48LC*B
Single Package Rooftop
Gas Heating/Electric Cooling Unit with
Multi−Zone VAV (Variable Air Volume) Operation
with Puron® (R−410A) Refrigerant
Size: 07

Carrier
United Technologies
turn to the experts

Installation Instructions

NOTE: Read the entire instruction manual before starting the installation

TABLE OF CONTENTS

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.

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.

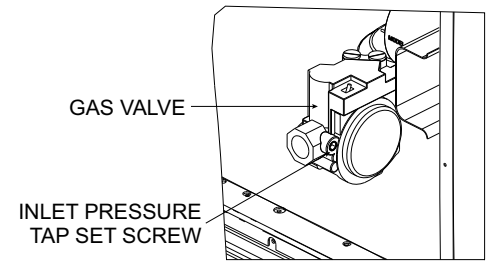
Disconnect gas piping from unit when leak testing at pressure greater than 0.5 psig (3450 Pa). Pressures greater than 0.5 psig (3450 Pa) will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig (3450 Pa), it must be replaced before use. 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

FIRE HAZARD

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

Inlet pressure tab set screw must be tightened and $^1/_8$ in. NPT pipe plug must be installed to prevent gas leaks.

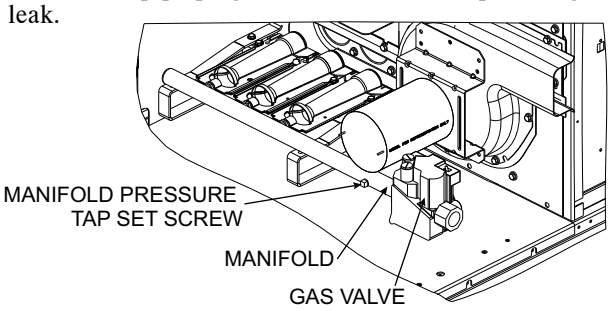


⚠ WARNING

FIRE HAZARD

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

Manifold pressure tap set screw must be tightened and $^1/_8$ in. NPT pipe plug must be installed to prevent gas leak.



⚠ WARNING

CARBON-MONOXIDE POISONING HAZARD

Failure to follow instructions could result in severe personal injury or death due to carbon-monoxide poisoning, if combustion products infiltrate into the building.

Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent infiltration of combustion products into the building.

Check that furnace vent (and air intake) terminal(s) are not obstructed in any way during all seasons.

⚠ 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 lock(s) and lockout tag(s). 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.

Puron® (R-410A) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron 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 following table lists the rated indoor airflow used for the AHRI efficiency rating for the units covered in this document.

Model Number	Full Load Airflow (cfm)
48LC*B07	2250

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	4	8	L	C	D	B	0	7	A	1	A	5	-	1	N	0	A	0

Unit Heat Type
48 - Gas Heat Packaged Rooftop

Model Series - WeatherExpert®
LC - Ultra High Efficiency

Heat Options
D = Low Gas Heat
E = Medium Gas Heat
F = High Gas Heat
S = Low Heat w/ Stainless Steel Exchanger
R = Medium Heat w/ Stainless Steel Exchanger
T = High Heat w/ Stainless Steel Exchanger

Refrigerant System
B = Three stage cooling capacity control with multi-zone VAV operation

Cooling Tons
07 - 6 ton

Sensor Options
A = None
B = RA Smoke Detector
C = SA Smoke Detector
D = RA + SA Smoke Detector
E = CO_2
F = RA Smoke Detector and CO_2
G = SA Smoke Detector and CO_2
H = RA + SA Smoke Detector and CO_2

Indoor Fan Options
1 = Standard Static Belt Drive with VFD controller
2 = Medium Static Belt Drive with VFD controller
3 = High Static Belt Drive with VFD controller

Coil Options: Fin/Tube (Condenser- Evaporator - Hail Guard)
A = Al/Cu - Al/Cu
B = Precoat Al/Cu - Al/Cu
C = E-coat Al/Cu - Al/Cu
D = E-coat Al/Cu - E-coat Al/Cu
E = Cu/Cu - Al/Cu
F = Cu/Cu - Cu/Cu
M = Al/Cu -Al/Cu — Louvered Hail Guard
N = Precoat Al/Cu - Al/Cu — Louvered Hail Guard
P = E-coat Al/Cu - Al/Cu — Louvered Hail Guard
Q = E-coat Al/Cu - E-coat Al/Cu — Louvered Hail Guard
R = Cu/Cu - Al/Cu — Louvered Hail Guard
S = Cu/Cu - Cu/Cu — Louvered Hail Guard

Voltage
1 = 575/3/60
5 = 208-230/3/60
6 = 460/3/60

Design Revision
- = Factory Design Revision

Base Unit Controls
1 = VAV-RTU Open Controller (required on each model)

Intake / Exhaust Options (required on each unit)
B = Standard Leak Temperature Economizer with Barometric Relief
E = Standard Leak Enthalpy Economizer with Barometric Relief
N = Ultra LOW LEAK Temperature Economizer with Barometric Relief
R = Ultra LOW LEAK Enthalpy Economizer with Barometric Relief

Service Options
0 = None
1 = Unpowered Convenience Outlet
2 = Powered Convenience Outlet
3 = Hinged Panels
4 = Hinged Panels and Unpowered Convenience Outlet
5 = Hinged Panels and Powered Convenience Outlet

Electrical Options
A = None
B = HACR Circuit Breaker
C = Non-Fused Disconnect
D = Thru-The-Base Connections
E = HACR Circuit Breaker and Thru-The Base Connections
F = Non-Fused Disconnect and Thru-The-Base Connections

Packaging
0 = Standard
1 = LTL

NOTE: Not all possible options can be displayed above. Refer to other support material or your local Carrier Expert

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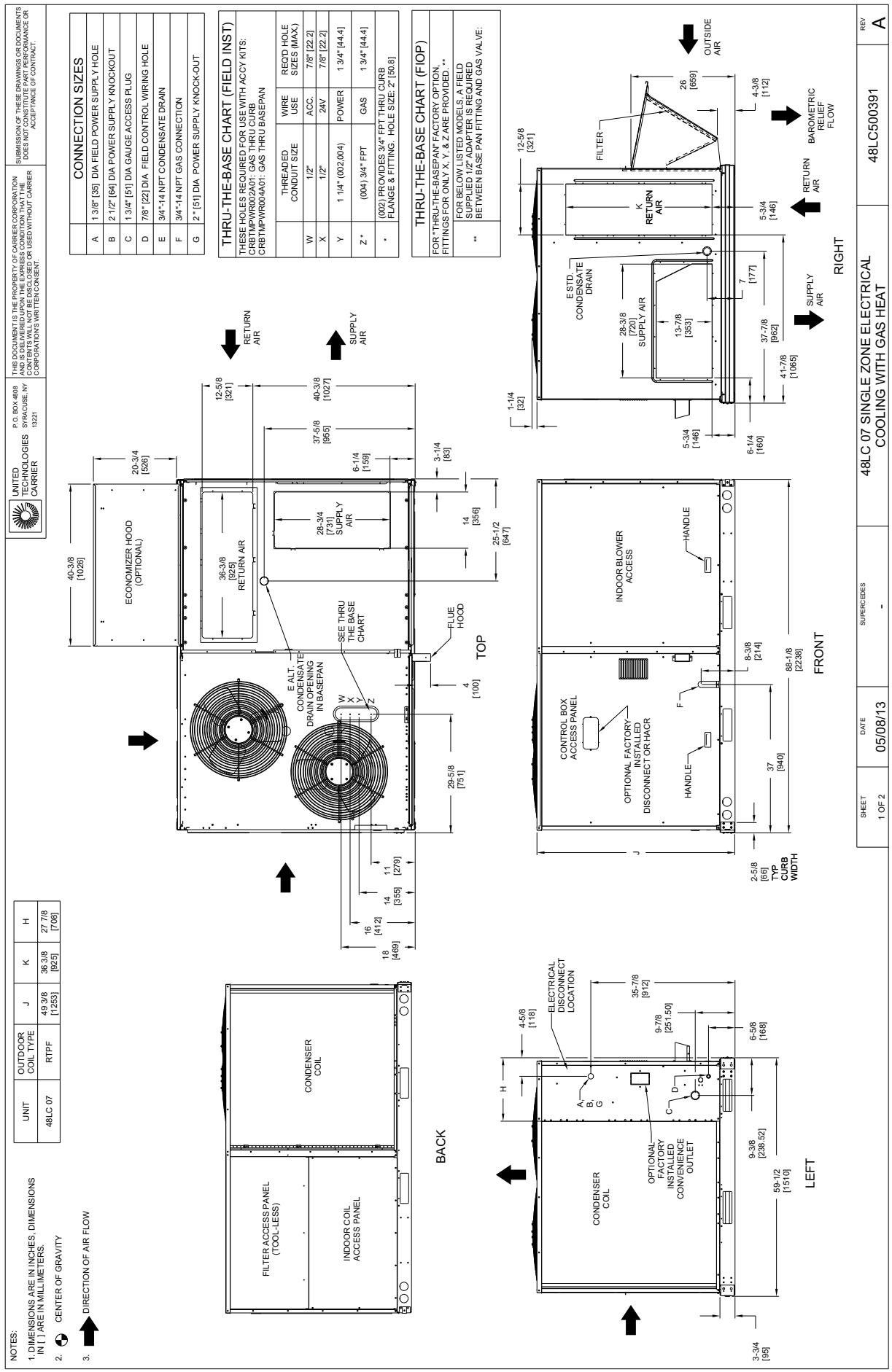
Fig. 1 - 48LC*B07 Model Number Nomenclature (Example)

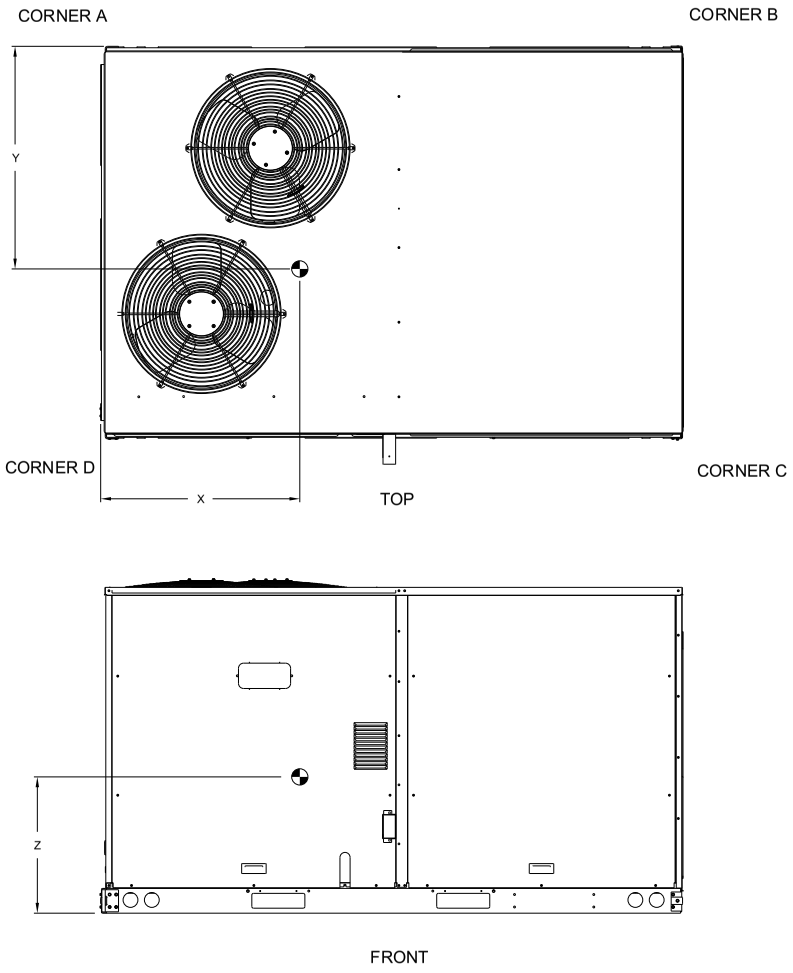


C13312

Fig. 2 - Unit Dimensional Drawing

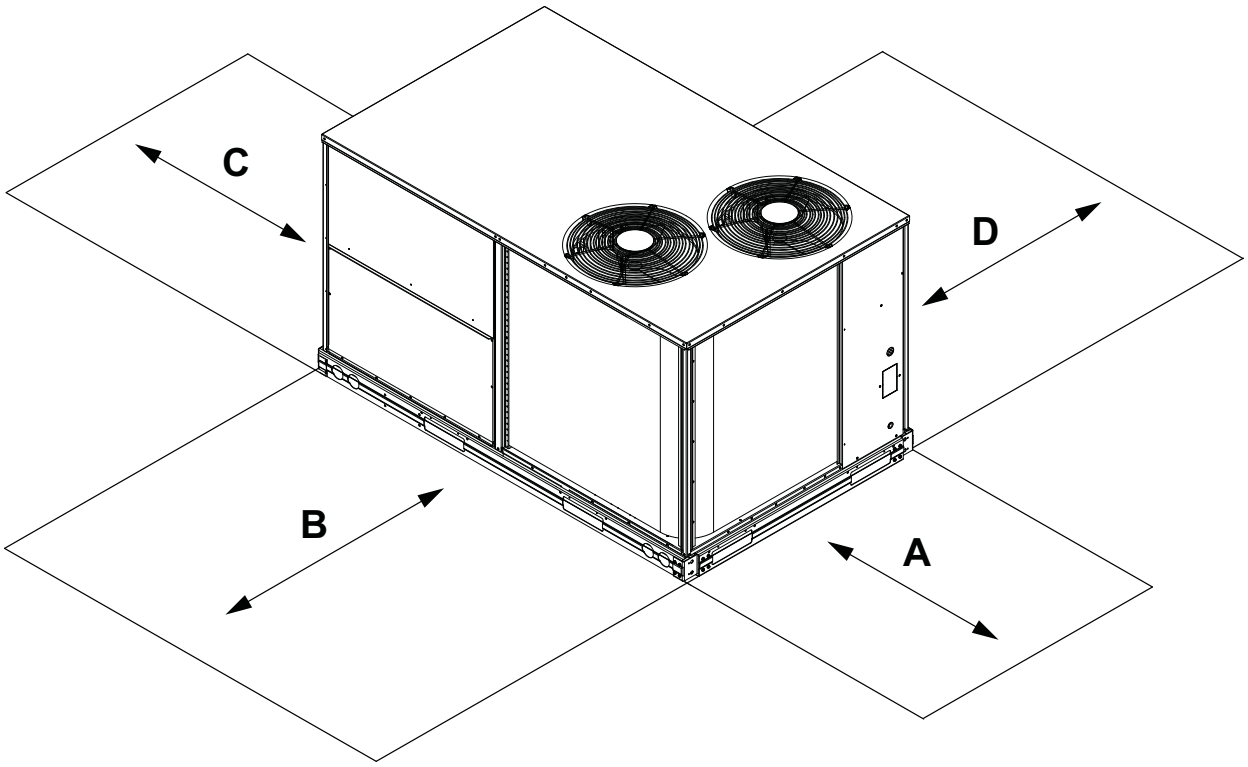
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48LC 07	RTPF	1032	468	226	102	204	92	286	130	317	144	41 3/4 [1060]	24 3/4 [629]	20 3/4 [527]

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



SHEET	DATE	SUPERCEDES			REV
2 OF 2	05/08/13	-	48LC 07 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC500391	A

Fig. 2 - Unit Dimensional Drawing (cont.)



C13093

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 and around unit as specified in 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 13 — Install External Condensate Trap and Line – for required trap dimensions.

Roof Mount —

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

Table 1 – Operating Weights

48LC*B07	UNITS LB (KG)
Base Unit	1090 (495)
Economizer	
Vertical	75 (34)
Horizontal	122 (55)
Powered Outlet	35 (16)
Curb	
14–in/356 mm	143 (65)
24–in/610 mm	245 (111)

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.

