50LC*B
Single Package Rooftop
Cooling Only with
Multi−Zone VAV (Variable Air Volume) Operation
with Puron® (R−410A) Refrigerant
Sizes: 08, 09, 12

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

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.

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

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

Failure to follow this warning could cause personal injury or death.

Relieve pressure and recover all refrigerant before system repair or final unit disposal.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing air conditioning equipment.

Rated Indoor Airflow (cfm)

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

Model Number	Full Load Airflow (cfm)
50LC*B08	2625
50LC*B09	2970
50LC*B12	3500

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

Unit Heat Type
50 - Electric Cooling/Heating Packaged Rooftop

Model Series - WeatherExpert®
LC - Ultra High Efficiency

Heat Options
0 = Standard - No Electric Heat
D = Low Electric Heat
E = Medium Electric Heat
F = High Electric Heat

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

Cooling Tons
08 - 7.5 ton
09 - 8.5 ton
12 - 10 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
4 = Ultra 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

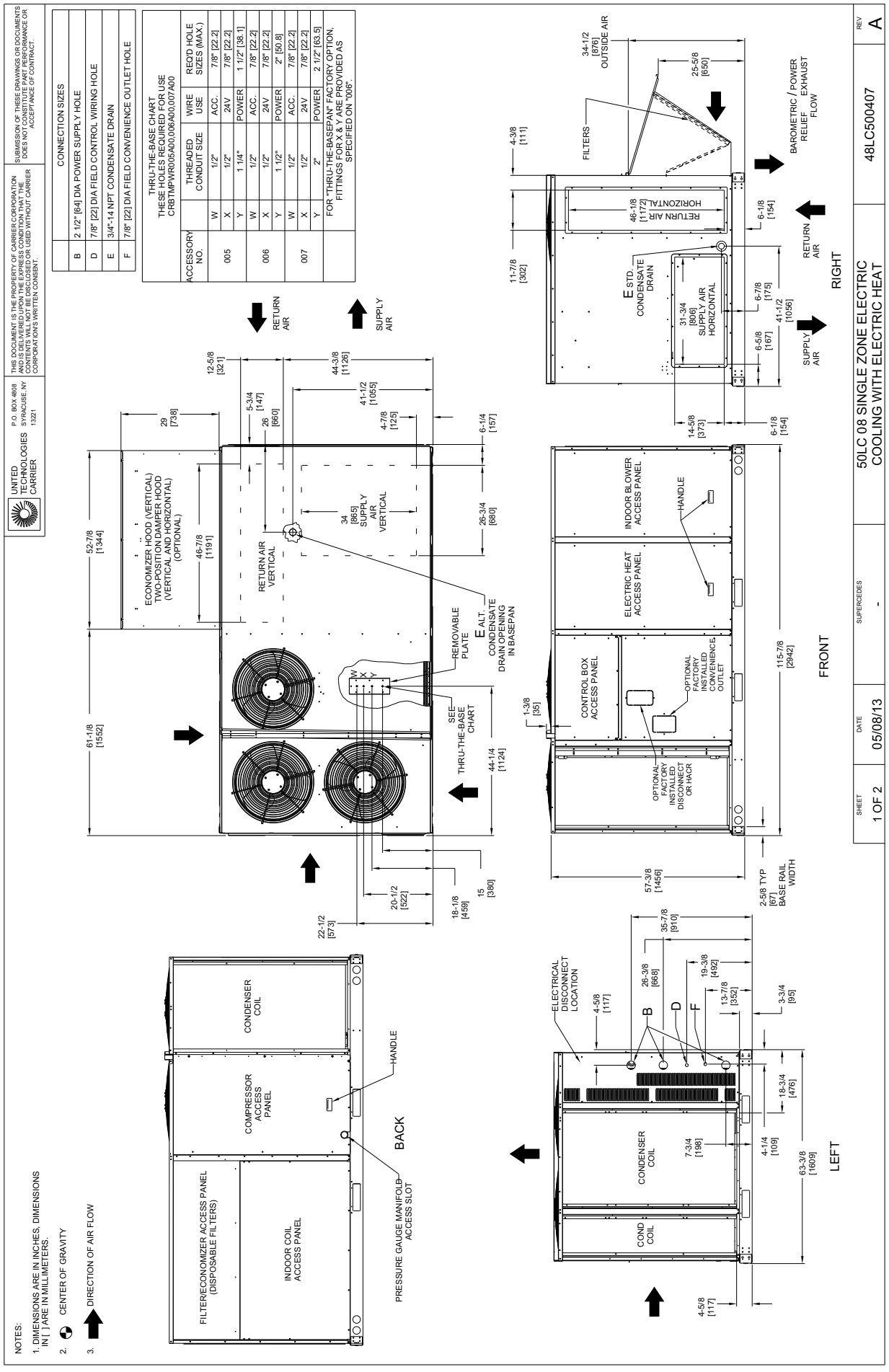
Electrical Options
A = None
B = HACR Circuit Breaker
C = Non-Fused Disconnect
D = Thru-The-Base Connections
E = HACR Circuit Breaker and Thru-The Base Connections
F = Non-Fused Disconnect and Thru-The-Base Connections

Packaging
0 = Standard
1 = LTL

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

C150386

Fig. 1 - 50LC*B08-12 Model Number Nomenclature (Example)

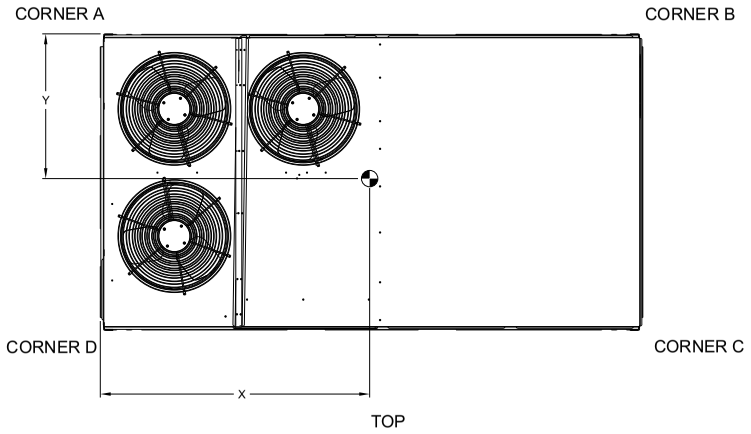


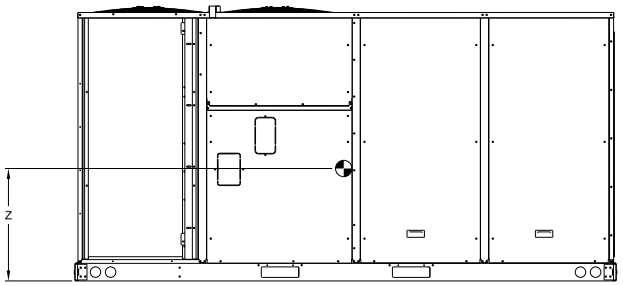
C13318

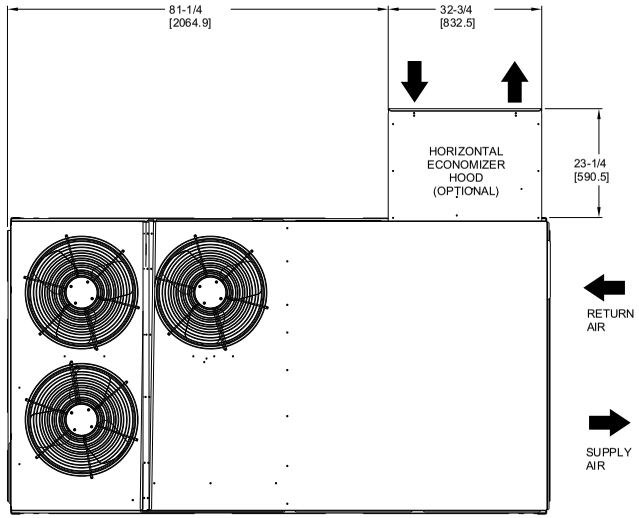
Fig. 2 - Unit Dimensional Drawing – 08 Size Unit

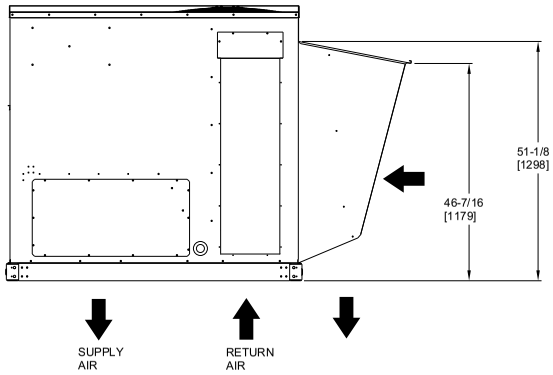
UNIT	STD UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50LC 08	1535	696	407	185	397	180	361	164	370	168	57 [1448]	33 [838]	20 5/8 [524]

STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





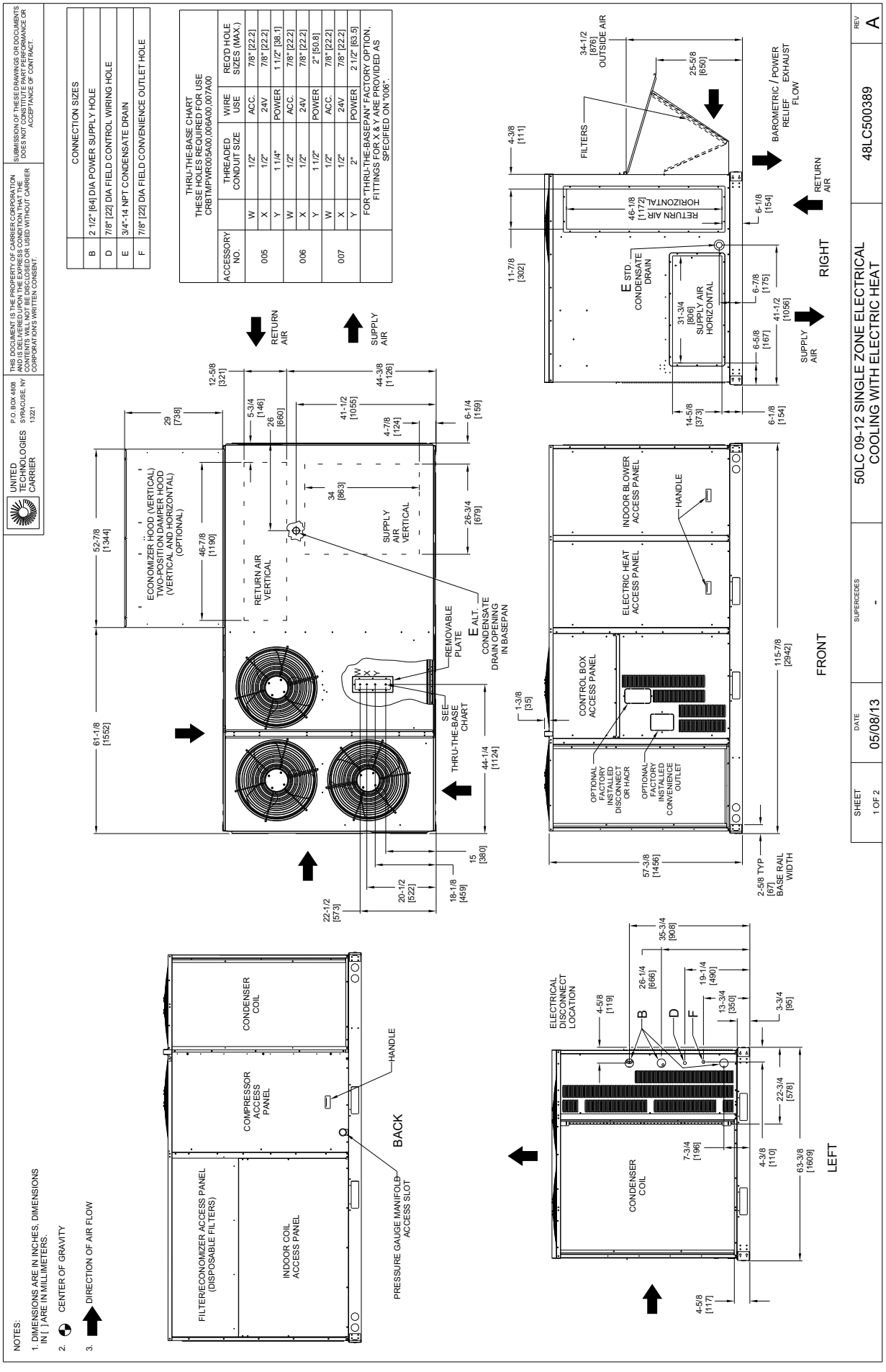




HORIZONTAL ECONOMIZER

Fig. 2 - Unit Dimensional Drawing – 08 Size Unit (cont.)

