	30	35	32	156
	575-3-60	STD	19	25	20	97	23	25	24	101
		MED	20	25	21	108	24	25	25	112
		HIGH	23	25	24	122	27	30	29	126
RGH120 (2-stage cool)	208/230-3-60	STD	52	60	55	287	56	60	60	291
		MED	58	70	61	343	62	70	66	347
		HIGH	61/60	70/70	65/64	345	65/64	80/70	69/68	349
	460-3-60	STD	26	30	27	137	27	30	29	139
		MED	28	30	30	165	30	35	32	167
		HIGH	29	35	31	166	31	35	33	168
	575-3-60	STD	19	25	20	107	23	25	25	111
		MED	20	25	21	118	24	30	26	122
		HIGH	23	25	24	132	27	30	29	136

See "Legend and Notes for Tables 6 and 7 on page 30.

**Table 7 – Unit Wire/Fuse or HACR Breaker Sizing Data with Two Speed Indoor Fan Motor**

UNIT	NOM.V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.							
			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
RGH073 (2-stage cool)	208/230-3-60	STD	31/31	45/45	30/30	165	35/35	50/50	35/34	169
		MED	34/33	50/50	33/33	195	38/37	50/50	38/37	199
		HIGH	39/38	50/50	39/38	230	43/42	50/50	44/43	234
	460-3-60	STD	15	20	15	81	17	25	17	83
		MED	16	20	16	97	18	25	18	99
		HIGH	19	25	19	114	21	25	21	116
	575-3-60	STD	12	15	12	68	16	20	16	72
		MED	14	20	14	81	18	20	18	85
		HIGH	16	20	16	95	20	25	20	99
RGH090 (2-stage cool)	208/230-3-60	STD	40/40	50/50	41/41	195	44/43	50/50	46/46	199
		MED	41/41	50/50	43/43	199	45/45	50/50	47/47	203
		HIGH	45/44	50/50	47/46	249	49/48	60/60	52/50	253
	460-3-60	STD	19	20	19	97	20	25	21	99
		MED	19	25	20	100	21	25	22	102
		HIGH	21	25	22	125	22	25	24	127
	575-3-60	STD	14	15	14	79	18	20	19	83
		MED	15	20	15	83	18	20	19	87
		HIGH	16	20	16	92	19	25	21	96
RGH102 (2-stage cool)	208/230-3-60	STD	40/40	50/50	42/41	195	44/44	50/50	46/46	199
		MED	41/41	50/50	43/43	199	45/45	50/50	47/47	203
		HIGH	45/44	50/50	47/46	249	49/48	60/60	52/51	253
	460-3-60	STD	19	25	19	97	21	25	22	99
		MED	19	25	20	100	21	25	22	102
		HIGH	21	25	22	125	23	25	24	127
	575-3-60	STD	15	20	16	79	19	20	20	83
		MED	16	20	16	83	20	25	21	87
		HIGH	17	20	18	92	21	25	22	96
RGH110 (2-stage cool)	208/230-3-60	STD	51/50	60/60	53/53	254	55/54	60/60	58/57	258
		MED	54/53	60/60	58/56	304	58/57	70/70	62/61	308
		HIGH	57/56	70/60	61/60	315	61/60	70/70	65/64	319
	460-3-60	STD	23	25	24	122	25	30	26	124
		MED	25	30	26	147	27	30	28	149
		HIGH	26	30	28	152	28	30	30	154
	575-3-60	STD	19	20	20	97	23	25	24	101
		MED	20	25	21	106	24	25	25	110
		HIGH	22	25	23	120	26	30	27	124
RGH120 (2-stage cool)	208/230-3-60	STD	50/49	60/60	52/52	279	53/53	60/60	56/56	283
		MED	53/52	60/60	56/55	329	57/56	70/60	60/59	333
		HIGH	56/55	60/60	59/58	340	60/59	70/70	64/63	344
	460-3-60	STD	24	30	25	134	26	30	27	136
		MED	26	30	27	159	28	30	29	161
		HIGH	27	30	29	164	29	35	31	166
	575-3-60	STD	19	25	20	107	23	25	24	111
		MED	20	25	21	116	24	30	26	120
		HIGH	22	25	23	130	26	30	27	134

See "Legend and Notes for Tables 6 and 7 on page 30.