Step 4 — Provide Unit Support

Roof Curb Mount —

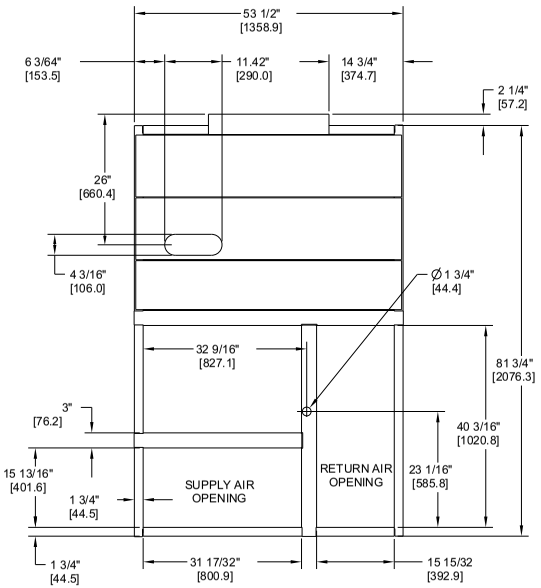
Accessory roof curb details and dimensions are shown in Fig. 4. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

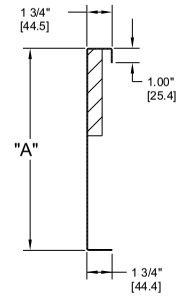
NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 4. Improperly applied gasket can also result in air leaks and poor unit performance.

ROOF CURB ACCESSORY #	A
CRRFCURB003A01	14" [356]
CRRFCURB004A01	24" [610]

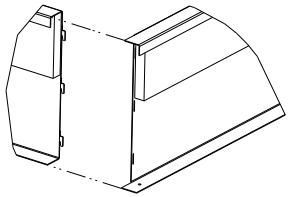
NOTES:
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
2. INSULATED PANELS: 25.4 [1"] THK. POLYURETHANE FOAM, 44.5 [1-3/4] # DENSITY.
3. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4. ROOFCURB: 18 GAGE STEEL.
5. ATTACH DUCTWORK TO CURB. (FLANGES OF DUCT REST ON CURB).
6. SERVICE CLEARANCE 4 FEET ON EACH SIDE.
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
CRBTMPWR002A01	THRU THE CURB	3/4" [19] NPT	1 1/4" [31.7] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR004A01	THRU THE BOTTOM				

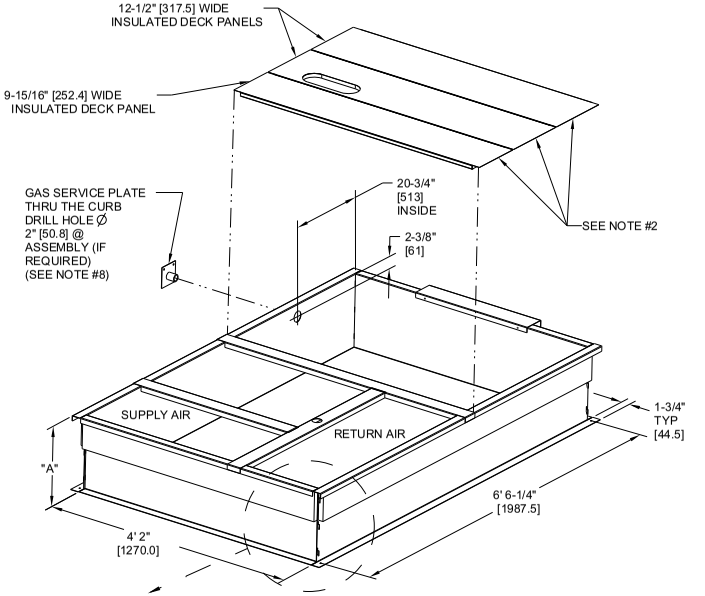




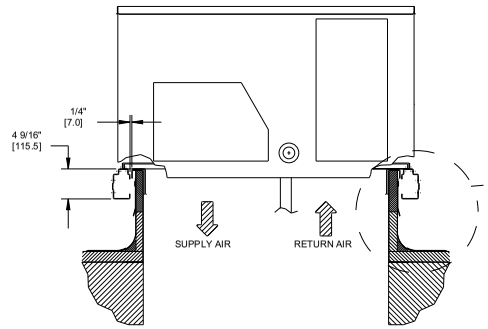
SECTION THRU SIDE

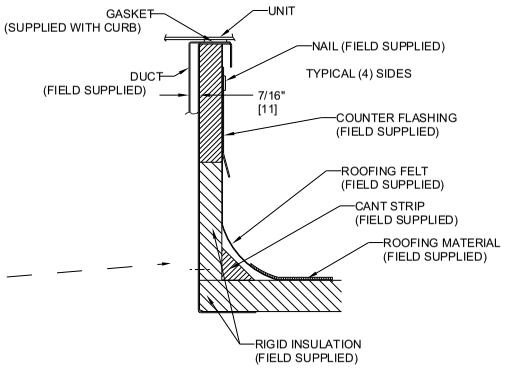


VIEW "B"
CORNER DETAIL



CERTIFIED DRAWING





REV	REVISION RECORD	DATE	BY	CHK'D	APP'D	ECN NO.
C	6' 61/4" WAS 6' 7 1/6", 4'2" WAS 4' 2 13/16"; 18 GA WAS 16 GA.; 15 13/16" WAS 15 15/16"; NAIL FIELD SUPPLIED WAS WITH CURB	4/22/13	MMC	-	-	1067898

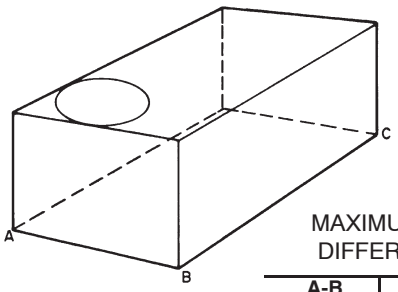
DRAWING RELEASE LEVEL:	PRODUCTION		
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: 1 DEC ± - 2 DEC ± - 3 DEC ± - ANG ± °	THIS DOCUMENT AND THE INFORMATION CONTAINED THEREIN IS PROPRIETARY TO CARRIER CORPORATION AND SHALL NOT BE USED OR DISCLOSED TO OTHERS, IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF CARRIER CORPORATION.	
MATERIAL - - -	AUTHORIZATION NUMBER 1029120	TITLE CURB ASY, ROOF	
ENGINEERING REQUIREMENTS T-005, Y-002	ENGINEERING - - MANUFACTURING - -	SIZE D	DRAWING NUMBER 50HJ405012 SHEET 5 OF 5 REV C
WEIGHT: -	DRAFTER MMC 12/16/09 CHECKER - -		
SURFACE FINISH - MFG/PURCH PURCH	MODEL (INTERNAL USE ONLY)	NEXT DRAWING -	SCALE N/A DISTRIBUTION -

Fig. 4 - Roof Curb Details

C13311

48LC*B

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



MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

A-B	B-C	A-C
0.5” (13)	1.0” (25)	1.0” (25)

C06110

Fig. 5 - Unit Leveling Tolerances

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 $^1/_2$-in. 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).

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 required. 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 can be tightened with a $^1/_2$-in. square socket drive extension. For further details see “Step 13 - Install External Condensate Trap & 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.

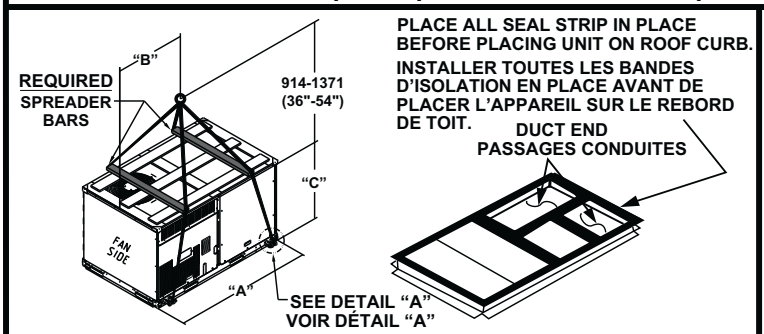
All panels must be in place when rigging. Unit is not designed for handling by fork truck when packaging is removed.

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.

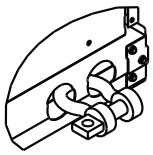
⚠ CAUTION - NOTICE TO RIGGERS:
⚠ AVERTISSEMENT - REMARQUE À L'ATTENTION DES MONTEURS

ALL PANELS MUST BE IN PLACE WHEN RIGGING.
TOUS LES CAPOTS DOIVENT ÊTRE EN PLACE AVANT LE LEVAGE

- **Hook rigging shackles through holes in base rail, as shown in Detail "A".**
- **Use wooden top skid, when rigging, to prevent rigging straps from damaging unit.**
- **Max weight includes base unit plus shipping pallet plus all available FIOP's which could be on that size unit.**
- **"B" dimension is based on base unit plus economizer option only. This dimension may vary slightly with units configured with other FIOP options.**
- **Spreader bars required to lift and transport the unit.**
- **Accrocher les manilles des élingues de levages dans les trous situés dans le rail de base comme indiqué au Détail "A".**
- **Utiliser des cales en bois lors du levage pour éviter que les élingues n'endommagent le haut de l'appareil.**
- **Le poids maximum inclut la configuration de base, le poids de la palette d'expédition, ainsi que toutes les options pouvant être installées en usine (FIOP) pour la plateforme sélectionnée.**
- **La dimension de "B" provient de la configuration de base qui inclut l'option economizer seulement, Cette dimension peut varier légèrement en fonction des différentes options sélectionnées installées en usine (FIOP).**
- **Barres d'écartement requises pour soulever et transporter l'unité.**



DETAIL A
DÉTAIL "A"



MODEL	MAX WEIGHT		A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
48LC_007	1145	520	88	2235	32	812	49 1/2	1257
50LC_007	1080	491	88	2235	30 3/8	772	49 1/2	1257

48TM504503 REV -

C13094

Fig. 6 - Rigging Label

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 back, 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.

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).

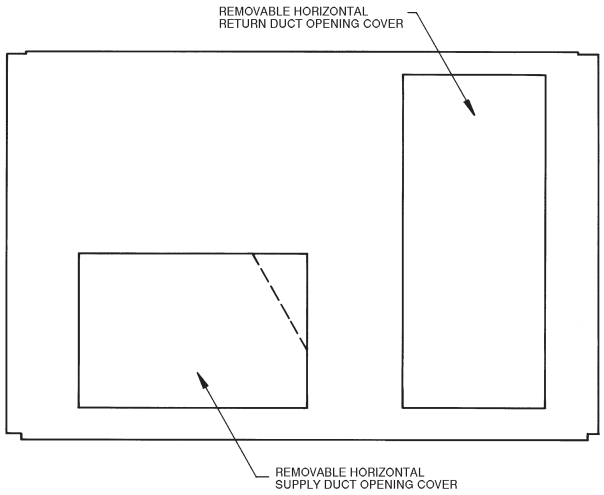
Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

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

After the unit is in position remove all riggings, shipping materials and top skid. Recycle or dispose of all shipping materials.

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

Unit is shipped in the vertical duct configuration. Unit *without* factory-installed 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 — SAT Sensor Installation

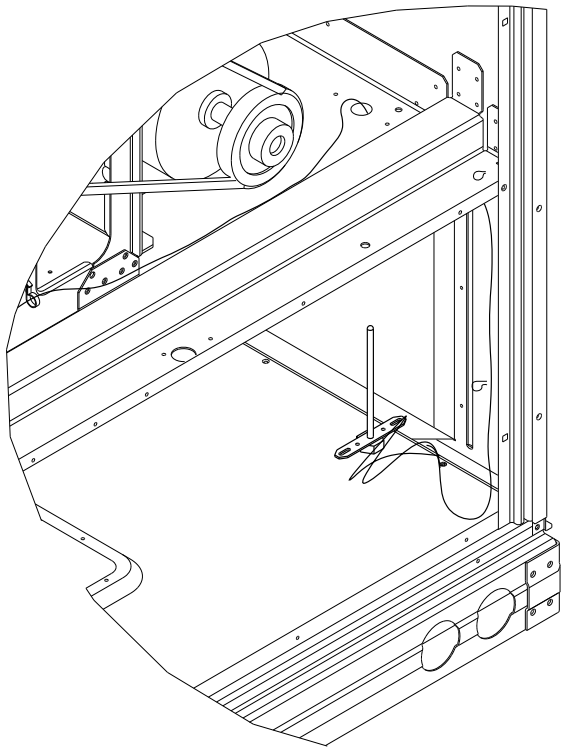
The supply air temperature (SAT) sensor is secured in the supply section of the unit for shipping purposes (see Fig, 8). This sensor must be relocated and mounted in the supply duct during installation.

Step 9 — VAV Duct Pressure Transducer and Field Tubing Installation

Before VAV rooftop unit can operate correctly, installation of the factory supplied duct pressure transducer (DPT) and plastic pneumatic tubing (field supplied) is required. The DPT is mounted in the unit control box for shipping purposes and is shown in Fig. 9. Remove the screw holding the DPT and disconnect quick connects from the transducer terminals. For correct pressure sensing, mount the DPT externally to the main trunk duct approximately $^{2}/_{3}$ of the way from the unit. Install factory supplied duct pressure tap (located in the installer's packet) at the DPT location by inserting tap perpendicular to duct airflow with the arrow on pressure tap flange matching airflow direction.

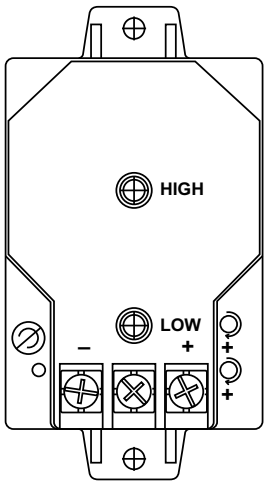
Connect $^{1}/_{4}$-in plastic pneumatic tubing (field supplied) to barbed fitting on pressure tap and connect the other end to "High" fitting of pressure transducer. Leave "Low" pressure connection open to the atmosphere. Connect 20 or 22 AWG insulated wire [35°C (95°F) minimum] to DPT "+" and "-" terminals. Route wiring back to rooftop unit along with the low voltage VAV terminal field control wiring. Connect wire from DPT "+" terminal to quick connect on red wire from VAV-RTU Open Board J4 – Terminal 4 and wire from DPT "-" terminal to quick connect on black wire from VAV RTU-Open Board J4-Terminal 5 with $^{3}/_{16}$-in quick connects. Wire nuts may also be used.

Proper installation of these components is required for accurate input to Analog Input 1 (static_press) on the VAV-RTU Open Control Board. For more information on this please refer to the 48/50LC*B07-26 Controls, Start-Up, Operation, and Troubleshooting document.



C150324

Fig. 8 - SAT Sensor - Shipping Location



C150384

Fig. 9 - Duct Pressure Transducer

Step 10 — Install Outside Air Hood

Economizer Hood Package Removal and Setup

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. 10.)

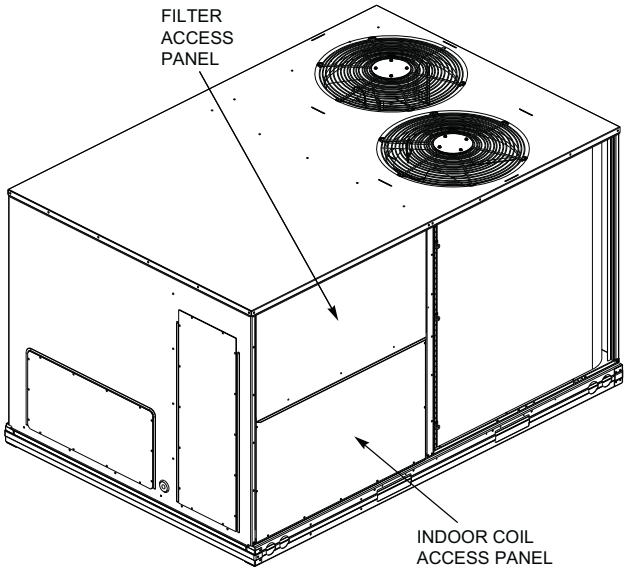


Fig. 10 - Access Panel Locations

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. 11) Be careful to not damage any wiring or cut tie-wraps securing any wiring.