SHEET	DATE	SUPERCEDES			REV
2 OF 2	05/08/13	-	50LC 08 SINGLE ZONE ELECTRIC COOLING WITH ELECTRIC HEAT	48LC500407	A

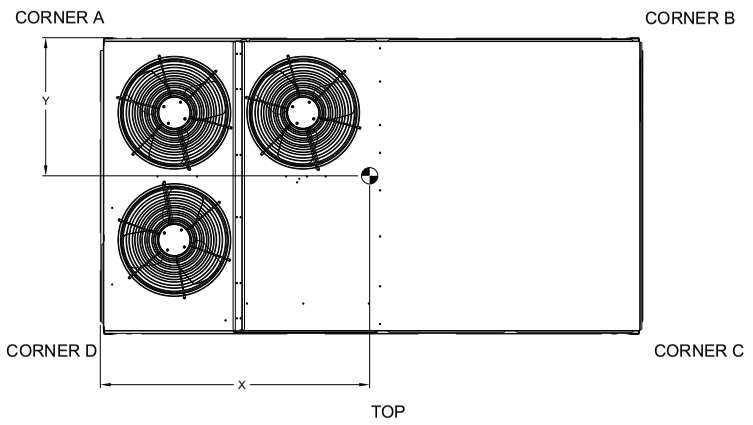


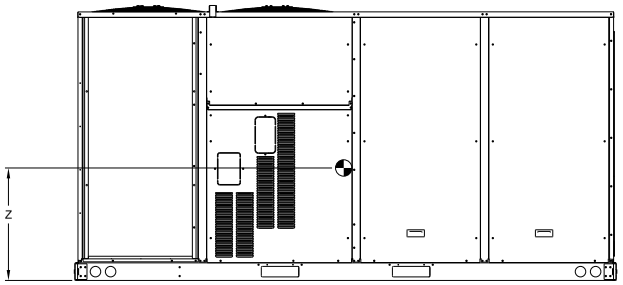
C13320

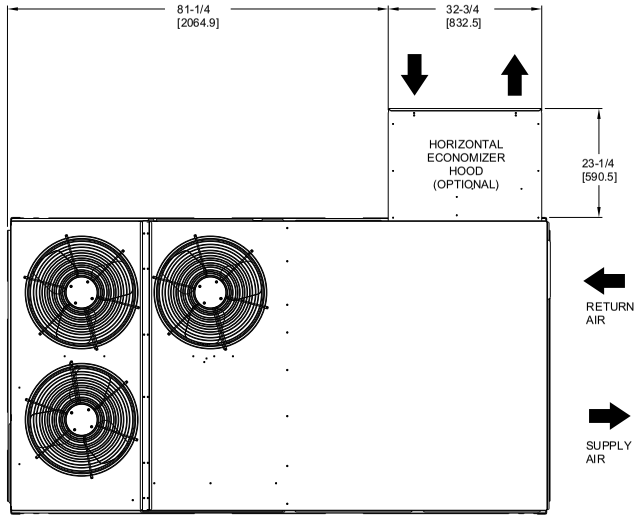
Fig. 3 - Unit Dimensional Drawing – 09 and 12 Size Units

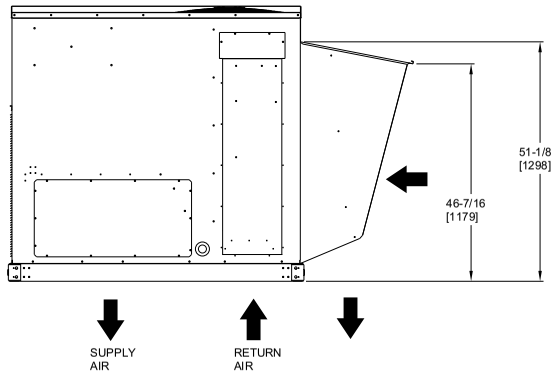
UNIT	STD UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50LC 09	1536	697	388	174	392	178	380	172	374	171	58 [1473]	32 [812]	20 5/8 [524]
50LC 12	1536	697	388	174	392	178	380	172	374	171	58 [1473]	32 [812]	20 5/8 [524]

STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.







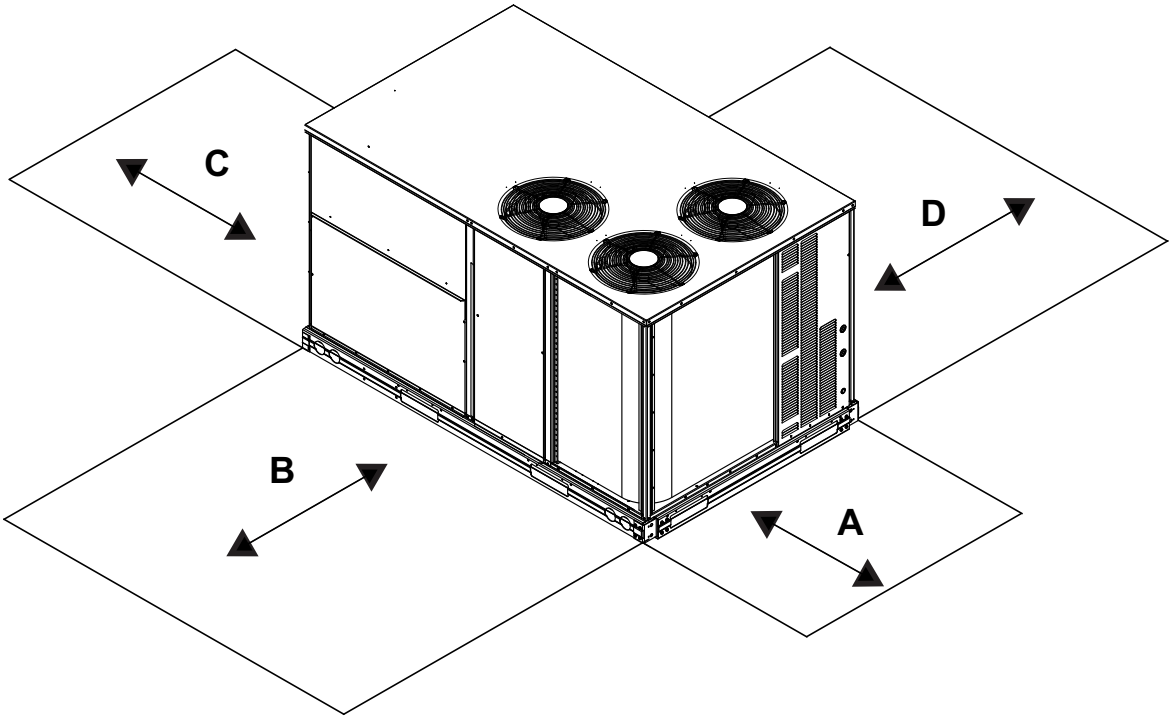


HORIZONTAL ECONOMIZER

UNITED TECHNOLOGIES CARRIER P.O. BOX 4808 SYRACUSE, NY 13221

SHEET	DATE	SUPERCEDES			REV
2 OF 2	05/08/13	-	50LC 09-12 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT	48LC500389	A

Fig. 3 - Unit Dimensional Drawing – 09 and 12 Size Units (cont.)



C12322

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)	Surface behind servicer is grounded (e.g., metal, masonry wall) Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)
C	36 – in (914 mm) 18 – in (457 mm)	Side condensate drain is used Minimum clearance
D	42 – in (1067 mm) 36 – in (914 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit) Surface behind servicer is electrically non – conductive (e.g., wood, fiberglass)

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

Fig. 4 - 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 at least the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 4.

NOTE: Consider also the effect of adjacent units.

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

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents, relief valves, or other sources of contaminated air.

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 9 — Install External Condensate Trap and Line – for required trap dimensions.

Roof Mount —

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

Table 1 – Operating Weights

50LC*B	UNITS LB (KG)		
	08	09	12
Base Unit	1360 (618)	1430 (650)	1500 (682)
Economizer			
Vertical	103 (47)	103 (47)	103 (47)
Horizontal	242 (110)	242 (110)	242 (110)
Powered Outlet	35 (16)	35 (16)	35 (16)
Curb	Curb	Curb	Curb
14–in/356 mm	180 (82)	180 (82)	180 (82)
24–in/610 mm	255 (116)	255 (116)	255 (116)

Step 2 — Plan for Sequence of Unit Installation

The support method used for this unit will dictate different sequences for the steps of unit installation. For example, on curb-mounted units, some accessories must be installed on the unit before the unit is placed on the curb. Review the following for recommended sequences for installation steps.

Curb-mounted installation —

Install curb

Install field-fabricated ductwork inside curb

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

Prepare bottom condensate drain connection to suit planned condensate line routing (refer to Step 9 for details)

Rig and place unit

Install outdoor air hood

Install condensate line trap and piping

Make electrical connections

Install other accessories

Pad-mounted installation —

Prepare pad and unit supports

Check and tighten the bottom condensate drain connection plug

Rig and place unit

Convert unit to side duct connection arrangement

Install field-fabricated ductwork at unit duct openings

Install outdoor air hood

Install condensate line trap and piping

Make electrical connections

Install other accessories

Frame-mounted installation —

Frame-mounted applications generally follow the sequence for a curb installation. Adapt as required to suit specific installation plan.

Step 3 — Inspect Unit

Inspect unit for transportation damage. File any claim with transportation agency.

Confirm before installation of unit that voltage, amperage and circuit protection requirements listed on unit data plate agree with power supply provided.

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

Locate the carton containing the outside air hood parts; see Figs. 14. Do not remove carton until unit has been rigged and located in final position.

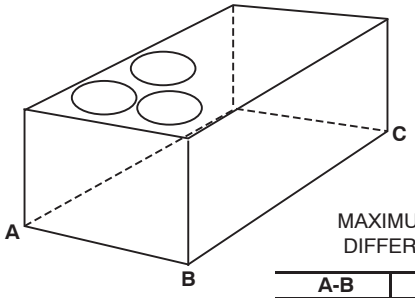
Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Fig. 6. 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. 7. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are show in Fig. 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)

C10001

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.*

IMPORTANT:
If the unit’s electric and control wiring is to be routed through the basepan and the unit is equipped with the factory-installed Thru-the-Base service option see the following section:

- **Factory-Option Thru-Base Connections**
  on page 23

If using the field-installed Thru-the-Base accessory follow the instructions provided with the accessory kit.

NOTE: If electrical connection is not going to occur at this time, tape or otherwise cover the fittings so that moisture does not get into the building or conduit in the interim.

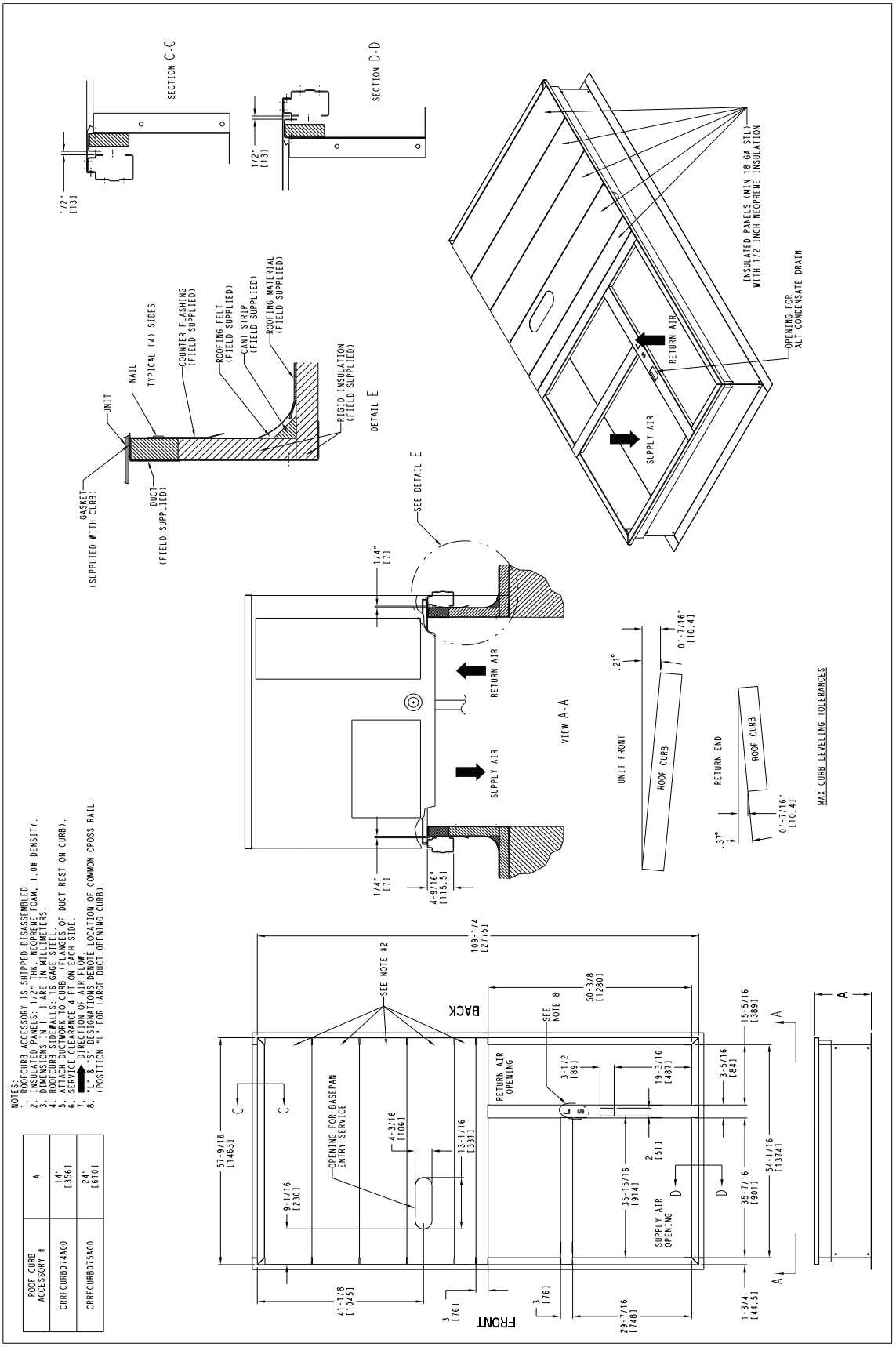
Slab Mount (Horizontal Units Only) —

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.



ROOF CURB ACCESSORY #	A
CRRFCURB074A00	14" [356]
CRRFCURB075A00	24" [610]

C10772B

Fig. 6 - Roof Curb Details - Size 08-12 Units

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.

⚠ CAUTION

PROPERTY DAMAGE HAZARD

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

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

For Units with Accessory or Optional Electric Heaters —

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

Outlet grilles must not lie directly below unit discharge.

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

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could cause personal injury.

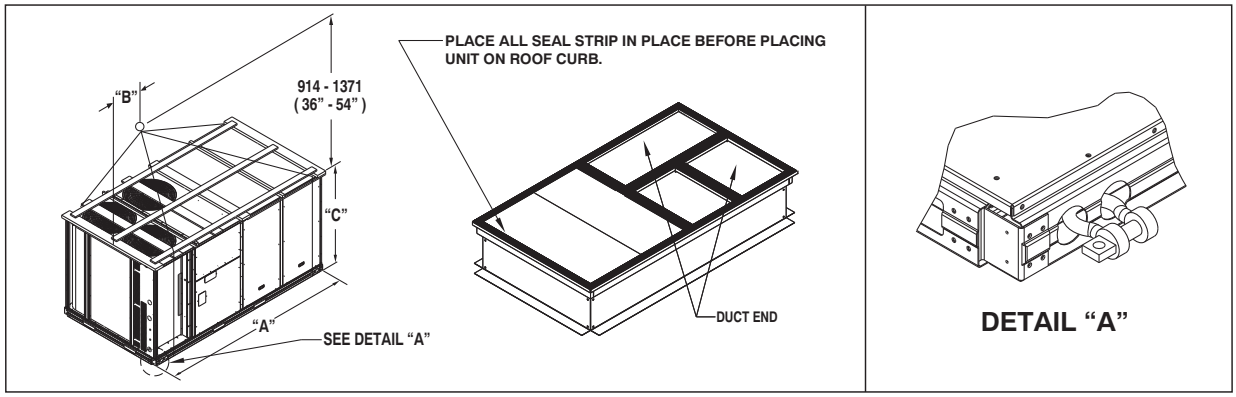
For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree turn in the return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, supply duct will require 90-degree elbow.

