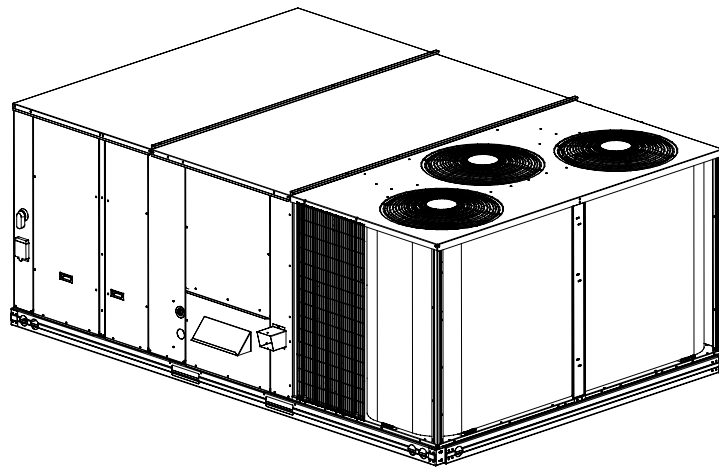


Installation Instructions

RGS Series - 3 Phase 15 to 25 Ton Package Gas / Electric With R-410A Refrigerant



15 & 17.5 Ton SHOWN

PACKAGED GAS HEATING / ELECTRIC COOLING UNITS

International Comfort Products, LLC
Lewisburg, TN. 37091

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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/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

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, 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

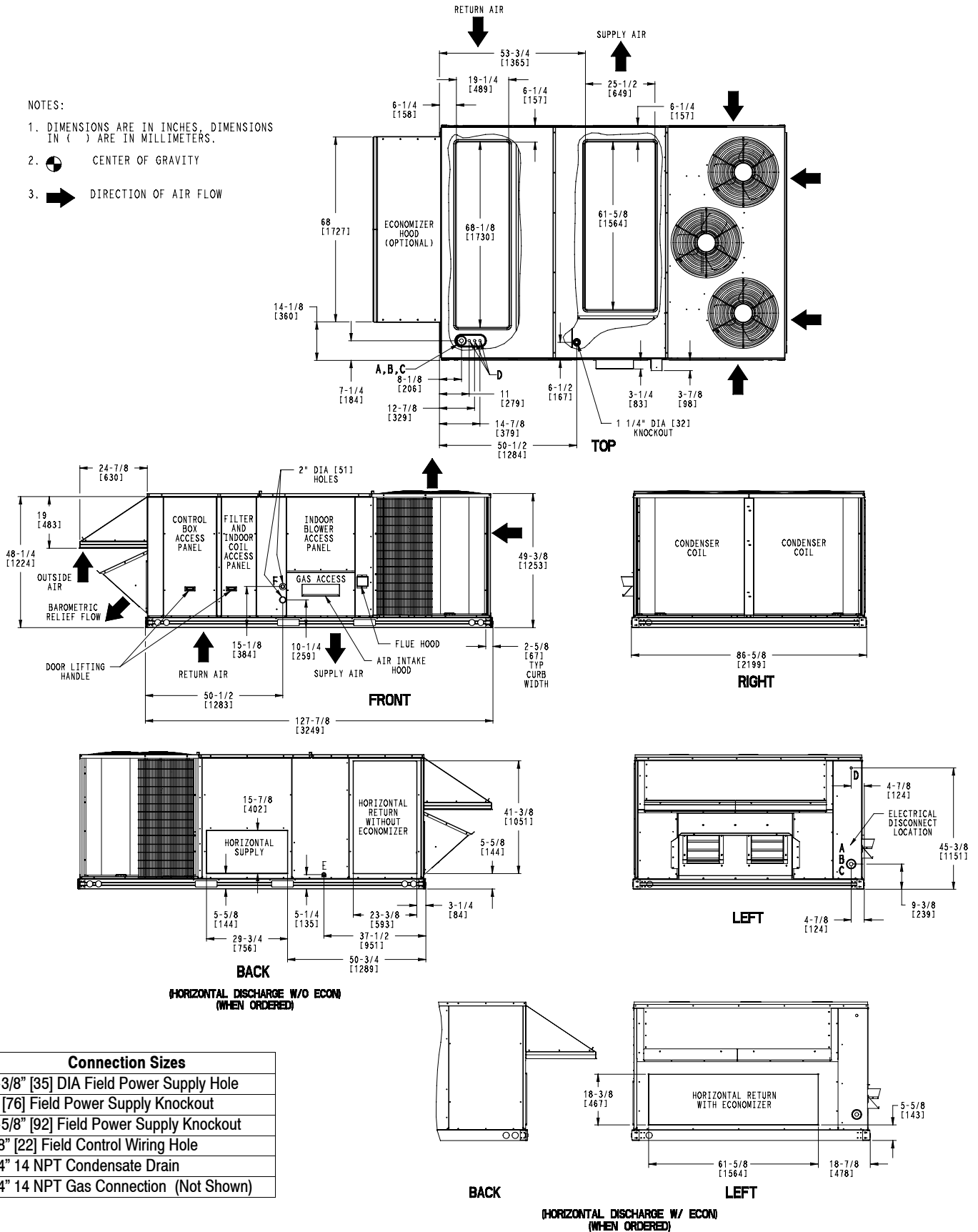
Failure to follow this caution may result in personal injury.

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 units.

FIGURE 1 Base Unit Dimensions: 15 & 17.5 Ton

NOTES:

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

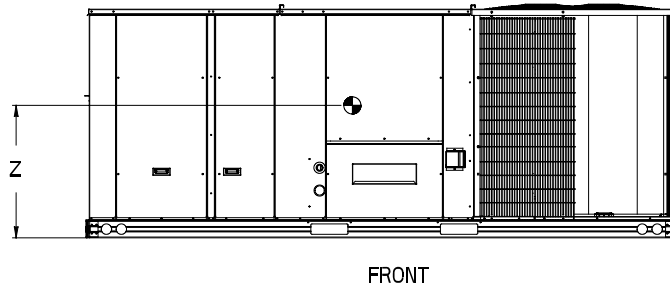
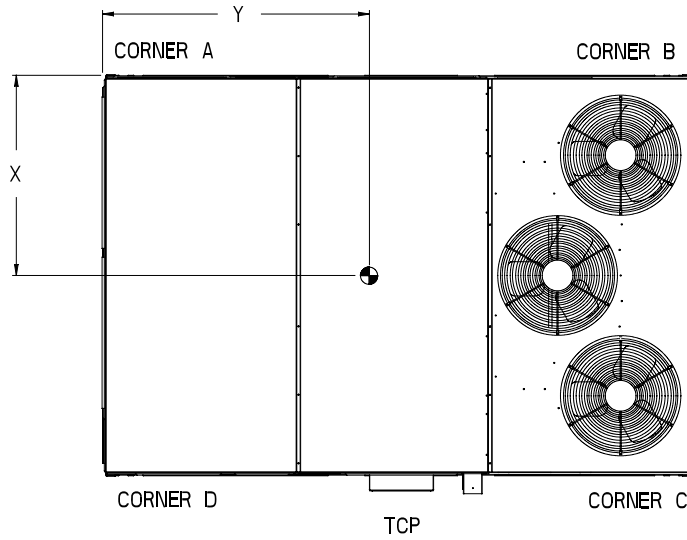


Connection Sizes

A	1-3/8" [35] DIA Field Power Supply Hole
B	3" [76] Field Power Supply Knockout
C	3-5/8" [92] Field Power Supply Knockout
D	7/8" [22] Field Control Wiring Hole
E	3/4" 14 NPT Condensate Drain
F	3/4" 14 NPT Gas Connection (Not Shown)

Fig. 1 - Unit Dimensional Drawing - 15 & 17.5 Ton



Unit Size	Unit Weight		Corner Weight (A)		Corner Weight (B)		Corner Weight (C)		Corner Weight (D)		C.G.		
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	X	Y	Z
15 Ton	1645	746	391	177	400	181	432	196	423	192	44-3/4 [1197]	64-3/4 [1645]	16-1/2 [419]
17.5 Ton	1660	753	394	179	403	183	436	198	427	194	44-3/4 [1197]	64-3/4 [1645]	16-1/2 [419]