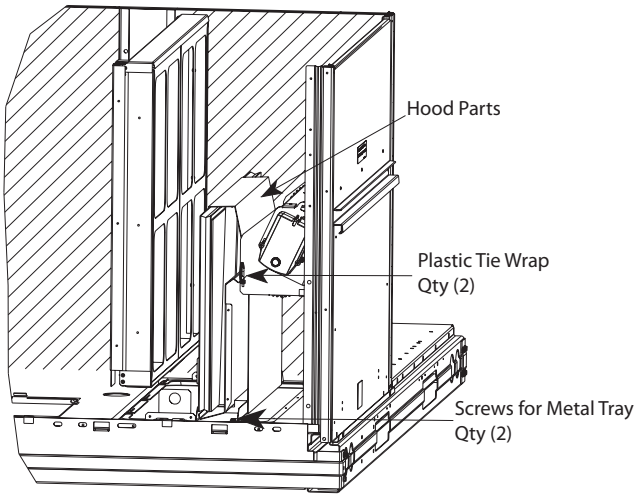


Fig. 11 - Economizer Hood Parts Location

4. Carefully lift the hood assembly (with metal tray) through the filter access opening and assemble per the steps outlined in *Economizer Hood,* below.

Economizer 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. 12.

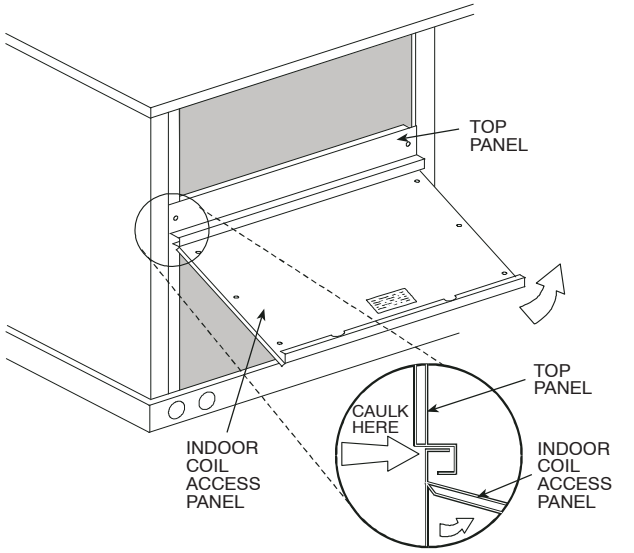


Fig. 12 - Indoor Coil Access Panel Relocation

2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 13.

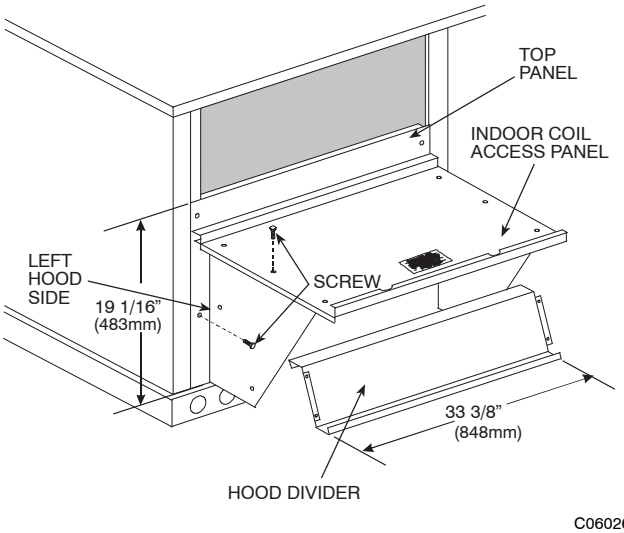


Fig. 13 - Economizer Hood Construction

3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. Insert the hood divider between the hood sides. See Fig. 13 and 14. Secure hood divider with 2 screws on

each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.

5. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 14.
6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.

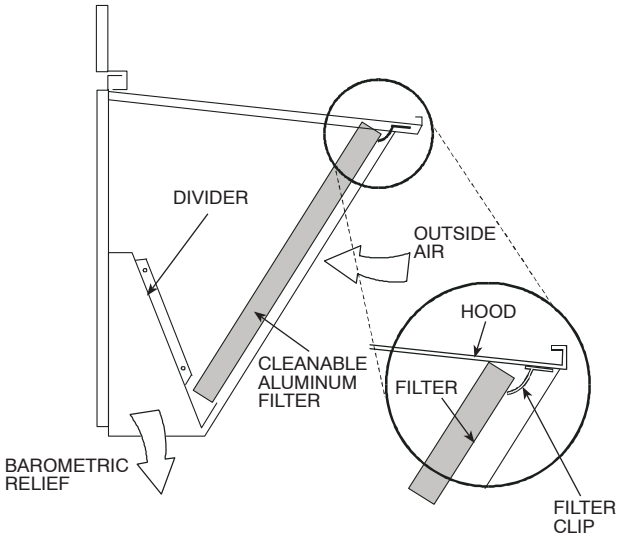


Fig. 14 - Economizer Filter Installation

Step 11 — 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. 15.

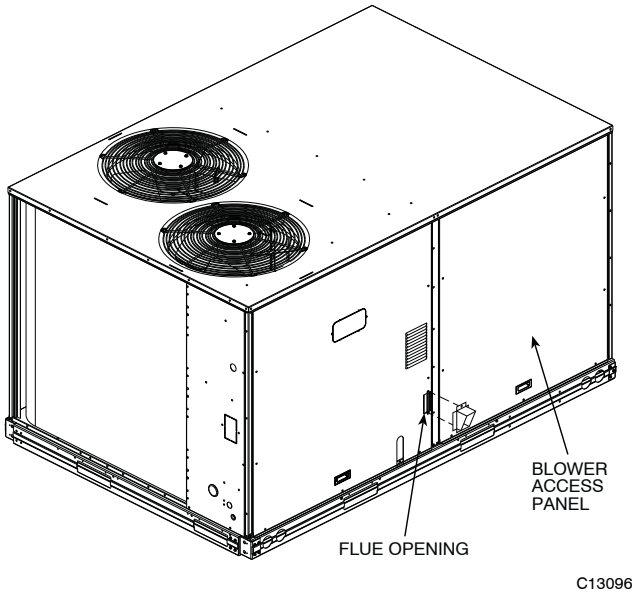


Fig. 15 - Flue Hood Details

Step 12 — 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 4 in. wg (996 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating. On 48LCF/TB07 (high-heat) units, the gas pressure at unit gas connection must not be less than 5 in. wg (1245 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating. For liquified petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13.6 in. wg (3390 Pa) at the unit connection.

Table 2 – Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN	MAX
48LCD/E/S/RB	07	4.0 in. wg (996 Pa)	13.0 in. Wg (3240 Pa)
48LCF/TB (High Heat units only)	07	5.0 in. wg (1245 Pa)	13.0 in. Wg (3240 Pa)

Table 3 – Liquid Propane Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN	MAX
48LCD/F/E/S/R/TB	07	11.0 in. wg (2740 Pa)	13.0 in. Wg (3240 Pa)

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 $^3/_4$-in. FPT gas inlet port on the unit gas valve.

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
48LCD/E/S/RB	07	3.5 in. wg (872 Pa)	1.7 in. Wg (423 Pa)
48LCF/TB (High Heat units only)	07	3.5 in. wg (872 Pa)	2.0 in. Wg (498 Pa)

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
48LCD/E/S/RB	07	10.0 in. wg (2490 Pa)	5.0 in. Wg (1245 Pa)
48LCF/TB (High Heat units only)	07	10.0 in. wg (2490 Pa)	5.7 in. Wg (1420 Pa)

⚠ CAUTION

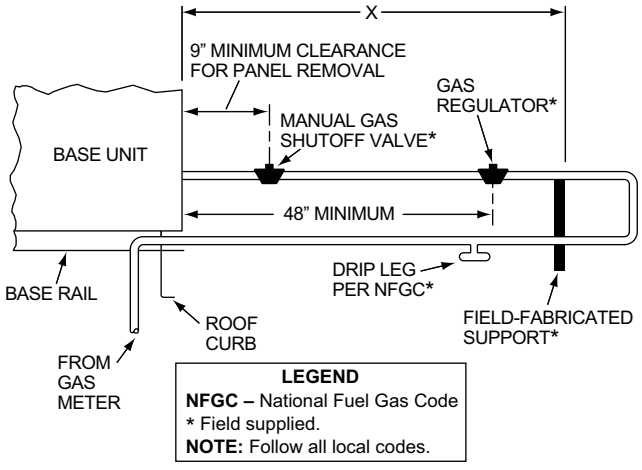
EQUIPMENT DAMAGE HAZARD

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/NFGC or equivalent code for gas pipe sizing data. Do not use a pipe size smaller than $^1/_2$-in. 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. 16.



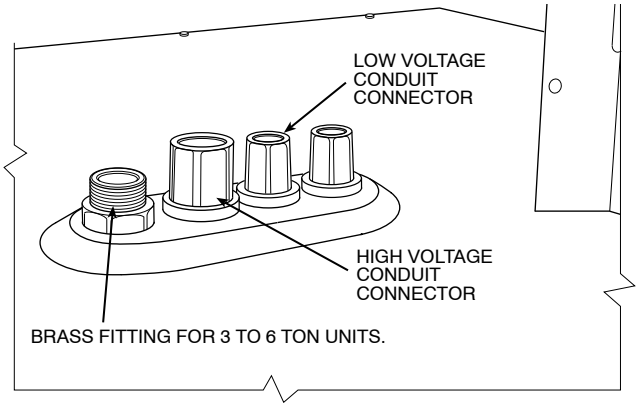
STEEL PIPE NOMINAL DIAMETER (in.)	SPACING OF SUPPORTS X DIMENSION (ft)
$^1/_2$	6
$^3/_4$ or 1	8
$1^1/_4$ or larger	10

C11091

Fig. 16 - Gas Piping Guide (with Accessory Thru-the-Curb Service Connections)

Factory-Option Thru-Base Connections (Gas Connections)—

This service connection kit consists of a $^3/_4$-in NPT gas adapter fitting (brass), two $^1/_2$-in electrical bulkhead connectors and a $^3/_4$-in electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section.



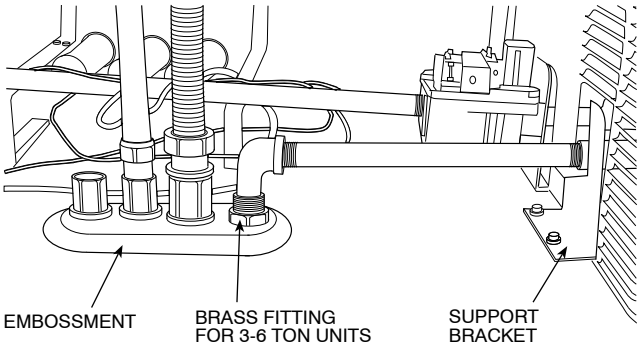
C13410

Fig. 17 - 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.

Install a $^3/_4$-in NPT street elbow on the thru-base gas fitting. Attach a $^3/_4$-in 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. 18.



C13411

Fig. 18 - Gas Line Piping for 6 Ton Units

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 Figures 19 and 20 for typical piping arrangements for gas piping that has been routed through the sidewall of the curb. See Fig. 21 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.

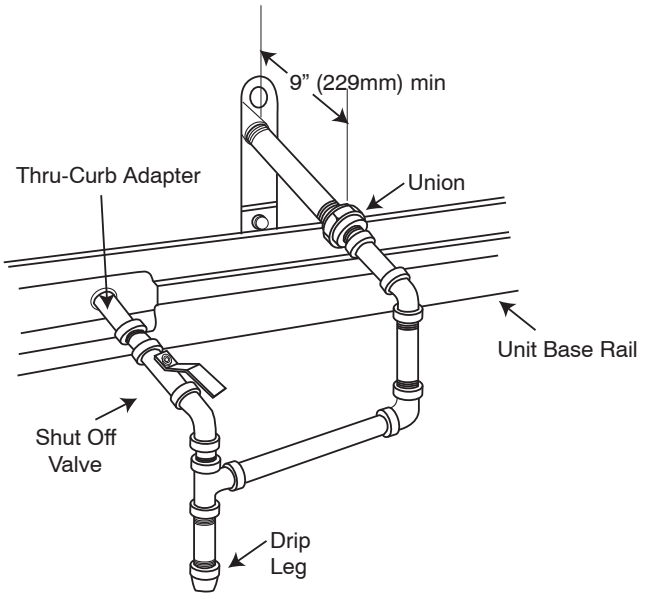


Fig. 19 - Gas Piping

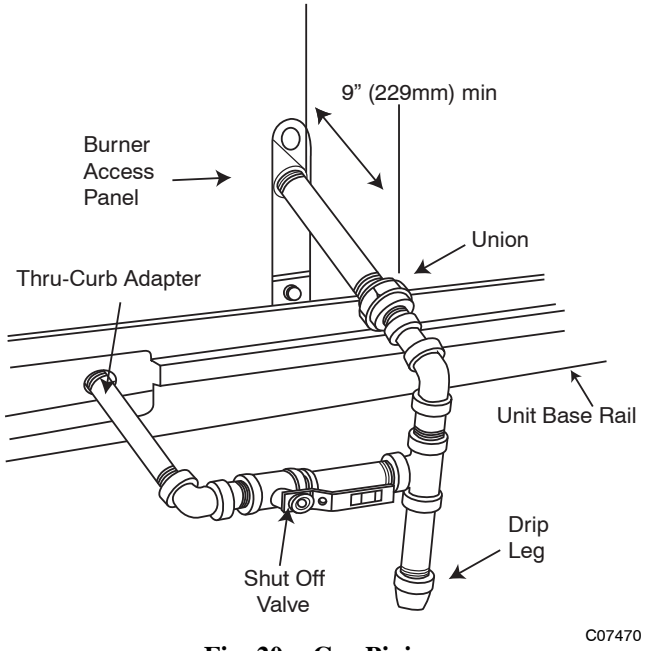


Fig. 20 - Gas Piping

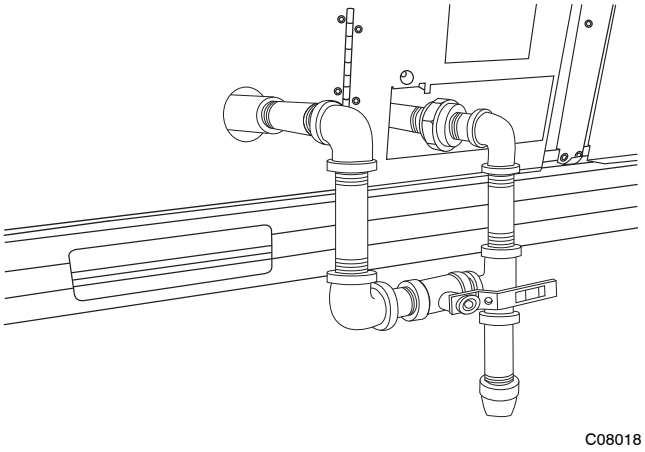


Fig. 21 - Gas Piping Thru-Base Connections

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 $^1/_4$-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 $^1/_2$-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.