Step 6 — Rig and Place Unit

When the unit is ready to be rigged and no longer will be lifted by a fork truck, the wood protector under the basepan must be removed. Remove 4 screws from each base rail. Wood protector will drop to the ground. See instructions on the unit base rails.

Keep unit upright and do not drop. Spreader bars are not required. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 7 for additional information.

Lifting holes are provided in base rails as shown in Fig. 7. Refer to rigging instructions on unit.



C10774

UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
50LC*B08	2280	1034	116	2945	63	1600	59.5	1510
50LC*B09	2285	1037	116	2945	58	1473	59.5	1510
50LC*B12	2285	1037	116	2945	58	1473	59.5	1510

NOTES:

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

Fig. 7 - Rigging Details

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 11 - Install External Condensate Trap & Line on page 15.

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

⚠ CAUTION

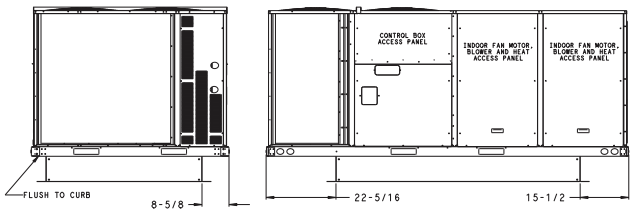
UNIT DAMAGE HAZARD

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 panels or packaging are removed.

Positioning on Curb —

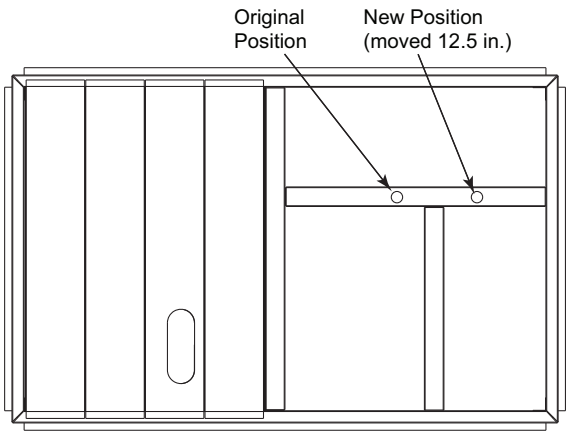
For full perimeter curbs CRRFCURB074A00 and 075A00, the clearance between the roof curb and the front and rear base rails should be $^1/_4$ in (6.4 mm). The clearance between the curb and the end base rails should be $^1/_2$ in (13 mm). For retrofit applications with curbs CRRFCURB003A01 and 4A01, the unit should be position as shown in Fig. 8. Maintain the 15.5 in (394 mm) and 8 $^5/_8$ in (220 mm) clearances and allow the 22 $^5/_{16}$ in (567 mm) dimension to float if necessary.



C10003

Fig. 8 - Retrofit Installation Dimensions

If the alternative condensate drain location through the bottom of the unit is used in conjunction with a retrofit curb, the hole in the curb must be moved 12.5 in (320 mm) towards the end of the unit. See Fig. 9.



C10904

Fig. 9 - Alternative Condensate Drain Hole Positions

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

IMPORTANT:
If the unit has the factory-installed Thru-the-Base option, make sure to complete installation of the option before placing the unit on the roof curb.

See the following section:

- **Factory-Option Thru-Base Connections**
  on page 23

NOTE: If electrical connections is not going to occur at this time, tape or otherwise cover the fittings so that moisture does not get into the building or conduit in the interim.

Remove all shipping materials and top skid. Remove extra center post from the condenser end of the unit so that the condenser end of the unit matches Fig. 20 - 22. Recycle or dispose of all shipping materials.

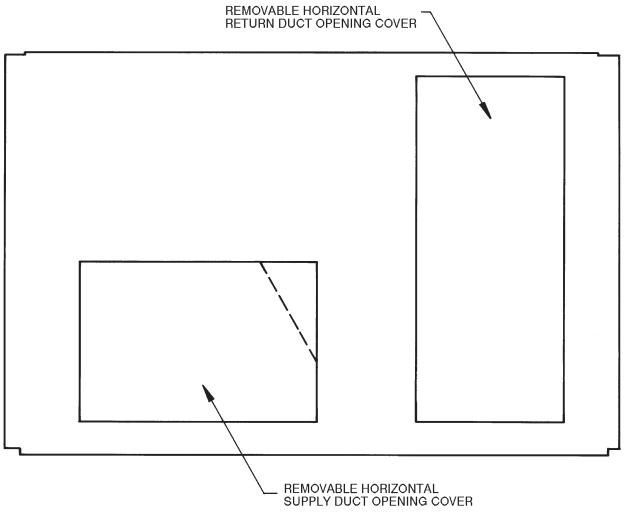
Step 7 — Convert to Horizontal & Connect Ductwork (when required)

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 using accessory CRDUCTCV002A00. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers. See Fig. 10.

Discard the supply duct cover. Install accessory CRDUCTCV002A00 to cover the vertical supply duct opening. Use the return duct cover removed from the end panel to cover the vertical return duct opening.

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.



C06108

Fig. 10 - Horizontal Conversion Panels

Step 8 — SAT Sensor Installation

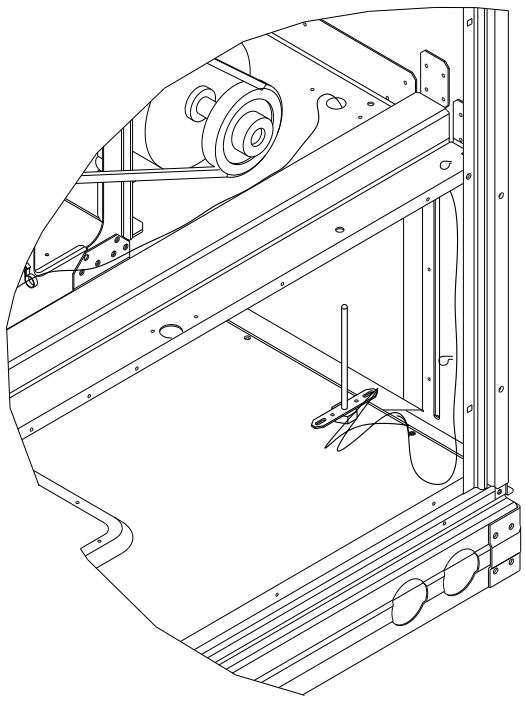
The supply air temperature (SAT) sensor is secured in the supply section of the unit for shipping purposes (see Fig, 11). This sensor must be relocated and mounted in the supply duct during installation.

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. 12. 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.

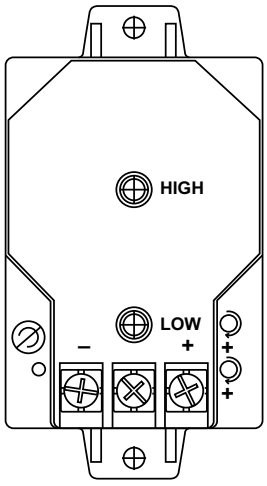
Connect $^{1}/_{4}$-in plastic pneumatic tubing (field supplied) to barbed fitting on pressure tap and connect the other end to "High" fitting of pressure transducer. Leave "Low" pressure connection open to the atmosphere. Connect 20 or 22 AWG insulated wire [35°C (95°F) minimum] to DPT "+" and "-" terminals. 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. 11 - SAT Sensor - Shipping Location



C150384

Fig. 12 - Duct Pressure Transducer

Step 10 — Install Outside Air Hood

Economizer Hood Removal and Setup —

1. The hood is shipped in knock-down form and located in the return air compartment. It is attached to the economizer using two plastic tie-wraps.
2. To gain access to the hood, remove the filter access panel. (See Fig. 13.)

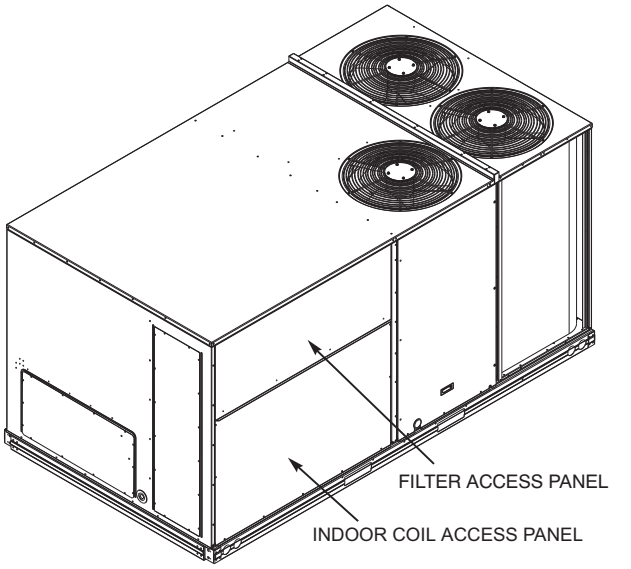


Fig. 13 - Typical Access Panel Locations

3. Locate and cut the (2) plastic tie-wraps, being careful to not damage any wiring. (See Fig. 14.)

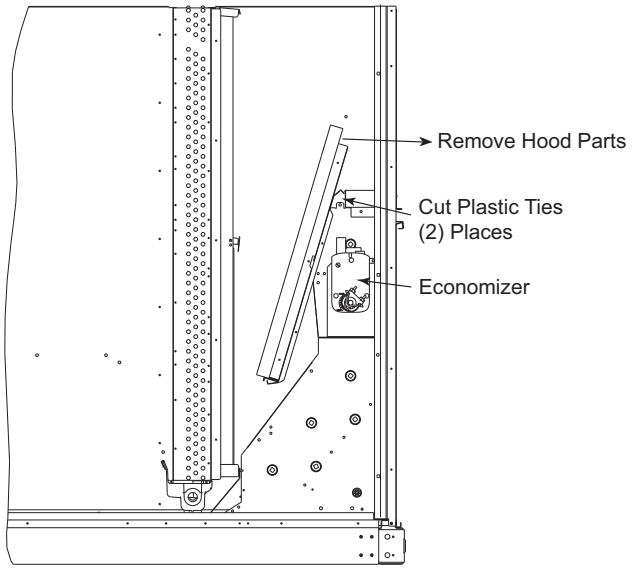


Fig. 14 - Economizer Hood Package Location

4. Carefully lift the hood assembly through the filter access opening and assemble per the steps outlined in the following procedure *Economizer Hood Assembly* .

Economizer Hood Assembly —

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. If the panel is still attached to the unit, remove the screws along the sides and bottom of the panel. See Fig. 15.

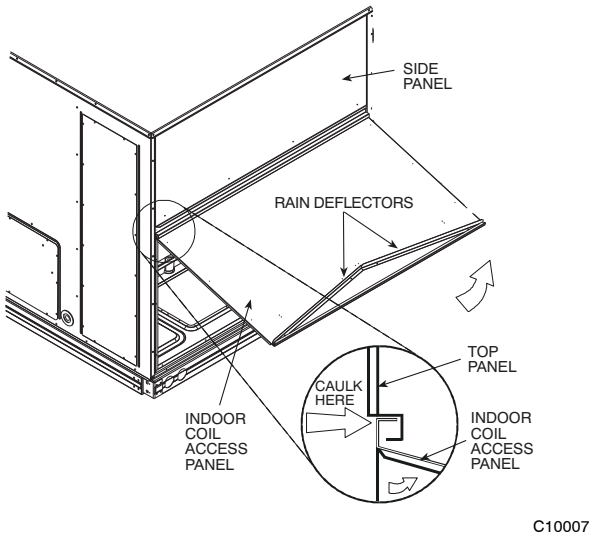


Fig. 15 - Indoor Coil Access Panel Relocation

2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). ***Be careful not to lift the panel too far as it might fall out.*** 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. 16.

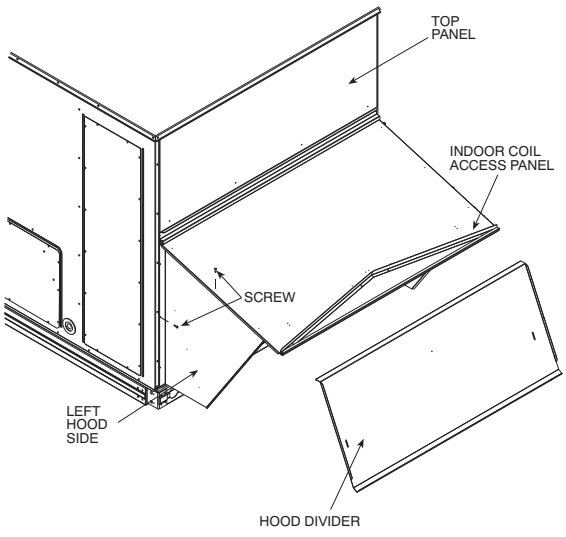


Fig. 16 - Economizer Hood Construction

3. Remove the shipping tape holding the economizer barometric relief damper in place.
4. Insert the hood divider between the hood sides. See Fig. 16 and 17. Secure hood divider with 3 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Attach the post that separates the filters with the screws provided.

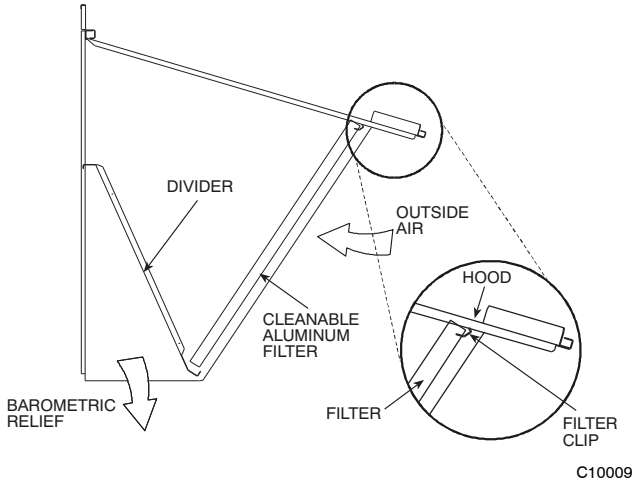


Fig. 17 - Economizer Filter Installation

6. Open the filter clips which are located underneath the hood top. Insert the aluminum filters into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filters into place. See Fig. 17.
7. Install the two rain deflectors on the edge of the hood top as shown in Fig. 15.
8. Caulk the ends of the joint between the unit top panel and the hood top as shown in Fig. 15.
9. Replace the filter access panel.