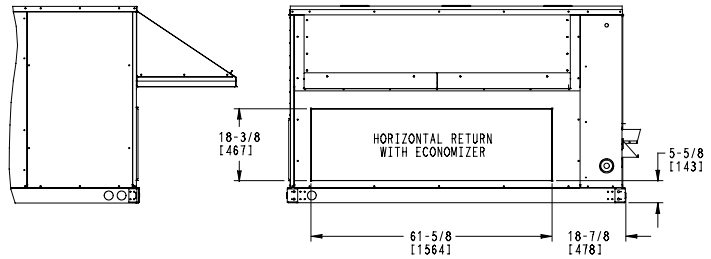
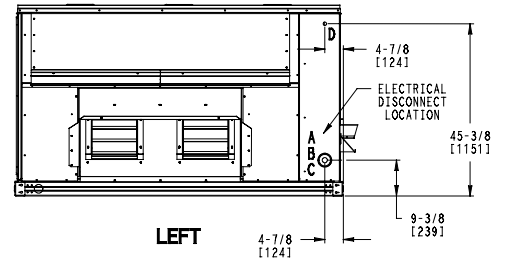
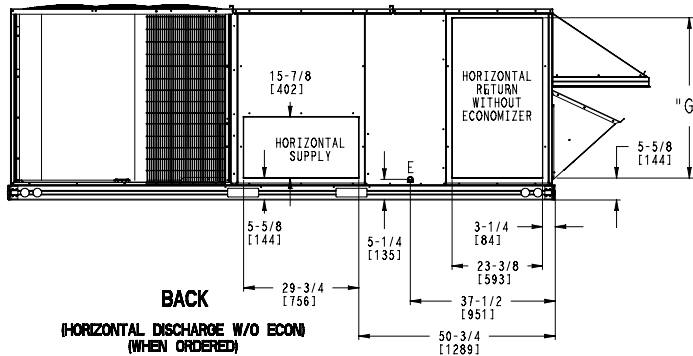
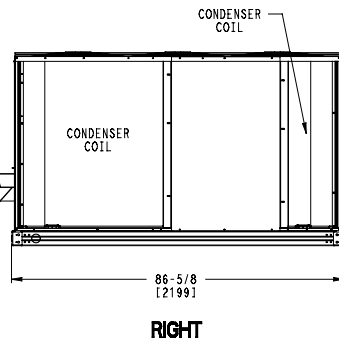
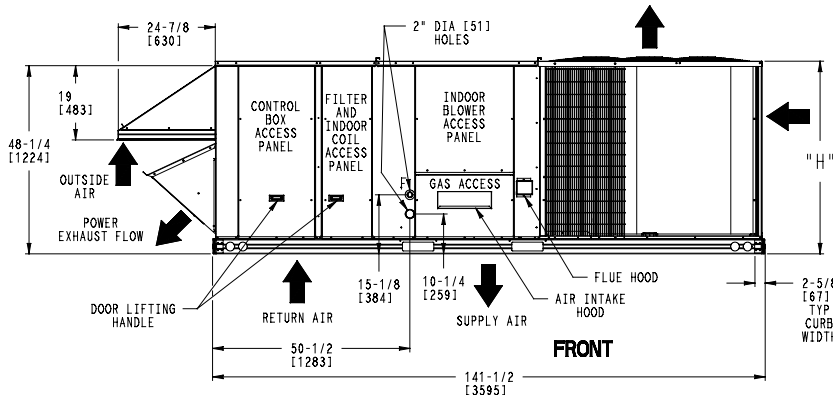
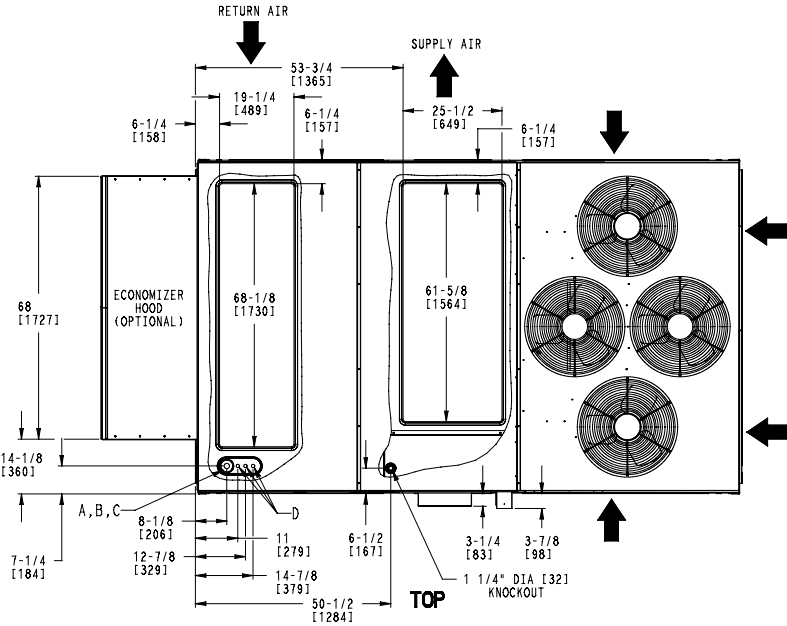


FRONT

FIGURE 2 Base Unit Dimensions: 20 & 25 Ton

NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN () ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW

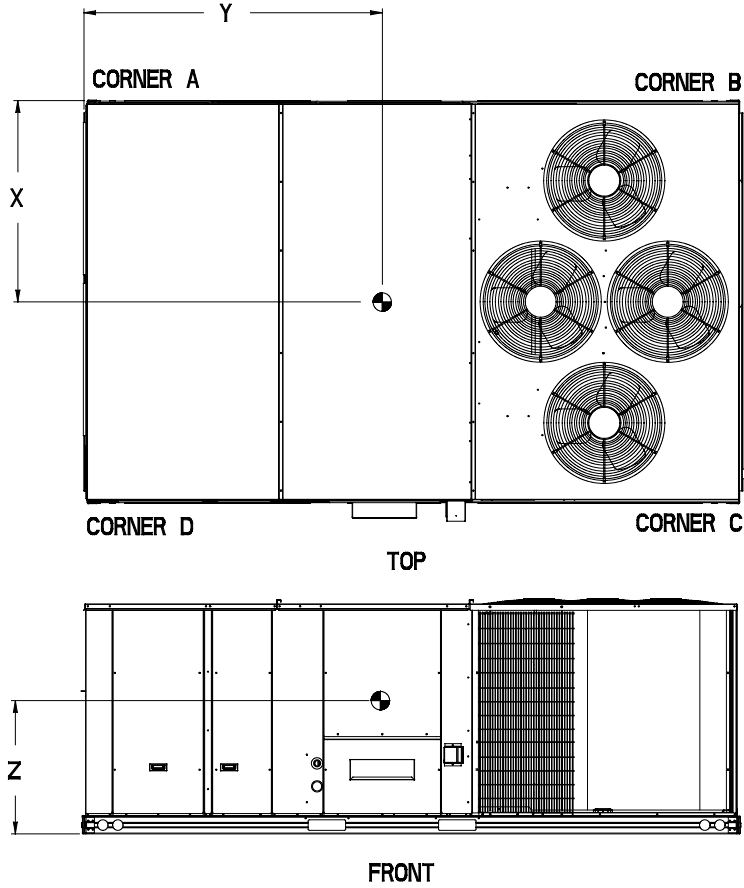


Connection Sizes	
A	1-3/8" [35] DIA Field Power Supply Hole
B	3" [76] Field Power Supply Knockout
C	3-5/8" [92] Field Power Supply Knockout
D	7/8" [22] Field Control Wiring Hole
E	3/4" 14 NPT Condensate Drain
F	3/4" 14 NPT Gas Connection (Not Shown)

UNIT	G	H
20Ton	41-3/8 [1051]	49-3/8 [1253]
25 ton	49-3/8 [1253]	57-3/8 [1456]

Fig. 2 - Unit Dimensional Drawing - 20 & 25 Ton

Unit Size	Unit Weight		Corner Weight (A)		Corner Weight (B)		Corner Weight (C)		Corner Weight (D)		C.G.		
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	X	Y	Z
20 Ton	1810	821	349	158	491	223	567	257	402	182	46-1/8 [1172]	82-7/8 [2105]	16-1/2 [419]
25 Ton	1950	884	376	171	529	240	611	277	434	197	46-1/8 [1172]	82-7/8 [2105]	19 [493]



INSTALLATION

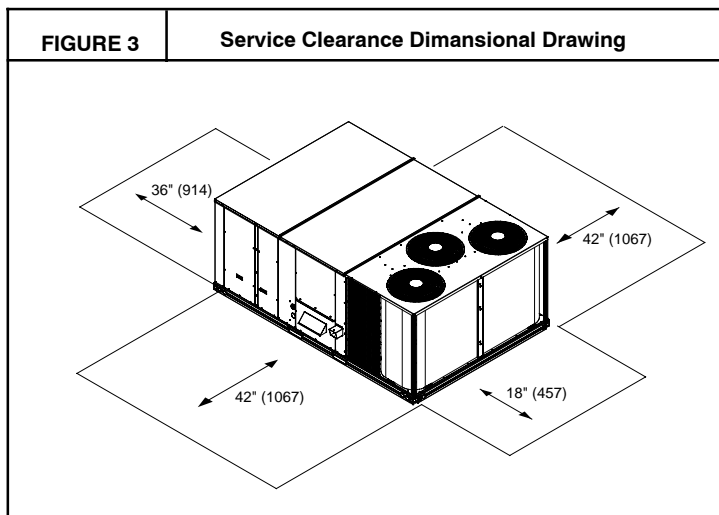
Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

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



NOTE: Consider also the effect of adjacent units.