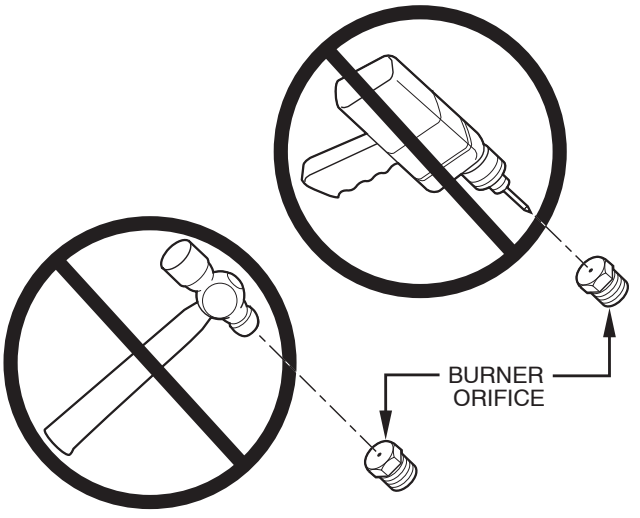


Fig. 22 - Orifice Hole

Step 13 — Install External Condensate Trap & Line

The unit has one $^{3}/_{4}$-in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 23. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

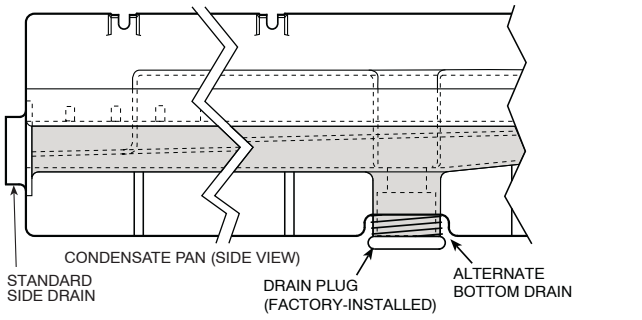
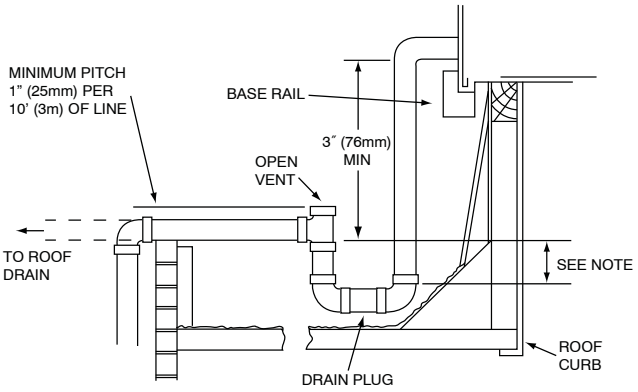


Fig. 23 - Condensate Drain Pan (Side View)

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

The piping for the condensate drain and external trap can be completed after the unit is in place. See Fig. 24.



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

Fig. 24 - 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 14 — 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: 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. 25).

Refer to Fig. 35 for power transformer connections and the discussion on connecting the convenience outlet on page 22.

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

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 or HACR. Max wire size is #4 AWG (copper only) per pole on contactors and #2ga AWG (copper only) per pole on optional non-fused disconnect or HACR. See Fig. 25 and the unit label diagram for field power wiring connections.

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

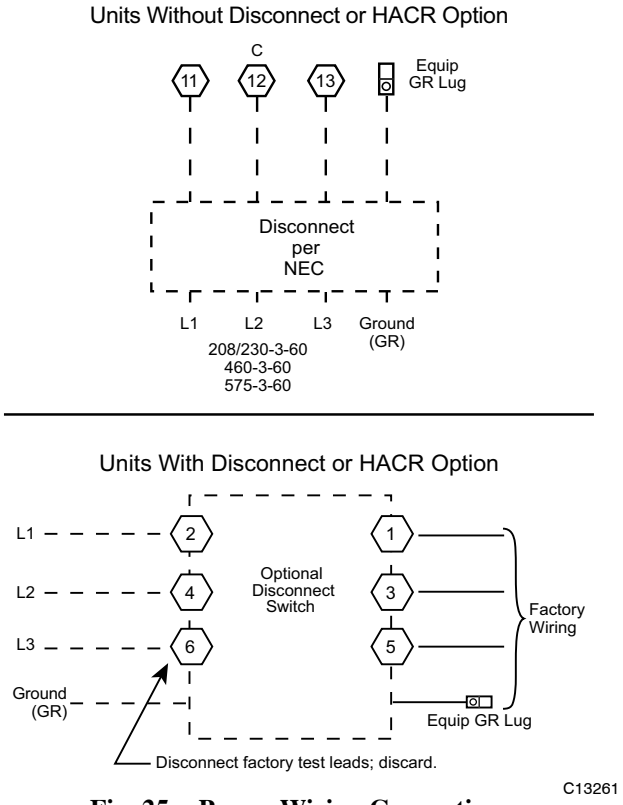


Fig. 25 - Power Wiring Connections

⚠ 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 48LC*B unit. Use only copper wire. (See Fig. 26.)

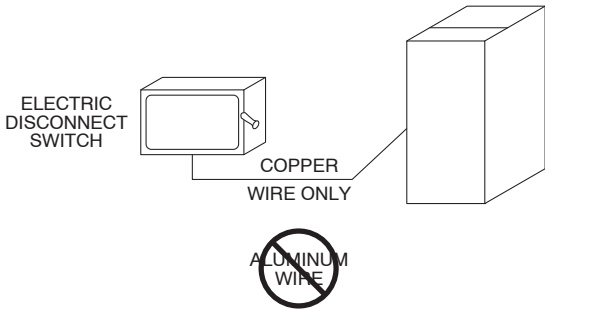


Fig. 26 - Disconnect Switch and Unit

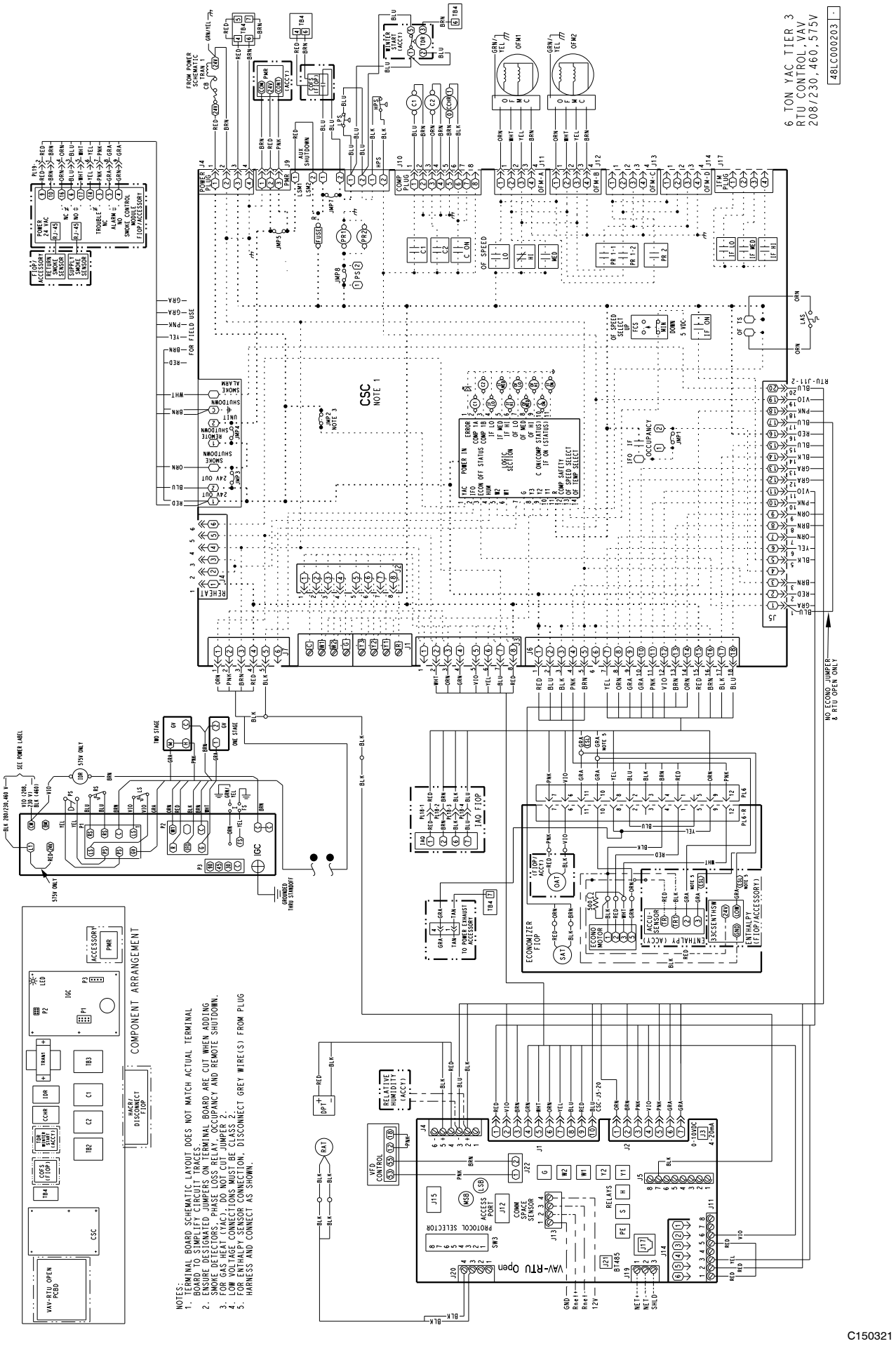
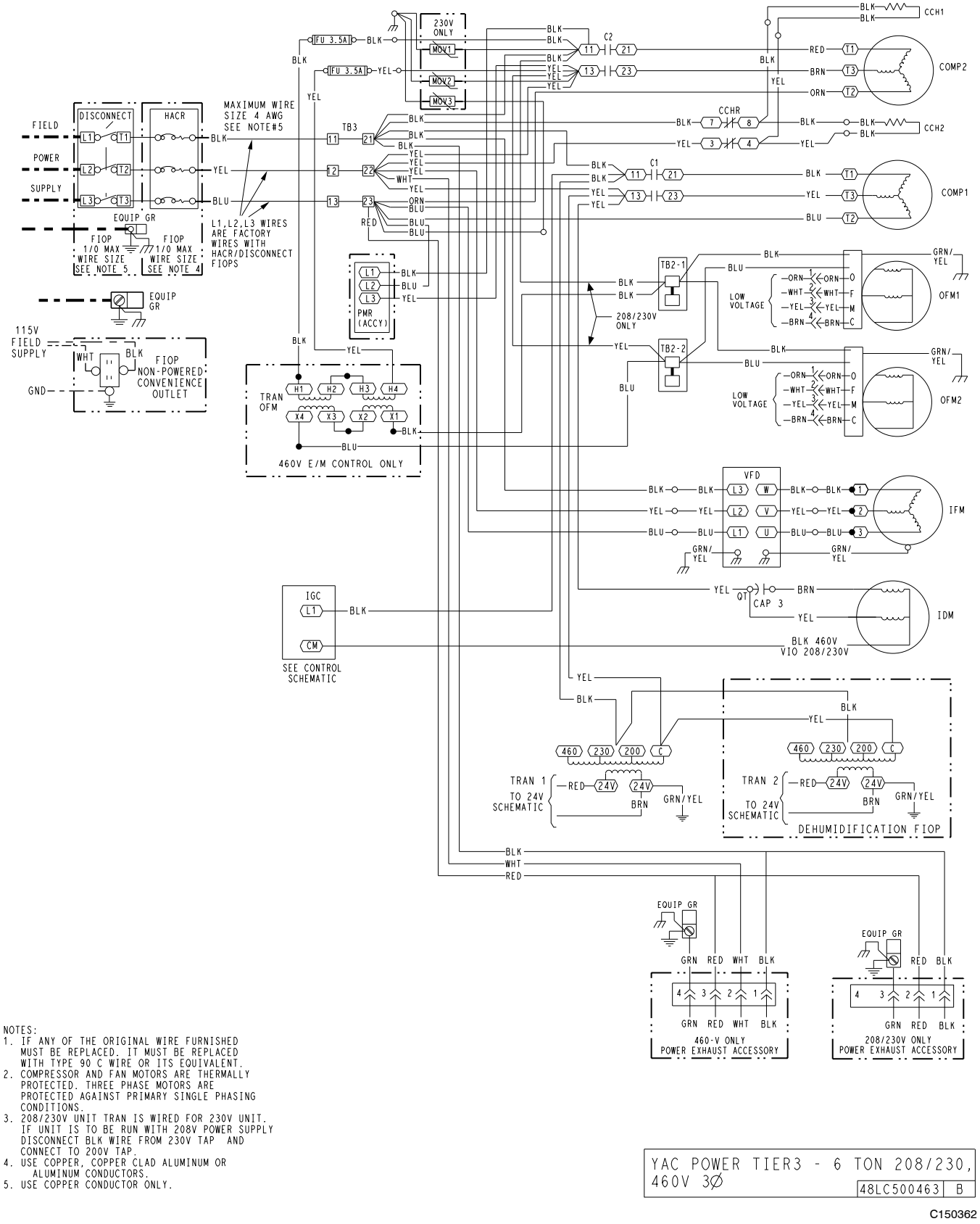


Fig. 27 - 48LC*B07 VAV-RTU Open Control Wiring Diagram



NOTES:
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS.
5. USE COPPER CONDUCTOR ONLY.

YAC POWER TIER3 - 6 TON 208/230, 460V 3Ø

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Fig. 28 - 48LC*B07 Power Wiring Diagram, 208/230V and 460V Units

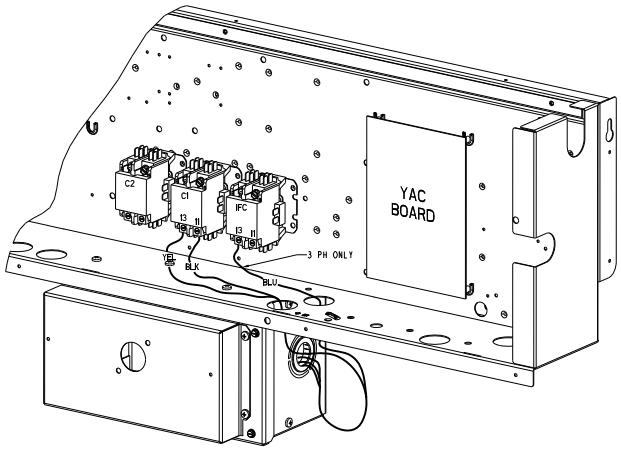
Units With Factory-Installed Non-Fused Disconnect or HACR —

The factory-installed optional non-fused disconnect (NFD) or HACR switch is located in a weatherproof enclosure located under the main control box. The manual switch handle and shaft is shipped in the disconnect or HACR enclosure. Assemble the shaft and handle to the switch at this point. Discard the factory test leads (see Fig. 25).

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

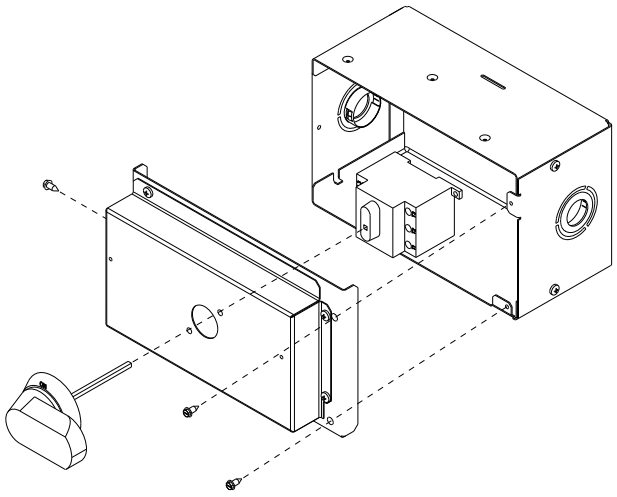
To field install the NFD shaft and handle:

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



C12278

Fig. 29 - Location of Non-Fused Disconnect Enclosure

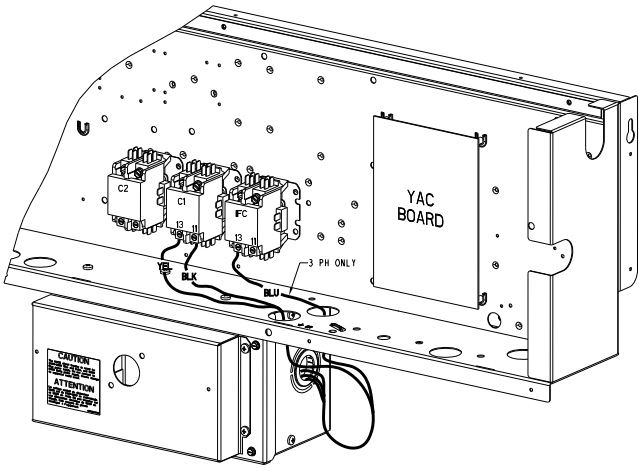


C12279

Fig. 30 - Handle and Shaft Assembly for NFD

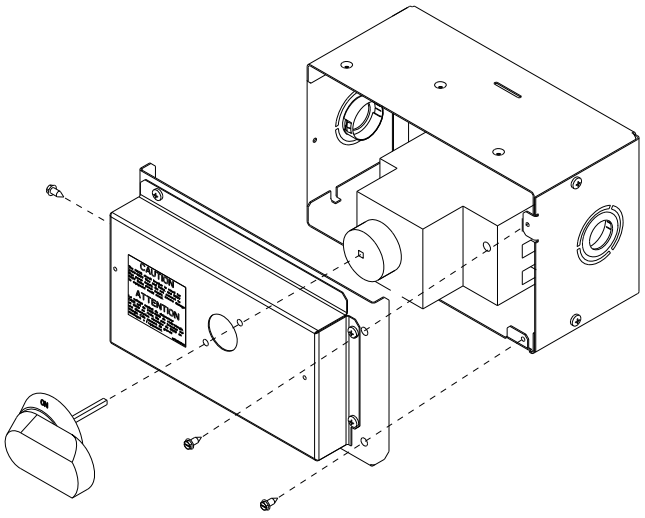
To field install the HACR shaft and handle:

1. Remove the unit front panel (see Fig. 2).
2. Remove (3) hex screws on the HACR enclosure - (2) on the face of the cover and (1) on the left side cover.
3. Remove the front cover of the HACR enclosure.
4. Make sure the HACR shipped from the factory is at OFF position (the white arrow pointing at OFF).
5. Insert the shaft all the way with the cross pin on the top of the shaft in the horizontal position.
6. Tighten the locking screw to secure the shaft to the HACR.
7. Turn the handle to the OFF position with red arrow pointing at OFF.
8. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
9. Secure the handle to the painted cover with (2) screws and lock washers supplied.
10. Engaging the shaft into the handle socket, re-install (3) hex screws on the HACR enclosure.
11. Re-install the unit front panel.