Step 11 — 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. 18. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

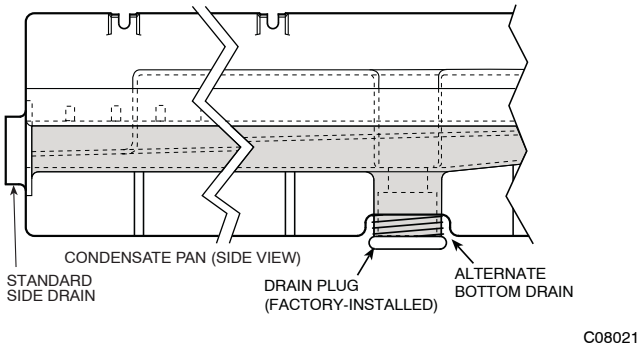


Fig. 18 - Condensate Drain Pan (Side View)

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. 19.

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.).

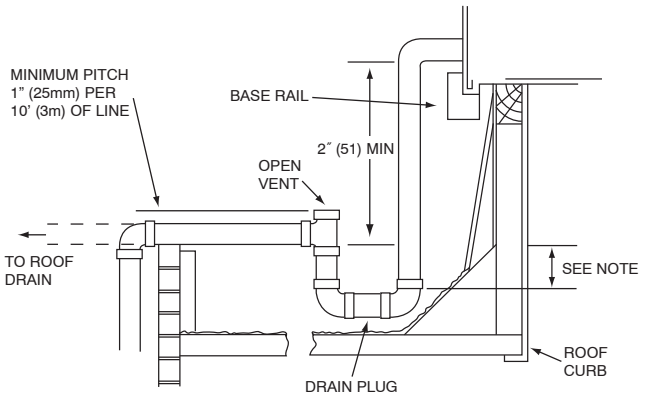


Fig. 19 - Condensate Drain Piping Details

Step 12 — Make Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

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

For those units without through-the-curb power, conduit must be used to route the main power from the condenser end, via the power entry in the corner post of the unit (see Figs. 20, 21 and 22) to either the factory option disconnect or the bottom of the control box. 1" conduit is provided wrapped around compressor. A second conduit is provided with factory installed powered convenience outlet. For those units that require conduit larger than 1", it must be field supplied. Figs. 20, 21 and 22 show the various wire routings.

If the field disconnect is larger than 100A, it must be attached to the unit using accessory CRDISBKT001A00 — disconnect switch bracket — (see Fig. 23). Follow the instructions provided with this accessory. For smaller field disconnects, be sure to use $^1/_2$" screws to mount the disconnect directly to the end panel, following the instructions on the Field Disconnect Warning label (see

Fig. 24). In either case, set the disconnect vertical location on the unit so that a 90° fitting can be used to connect the conduit to the disconnect.

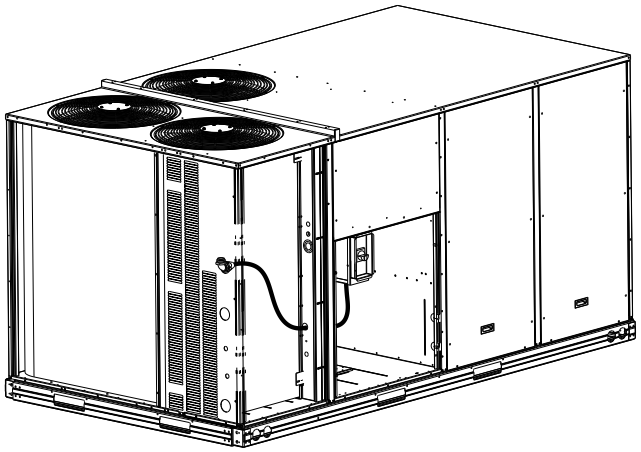


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Fig. 20 - Conduit into Factory Option Non-Fused Disconnect or HACR

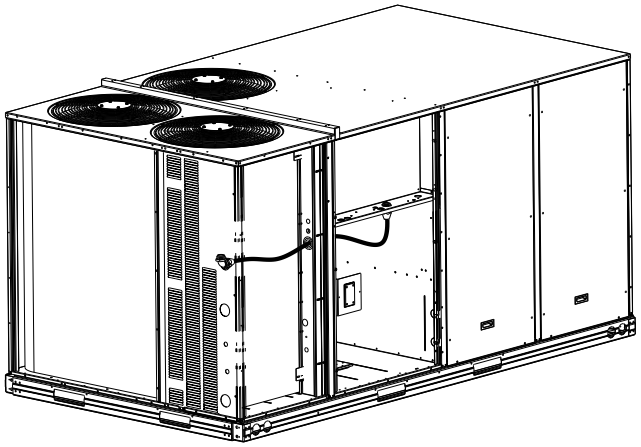

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Fig. 21 - Conduit into Control Box

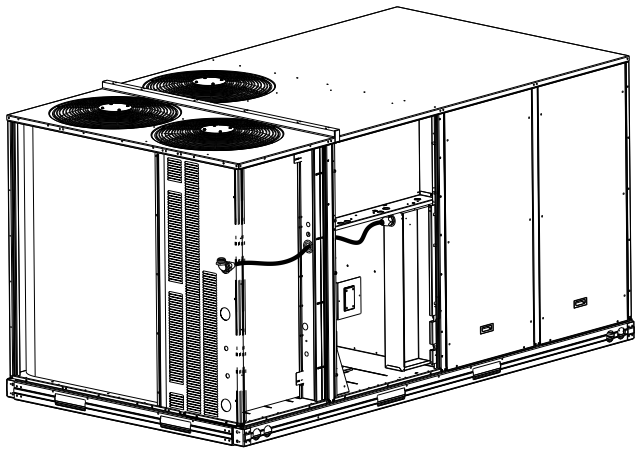

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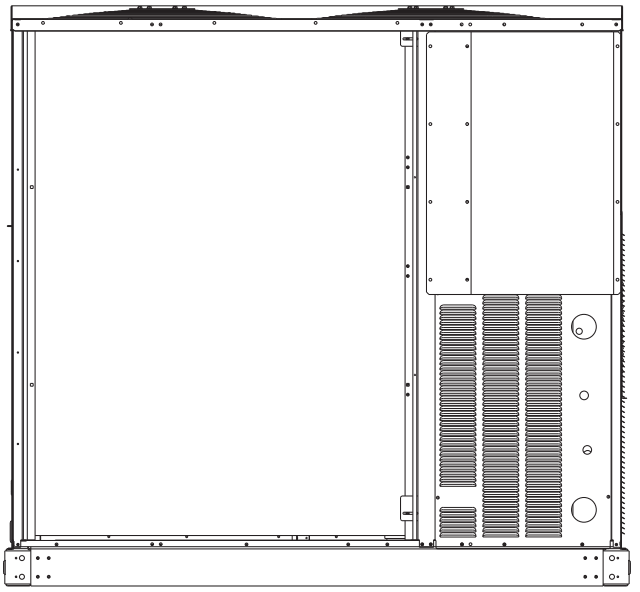
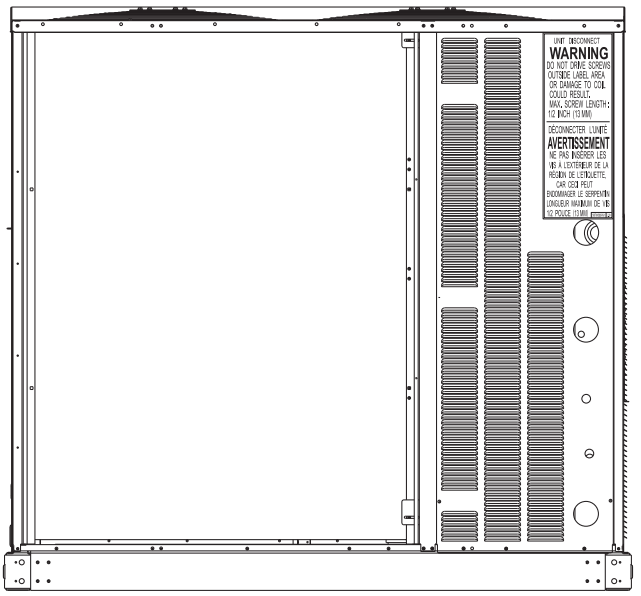
Fig. 22 - Conduit into Single Point Box



C10853

Fig. 23 - Mounting Position for Field Disconnects (over 100A)

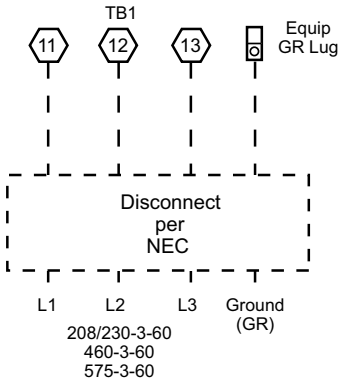


C10854

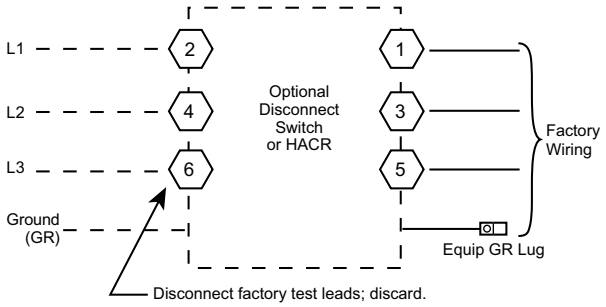
Fig. 24 - Mounting Position for Field Disconnects (up to 100A)

Field power wires are connected to the unit at line-side pressure lugs at the main terminal block (TB1), at factory-installed option non-fused disconnect switch or HACR, or field or factory-installed Single Point box for electric heat. Refer to Table 2 for maximum wire size at connection lugs. Use copper wire only. See Fig. 25.

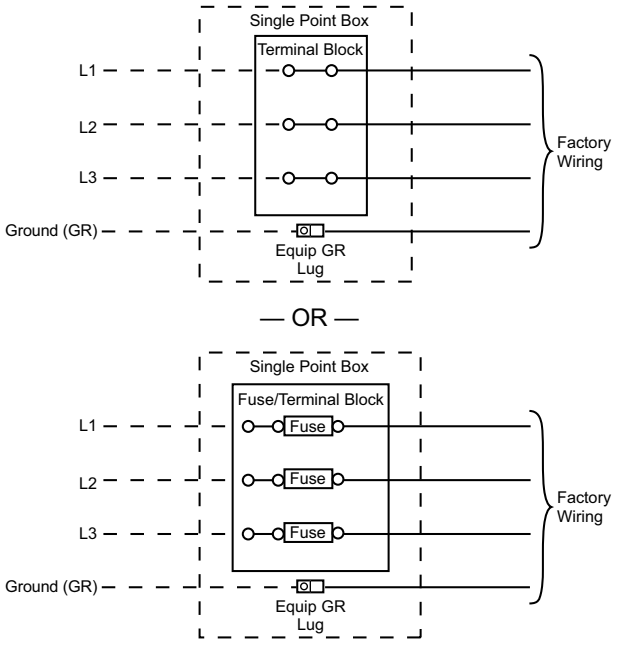
Units Without Single Point Box, Disconnect or HACR Option



Units With Disconnect or HACR Option



Units With Electric Heat Option with Single Point Box and Without Disconnect or HACR Option



C12336

Fig. 25 - Power Wiring Connections

Table 2 – Connection Lug Min/Max Wire Sizes

	Minimum	Maximum
TB1 in unit control box	#14	#1
Terminal/Fuse block in Single Point Box for Electric Heat	#8	3/0
80A Disconnect Option	#14	#4
100A Disconnect Option	#8	1/0
200A Disconnect Option	#4	300 kcmil
25A HACR Option	#14	1/0
30A HACR Option	#14	1/0
35A HACR Option	#14	1/0
40A HACR Option	#14	1/0
50A HACR Option	#14	1/0
60A HACR Option	#14	1/0
70A HACR Option	#14	1/0
80A HACR Option	#14	1/0
90A HACR Option	#14	1/0
100A HACR Option	#14	1/0
110A HACR Option	#4	300 kcmil
125A HACR Option	#4	300 kcmil
150A HACR Option	#4	300 kcmil
175A HACR Option	#4	300 kcmil
200A HACR Option	#4	300 kcmil

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

⚠ WARNING

FIRE HAZARD

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

Do not connect aluminum wire between disconnect switch and air conditioning unit. Use only copper wire. (See Fig. 26.)