Be sure that 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 Trap for Condensate Drain — 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)
- Rig and place unit
- Remove top skid
- Install combustion 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
- Rig and place unit
- Remove duct covers and top skid
- Install field-fabricated ductwork at unit duct openings
- Install combustion 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.

Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Fig. 5 (15 & 17.5 ton units) and Fig. 6 (20 & 25 ton units). 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. 5 and Fig. 6. 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. 7. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb and not to the unit. The accessory thru-the-base power and gas connection package must be installed before the unit is set on the roof curb.* If field-installed thru-the-roof curb gas connections are desired, remove knockout in basepan located in the gas section, see Fig. 4 for location. 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 remove knockouts in basepan located in control box area, see Fig. 4 for location. Attach the service connections to the basepans.

Slab Mount (Horizontal Units Only) —

Provide a level concrete slab that extends a minimum of 6 in. (150 mm) beyond unit cabinet. Install a gravel apron in front

of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

NOTE:Horizontal units may be installed on a roof curb if required.

Alternate Unit Support (In Lieu of Curb or Slab Mount) —

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

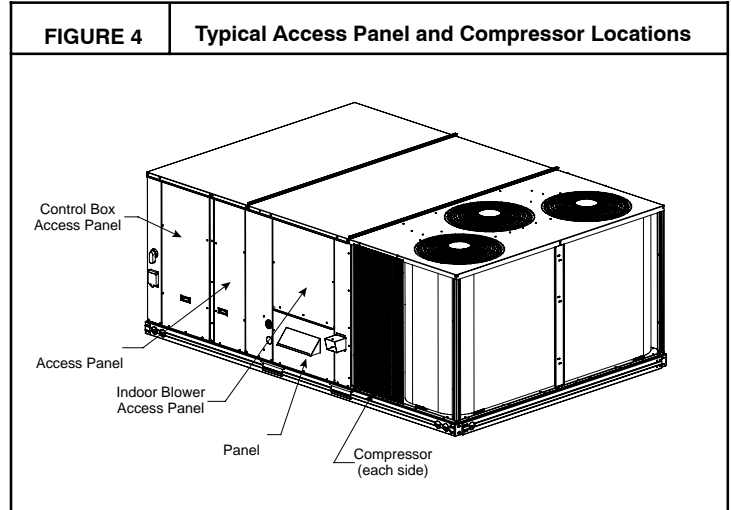
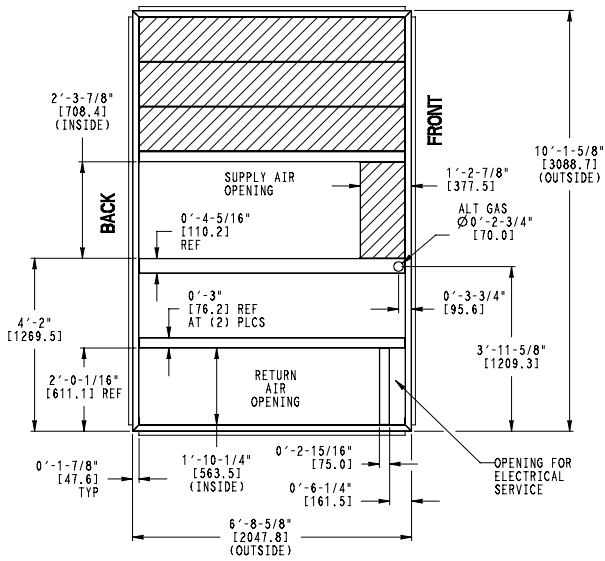


Table 1—Operating Weights

Component	UNITS LB (KG)			
	15 Ton	17.5 Ton	20 Ton	25 Ton
Base Unit	1645 [746]	1660 [753]	1810 [821]	1950 [885]
Economizer	245 [111]	245 [111]	245 [111]	245 [111]
Curb				
14-in/356 mm	243 [111]	243 [111]	273 [124]	273 [124]
24-in/610 mm	315 [143]	315 [143]	350 [159]	350 [159]

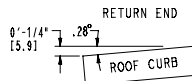
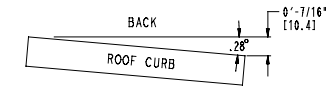
FIGURE 5 Roof Curb Details 15 & 17.5 Ton

RoofCurb Accessory	A	Unit Size
CRRFCURB045A00	14" [356]	15 & 17.5 Ton
CRRFCURB046A00	24" [610]	

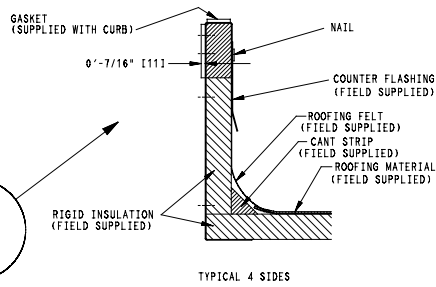
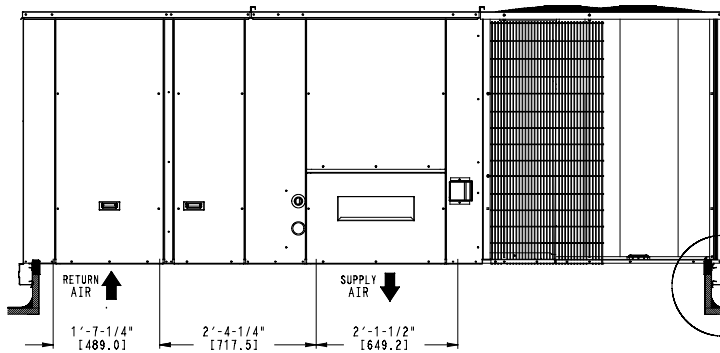


- NOTES:
- 1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
 - 2 BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
 - 3 DIMENSIONS IN [] ARE IN MILLIMETERS.
 - 4 ROOF CURB GALVANIZED STEEL.
 - 5 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
 - 6 SERVICE CLEARANCE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

➔ DIRECTION OF AIR FLOW



MAX CURB LEVELING TOLERANCES



TYPICAL 4 SIDES

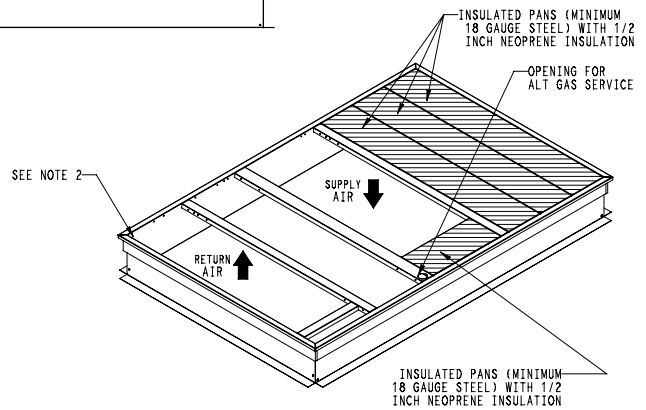
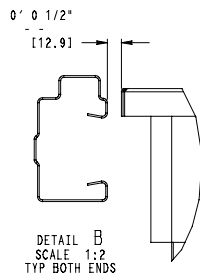
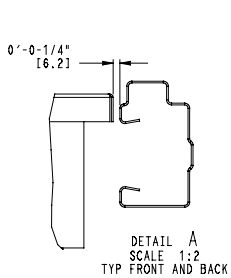
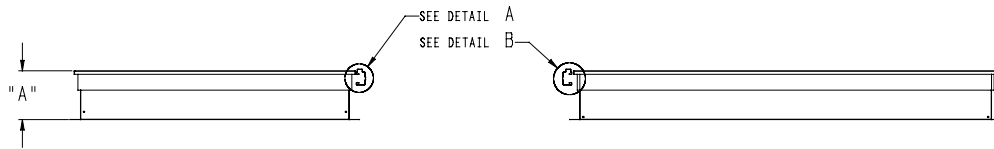
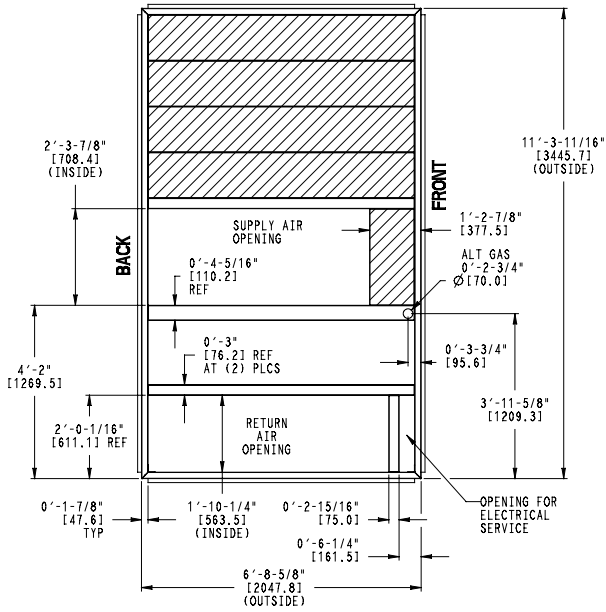