C12280

Fig. 31 - Location of HACR Enclosure



C12281

Fig. 32 - Handle and Shaft Assembly for HACR

Units Without Factory-Installed Non-Fused Disconnect or HACR —

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. 25 and unit label diagram for power wiring connections to the unit 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 or HACR.

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.

NOTE: Units ordered with factory installed HACR do not need an additional ground-fault and short-circuit over-current protective device unless required by local codes.

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 9 - 10. 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 9 and 10, Note 2 (see page 38) 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 Carrier warranty.

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

Convenience Outlets —

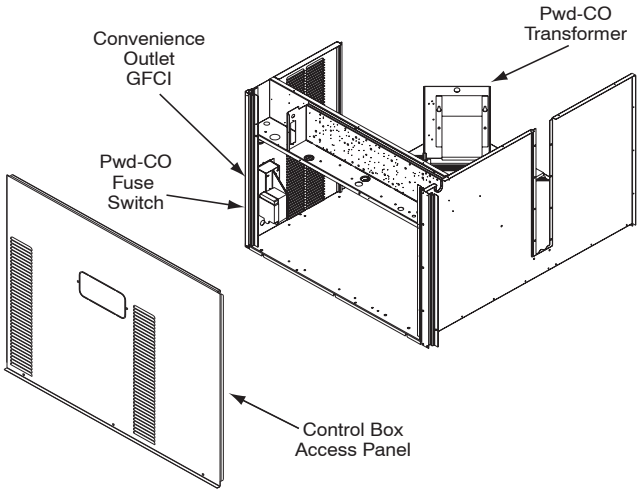
⚠ WARNING

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.

Two types of convenience outlets are offered on 48LC*B models: 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. 33.



C08128

Fig. 33 - Convenience Outlet Location

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

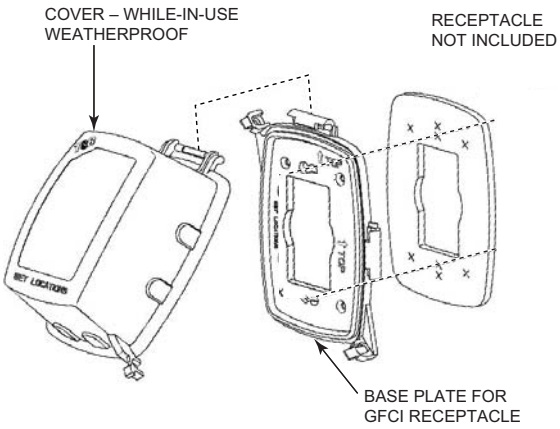
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET. 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. 34. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.



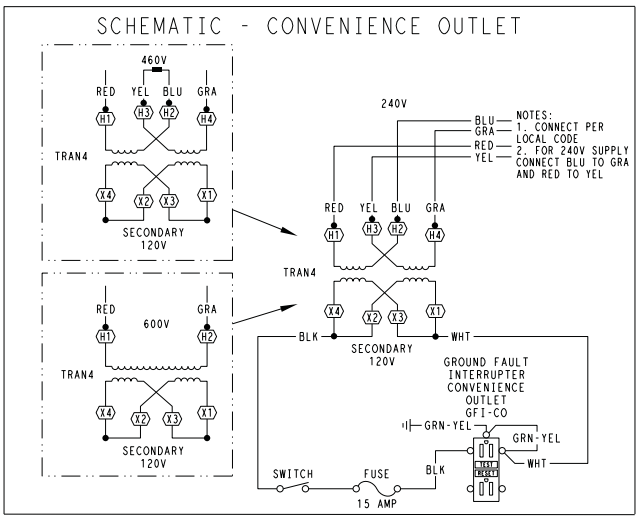
C09022

Fig. 34 - 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. 33.

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 or HACR breaker switch; this will provide service power to the unit when the unit disconnect switch or HACR switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect or HACR switch is open. See Fig. 35.



C08283

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 Splice BLU + YEL L2: GRA	H1 H2 + H3 H4
575	600	L1: RED L2: GRA	H1 H2

Fig. 35 - Powered Convenience Outlet Wiring

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.

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

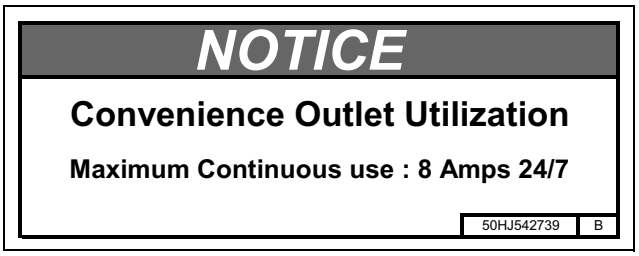
Duty Cycle: the unit-powered convenience outlet has a duty cycle limitation. The transformer is intended to provide power on an intermittent basis for service tools, lamps, etc; it is not intended to provide 15-amps loading for continuous duty loads (such as electric heaters for overnight use). Observe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

Convenience outlet usage rating:

Continuous usage: 8 amps maximum

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.

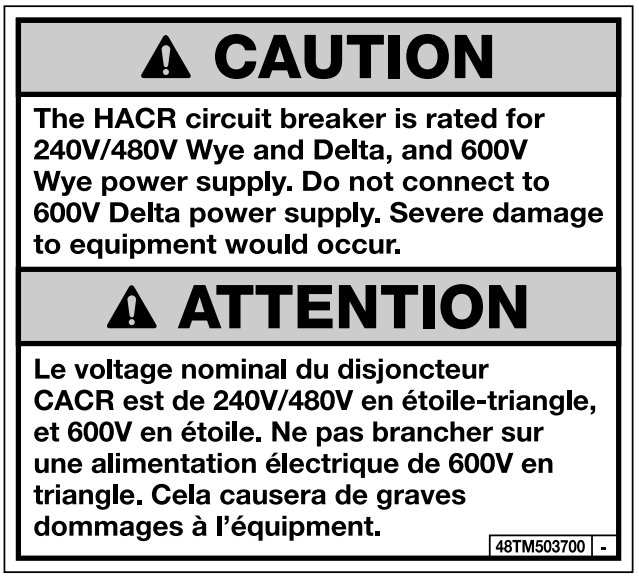


C13415

Fig. 36 - Convenience Outlet Utilization Notice Label

HACR —

The amp rating of the HACR factory installed option is based on the size, voltage, indoor motor and other electrical options of the unit as shipped from the factory. If field installed accessories are added or changed in the field (i.e. power exhaust, etc.), the HACR may no longer be of the proper amp rating and therefore will need to be removed from the unit. See unit nameplate and label on factory installed HACR for the amp rating of the HACR that was shipped with the unit from the factory. See unit nameplates for the proper fuse, HACR or maximum over-current protection device required on the unit with field installed accessories.



C12105

Fig. 37 - HACR Caution Label

Factory-Option Thru-Base Connections (Electrical Connections) —

This service connection kit consists of a $^1/_2$-in electrical bulkhead connector and a $1^1/_4$-in electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section. The $^1/_2$-in bulkhead connector enables the low-voltage control wires to pass through the basepan. The $1^1/_4$-in electrical bulkhead connector allows the high-voltage power wires to pass through the basepan. See Fig. 17.

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.

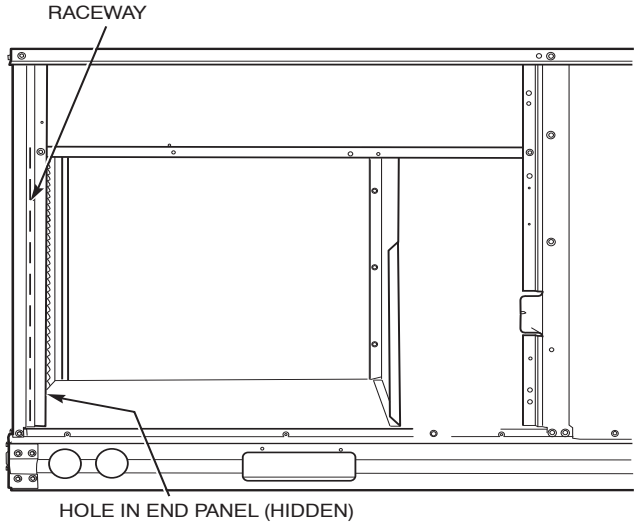
Units Without Thru-Base Connections —

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. 25.

Unit without Thru-Base Connection Kit —

Pass the field control wires through the hole provided in the corner post; then feed the wires through the raceway built into the corner post (see Fig. 38) to the control box. Pull the wires over to the terminal strip on the upper-left corner of the Controls Connection Board.

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



C08027

Fig. 38 - 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.

VAV-RTU Open Controller

The VAV RTU Open controller acts as an intelligent imbedded thermostat to the rooftop unit.

For details on VAV-RTU Open option refer to the *48/50LC*B 7-26 VAV-RTU Open Controller Controls, Start-up, Operation and Troubleshooting* manual.

Integrated Staging Control (ISC) Board

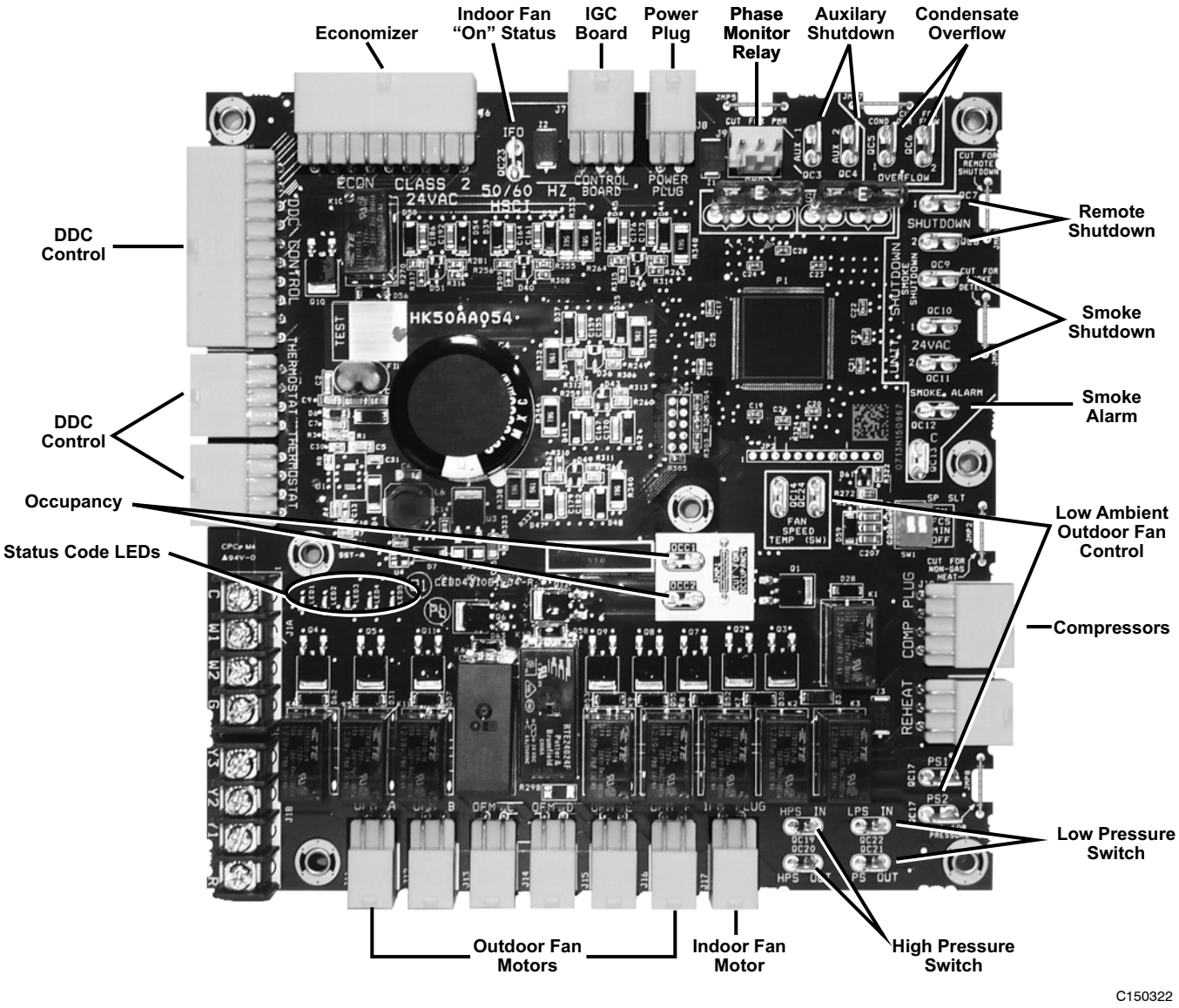


Fig. 39 - Integrated Staging Control (ISC) Board

Sequence of Operation

General —

The Carrier Integrated Staging Control (ISC) is intended for use with the VAV-RTU Open controller. After initial power to the board, a Green LED will blink with a 1 second duty cycle indicating the unit is running properly. In the event of the ISC board failing, the Green LED will be OFF or continuously ON. When the unit is not running properly, the Green LED will blink along with Red LED lights. The Red LED light configuration will indicate the type of error the board has identified. See Fig. 39 for LED locations and Table 6 for a list of the status codes.

The ISC board can be remotely shutdown by removing Jumper 4 and wiring to the Remote Shutdown terminal. The Smoke Control Module can shutdown the unit by removing Jumper 3 and wiring to the Smoke Shutdown terminal. The Smoke Alarm terminal on the ISC Board provides a pass thru connection should a smoke alarm signal be connected. The VAV-RTU Open controller provides the signal which is passed thru the ISC board to the Smoke Alarm terminal.

The crankcase heater will run at all times except when the compressors are running. An auxiliary power supply (24Vac) available at TB-4 Terminal is provided to power auxiliary equipment. An optional Phase Monitor Relay can be wired to the PMR terminal by removing Jumper 5. An optional Condensate Flow Switch can be wired to the COFS Terminal by removing Jumper 7.

Static Pressure Control –

The supply fan VFD will be controlled using a PID and an analog input from a duct static pressure transducer. The supply fan will modulate its speed to maintain the desired duct static pressure setpoint.