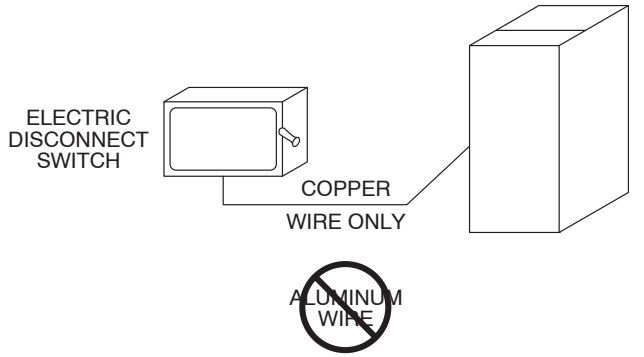


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Fig. 26 - Disconnect Switch and Unit

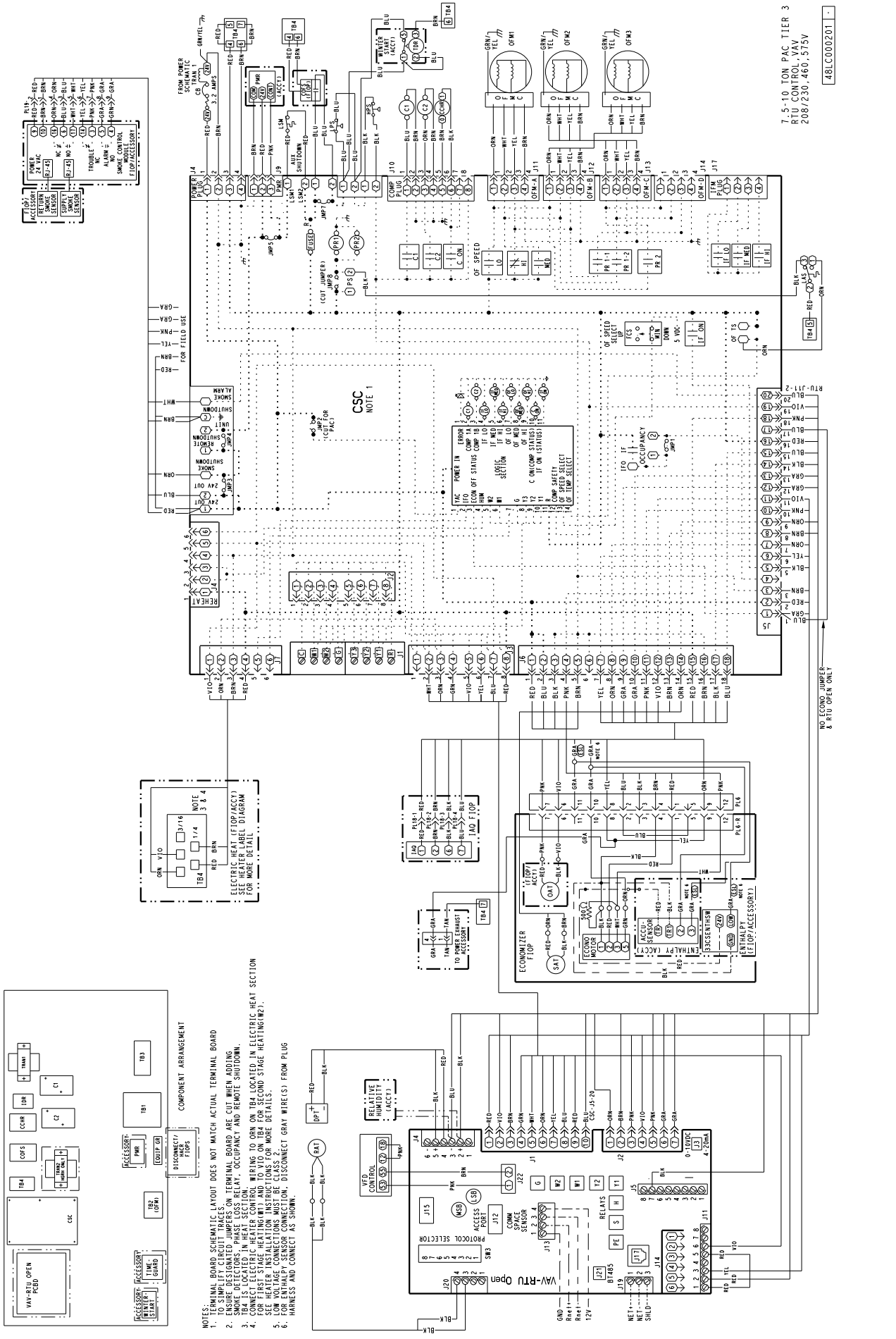


Fig. 27 - 50LC*B08-12 VAV-RTU Open Control Wiring Diagram

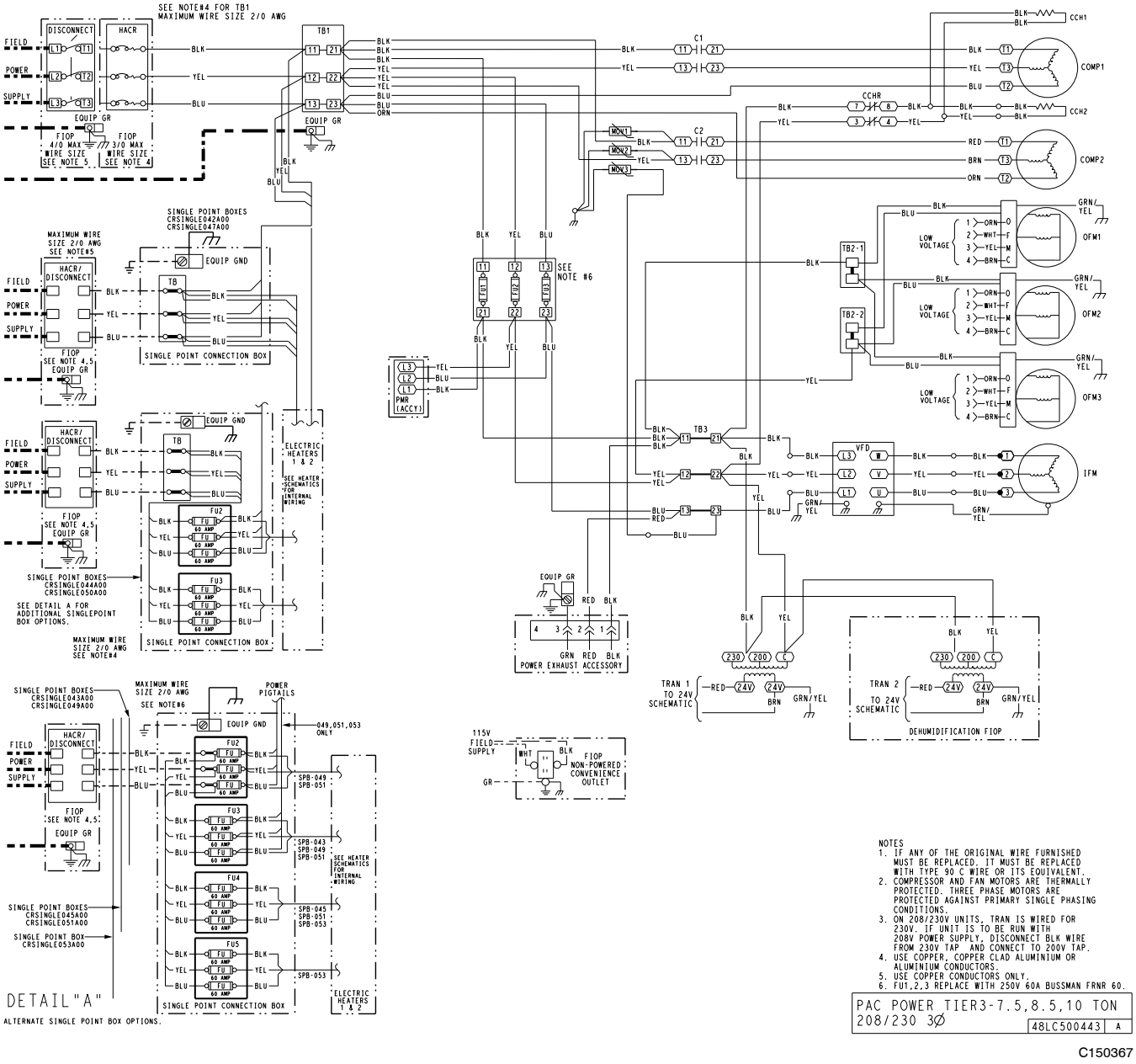


Fig. 28 - Typical 50LC*B08-12 Power Wiring Diagram

All Units —

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

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 25 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Refer to Table 2 for maximum wire size at connection lugs.

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 protection device unless local codes require.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. See Tables 8 and 9. 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 8 and 9 (see Note 2 on page 46) to determine the percent of voltage imbalance.

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.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

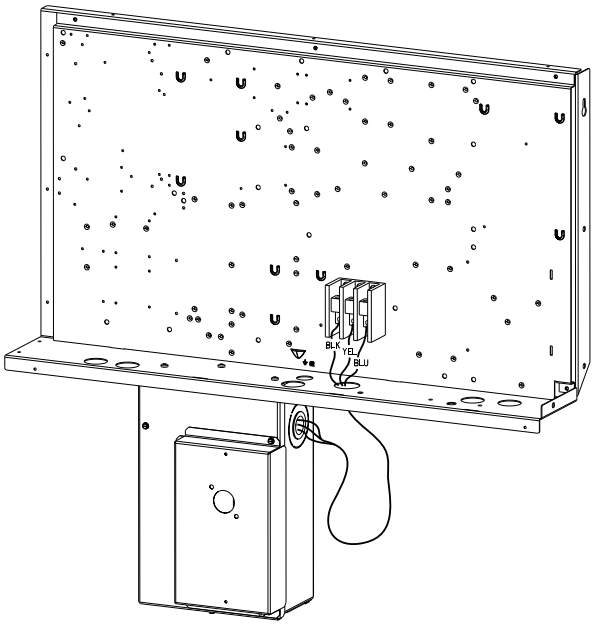
NOTE: Check all factory and field electrical connections for tightness.

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

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

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

The factory-installed option disconnect switch is located in a weatherproof enclosure located under the main control box. The manual switch handle is shipped in the disconnect or HACR enclosure. Assemble the shaft and handle to the switch or HACR at this point. Discard the factory test leads (see Fig. 25). The factory disconnect is a 200A disconnect on 230-3-60 units and a 100A disconnect on 460-3-60 and 575-3-60 units. On units with factory installed non-fused disconnect, without factory installed electric heat, the factory supplied load side wires may be of insufficient size for accessory electric heat applications. If so, remove the load side factory wiring. Re-size wires per unit nameplate data provided with accessory electric heat.



C12324

Fig. 29 - Location of Non-Fused Disconnect Enclosure

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 bottom.
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 the tip of the shaft to the top surface of the pointer to be 3.75 - 3.88 in. (95 - 99 mm) for 80A & 100A NFD and 3.43 - 3.56 in. (87 - 90 mm) for 200A NFD.
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.

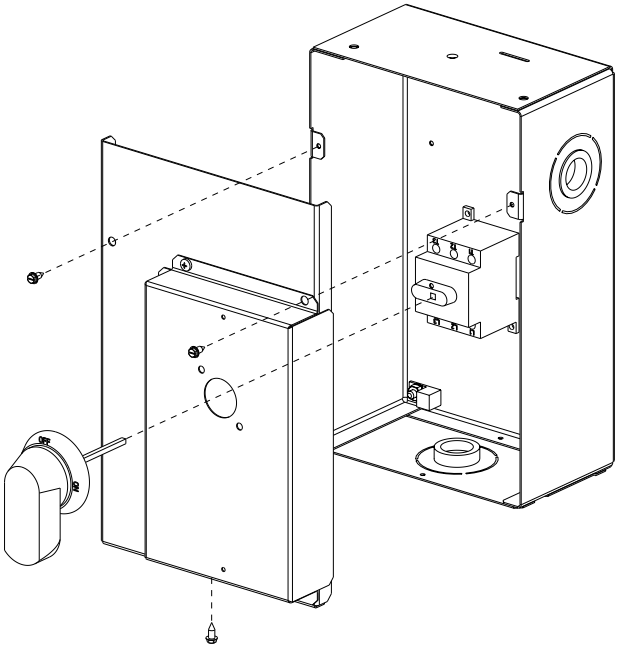


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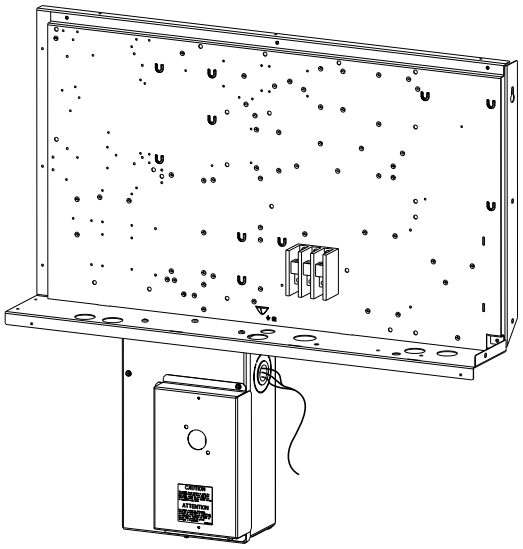
Fig. 30 - Handle and Shaft Assembly for NFD

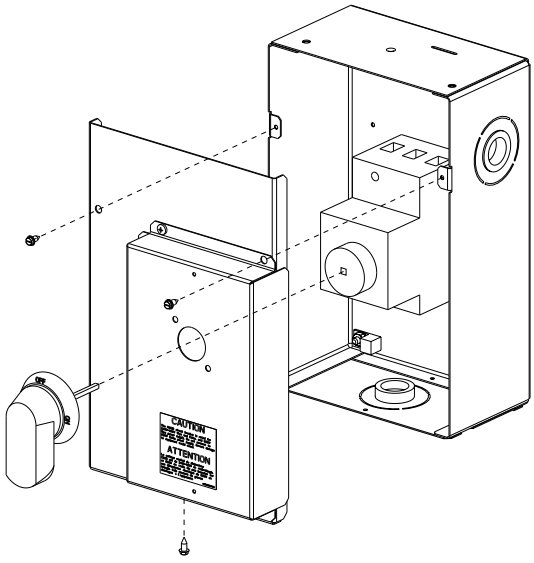


C12326

Fig. 31 - Location of HACR Enclosure

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 bottom.
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.



C12327

Fig. 32 - Handle and Shaft Assembly for HACR

Convenience Outlets —

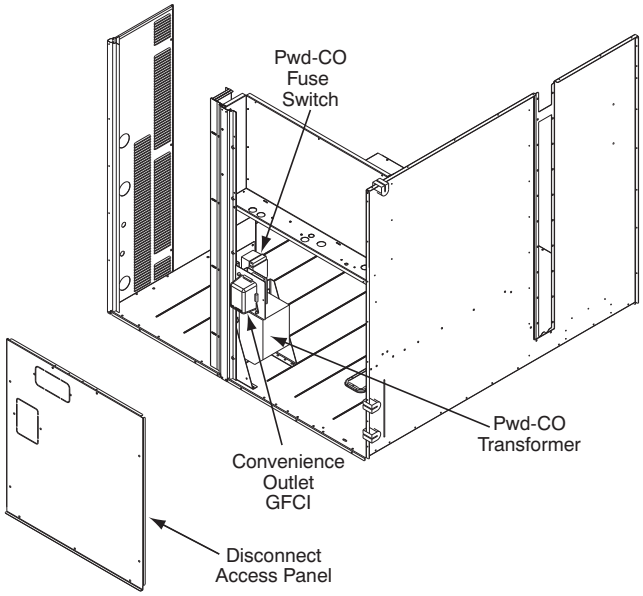
⚠ WARNING

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 the 50LC*B 08-12 units : non-powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the panel beneath the control box. See Fig. 33.