**Table 7 - Unit Wire/Fuse or HACR Breaker Sizing Data with Two Speed Indoor Fan Motor (cont)**

UNIT	NOM.V-Ph-Hz	IFM TYPE	w/ PWRD C.O.							
			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
RGH073 (2-stage cool)	208/230-3-60	STD	36/36	50/50	36/36	170	40/40	50/50	40/40	174
		MED	39/38	50/50	39/38	200	43/42	50/50	43/42	204
		HIGH	45/44	60/50	45/44	235	48/47	60/60	49/48	239
	460-3-60	STD	18	25	17	83	19	25	19	85
		MED	19	25	18	99	20	25	20	101
		HIGH	21	25	21	116	23	30	23	118
	575-3-60	STD	14	20	14	70	18	20	18	74
		MED	16	20	16	83	20	25	20	87
		HIGH	17	20	18	97	21	25	22	101
RGH090 (2-stage cool)	208/230-3-60	STD	45/44	50/50	47/47	200	48/48	60/60	51/51	204
		MED	46/46	50/50	48/48	204	50/49	60/60	53/52	208
		HIGH	50/49	60/60	53/52	254	53/52	60/60	57/56	258
	460-3-60	STD	21	25	22	99	23	25	24	101
		MED	22	25	23	102	23	25	25	104
		HIGH	23	25	24	127	25	30	26	129
	575-3-60	STD	16	20	16	81	19	25	21	85
		MED	16	20	17	85	20	25	21	89
		HIGH	17	20	18	94	21	25	23	98
RGH102 (2-stage cool)	208/230-3-60	STD	45/45	50/50	47/47	200	49/48	60/60	52/51	204
		MED	46/46	50/50	49/48	204	50/50	60/60	53/53	208
		HIGH	50/49	60/60	53/52	254	54/53	60/60	57/56	258
	460-3-60	STD	21	25	22	99	23	25	24	101
		MED	22	25	23	102	23	25	25	104
		HIGH	23	25	24	127	25	30	26	129
	575-3-60	STD	17	20	18	81	21	25	22	85
		MED	18	20	18	85	21	25	23	89
		HIGH	19	20	20	94	22	25	24	98
RGH110 (2-stage cool)	208/230-3-60	STD	56/55	60/60	59/58	259	59/59	70/70	63/63	263
		MED	59/58	70/70	63/62	309	63/62	70/70	67/66	313
		HIGH	62/61	70/70	66/65	320	66/65	80/80	71/70	324
	460-3-60	STD	25	30	27	124	27	30	29	126
		MED	27	30	28	149	29	35	30	151
		HIGH	28	30	30	154	30	35	32	156
	575-3-60	STD	21	25	22	99	25	30	26	103
		MED	22	25	23	108	26	30	27	112
		HIGH	24	25	25	122	28	30	29	126
RGH120 (2-stage cool)	208/230-3-60	STD	54/54	60/60	57/57	284	58/58	70/70	62/61	288
		MED	58/57	70/70	62/60	334	62/61	70/70	66/65	338
		HIGH	61/60	70/70	65/64	345	65/64	80/70	69/68	349
	460-3-60	STD	26	30	28	136	28	30	30	138
		MED	28	30	29	161	30	35	32	163
		HIGH	29	35	31	166	31	35	33	168
	575-3-60	STD	21	25	22	109	25	30	26	113
		MED	22	25	23	118	26	30	27	122
		HIGH	24	25	25	132	28	30	29	136

See "Legend and Notes for Tables 6 and 7 on page 30.

## Legend and Notes for Tables 6 and 7

### LEGEND:

BRKR	-	Circuit breaker
C.O.	-	Convenience outlet
DISC.	-	Disconnect
FLA	-	Full load amps
LRA	-	Locked rotor amps
MCA	-	Minimum circuit amps
PE.	-	Power exhaust
Pwr'd fr/ unit	-	Powered from unit
PWRD C.O.	-	Powered convenience outlet
UNPWR C.O.	-	Unpowered convenience outlet

### NOTES:

- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
- For 208/230 v units, where one value is shown it is the same for either 208 or 230 volts.
- 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.

# UNIT START-UP CHECKLIST

(Remove and Store in Job File)

**NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgement, follow safe practices, and adhere to the safety considerations/information as outlined in the preceding sections of this Installation Instructions document.**

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
- VERIFY GAS PRESSURE TO UNIT GAS VALVE IS WITHIN SPECIFIED RANGE
- CHECK GAS PIPING FOR LEAKS
- 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
- VERIFY THAT CRANKCASE HEATERS HAVE BEEN ENERGIZED FOR AT LEAST 24 HOURS

## 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

GAS HEAT SUPPLY AIR \_\_\_\_\_ °F

### PRESSURES

GAS INLET PRESSURE \_\_\_\_\_ IN. WG

GAS MANIFOLD PRESSURE STAGE 1 \_\_\_\_\_ IN. WG

STAGE 2 \_\_\_\_\_ IN. WG

REFRIGERANT SUCTION CIRCUIT A \_\_\_\_\_ PSIG

CIRCUIT B \_\_\_\_\_ PSIG

REFRIGERANT DISCHARGE CIRCUIT A \_\_\_\_\_ PSIG

CIRCUIT B \_\_\_\_\_ PSIG

## PRESSURES (CONT.)

- 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. LIQUID SOLENOID VALVE (LSV) ENERGIZED (VALVE CLOSES)
- 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. LIQUID SOLENOID VALVE (LSV) ENERGIZED (VALVE CLOSES)
- E. DISCHARGE SOLENOID VALVE (DSV) 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

## REPEAT PROCESS FOR 2 COMPRESSOR SYSTEMS