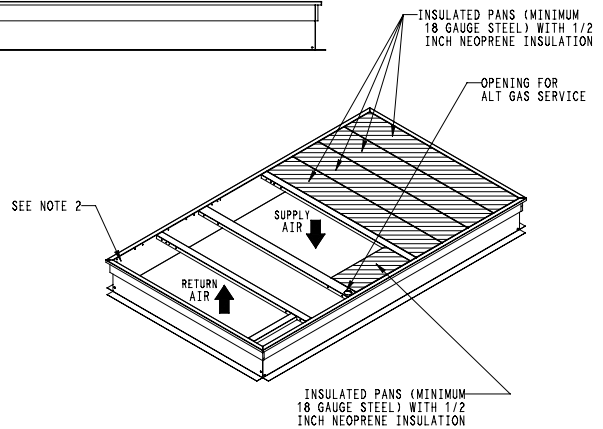
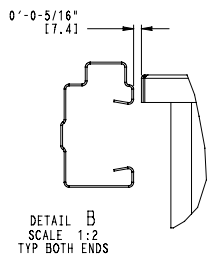
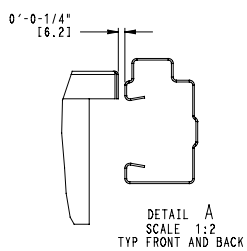
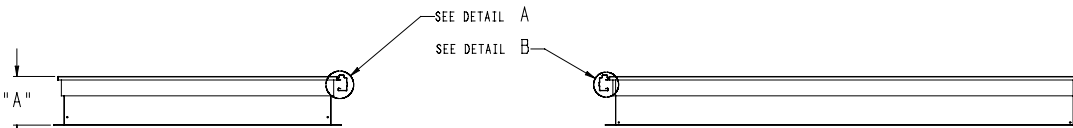
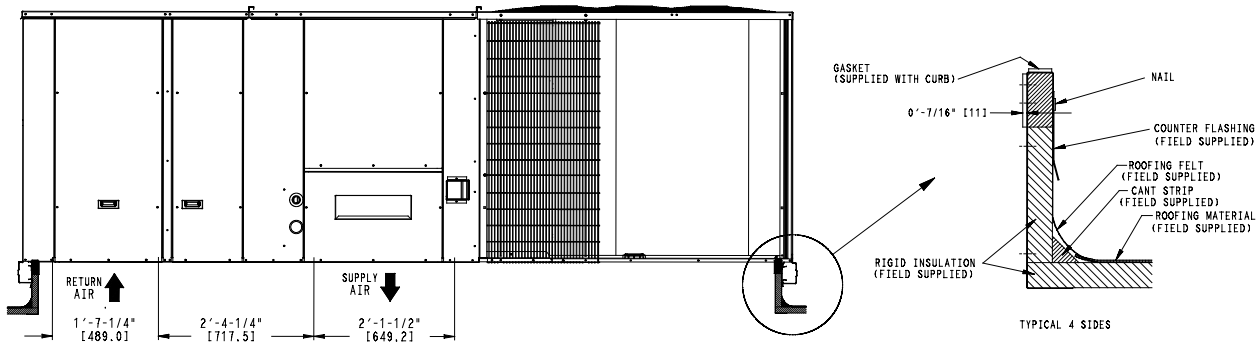
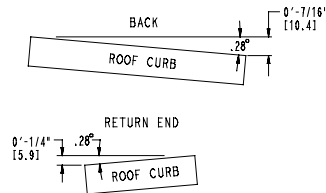
FIGURE 6 **Roof Curb Details - 20 & 25 Ton**

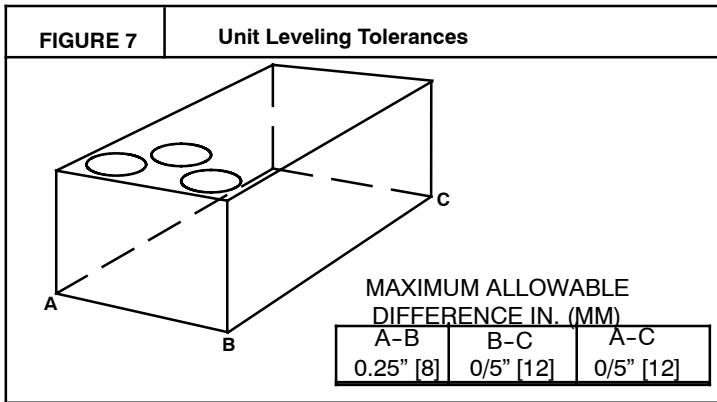
RoofCurb Accessory	A	Unit Size
CRRFCURB047A00	14" [356]	20 & 25 Ton
CRRFCURB048A00	24" [610]	



- NOTES:
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 - 8 GAS SERVICE PLATE CAN BE USED WITH EITHER ACCESSORY ROOFCURB.

➔ DIRECTION OF AIR FLOW





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.

A minimum clearance is not required around ductwork.

Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 5 for additional information.

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

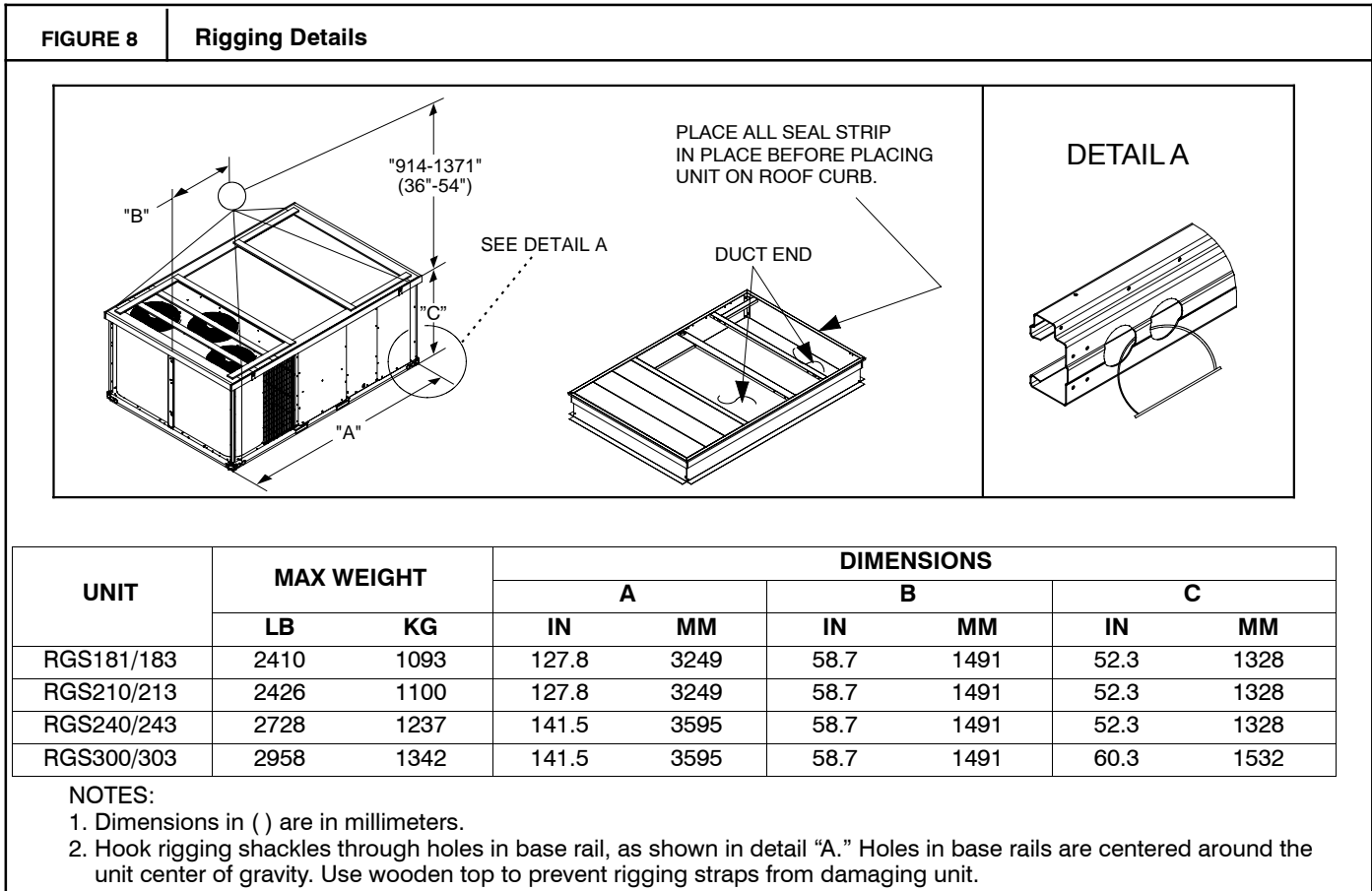
⚠ **CAUTION**

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.



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, 1/2 in. (12mm) clearance between the roof curb and the base rail inside on the front and back. 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 Detail A in Figs. 5 & 6.