C10361

Fig. 33 - Convenience Outlet Location

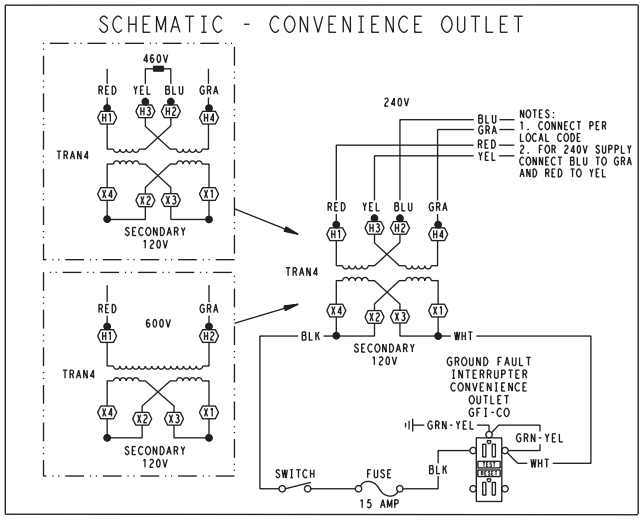
Non-powered type: This type requires the field installation of a general-purpose 125-volt 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size and conduit requirements, fuse or breaker requirements and disconnect switch size and location.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

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 panel beneath the control box. 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 switch; this will provide service power to the unit when the unit disconnect switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect switch is open. See Fig. 34. On a unit without a unit-mounted disconnect, connect the source leads to the main terminal block (TB1).

If the convenience outlet transformer is connected to the line side of a field disconnect, the conduit provided with the unit must be used to protect the wire as they are routed from the transformer to the field disconnect. The end of the conduit with the straight connector attaches to the field disconnect. The other end does not need to connect to the transformer; however, the conduit must be routed so that all wiring is either in the conduit or behind the access panel.



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. 34 - Unit Powered Convenience Outlet Wiring

If the convenience outlet transformer is connected to the line side of the factory disconnect option, route the wires through the web bushing located on the bottom of the disconnect box. For the load side wiring to the factory option disconnect, route the wires through the hole on the right side of the disconnect. Be sure to create a drip loop at least 6" long.

Test the GFCI receptacle by pressing the TEST button on the face of the receptacle to trip and open the receptacle. Check for proper grounding wires and power line phasing if the GFCI receptacle does not trip as required. Press the RESET button to clear the tripped condition.

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

C10077

Fig. 35 - Convenience Outlet Utilization Notice

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

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.

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.

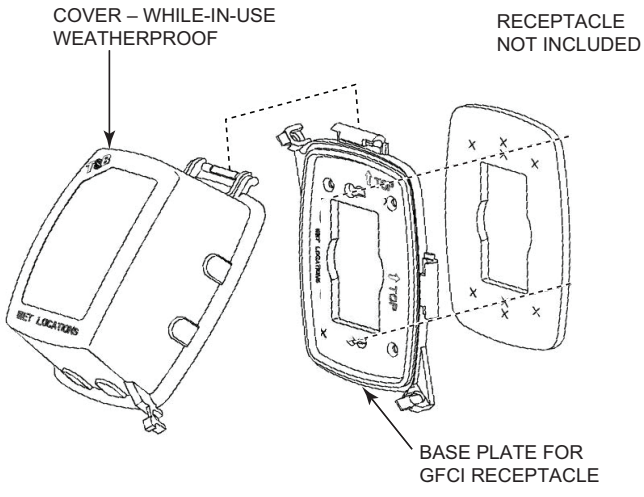
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

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. 36. 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.

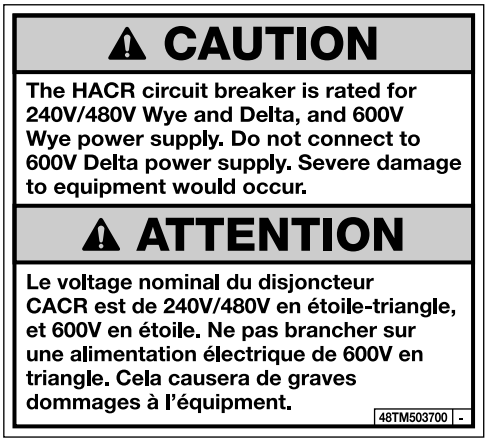


C09022

Fig. 36 - Weatherproof Cover Installation

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., electric heat, power exhaust), 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.

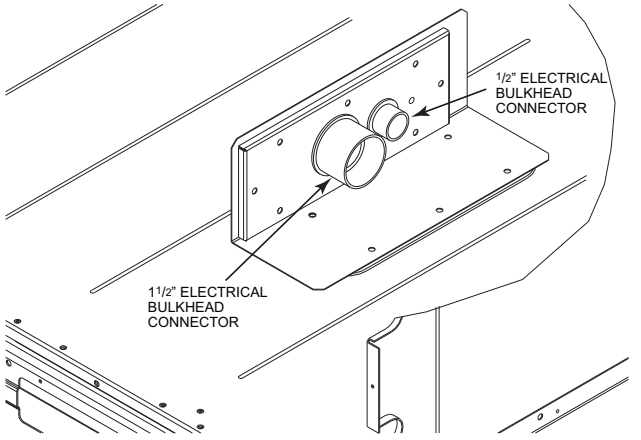


C12105

Fig. 37 - HACR Caution Label

Factory-Option Thru-Base Connections —

This service connection kit consists of a $^1/_2$-in electrical bulkhead connector and a $1^1/_2$-in electrical bulkhead connector, connected to an "L" bracket covering the embossed (raised) section of the unit basepan in the condenser section. See Fig. 38. The $^1/_2$-in bulkhead connector enables the low-voltage control wires to pass through the basepan. The $1^1/_2$-in electrical bulkhead connector allows the high-voltage power wires to pass through the basepan.



C10907

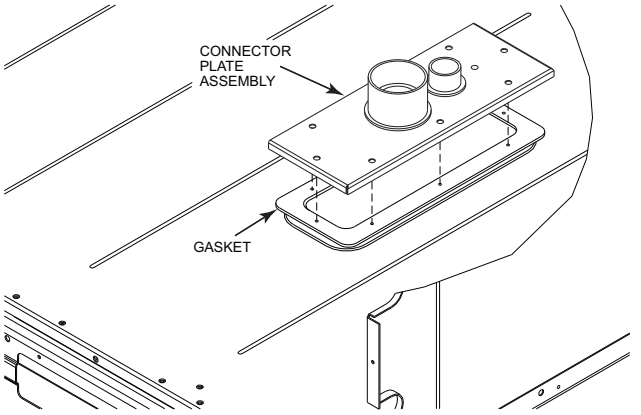
Fig. 38 - Thru-the-Base Option, Shipping Position

1. Remove the "L" bracket assembly from the unit.
2. Remove connector plate assembly from the "L" bracket and discard the "L" bracket, but retain the washer head screws and the gasket (located between the "L" bracket and the connector plate assembly).

NOTE: Take care not to damage the gasket, as it is reused in the following step.

3. Place the gasket over the embossed area in the basepan, aligning the holes in the gasket to the holes in the basepan. See Fig. 39.
4. Install the connector plate assembly to the basepan using 8 of the washer head screws.

NOTE: If electrical connections are not going to occur at this time, tape or otherwise cover the fittings so that moisture does not get into the building or conduit in the interim.



C10908

Fig. 39 - Installing Thru-the-Base Option

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquidtight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage and low voltage wires 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). Remove one of the two knockouts located on the bottom left side of the unit control box. Use this hole for the control conduit.

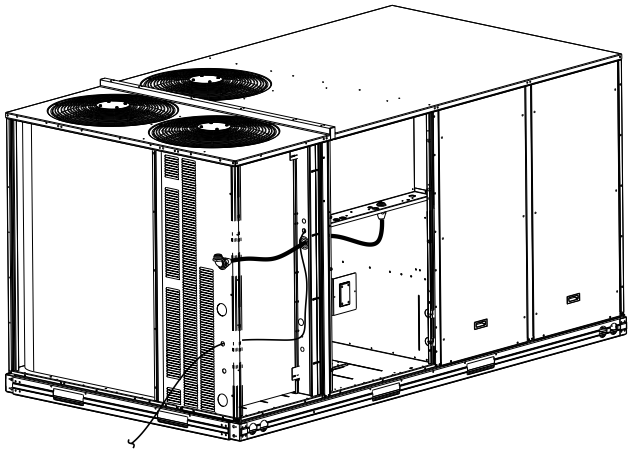
Units Without Thru-Base Connections —

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 thermostat control wires through the bushing on the unit end panel. Route the wire through the snap-in wire tie and up to the web bushing near the control box. Route the wire through the bushing and into the bottom left side of the control box after removing one of the two knockouts in the corner of the box. Using a connector at the control box to protect the wire as it passes into the control box pull the wires over to the terminal strip at the lower left corner of the Integrated Staging Control (ISC) Board. Use the connector at the control box and the wire tie to ensure that the thermostat wire is tight and will not be damaged by contact with the condenser coil. See Fig. 40.

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



C12378

Fig. 40 - Thermostat Wire Routing

Heat Anticipator Settings —

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

Electric Heaters

50LC*B08-12 units may be equipped with factory or field-installed electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor. One or two heater modules may be used in a unit.

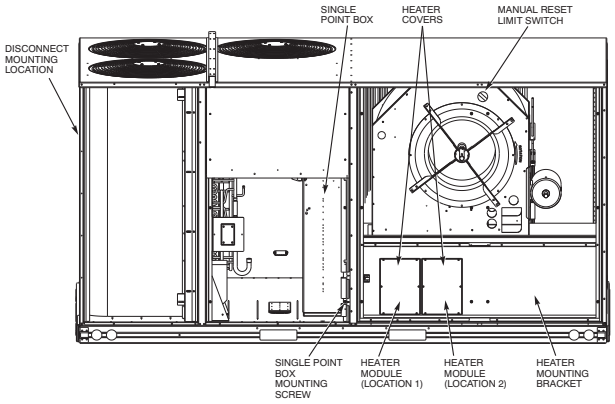
Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. See Fig. 41.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

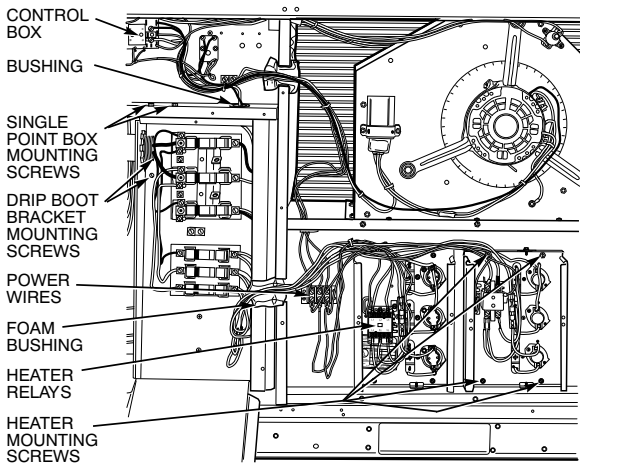


C10029

Fig. 41 - Typical Component Location

Single Point Boxes

When heaters are installed, power wiring to both heaters and the rest of the unit is connected via the single point box accessory, which will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The single point box has a hinged access cover. See Fig. 42. The single point box also includes pigtails to complete the wiring between the single point box and the unit's main control box terminals. The pigtails will already be connected into the unit's main control box on units with factory installed electric heat. Refer to the accessory heater and Single Point Box installation instructions for details on tap connections for field installed electric heat accessory.



C14253

Fig. 42 - Typical Single Point Installation

Heater and Supplementary Fuses —

When the unit MOCP device value exceeds 60-A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory Single Point Boxes, with power distribution and fuse blocks.

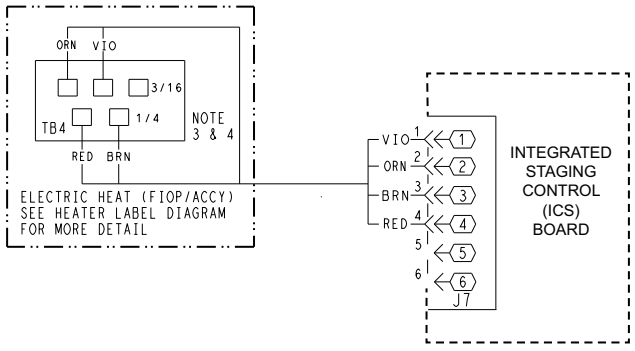
All fuses on 50LC*B08-12 units are 60-A. (Note that all heaters are qualified for use with a 60-A fuse, regardless of actual heater ampacity, so only 60-A fuses are necessary.)

Heater Low-Voltage Control Connections —

One or two heaters can be installed in the unit. Use the wiring procedure below for each heater.

The two-stage electric heaters have orange, violet, red and brown wires. The orange and the violet are the control wires and the red and brown wires feed the safety circuit. Connect the orange and the violet wires to the orange and violet wire locations of TB4. Connect the red and brown wires to red and brown wires on TB4. If more than one heater is installed, repeat the wiring procedure for the second heater. The 3 locations across the top of TB4 do allow a switch to be installed in series with some of the heaters in order to add additional heater control. See Fig. 43.

NOTE: The low voltage wiring will already be completed on units with factory installed electric heat.



NOTES:
3. TB4 IS LOCATED IN HEAT SECTION.
4. CONNECT ELECTRIC HEATER CONTROL WIRING TO ORN ON TB4 LOCATED IN ELECTRIC HEAT SECTION FOR FIRST STAGE HEATING(W1) AND TO VIO ON TB4 FOR SECOND STAGE HEATING(W2). SEE HEATER INSTALLATION INSTRUCTIONS FOR MORE DETAILS.