Table 6 – Status Code Descriptions for ISC Board LEDs

ERROR#	ERROR NAME	LED INDICATION				
		LED01	LED02	LED03	LED04	LED05
1	Check Smoke Detector/PMR/AUX		RED	Blinking Green LED (Note 1)		
2	Check HPS/LPS/COFS	RED	RED			
3	Call for Y3 with no call for Y1. Check Y1 wiring.				RED	
4	Call for Y3 with no call for Y1/Y2. Check Y1 wiring.				RED	RED
5	Call for Y2 with no call for Y1. Check Y1 wiring.		RED		RED	
6	Call for W2 with no call for W1. Check W1 wiring.	RED				RED
7	Call for heat (W1/W2) and cooling (Y1/Y2/Y3). Check VAV–RTU Open wiring.	RED	RED		RED	RED
8	Call for heat (W1/W2) with no IFM. Check G wiring.		RED		RED	RED
9	Call for cooling (Y1/Y2/Y3) with no G. Check G wiring	RED	RED		RED	
10	Call for heat (W1/W2) and cooling (Y1/Y2/Y3) with no G. Check VAV–RTU Open and G wiring.	RED	RED			RED
11	Check ISC Board and the VAV–RTU Open wiring	RED			RED	RED
12	Call for Economizer Y1 Feedback (ECON) from economizer with no call for Y1. Check VAV–RTU Open and economizer wiring.	RED				
13	Check ISC Board and the VAV–RTU Open wiring	RED			RED	
14	Check ISC Board and the VAV–RTU Open wiring					RED
15	Check ISC Board and the VAV–RTU Open wiring		RED			RED

NOTES: 1. Green LED Blinking at 1HZ indicates normal operation.
2. Solid red LED indicates an error exists, see above LED configuration.

Field Test/Commissioning –

The control will provide BACnet test points to activate specific test modes that can be used to commission the rooftop and the system. Test modes will be available in the Service Test screen on the Property pages and shall also be available on the local Equipment Touch device for standalone commissioning. Tests include: Fan Test, Low Heat Test, High Heat Test, Cooling Test, Power Exhaust Test, and an Economizer Test. When any test is active, the appropriate Linkage mode will be sent to the system's terminals. This will ensure appropriate system operation and airflow during any test mode.

Ventilation —

In the Ventilation/Fan Mode (G), the indoor-fan will run at low speed and the damper will operate at minimum position.

Supply Air Temperature Control –

The control will maintain the desired supply air temperature setpoint whenever cooling is required. A user configurable setpoint will be provided (default 53°F). The control will use the appropriate method (economizer cooling, mechanical cooling, or a combination of both) to achieve this setpoint whenever the zone temperature is greater than the current cooling setpoint (occupied or unoccupied). If Supply Air Reset is enabled, the reset algorithm will calculate a proportional reset value between the Occupied Cooling setpoint and 1°F above the Occupied Heating setpoint. The amount of reset (reset ratio and maximum reset limit value) is user configurable.

Minimum Ventilation –

The economizer minimum position will be adjusted as required based on the supply fan speed. Two user configurable minimum economizer positions will be provided. The economizer will be positioned at the "Low Fan Econ Min Pos" when the fan is operating at its slowest speed. When the fan is operating at its maximum speed, the economizer will be positioned at the "Vent Dmpr Pos / DCV Min Pos". For any supply fan speed between these two points, the economizer minimum position will be calculated proportionally.

Demand Controlled Ventilation [DCV] –

Whenever the unit is in an occupied mode and "DCV Control" is set to enable, a unique economizer minimum position will be calculated based on the output of the DCV calculation. Two user configurable values are provided; the "DCV Max Ctrl Setpoint" is the differential CO_2 setpoint that is used as the control point and a "DCV Max Vent Damper Pos" provides the ability to limit the maximum amount of outdoor air being introduced into the unit through the economizer by the DCV control. The economizer will be positioned at the greater of any minimum economizer position. Demand Controlled Ventilation can be used in either a differential mode where both the indoor air and outdoor air CO_2 levels are provided to the control or it may be used in a single indoor air mode with only the indoor air CO_2 level. In the latter case, the outdoor air CO_2 level is assumed at 400 ppm.

Mechanical Cooling Cycle –

The control will operate three stages of mechanical cooling in order to maintain the desired supply air temperature whenever economizer cooling operation is unavailable but cooling is required. This condition will be determined if the OA has high enthalpy or at a temperature above the Economizer Lockout temperature. The two compressors will be staged in a binary fashion so that three stages of cooling are provided. Mechanical cooling stages will be added as required to meet the desired SA setpoint. The number of stages will depend on the return air conditions and the system load (airflow through the coil). Stages will be added

or dropped as required to maintain the setpoint while also maintaining the minimum on time and minimum off time for compressor operation. Anytime the SA falls below the desired SA setpoint, stages will be dropped until only stage 1 is operating. At that point, should the SA fall below 45°F (7°C), the economizer will modulate to increase the amount of outdoor air in order to maintain this minimum SA temperature. Should the economizer reach the maximum OA position and if the SA is still below the minimum SA temperature, the 1st cooling stage will be disabled and the economizer will return to the minimum position.

Integrated Cooling Cycle -

If economizer cooling operation is insufficient to maintain the desired SA setpoint, mechanical cooling will be activated to supplement the free economizer cooling. This condition will be determined if the OA has low enthalpy but is at a temperature at least 5 deg F above the desired SA setpoint and below the Economizer Lockout temperature. Mechanical cooling stages will be added as required to meet the desired SA setpoint. The number of stages will depend on the return air conditions and the system load (airflow through the coil). Stages will be added or dropped as required to maintain the setpoint while also maintaining the minimum on time and minimum off time for compressor operation. Anytime the SA falls below the desired SA setpoint, stages will be dropped until only stage 1 is operating. At that point, should the SA fall below the minimum SA temperature, the economizer will modulate to increase the amount of return air in order to maintain this minimum SA temperature. Should the economizer reach the minimum OA position and if the SA is still below the minimum SA temperature, the 1st cooling stage will be disabled.

Economizer Cooling Cycle –

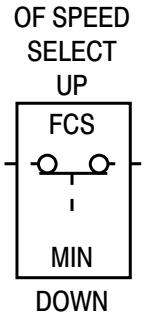
The control will provide the ability to utilize outdoor air for maintaining the supply air setpoint should the outdoor air be suitable. The economizer control will utilize an OAT temperature check, a RAT temperature check if RAT is available or a SPT temperature check comparison and optionally, an OA enthalpy check to determine if OA conditions are suitable for economizing. Economizer operation, if available, will begin whenever cooling is required. The economizer will modulate the position of the OA damper to maintain the desired calculated economizer setpoint. The economizer will be controlled to meet CEC Title 24 requirements so that it will remain open 100% during integrated cooling and only partially close if required.

Low Ambient Cooling Operation down to 45°F (7°C) —

In Low Ambient RTU conditions when the temperature is between 55°F (13°C) and 45°F (7°C), the Low Ambient Switch (LAS) will be active and the outdoor-fans will run to the pre-set factory outdoor-fan speed. When the temperature is greater than 65°F (18°C), the Low Ambient Switch will deactivate and the outdoor-fans will run in the standard cooling mode. If the Outdoor Fan Select Switch (see Fig. 40) is in the up position, the outdoor fans will run in the Fan Cycle Speed Mode (FCS) set to 250 rpm. If the Outdoor Fan Select Switch is in the down position, the outdoor fans will run in the Minimum Fan Speed Mode (MIN) set to 160 rpm regardless of the cooling demand.

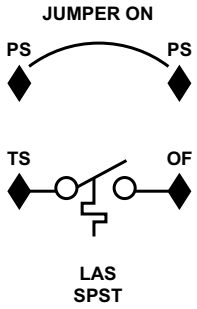
At temperatures below 45°F (7°C), unit will utilize economizer for SA temperature control.

LC Size 07 Units have a SPST normally open Low Ambient Switch wired across the TS and OF terminal and a jumper placed across the PS terminal (see Fig. 41). When the LAS is active, the switch will close making contact to the OF terminal. This is done for units that require all outdoor fans to run at the same pre-set factory Low Ambient Speed.



C13327

Fig. 40 - Outdoor Fan Speed Select Switch



C13328

Fig. 41 - Schematic of SPST Low Ambient Switch

The Low Ambient Temperature Outdoor Fan Control Table (below) shows the operation of the outdoor fan for size 07 units.

Table 7 – Low Ambient Temperature Outdoor Fan Control

LC Size	No. of Fans On	No. of Fans Off	Switch	Outdoor Fan Select Switch	RPM
07	2	0	SPST	Up	250

Heating —

In the Heating Mode (W1 and G), the ISC board sends power to W on the IGC board. The indoor-fan motor will energize and the outdoor-air dampers will open to their minimum position. The ISC board upon seeing W1 and G ON will turn the indoor fan to high speed.

The IGC board starts its gas ignition process. A check is made to ensure that the rollout switch and limit switch are closed. If the check was successful, the induced draft motor is energized, and when its speed is satisfactory, as proven by the "hall effect" sensor, the ignition activation period begins. The burners will ignite within 5 seconds. If the burners do not light, there is a 22-second delay before another 5 second attempt. This sequence is repeated for 15 minutes or until the burners light. If, after the 15 minutes,

the burners still have not lit, heating is locked out. To reset the control, break 24VAC power to the VAV-RTU Open.

When gas ignition occurs, the IGC board will continue to monitor the condition of the rollout switch, the limit switches, the "hall effect" sensor, as well as the flame sensor.

When W1 is turned OFF, the IGC board turns off the gas valve. The IGC board has a delay time before it turns IFO=OFF. At this time, the ISC board sees W1=OFF and IFO=ON. The ISC will keep the indoor fan ON high speed. Once the IGC board delay times out, the ISC board will see W1=OFF and IFO=OFF, which then turns the indoor fan OFF.

If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. The indoor fan motor will continue to operate for an additional 45 seconds then stop. If the over temperature limit opens after the indoor motor is stopped, but within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan OFF delay will not change back to 45 seconds unless power is reset to the control. A LED indicator is provided on the IGC to monitor operation.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the zones are satisfied, the gas valve closes, interrupting the flow of gas to the main burners.

Morning Warm-up –

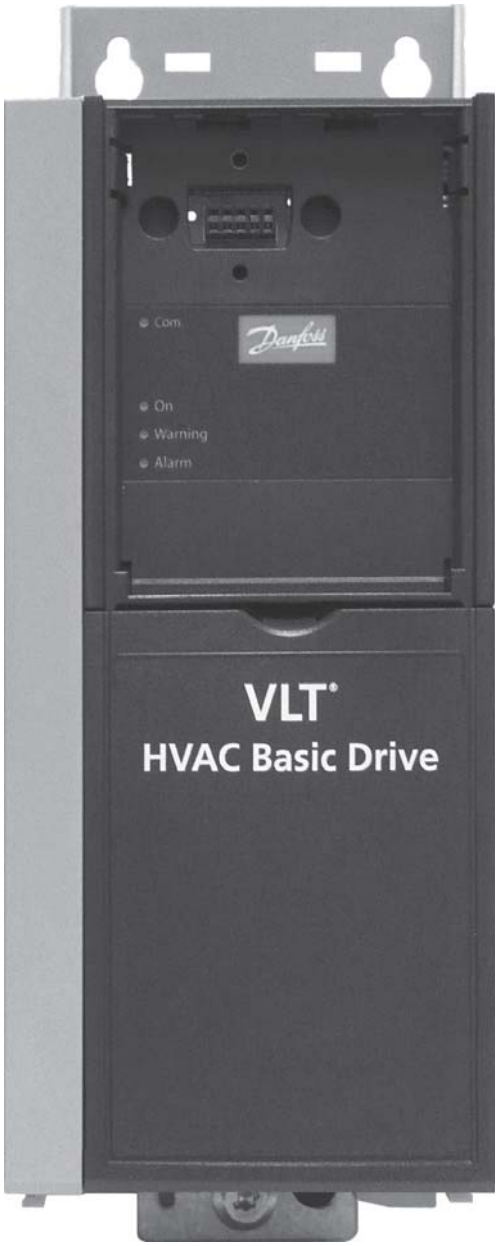
The control will provide a Morning Warm-up cycle the first time if transition from unoccupied to occupied and if the heating is required and the unit goes into heating immediately. Whenever the unit enters the heating mode, before any heat stage is enabled, the control will provide a Linkage mode to the system that will cause the terminals to maintain sufficient airflow. The Linkage mode of Warm-up (2) will be sent to the terminal system to insure sufficient airflow while in the heating mode but also providing a controlled warm-up cycle to prevent overheating of some zones. As a safety measure, should the heating cycle continue and the SAT approach the "Maximum Heating SAT" limit, the Linkage mode sent will change to Pressurization (6) to insure all terminals open to their maximum airflow. The Linkage mode will remain Pressurization until that heating cycle ends. Once the heating demand is met and the heat cycle is completed or if cooling is required, heating will be locked out until the beginning of the next occupied period.

Occupied Heating –

Optionally, the user may enable occupied heating which will allow heating whenever heating is needed during the occupied period. The cycle will operate exactly the same as Morning Warm-up above, except it will not be limited by the transition into an occupied period.

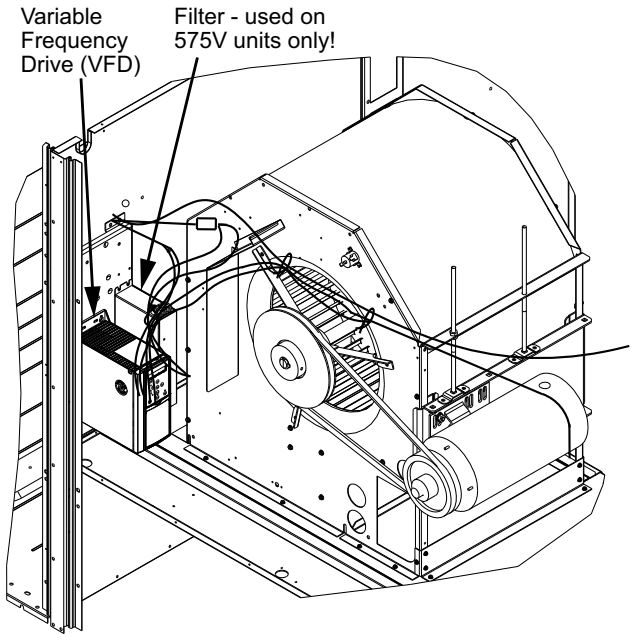
Variable Air Volume (VAV) with Variable Frequency Drive

The Variable Air Volume (VAV) system utilizes a Variable Frequency Drive (VFD) to modulate supply fan speed using a PID and an analog input from a duct static pressure sensor. The supply fan will adjust to meet the configured static set point regardless of cooling stage. In heating mode the latest VAV Open air terminals offer a minimum airflow setting. This shall be configured to maintain the required airflow (CFM) whenever the RTU is in a heating mode per the unit's specification. The Open VAV terminals will recognize the Heating or Warm-up modes as a heat mode and utilize the higher airflow minimum setpoint as configured. The system will further monitor the SAT of the RTU to determine if the SAT is approaching the configured maximum limit. As the limit is approached, the Linkage mode is changed to Linkage Pressurization to ensure all terminals open to their maximum supply airflow.



C13110

Fig. 42 - Variable Frequency Drive (VFD)



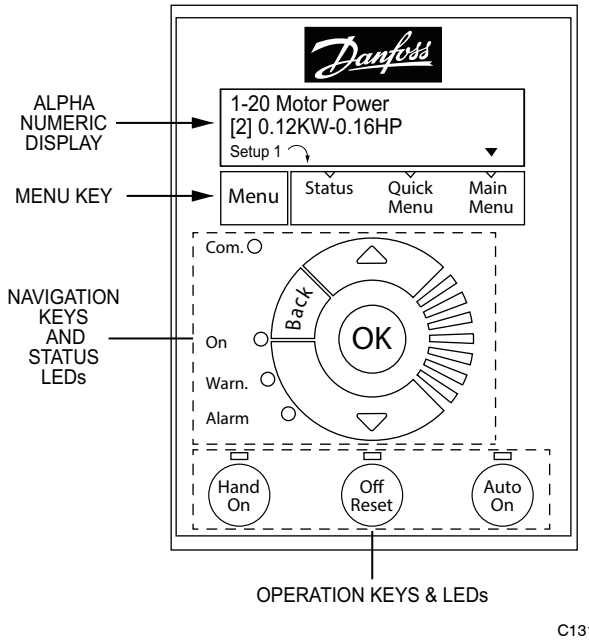
C13111

Fig. 43 - VFD Location

Multi-Speed VFD Display Kit (Field-Installed Option)

NOTE: The Remote VFD Keypad is part of the Multi-Speed VFD display kit (PN: CRDISKIT002A00) which is a field-installed option. It is not included with the 48LC*B07 base unit.