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

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

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).

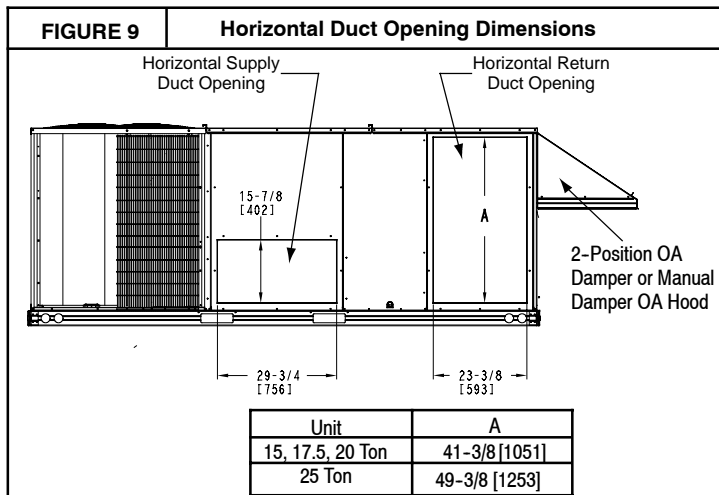
Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

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 — Duct Connection

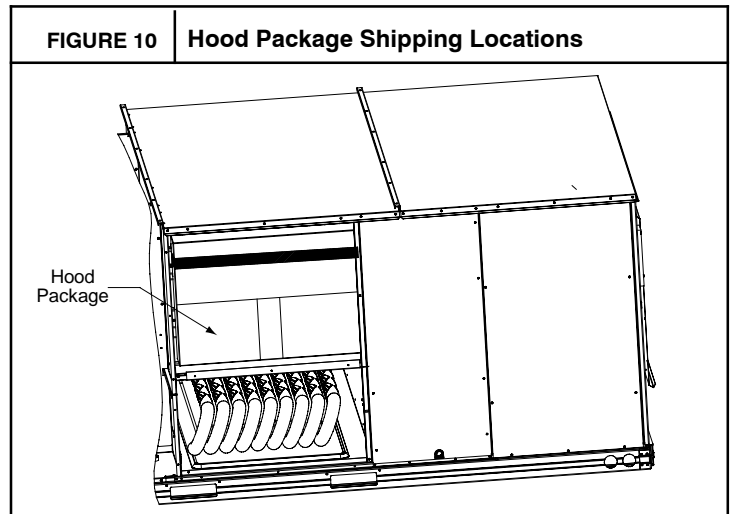
Field-supplied (3/4-inch) flanges should be attached to horizontal duct openings (see Fig. 9) and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.



Step 8 — Install Optional Outside Air Hood

Economizer and Two Position Hood Removal - Factory Option

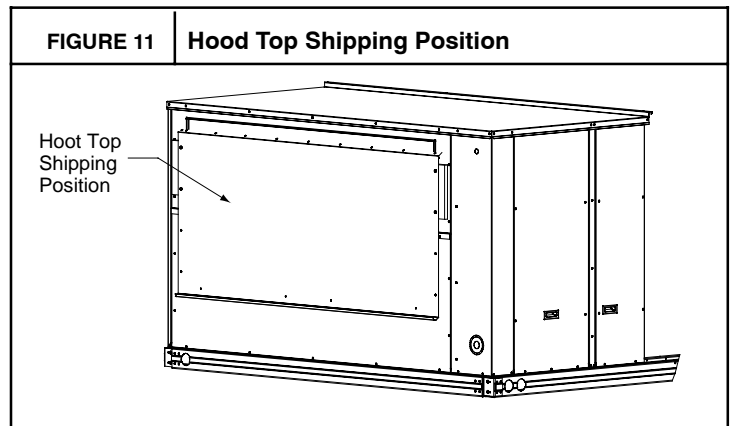
1. The hood is shipped in knock--down form and is located in the indoor air compartment. The hood is strapped to the blower assembly. (See Fig. 10)



2. To gain access to the hood, remove the back blower access panel.
3. Locate and cut the strap, being careful to not damage any wiring.
4. Carefully lift the hood assembly through the back blower access opening and assemble per the steps outlined in the following procedure.

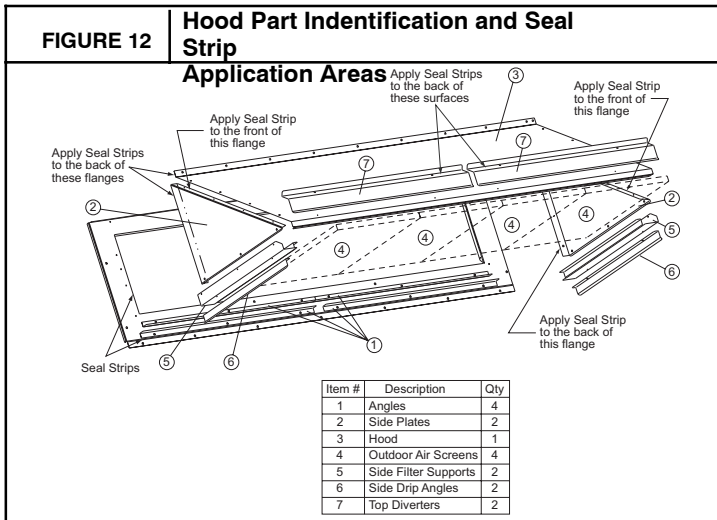
Two Position Damper and Economizer Hood Installation - Factory Option

1. Remove hood top from shipping position. (See Fig. 11.)

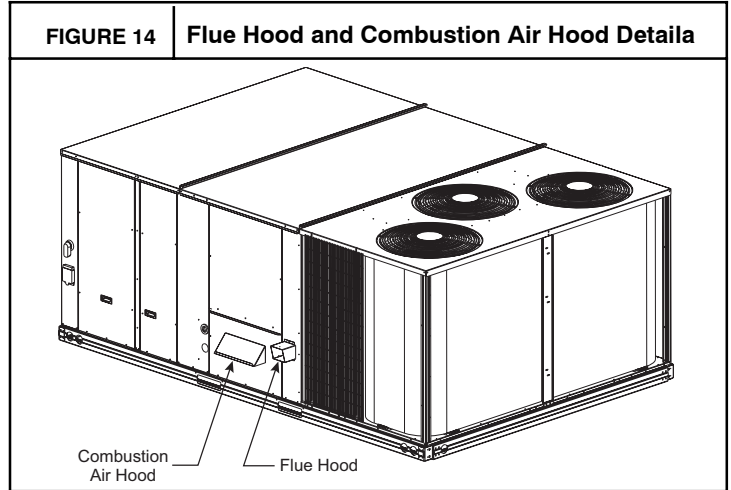


See Fig. 12 for identification of the various parts of the hood assembly.

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



hood to the back of the burner access panel. Using the two screws, re-attach the hood to the front of the burner access panel as shown in Fig. 14.



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.

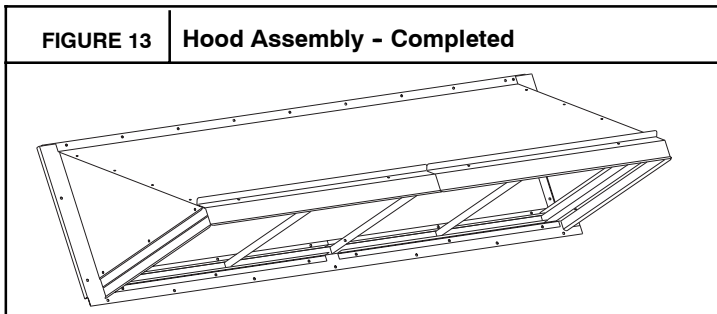
This unit is factory equipped for use with Natural Gas fuel at elevations up to 2000 ft (610 m) above sea level. Unit may be field converted for operation at elevations above 2000 ft (610 m) and/or for use with liquefied petroleum fuel. See accessory kit installation instructions regarding these accessories.

NOTE: Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. In U.S.A. the input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level. In Canada the input rating must be derated by 10% for altitudes of 2000 ft (610 m) to 4500 ft (1372 m) above sea level.

*For natural gas applications, gas pressure at unit gas connection must not be less than 5 in. wg (1246 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 adjacent to the burner access panel on the front side of the unit, through the grommeted hole. The gas connection to the unit is made to the $\frac{3}{4}$ -in. FPT gas inlet port on the unit gas valve. See *RGS Gas Heat/Electric Cooling Packaged Rooftop 15 to 25 Nominal Tons Product Specifications* for complete details.

- Secure side plates to panel using the screws provided.
- Apply seal strip to mating flange of the hood (see Fig. 12).
- On 15 & 17.5 ton chassis, remove screws across top cover. Attach hood to side plates. (On 44 inch chassis, flange will slide behind flange of top cover.)
- On 15 & 17.5 ton chassis, reinstall screws previously removed. On 20 & 25 ton chassis, secure top flange using screws provided in kit.
- Install outdoor air screens by sliding them into the channel formed by the four angles installed in step 2. Make sure that the screens extend a across the entire length of the hood.
- Install side filter supports using the screws provided.
- Install side drip angles using the screws provided.
- Run a continuous length of seal strip across the hood covering the engagement holes in the lower hood.
- Install top diverter using the screws provided.
- On units with barometric relief, remove screws at bottom of relief damper. Do not discard damper door.