C13272

Fig. 43 - Optional or Accessory Electric Heater Control Connections

VAV-RTU Open Controller

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

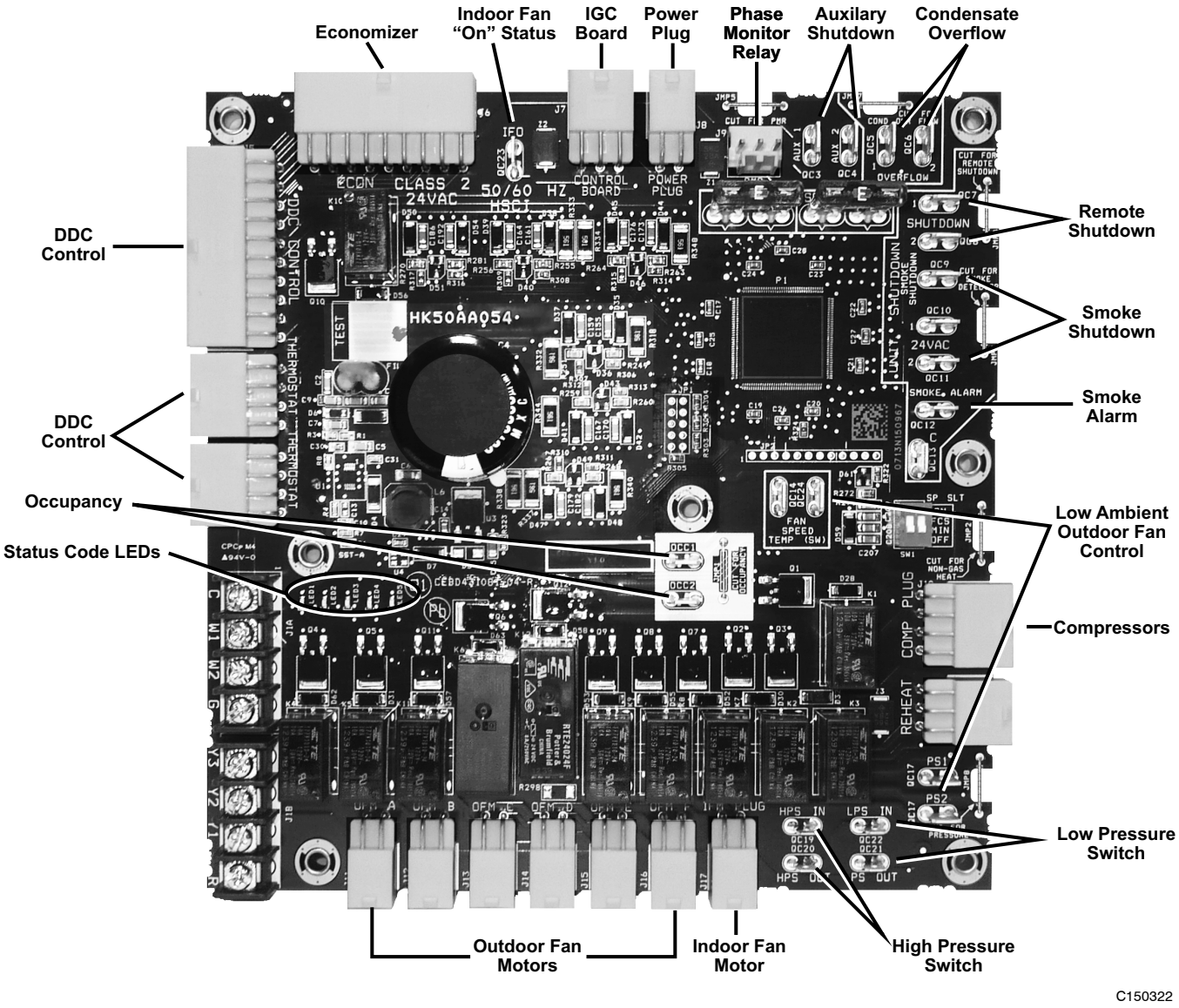


Fig. 44 - Integrated Staging Control (ISC) Board

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. 44 for LED locations and Table 3 for a list of 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 3 – 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 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 –

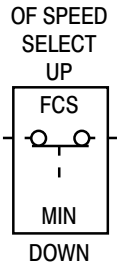
The control will provide the ability to utilize outdoor air for maintaining the supply air setpoint should the outdoor air be suitable. The economizer control will utilize an OAT temperature check, a RAT temperature check if RAT is available or a SPT temperature check comparison and optionally, an OA 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. 45) 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.

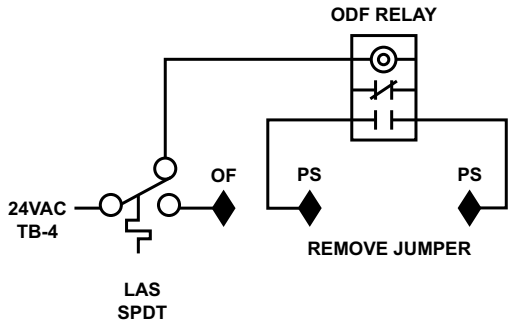
At temperatures below 45°F (7°C), unit will utilize economizer for SA temperature control.

LC*B08 through 12 Units have a SPDT Low Ambient Switch wired to the OF terminal and the Outdoor Fan Relay (See Fig. 46). The jumper across the PS terminal will be removed. When the LAS is active, the switch will close making contact to the OF terminal and will drop connection to the ODF Relay. When electrical connection is removed from the ODF Relay, the PS connection will be opened. This will place the third outdoor-fan electrically isolated from receiving any speed command, which will then turn the motor off. This is done for units that only require two outdoor fans to run at the same pre-set factory Low Ambient Speed.



C13327

Fig. 45 - Outdoor Fan Speed Select Switch



C13703

Fig. 46 - Schematic of SPDT Low Ambient Switch

The Low Ambient Temperature Outdoor Fan Control Table (below) shows the operation of the outdoor fan for size 08, 09 and 12 units.

Table 4 – Low Ambient Temperature Outdoor Fan Control

LC Size	No. of Fans On	No. of Fans Off	Switch	Outdoor Fan Select Switch	RPM
08	2	1	(1) SPDT	Down	160
09	2	1	(1) SPDT	Down	160
12	2	1	(1) SPDT	Down	160

Heating —

In the Heating Mode power is applied to the G and W1 terminal at the ISC board and energizes the first state of electric heat. Upon more call for heat power is applied to the G and W2 terminal at the ISC board and energizes the second state of electric heat. The VFD controlled indoor fan will operate at high speed regardless of the heating demand.

Morning Warm-up –

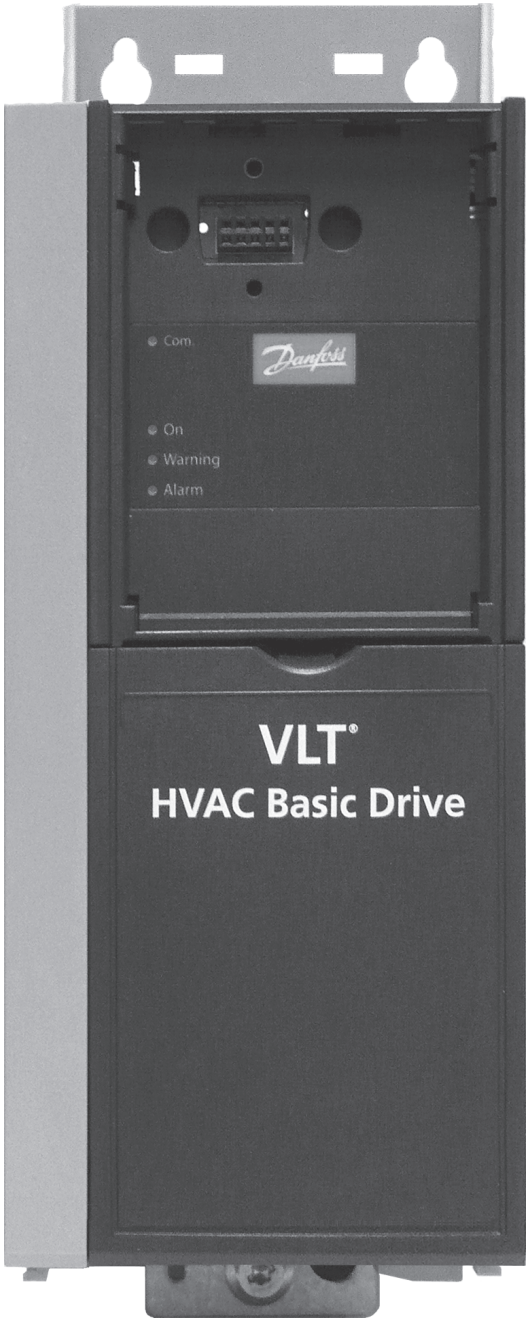
The control will provide a Morning Warm-up cycle the first time if transition from unoccupied to occupied and if the heating is required and the unit goes into heating immediately. Whenever the unit enters the heating mode, before any heat stage is enabled, the control will provide a Linkage mode to 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. 47 - Variable Frequency Drive (VFD)

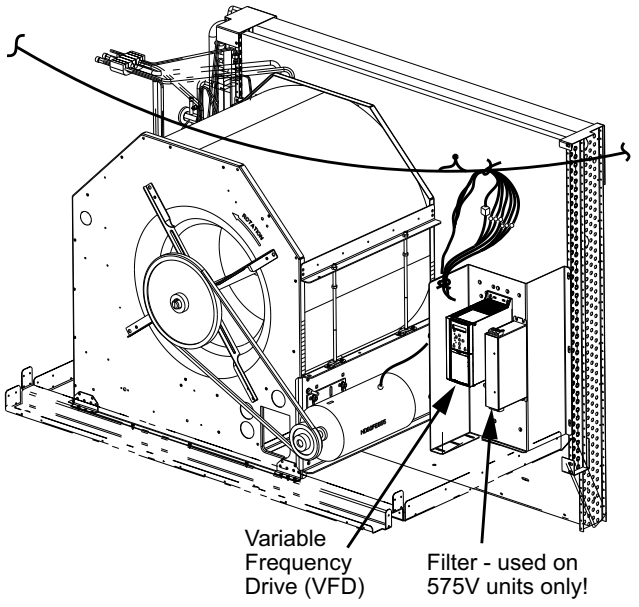


Fig. 48 - VFD Location

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 50LC*B08-12 base units.

The VFD keypad as shown in Fig. 49 consists of the following sections:

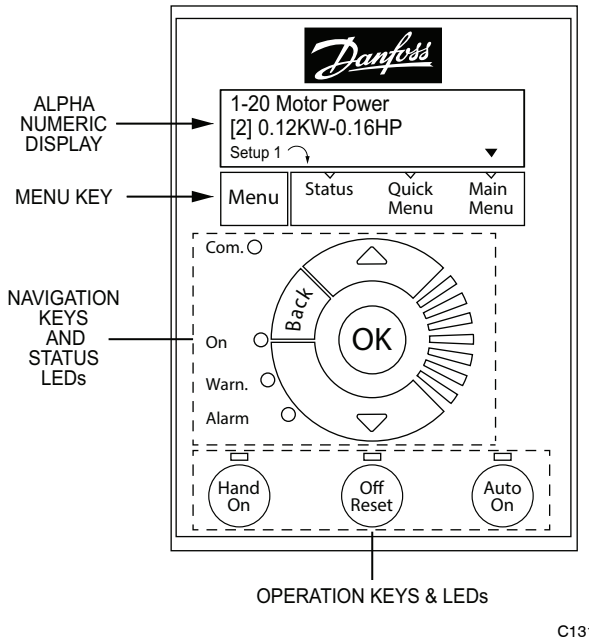
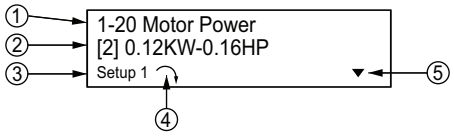


Fig. 49 - VFD Keypad

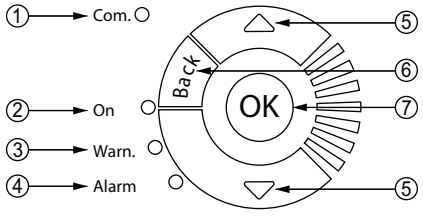
Alpha Numeric Display: The LCD display is back lit with 2 alpha-numeric lines. All data is displayed on the LCD.



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.

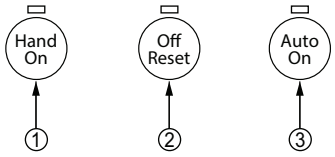
Menu Key: Use the Menu key to select between Status, Quick Menu or Main Menu. The triangle icon at the bottom of the LCD display indicates the currently selected mode. (See number 5 in the table above.)

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



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

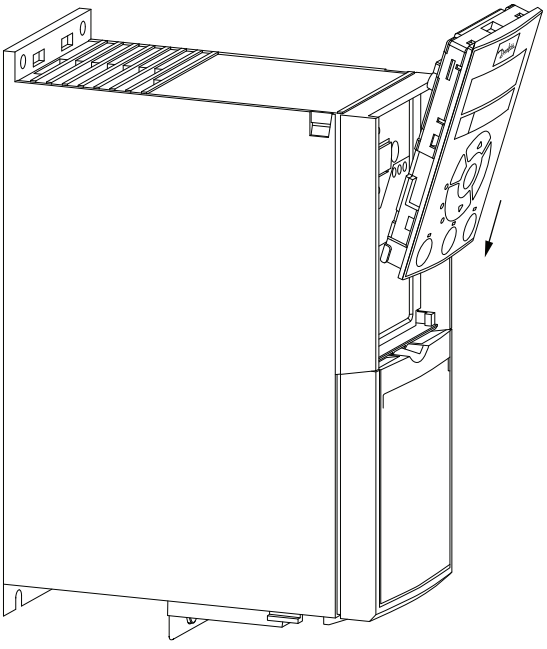
1	**Hand On** key: Starts the motor and enables control of the variable frequency drive (VFD) via the VFD Keypad option. **NOTE**: Please note that terminal 27 Digital Input *(5-12 Terminal 27 Digital Input)* has coast inverse as default setting. This means that the Hand On key will not start the motor 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 —

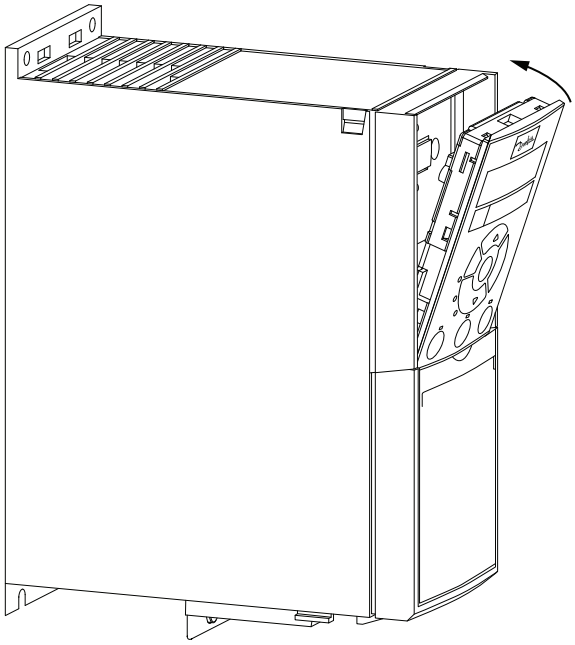
1. Place the bottom of the VFD keypad into the variable frequency drive as shown in Fig. 50.