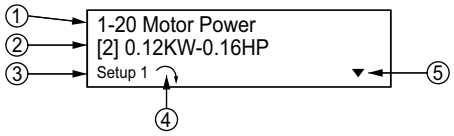
The VFD keypad as shown in Fig. 44 consists of the following sections:



C13112

Fig. 44 - VFD Keypad

Alpha Numeric Display: The LCD display is back lit with 2 alpha-numeric lines. All data is displayed on the LCD.

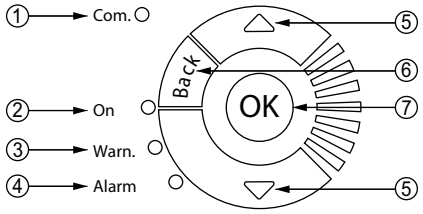


C13113

1	Parameter number and name.
2	Parameter value.
3	Setup number shows the active setup and the edit setup. If the same set-up acts as both the active and edit set-up, only that setup number is shown (factory setting). When the active and edit setup differ, both numbers are shown in the display (SETUP 12). The flashing number indicates the edit setup.
4	The symbol in the number 4 position in the figure above indicates motor direction. The arrow point either clockwise or counter-clockwise to show the motor's current direction.
5	The position of the triangle indicates the currently selected menu: Status, Quick Menu or Main Menu.

Menu Key: Use the Menu key to select between Status, Quick Menu or Main Menu. The triangle icon at the bottom of the LCD display indicates the currently selected mode. (See number 5 in the table above.)

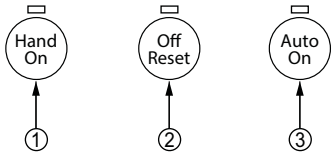
Navigation Keys and Status LEDs: The Navigation keys and Status LEDs are detailed in the following table.



C13114

1	**Com.** LED: Flashes when bus communications is communicating.
2	Green LED/**On**: Control selection is working.
3	Yellow LED/**Warn**.: Indicates a warning.
4	Flashing Red LED/**Alarm**: Indicates an alarm.
5	**Arrows ▲▼**: Use the Up and Down arrow keys to navigate between parameter groups, parameters and within parameters. Also used for setting local reference.
6	**Back** key: Press to move to the previous step or layer in the navigation structure.
7	**OK** key: Press to select the currently displayed parameter and for accepting changes to parameter settings.

Operation Keys and LEDs: The following table details the functions of the Operating keys. An illuminated yellow LED above the key indicates the active key.



C13115

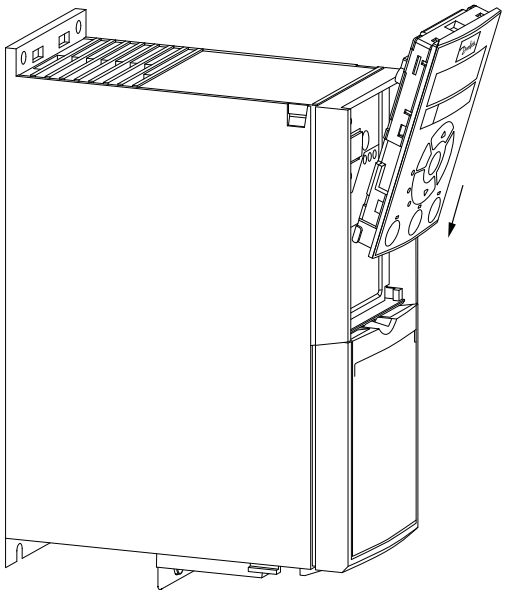
1	**Hand On** key: Starts the motor and enables control of the variable frequency drive (VFD) via the VFD Keypad option. **NOTE**: Please note that terminal 27 Digital Input *(5-12 Terminal 27 Digital Input)* has coast inverse as default setting. This means that the Hand On key will not start the motor if there is no 24V to terminal 27, so be sure to connect terminal 12 to terminal 27.
2	**Off/Reset** key: Stops the motor (off). If in alarm mode the alarm will be reset.
3	**Auto On** key: The variable frequency drive is controlled either via control terminals or serial communication.

Connecting the Keypad to the VFD

The VFD keypad can be mounted directly to the variable frequency drive, provided you can easily access the front panel of the VFD. If you don't have easy access to the VFD front panel, use the cable included with the kit to connect the keypad to the VFD.

Connecting the Keypad Directly to the VFD —

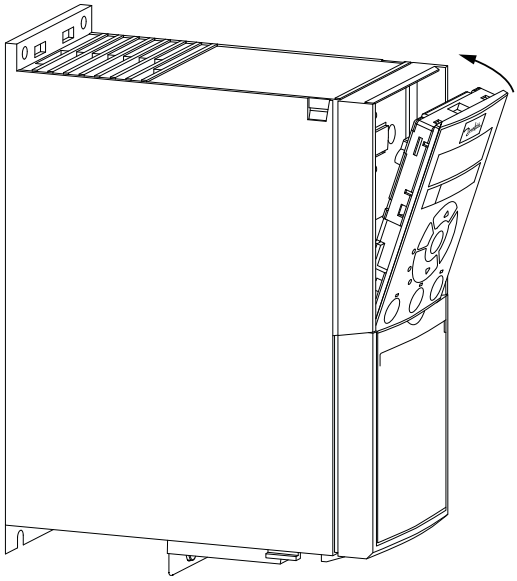
1. Place the bottom of the VFD keypad into the variable frequency drive as shown in Fig. 45.



C13116

Fig. 45 - Align Bottom of VFD Keypad with Opening in VFD Front Panel

2. Push the top of the VFD keypad into the variable frequency drive as shown in Fig. 46.

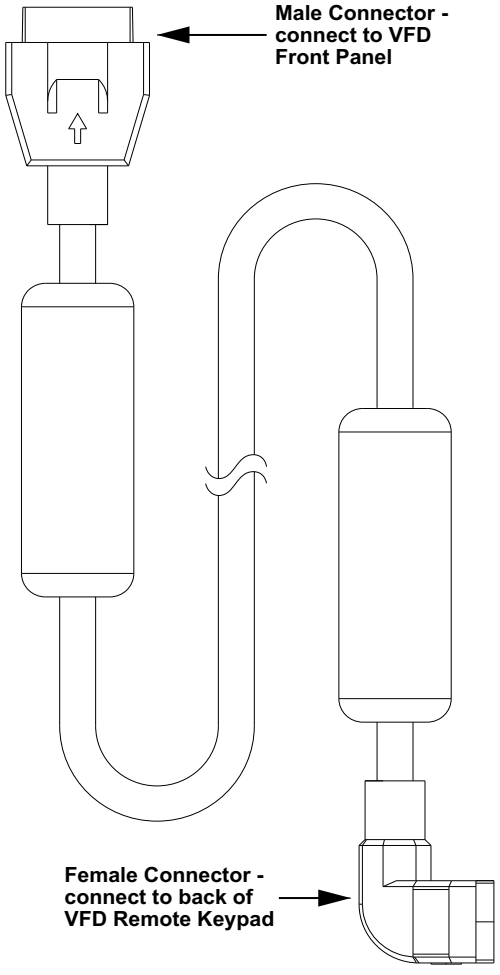


C13117

Fig. 46 - Secure Keypad in Place

Using the Cable to Connect the Keypad to the VFD —

The VFD keypad can be connected to the variable frequency drive via the cable included with the Multi-Speed VFD display kit (PN: CRDISKIT002A00).



C13118

Fig. 47 - VFD Remote Keypad Cable

1. Connect the male end of the cable to the front panel of the variable frequency drive. Use 2 of the screws included with the kit to secure the cable to the VFD.
2. Connect the female end of the cable to the back panel of the VFD Remote keypad. Secure the cable to the remote keypad using the 2 remaining screws from the kit.

Program the VFD for Indoor Fan Control

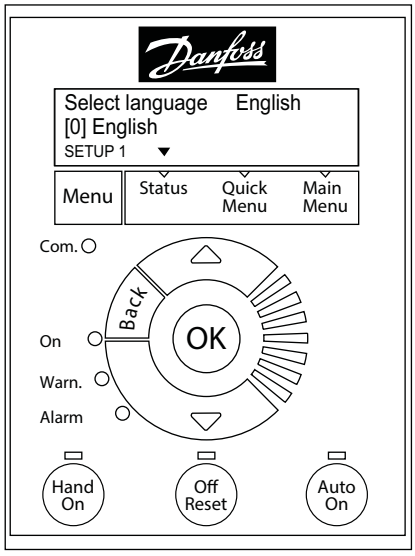
IMPORTANT: 48LC*B07 units are programmed at the Factory for variable indoor fan speeds. The following procedure is only to be used to recover this function after an event such as a system crash.

NOTE: This procedure requires use of the VFD Keypad which is included as part of the field-installed Multi-Speed VFD display kit (PN: CRDISKIT002A00). If the VFD keypad is not already installed, install it. See "Connecting the Keypad to the VFD" for details.

To program the VFD for variable indoor fan motor speeds:

1. At Power-Up:

   At the first power up the LCD displays the Select Language screen. The default setting is English. To change the language, press the **OK** key and use the ▲ and ▼ keys to scroll to the desired language and then press **OK**.



C13119

Fig. 48 - Keypad with Power Up Screen Displayed

2. Selecting Regional Settings:
   a. Press the **Off Reset** key.
   b. Press the **Menu** key to move the ▼(triangle icon) so it is positioned over Main Menu. The display show the following -

0-** Operation / Display
1-** Load and Motor

   c. Press the **OK** key, the display changes to -

0-0* Basic Settings
0-1* Set-up Operations

   d. With the top row highlighted, press **OK**. The display changes to -

0-01 Language
[0] English

NOTE: If English is not the desired language press **OK**, select the desired language and press **OK** again.

   e. Press ▼**(Down Arrow** key) once; the display changes to -

0-03 Regional Settings
[0] International

   f. Press **OK**; the [0] is now highlighted.
   g. Press ▼**(Down Arrow)** key once; the display changes to -

0-03 Regional Settings
[1] North America

   h. Press **OK**

NOTE: If the Alarm 060 appears, follow Step 3 to clear the alarm. Make sure to press **Off Reset** when done. If there is no alarm, continue at Step 4.

3. Clearing Alarm 060: External Interlock:
   a. Press the **Menu** key twice to position the ▼ (triangle icon) over Main Menu; the display changes to -

0-** Operation / Display
1-** Load and Motor

   b. Press the ▼**(Down Arrow)** key until the following display appears -

4-** Limits / Warnings
5-** Digital In/Out

   c. Press **OK**. The display changes to -

5-0* Digital I/O mode
5-1* Digital Inputs

   d. Press ▼**(Down Arrow)** once to highlight the bottom row and press **OK**. The display changes to -

5-10 Terminal 18 Digital In...
[8] Start

   e. Press ▼**(Down Arrow)** twice; the following display appears-

5-12 Terminal 27 Digital In...
[7] External Interlock

   f. Press **OK** to highlight the number in the bracket.
   g. Press ▼**(Down Arrow)** until the following display appears -

5-12 Terminal 27 Digital In...
[0] No operation

   h. Press **OK**.
   i. Press **Off Reset.** The Alarm indicator disappears.

4. Entering Grid Type:
   a. Press the **Menu** key to move the ▼(triangle icon) so it is positioned over Main Menu. The display show the following -

0–0* Basic Settings
0–1* Set–up Operations

   b. Press **OK** twice: the display changes to -

0–01 Language
[0] English

   c. Press ▼**(Down Arrow)** three times, to reach the following display -

0–06 Grid Type
[102] 200–240V/60Hz

   d. Press **OK** to highlight the number in the bracket and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the desired voltage and Hertz for the unit.
   e. Press **OK** to accept the selection and continue.
5. Entering Motor Data:
   a. Press the **Menu** key to move the ▼(triangle icon) so it is positioned over Main Menu. The display show the following -

0–** Operation / Display
1–** Load and Motor

   b. Press ▼**(Down Arrow)** once to highlight the bottom row.
   c. Press **OK**, the display changes to -

1–0* General Settings
1–1* Motor Selection

   d. Press ▼**(Down Arrow)** twice to reach the following display -

1–1* Motor Selection
1–2* Motor Data

   e. Press **OK**, the following display appears -

1-20 Motor Power
[9] 1.5kW – 2 hp

NOTE: The number in the bracket may be different from what is shown above.

   f. Press **OK** and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to scroll to the proper motor horsepower. Press **OK** again to set the selected hp.
   g. Press ▼**(Down Arrow)** once, the following display appears -

1-22 Motor Voltage
230V

   h. Press **OK** to highlight the voltage value. Use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the nameplate voltage. Press **OK** again to set the selected voltage.
   i. Press ▼**(Down Arrow)** once to display the following -

1-23 Motor Frequency
60Hz

   j. Press **OK** to highlight the Frequency value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the nameplate Hz. Press **OK** again to set the selected Hz.
   k. Press ▼**(Down Arrow)** once to display the following -

1-24 Motor Current
6.61A

   l. Press **OK** to highlight the Current value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the Max Amps value provided. Press **OK** again to set the selected Max Amps.

NOTE: The Max Amps is greater than the nameplate value. Check the VFD Unit Parameters (see Table 8 on page 36) and use the value listed for the given unit in the column labeled "Motor Current Must-Hold Amps".

   m. Press ▼**(Down Arrow)** once to display the following -

1-25 Motor Nominal Speed
1740rpm

   n. Press **OK** to highlight the rpm value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the nameplate rpm. Press **OK** again to set the selected rpm.
6. Entering Parameters for 1-71, 1-73, 1-82, and 1-90:
   a. Press the **Menu** key to move the ▼(triangle icon) so it is positioned over Main Menu. The display show the following -

0–** Operation / Display
1–** Load and Motor

   b. Press ▼**(Down Arrow)** once to highlight the bottom row.
   c. Press **OK**, the display changes to -

1–0* General Settings
1–1* Motor Selection

   d. Press ▼**(Down Arrow)** until the following display appears -

1–6* Load Depen. Setting
1–7* Start Adjustments

   e. Press **OK**, the following display appears -

1-71 Start Delay
2.0s

   f. Press **OK** to highlight the number and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the number provided in Table 8. Press **OK** again to set the selected value.

g. Press ▼**(Down Arrow)** twice, the following display appears -

1-73 Flying Start
[1] Enabled

h. Press **OK** to highlight the number in the bracket and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the number provided in Table 8. Press **OK** again to set the selected value.

i. Press the **Back** key once, the following display appears -

1–6* Load Depen. Setting
1–7* Start Adjustments

j. Press ▼**(Down Arrow)** once, the following display appears -

1–7* Start Adjustments
1–8* Stop Adjustments

k. Press **OK**, the following display appears -

1-80 Function at Stop
[0] Coast

l. Press ▼**(Down Arrow)** once, the following display appears -

1-82 Min Speed for Functio…
1.0 Hz

m. Press **OK** to highlight the number and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the number provided in Table 8. Press **OK** again to set the selected value.

n. Press the **Back** key once, the following display appears -

1–7* Start Adjustments
1–8* Stop Adjustments

o. Press ▼**(Down Arrow)** once, the following display appears -

1–8* Stop Adjustments
1–9* Motor Temperature

p. Press **OK**, the following display appears -

1-90 Motor Thermal Prote…
[4] ETR trip 1

q. Press **OK** to highlight the number in the bracket then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the number provided in Table 8. Press **OK** again to set the selected value.

7. Setting References:

a. Press the **Menu** key to move the ▼(triangle icon) so it is positioned over Main Menu. The display show the following -

0–** Operation / Display
1–** Load and Motor

b. Press ▼**(Down Arrow)** three times, the following display appears -

2–** Brakes
3–** Reference / Ramps

c. Press **OK**, the following display appears -

3–0* Reference Limits
3–1* References

d. Press **OK** again, the following display appears -

3-02 Minimum Reference
0.000

NOTE: If the bottom row displays a number other than 0.000, press **OK** and use the ▲ and ▼ (**Up** and **Down Arrow**) key to select 0.000.

e. Press ▼**(Down Arrow)** once, the following display appears -

3-03 Maximum Reference
60.000

NOTE: If the bottom row displays a number other than 60.000, press **OK** and use the ▲ and ▼ (**Up** and **Down Arrow**) key to select 60.000.

f. Press the **Back** key until the following display appears -

3–0* Reference Limits
3–1* References

g. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears -

3-10 Preset Reference
[0]0.00%

h. Press **OK** once to highlight the number in the bracket. Press **OK** again; the highlight moves to the current percent value.