Step 9 — Install Flue Hood and Combustion Air Hood

The flue hood is shipped screwed to the fan deck inside the burner compartment. Remove the burner access panel and then remove the flue hood from its shipping location. Using the screws provided, install flue hood in the location shown in Fig. 14.

The combustion air hood is attached to the back of the burner access panel. Remove the two screws securing the

Table 2—Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE – TON	MIN	MAX
RGS	15, 17.5, 20, 25	5.0 in. wg (1246 Pa)	13.0 in. wg (3240 Pa)

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).

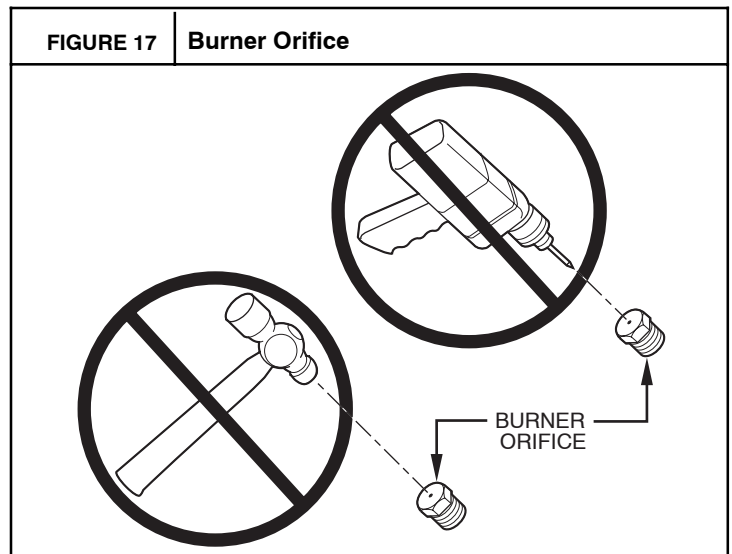
⚠ WARNING

FIRE OR EXPLOSION HAZARD

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

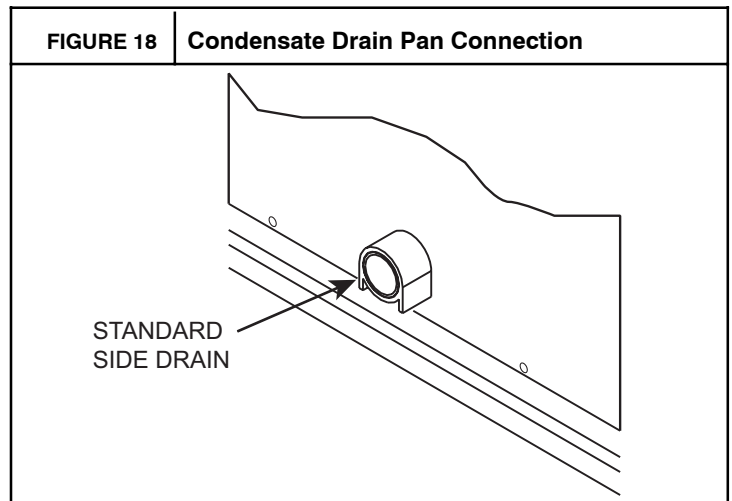
- Connect gas pipe to unit using a backup wrench to avoid damaging gas controls.
- Never purge a gas line into a combustion chamber.
- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections.
- Use proper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



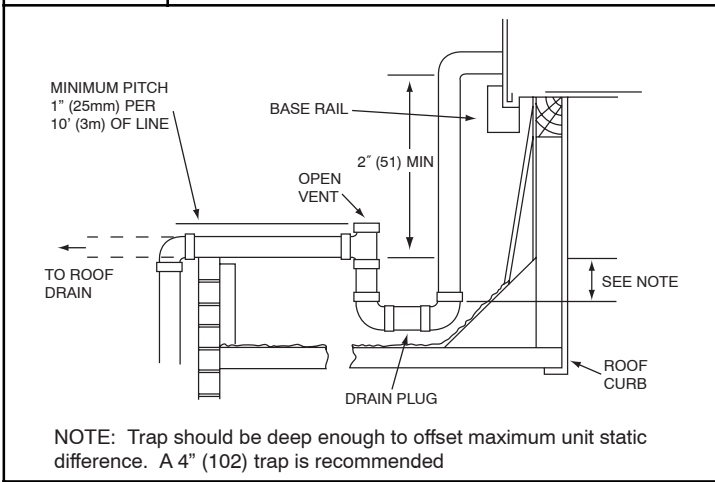
Step 11 — Install External Condensate Trap and Line

The unit has one $\frac{3}{4}$ -in. condensate drain connection on the end of the condensate pan (see Fig. 18) See Fig. 1 (or Fig. 2), item "E", in the view labeled "BACK (HORIZONTAL DISCHARGE)" for the location of the condensate drain connection.



The piping for the condensate drain and external trap can be completed after the unit is in place. Hand tighten fittings to the drain pan fitting. Provide adequate support for the drain line. Failure to do so can result in damage to the drain pan. See Fig. 19.

FIGURE 19 Condensate Drain Piping Details



All units must have an external trap for condensate drainage. Install a trap at least 4-in. (102 mm) deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1-in. per 10 ft (25 mm in 3 m) of run. Do not use a pipe size smaller than the unit connection (3/4-in.).

Step 12 — 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 —

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

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

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.

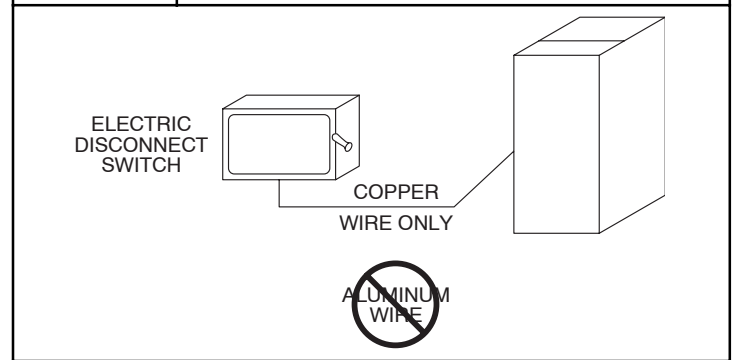
⚠ WARNING

FIRE HAZARD

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

Do not connect aluminum wire between disconnect switch and furnace. Use only copper wire. (See Fig. 20.)

FIGURE 20 Disconnect Switch Unit



Units Without Factory-Installed Disconnect —

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

Units with Factory-Installed Disconnect —

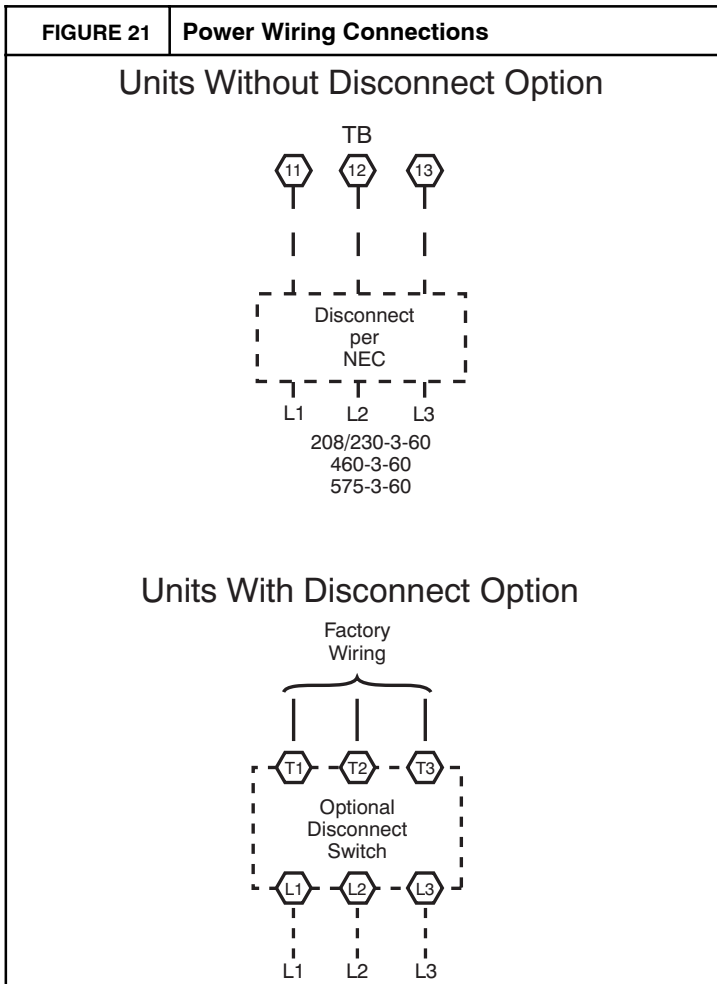
The factory-installed option disconnect switch is located in the main control box. The manual switch handle is accessible on the corner post adjacent to the control box access panel.

All units -

All field wiring must comply with NEC and all local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 21 for power wiring connections to the unit power terminal block and equipment ground.

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.



Convenience Outlets —

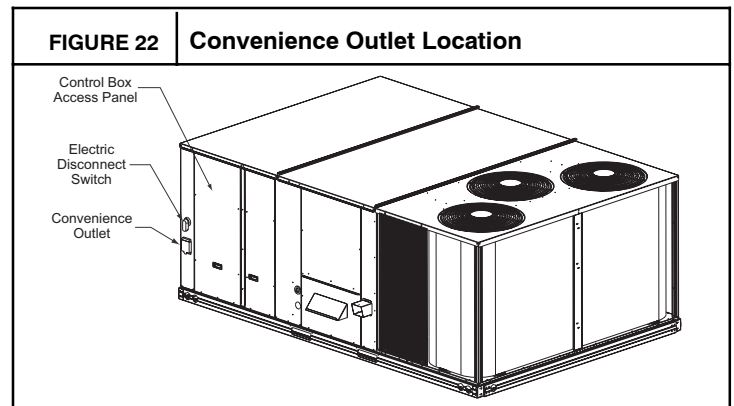
⚠ WARNING

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.

A non-powered convenience outlet is offered on RGS models that provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. See Fig. 22.



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.

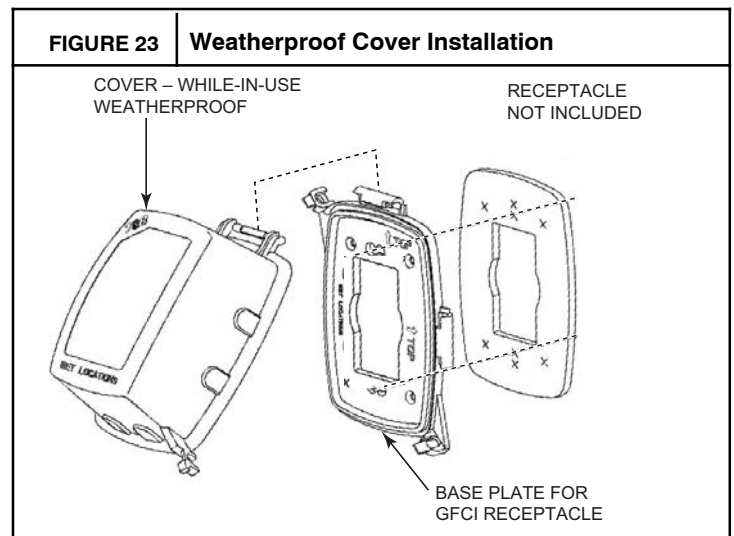
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

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. 23. 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.



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.

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 FNQ-7 dual element time delay 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.

Thru-Base Connections —

All units are equipped with the ability to bring utilities through the base.

Gas is brought up through an embossed area located in the gas section behind the gas entrance post. Access is gained through the gas access panel. A knock out must be removed to accomplish this.

The electrical entrance is located in the control box area can be accessed through the control box access panel. An embossed area is provided with three knock outs. High voltage is brought through the multi knock out by removing the appropriate size for the size of the fitting required. A 7/8-in. knock out is provided for low voltage. An additional 7/8-in. knock out is provided for a 115 volt line which is used when the unit is equipped with the non-powered convenience outlet option.

All required fittings are field supplied. Install fittings when access to both top and bottom of the base pan is available. See electrical and gas connections for routing and connection information.

Units without Thru-Base Connections —

1. Install conduit, liquid tight, between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 21.

All Units —

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the following formula to determine the percent of voltage imbalance.

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

C09103

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 RGS unit requires a field-supplied commercial grade programmable (occupied and unoccupied setpoints) external temperature control device.

Thermostat —

Install a commercial grade 2-stage thermostat according to installation instructions included with the accessory. Locate the field-supplied thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

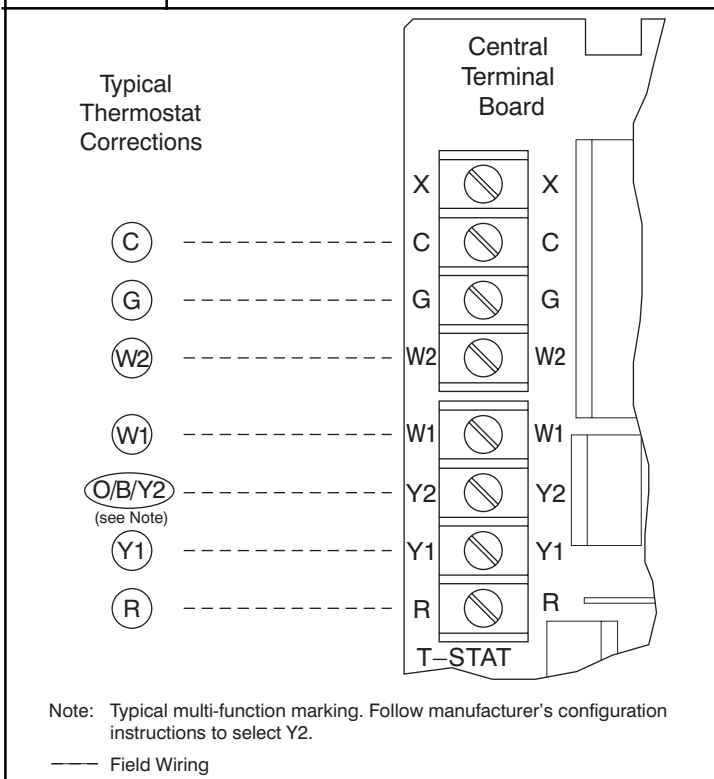
If the thermostat contains a logic circuit requiring 24-v power, use a thermostat cable or equivalent single leads of different colors with minimum of seven leads. If the thermostat does not require a 24-v source (no "C" connection required), use a thermostat cable or equivalent with minimum of six leads.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

Unit without thru-base connection —

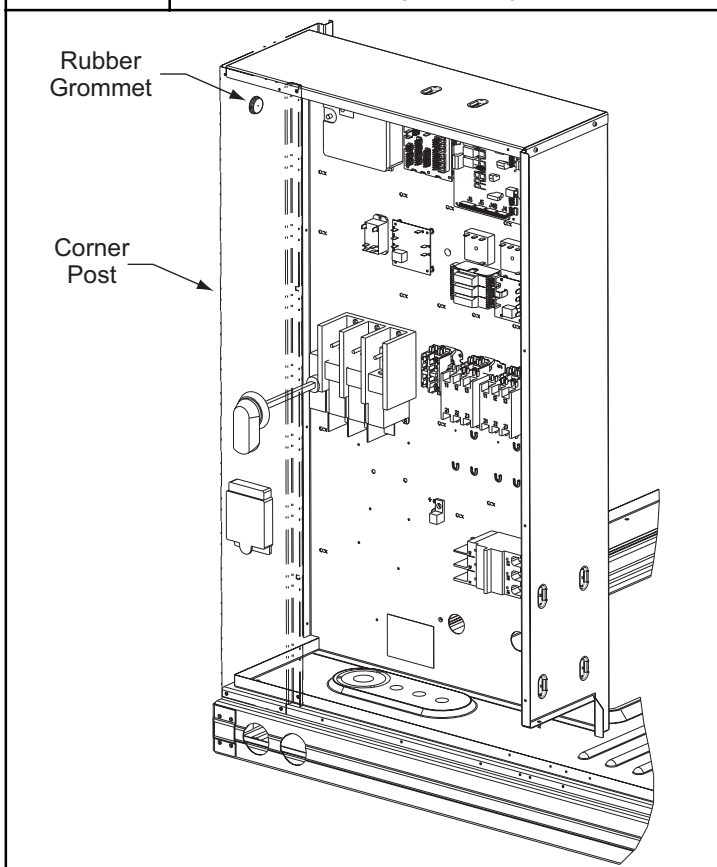
Correctly rated low voltage wire can be routed through the rubber grommet located on the corner post adjacent to the control box access panel. Route wire through the grommet and then route the wire behind the corner post utilizing the factory provided wire ties secured to the control box. This will insure separation of the field low voltage wire and the high voltage circuit. Route the low voltage wire to the central terminal board. See Fig. 24.

FIGURE 24 Typical Low-Voltage Control connections



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

FIGURE 25 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.

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on RGS 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. 26) 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. 27) 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 is shipped in the blower section and is wire tied to the blower housing. See Fig. 28. 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.