Use the ▲ and ▼ (**Up** and **Down Arrow**) keys and the following table to enter the required Preset Reference values.

[0]0.00%	Stop
[1]LL.LL%	Low Speed (see Table 8, column labeled “Preset References 3–10[1]” for the proper % for each unit)
[2]MM.MM%	Medium Speed (see Table 8, column labeled “Preset References 3–10[2]” for the proper % for each unit)
[3]100%	Override (High Speed)
[4]100%	High Speed (100% or close to 100% to achieve the required CFM at high speed)
[5]0.00%	Stop
[6]0.00%	Stop
[7]0.00%	Stop

8. Setting the Ramp Time:
   a. Press the **Back** key until the following display appears –

3–0* Reference Limits
3–1* References

   b. Press ▼**(Down Arrow)** twice, the following display appears –

3–1* References
3–4* Ramp 1

   c. Press **OK**, the following display appears –

3-41 Ramp 1 Ramp up Time
3.00s

   d. Press **OK** again to highlight the bottom row and use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select 10.00s. Press **OK** again to set the selected Ramp up Time.
   e. Press ▼**(Down Arrow)** once, the following display appears –

3-42 Ramp 1 Ramp Down Time
3.00s

   f. Press **OK** again to highlight the bottom row and use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select 10.00s. Press **OK** again to set the selected Ramp Down Time.
9. Setting Limits:
   a. Press the **Back** key until the following display appears –

2–** Brakes
3–** Reference / Ramps

   b. Press ▼**(Down Arrow)** once, the following display appears –

3–** Reference / Ramps
4–** Limits / Warnings

   c. Press **OK**, the following display appears –

4–1* Motor Limits
4–4* Adj. Warning 2

   d. Press **OK** again, the following display appears –

4-10 Motor Speed Direction
[2] Both Directions

   e. Press ▼**(Down Arrow)** once, the following display appears –

4-12 Motor Speed Low Limi…
0.0Hz

   f. Press ▼**(Down Arrow)** again, the following display appears –

4-14 Motor Speed High Limi…
65.0Hz

NOTE: Press **OK** to highlight the Hz value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to enter the required values.

   g. Press ▼**(Down Arrow)** once, the following display appears –

4-18 Current Limit
110%

NOTE: Press **OK** to highlight the % value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to enter the required value. See Table 8 for proper selection of the value for this parameter then press **OK** to set the selected value.

   h. Press ▼**(Down Arrow)** once, the following display appears –

4-19 Max Output Frequency
65.0Hz

NOTE: Press **OK** to highlight the Hz value and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to enter the required values.

10. Setting Digital Inputs:
   a. Press the **Back** key until the following display appears –

3–** Reference / Ramps
4–** Limits / Warnings

   b. Press ▼**(Down Arrow)** once, the following display appears –

4–** Limits / Warnings
5–** Digital In/Out

   c. Press **OK**, the following display appears –

5–0* Digital I/O mode
5–1* Digital Inputs

   d. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears –

5-10 Terminal 18 Digital In…
[8] Start

   e. Press ▼**(Down Arrow)** again. The following display appears –

5-11 Terminal 19 Digital In…
[16] Preset ref bit 0

   f. Press ▼**(Down Arrow)** again. The following display appears –

5-12 Terminal 27 Digital In…
[17] Preset ref bit 1

   g. Press ▼**(Down Arrow)** again. The following display appears –

5-13 Terminal 29 Digital In…
[18] Preset ref bit 2

NOTE: By pressing **OK** the number in the bracket can be changed until the desired number appears. Press **OK** again to set the selected value.

11. Setting Analog Inputs:
    a. Press the **Back** key until the following display appears –

4 – ** Limits / Warnings
5 – ** Digital In/Out

    b. Press ▼**(Down Arrow)** until the following display appears –

5 – ** Digital In/Out
6 – ** Analog In/Out

    c. Press **OK**, the following display appears –

6 – ** Analog In/Out
6 – 1* Analog Input 53

    d. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears –

6-10 Terminal 53 Low Voltage
2V

    e. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears –

6-11 Terminal 53 High Voltage
[10V]

    f. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears –

6-14 Set Min Reference
[0 Hz]

    g. Press ▼**(Down Arrow)** once to move the highlight to the bottom row and then press **OK**. The following display appears –

6-15 Set Max Reference
[60 Hz]

12. Setting Reset Mode and RFI Filter:
    a. Press the **Back** key until the following display appears –

0 – ** Operation / Display
1 – ** Load and Motor

    b. Press ▼**(Down Arrow)** until the following display appears –

13 – ** Smart Logic
14 – ** Special Functions

    c. Press **OK**, the following display appears –

14 – 0* Inverter Switching
14 – 1* Mains On/Off

    d. Press ▼**(Down Arrow)** twice. The following display appears –

14 – 1* Mains On/Off
14 – 2* Reset Functions

    e. Press **OK**, the following display appears –

14-20 Reset Mode
[0] Manual reset

    f. Press **OK** to highlight the number in the bracket.
    g. Use the ▲ and ▼ (**Up** and **Down Arrow**) keys to change the number to 3 for 3 automatic resets and then press **OK**. The display changes to –

14-20 Reset Mode
[3] Automatic reset x 3

    h. Press ▼**(Down Arrow)** once, the following display appears –

14-21 Automatic Restart T…
10s

    i. Press **OK** to highlight the number of seconds and use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select 600 seconds. Press **OK** again to set the selected value.
    j. Press the **Back** key once, the following display appears –

14 – 1* Mains On/Off
14 – 2* Reset Functions

    k. Press ▼**(Down Arrow)** twice, the following display appears –

14 – 4* Energy Optimising
14 – 5* Environment

    l. Press **OK**, the following display appears –

14-50 RFI Filter
[1] On

    m. Press **OK** to highlight the number in the bracket and use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select [0]. Press **OK** again to set the selected value.

13. To Complete Reprogramming:
    a. Press the **Auto On** key before disconnecting the VFD Remote Keypad from the variable frequency drive.

Table 8 – VFD Unit Parameters - 48LC*B07 Units

						Regional Settings	Grid Type	Motor Power	Motor Voltage	Motor Frequency (Hz)	Motor Current (Must–Hold Amps)	Motor Nominal Speed (rpm)	Star Delay (Sec)	Flying Start	Min Speed for Function (Hz)	Motor Thermal Protection	Preset Reference		
Voltage	Unit Size	Motor Option	Motor P/N	VFD Carrier P/N	VFD Mfr P/N	0–03	0–06	1–20	1–22	1–23	1–24	1–25	1–71	1–73	1–82	1–90	3–10 [0]	3–10 [1]	3–10 [2]
208/230V	07	STD	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	07	STD	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	07	STD	HD56FR579	HK30WA382	131N0225	[1]	[132]	[9]	575	60	3.1	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	07	MID	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	07	MID	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	07	MID	HD56FR579	HK30WA382	131N0225	[1]	[132]	[9]	575	60	3.1	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	07	HIGH	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	07	HIGH	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	07	HIGH	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	66.50%	.66.50%

			Preset Reference (cont.)					Ramp Up Time (Sec)	Ramp Down Time (Sec)	Current Limit	Terminal 18 Digital Input	Terminal 19 Digital Input	Terminal 27 Digital Input	Terminal 29 Digital Input	Terminal 53 Low Voltage	Terminal 53 High Voltage	Terminal 53 Low Reference	Terminal 53 High Reference	Reset Mode	Auto. Restart Time (S)	RFI Filter
Voltage	Unit Size	Motor Option	3–10 [3]	3–10 [4]	3–10 [5]	3–10 [6]	3–10 [7]	3–41	3–42	4–18	5–10	5–11	5–12	5–13	6–10	6–11	6–14	6–15	14–20	14–21	14–50
208/230V	07	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	07	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	07	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	07	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	07	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	07	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	07	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	07	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	07	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 9 – Unit Wire/Fuse or HACR Breaker Sizing Data

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				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		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
07	208/ 230–3–60	STD	35/34	45/45	36/35	173	38/38	50/50	40/40	177	39/39	50/50	41/41	178	43/43	50/50	45/45	182
		MED	35/34	45/45	36/35	173	38/38	50/50	40/40	177	39/39	50/50	41/41	178	43/43	50/50	45/45	182
		HIGH	37/37	50/45	39/38	203	41/40	50/50	43/42	207	42/41	50/50	44/43	208	46/45	50/50	49/48	212
	460–3–60	STD	20	25	20	87	21	25	22	89	22	25	23	89	24	25	25	91
		MED	20	25	20	87	21	25	22	89	22	25	23	89	24	25	25	91
		HIGH	20	25	21	103	22	25	23	105	23	25	24	105	24	30	26	107
	575–3–60	STD	15	20	16	67	19	20	20	71	17	20	18	69	21	25	22	73
		MED	15	20	16	67	19	20	20	71	17	20	18	69	21	25	22	73
		HIGH	17	20	18	80	21	25	22	84	19	20	20	82	23	25	24	86

See “Legend and Notes for Tables 9 and 10” on page 38.

Table 10 – Unit Wire Sizing Data with Factory Installed HACR Breaker

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
07	208/ 230–3–60	STD	35/35	45/45	36/35	173	38/38	50/50	40/40	177	39/39	50/50	41/41	178	43/43	50/50	45/45	182
		MED	35/35	45/45	36/35	173	38/38	50/50	40/40	177	39/39	50/50	41/41	178	43/43	50/50	45/45	182
		HIGH	37/37	50/50	39/38	203	41/41	50/50	43/42	207	42/42	50/50	44/43	208	46/46	50/50	49/48	212
	460–3–60	STD	20	25	20	87	21	25	22	89	22	25	23	89	24	25	25	91
		MED	20	25	20	87	21	25	22	89	22	25	23	89	24	25	25	91
		HIGH	20	25	21	103	22	25	23	105	23	25	24	105	24	30	26	107
	575–3–60	STD	15	20	16	67	19	20	20	71	17	20	18	69	21	25	22	73
		MED	15	20	16	67	19	20	20	71	17	20	18	69	21	25	22	73
		HIGH	17	20	18	80	21	25	22	84	19	20	20	82	23	25	24	86

See “Legend and Notes for Tables 9 and 10” on page 38.

Legend and Notes for Tables 9 and 10

LEGEND:

BRKR	–	Circuit breaker
CO	–	Convenient outlet
DISC	–	Disconnect
FLA	–	Full load amps
IFM	–	Indoor fan motor
LRA	–	Locked rotor amps
MCA	–	Minimum circuit amps
PE	–	Power exhaust
PWRD CO	–	Powered convenience outlet
UNPWR CO	–	Unpowered convenience outlet

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

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

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.

Smoke Detectors

Smoke detectors are available as factory-installed options on 48LC*B07 units. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. 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 the Integrated Staging Control (ISC) 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. 49 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. 50, Step 1. Save the screws.
2. Turn the assembly 90 and then rotate end to end. Make sure that the elbow fitting is pointing down. See Fig. 50, Step 2.
3. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 50, Step 3.
4. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.

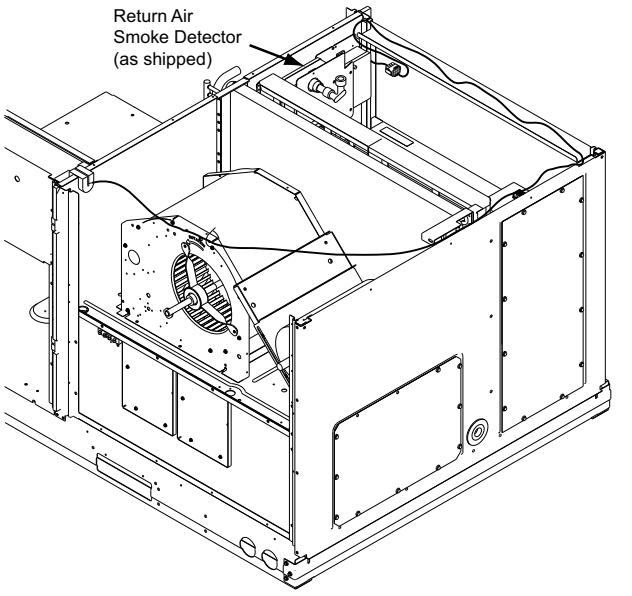


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Fig. 49 - Return Air Smoke Detector, Shipping Position

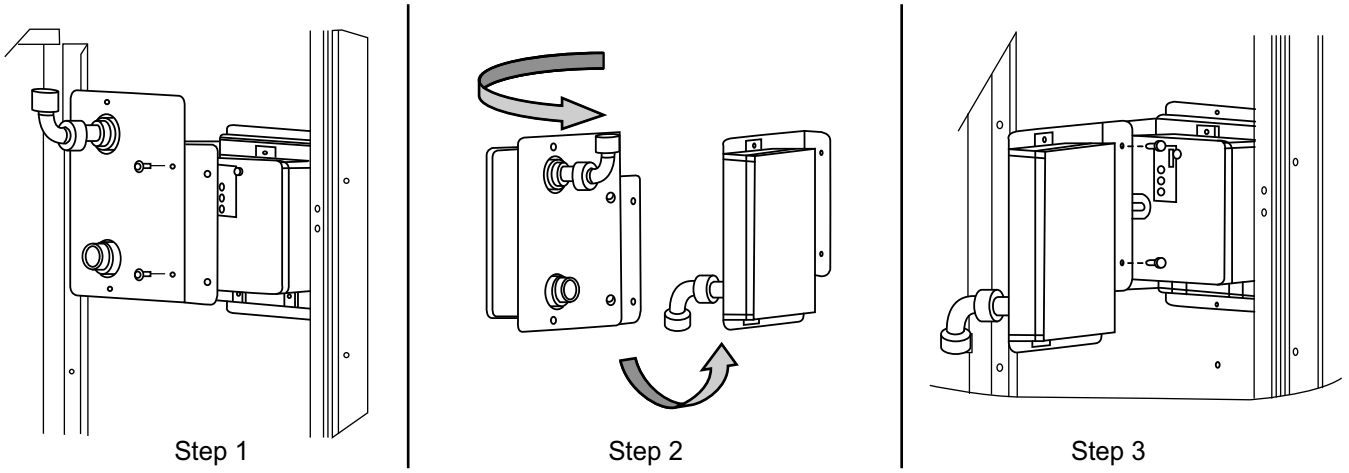

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Fig. 50 - Completing Installation of Return Air Smoke Sensor

Additional Application Data —

Refer to Catalog No. HKRNKA-1XA for discussions on additional control features of these smoke detectors including multiple unit coordination.

Step 15 — Adjust Factory-Installed Options

Smoke Detectors —

Smoke detector(s) will be connected at the Integrated Staging Control (ISC) board, at terminals marked “Smoke Shutdown”. Remove jumper JMP 3 when ready to energize unit.

Step 16 — Install Accessories

Available field installed accessories include:

- Curb
- Power Exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- CO_2 sensor
- Louvered hail guard
- Phase monitor control

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

Pre-Start and Start-Up —

This completes the mechanical installation of the unit. Refer to the unit’s Service Manual for detailed Pre-Start and Start-Up instructions. Download the latest versions from HVAC Partners (www.hvacpartners.com).

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Replaces: New

UNIT START-UP CHECKLIST
(Remove and Store in Job File)

MODEL NO.: _____ SERIAL NO.: _____

I. PRE-START-UP

☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT

☐ VERIFY INSTALLATION OF DUCT PRESSURE TRANSDUCER AND SUPPLY AIR TEMPERATURE SENSOR

☐ 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 THAT CRANKCASE HEATERS HAVE BENN 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

☐ 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

REPEAT PROCESS FOR 2 COMPRESSOR SYSTEMS

Edition Date: 11/15 518A

Catalog No: 48LCB–7–01SI

Replaces: New