FIGURE 26 Controller Assembly

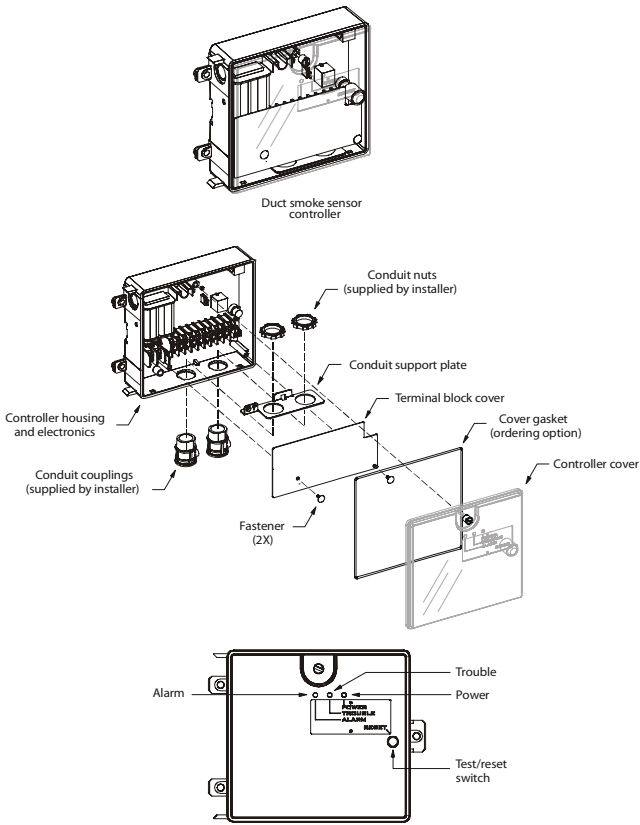
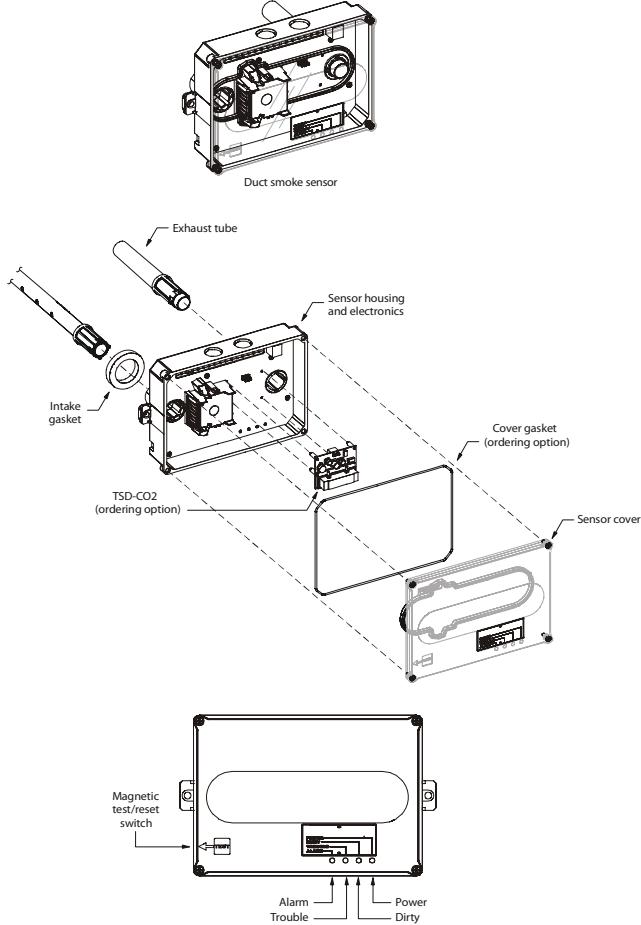


FIGURE 27 Smoke Detector Sensor



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.

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. 28. 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).

FIGURE 28 Typical Supply Air Smoke Detector Sensor Locations

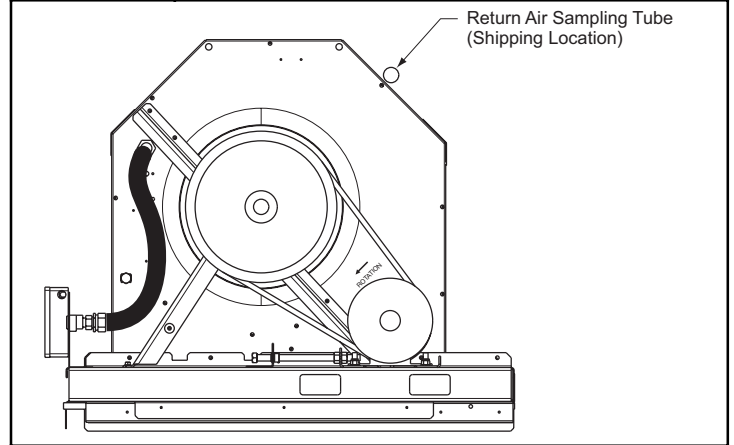
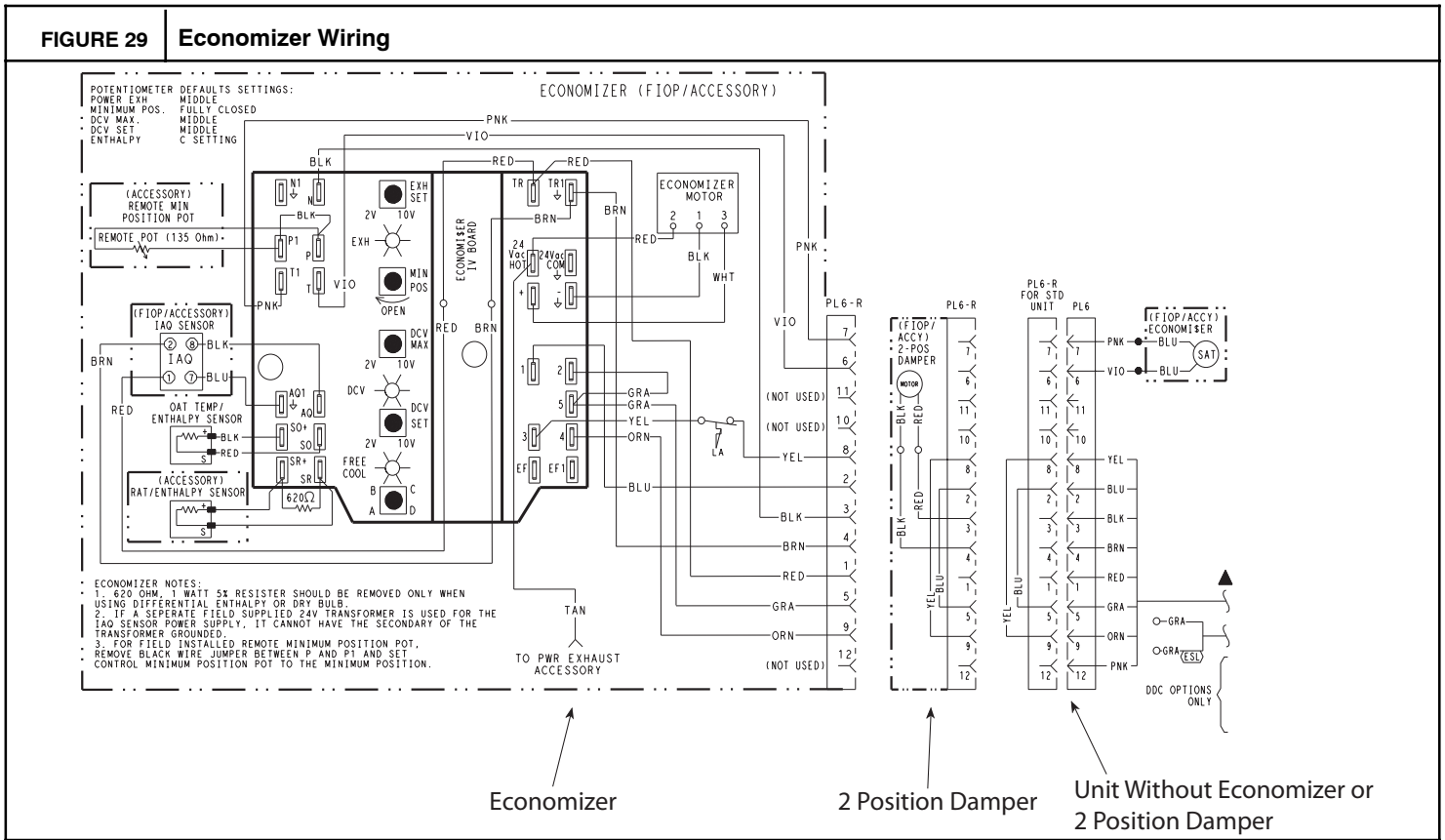


FIGURE 29 Economizer Wiring



Step 13 — Adjust Factory-Installed Options

Smoke Detectors —

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. 29 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
- Low Ambient Controls
- Thermostat / Sensors
- Two-Position motorized outside air damper
- Power Exhaust
- Differential dry-bulb sensor (Economizer)
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- CO₂ sensor
- Louvered hail guard
- Phase monitor control
- Winter Start kit

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

Pre-Start and Start-Up

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