C13116

Fig. 50 - 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. 51.

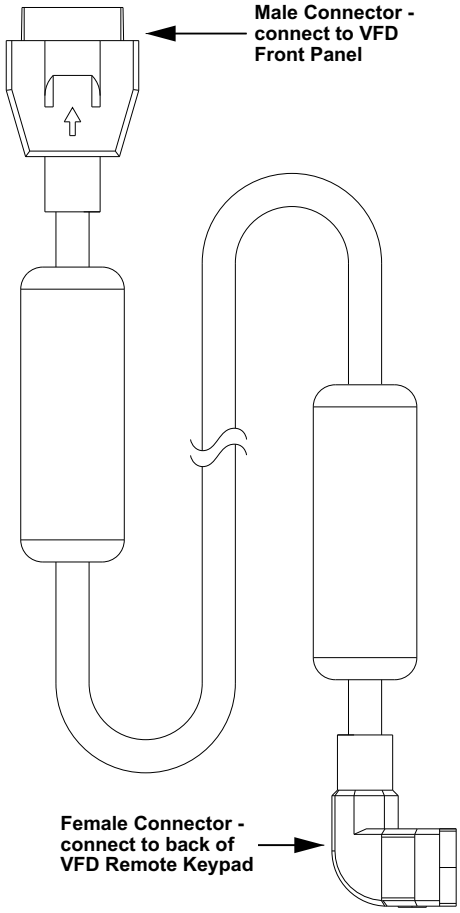


C13117

Fig. 51 - 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. 52 - 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

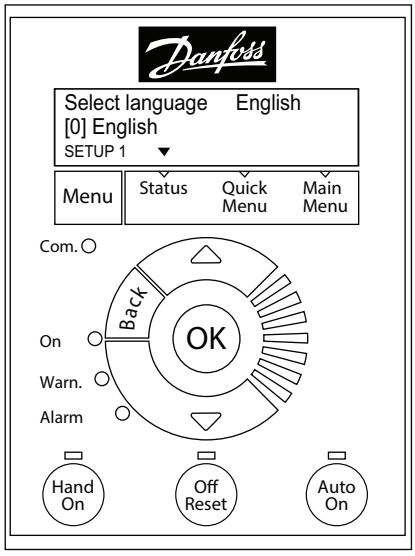
IMPORTANT: 50LC*B08-12 units are programmed at the Factory for variable indoor fan speeds. The following procedure is only to be used to recover this function after an event such as a system crash.

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. 53 - 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: Max Amps is greater than the nameplate value. Check the VFD Unit Parameters (see Tables 5 - 7 on pages 37 - 39) 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 Tables 5 - 7. 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 Tables 5 - 7. 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 Tables 5 - 7. 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 Tables 5 - 7. 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 Tables 5 –7, column labeled “Preset References 3–10[1]” for the proper % for each unit)
[2]MM.MM%	Medium Speed (see Tables 5 –7, 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 5 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 5 – VFD Unit Parameters - 50LC*B08 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	08	STD	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	08	STD	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	08	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	08	MID	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	08	MID	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	08	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	08	HIGH	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	08	HIGH	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	08	HIGH	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	08	ULTRA	HD60FE656	HK30WA372	131L9797	[1]	[102]	[11]	230	60	11.7	1750	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	08	ULTRA	HD60FE656	HK30WA378	131L9865	[1]	[122]	[11]	460	60	5.4	1750	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	08	ULTRA	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	08	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	08	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	08	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	08	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	08	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	08	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	08	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	08	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	08	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	08	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	08	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	08	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 6 – VFD Unit Parameters - 50LC*B09 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	09	STD	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	09	STD	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	09	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	09	MID	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	09	MID	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	09	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	09	HIGH	HD60FE656	HK30WA372	131L9797	[1]	[102]	[11]	230	60	11.7	1750	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	09	HIGH	HD60FE656	HK30WA378	131L9865	[1]	[122]	[11]	460	60	5.4	1750	2.0	[1]	1.0	[4]	0%	.66.50%	66.50%
575V	09	HIGH	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	09	ULTRA	HD60FK658	HK30WA372	131L9797	[1]	[102]	[13]	230	60	13.6	1745	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	09	ULTRA	HD60FK658	HK30WA379	131L9866	[1]	[122]	[13]	460	60	6.8	1745	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	09	ULTRA	HD60FE576	HK30WA387	134F0217	[1]	[132]	[13]	575	60	6.0	1745	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	09	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	09	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	09	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	09	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	09	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	09	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	09	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	09	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	09	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	09	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	09	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	09	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 7 – VFD Unit Parameters - 50LC*B12 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	12	STD	HD56FE653	HK30WA371	131L9796	[1]	[102]	[10]	230	60	7.9	1680	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	12	STD	HD56FE653	HK30WA377	131L9864	[1]	[122]	[10]	460	60	3.6	1680	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	12	STD	HD56FE577	HK30WA382	131N0225	[1]	[132]	[11]	575	60	3.8	1680	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	12	MID	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	12	MID	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	12	MID	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
208/230V	12	HIGH	HD60FK658	HK30WA372	131L9797	[1]	[102]	[13]	230	60	13.6	1745	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
460V	12	HIGH	HD60FK658	HK30WA379	131L9866	[1]	[122]	[13]	460	60	6.8	1745	2.0	[1]	1.0	[4]	0%	66.50%	66.50%
575V	12	HIGH	HD60FE576	HK30WA387	134F0217	[1]	[132]	[13]	575	60	6.0	1745	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	12	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	12	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	12	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	12	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	12	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	12	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	12	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	12	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	12	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 8 – Unit Wire/Fuse or HACR Breaker Sizing Data

UNIT	NOM. V–Ph–HZ	IFM TYPE	ELEC. HTR			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)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B08	208/230–3–60	STD	NONE	–	–	42/42	50/50	44/44	200	46/46	50/50	48/48	204	47/47	60/50	49/49	205	51/50	60/60	54/53	209
			288A	7.5/10.0	20.9/24.1	42/42	50/50	44/44	200/200	46/46	50/50	48/48	204/204	47/47	60/50	49/49	205/205	51/50	60/60	54/53	209/209
			291A	12.4/16.5	34.4/39.7	51/57	60/60	46/52	200/200	55/62	60/70	51/56	204/204	57/63	60/70	52/58	205/205	61/68	70/70	56/62	209/209
			294A	25.2/33.5	69.9/80.6	95/108	100/110	87/99	200/200	100/113	100/125	91/104	204/204	101/114	110/125	93/105	205/205	106/119	110/125	97/109	209/209
		MED	NONE	–	–	42/42	50/50	44/44	200	46/46	50/50	48/48	204	47/47	60/50	49/49	205	51/50	60/60	54/53	209
			288A	7.5/10.0	20.9/24.1	42/42	50/50	44/44	200/200	46/46	50/50	48/48	204/204	47/47	60/50	49/49	205/205	51/50	60/60	54/53	209/209
			291A	12.4/16.5	34.4/39.7	51/57	60/60	46/52	200/200	55/62	60/70	51/56	204/204	57/63	60/70	52/58	205/205	61/68	70/70	56/62	209/209
			294A	25.2/33.5	69.9/80.6	95/108	100/110	87/99	200/200	100/113	100/125	91/104	204/204	101/114	110/125	93/105	205/205	106/119	110/125	97/109	209/209
		HIGH	NONE	–	–	45/44	50/50	47/46	230	49/48	60/60	51/50	234	50/49	60/60	53/52	235	53/53	60/60	57/56	239
			288A	7.5/10.0	20.9/24.1	45/44	50/50	47/46	230/230	49/48	60/60	51/50	234/234	50/49	60/60	53/52	235/235	53/53	60/60	57/56	239/239
			291A	12.4/16.5	34.4/39.7	54/60	60/60	49/55	230/230	59/65	60/70	54/59	234/234	60/66	60/70	55/60	235/235	65/71	70/80	59/65	239/239
			294A	25.2/33.5	69.9/80.6	99/111	100/125	90/102	230/230	103/116	110/125	95/106	234/234	105/117	110/125	96/107	235/235	109/122	110/125	100/112	239/239
		ULTRA HIGH	NONE	–	–	47/46	60/50	50/48	254	51/50	60/60	54/53	258	52/51	60/60	55/54	259	56/55	60/60	59/58	263
			288A	7.5/10.0	20.9/24.1	47/46	60/50	50/48	254/254	51/50	60/60	54/53	258/258	52/51	60/60	55/54	259/259	56/55	60/60	59/58	263/263
			291A	12.4/16.5	34.4/39.7	57/62	60/70	52/57	254/254	62/67	70/70	56/61	258/258	63/68	70/70	58/62	259/259	68/73	70/80	62/67	263/263
			294A	25.2/33.5	69.9/80.6	101/113	110/125	93/104	254/254	106/118	110/125	97/108	258/258	107/119	110/125	98/109	259/259	112/124	125/125	103/114	263/263
	460–3–60	STD	NONE	–	–	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			289A	10.0	12.0	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			292A	16.5	19.9	29	30	26	102	31	35	28	104	32	35	29	104	34	35	31	106
			295A	33.5	40.3	54	60	50	102	57	60	52	104	57	60	52	104	59	60	54	106
		MED	NONE	–	–	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			289A	10.0	12.0	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			292A	16.5	19.9	29	30	26	102	31	35	28	104	32	35	29	104	34	35	31	106
			295A	33.5	40.3	54	60	50	102	57	60	52	104	57	60	52	104	59	60	54	106
		HIGH	NONE	–	–	23	25	25	118	25	30	27	120	26	30	27	120	27	30	29	122
			289A	10.0	12.0	23	25	25	118	25	30	27	120	26	30	27	120	27	30	29	122
			292A	16.5	19.9	30	30	27	118	32	35	29	120	33	35	30	120	35	35	32	122
			295A	33.5	40.3	56	60	51	118	58	60	53	120	58	60	53	120	61	70	55	122
		ULTRA HIGH	NONE	–	–	25	30	26	130	26	30	28	132	27	30	28	132	29	30	30	134
			289A	10.0	12.0	25	30	26	130	26	30	28	132	27	30	28	132	29	30	30	134
			292A	16.5	19.9	31	35	29	130	34	35	31	132	34	35	31	132	36	40	33	134
			295A	33.5	40.3	57	60	52	130	59	60	54	132	60	60	55	132	62	70	57	134
	575–3–60	STD	NONE	–	–	19	20	20	78	23	25	24	82	21	25	22	80	24	30	26	84
			293A	16.5	15.9	24	25	22	78	29	30	26	82	26	30	23	80	31	35	28	84
			296A	33.5	32.2	44	45	40	78	49	50	45	82	46	50	42	80	51	60	47	84
		MED	NONE	–	–	19	20	20	78	23	25	24	82	21	25	22	80	24	30	26	84
			293A	16.5	15.9	24	25	22	78	29	30	26	82	26	30	23	80	31	35	28	84
			296A	33.5	32.2	44	45	40	78	49	50	45	82	46	50	42	80	51	60	47	84
		HIGH	NONE	–	–	21	25	22	91	24	30	26	95	22	25	24	93	26	30	28	97
			293A	16.5	15.9	26	30	23	91	31	35	28	95	28	30	25	93	33	35	30	97
			296A	33.5	32.2	46	50	42	91	51	60	47	95	48	50	44	93	53	60	49	97
		ULTRA HIGH	NONE	–	–	21	25	22	91	24	30	26	95	22	25	24	93	26	30	28	97
			293A	16.5	15.9	26	30	23	91	31	35	28	95	28	30	25	93	33	35	30	97
			296A	33.5	32.2	46	50	42	91	51	60	47	95	48	50	44	93	53	60	49	97

See “Legend and Notes for Tables 8 and 9” on page 46.

Table 8 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont.)

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
						NO P.E.				w/ P.E. (pwrd fr/unit)				NO P.E.				w/ P.E. (pwrd fr/unit)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B09	208/230–3–60	STD	NONE	–	–	45/45	60/50	46/46	227	49/48	60/60	51/50	231	50/49	60/60	52/52	232	53/53	60/60	56/56	236
			288A	7.5/10.0	20.9/24.1	45/45	60/50	46/46	227/227	49/48	60/60	51/50	231/231	50/49	60/60	52/52	232/232	53/53	60/60	56/56	236/236
			291A	12.4/16.5	34.4/39.7	51/57	60/60	46/52	227/227	55/62	60/70	51/56	231/231	57/63	60/70	52/58	232/232	61/68	70/70	56/62	236/236
			294A	25.2/33.5	69.9/80.6	95/108	100/110	87/99	227/227	100/113	100/125	91/104	231/231	101/114	110/125	93/105	232/232	106/119	110/125	97/109	236/236
		MED	NONE	–	–	45/45	60/50	46/46	227	49/48	60/60	51/50	231	50/49	60/60	52/52	232	53/53	60/60	56/56	236
			288A	7.5/10.0	20.9/24.1	45/45	60/50	46/46	227/227	49/48	60/60	51/50	231/231	50/49	60/60	52/52	232/232	53/53	60/60	56/56	236/236
			291A	12.4/16.5	34.4/39.7	51/57	60/60	46/52	227/227	55/62	60/70	51/56	231/231	57/63	60/70	52/58	232/232	61/68	70/70	56/62	236/236
			294A	25.2/33.5	69.9/80.6	95/108	100/110	87/99	227/227	100/113	100/125	91/104	231/231	101/114	110/125	93/105	232/232	106/119	110/125	97/109	236/236
		HIGH	NONE	–	–	50/49	60/60	52/51	281	54/53	60/60	56/55	285	55/54	60/60	58/56	286	58/57	70/70	62/61	290
			288A	7.5/10.0	20.9/24.1	50/49	60/60	52/51	281/281	54/53	60/60	56/55	285/285	55/54	60/60	58/56	286/286	58/57	70/70	62/61	290/290
			291A	12.4/16.5	34.4/39.7	57/62	60/70	52/57	281/281	62/67	70/70	56/61	285/285	63/68	70/70	58/62	286/286	68/73	70/80	62/67	290/290
			294A	25.2/33.5	69.9/80.6	101/113	110/125	93/104	281/281	106/118	110/125	97/108	285/285	107/119	110/125	98/109	286/286	112/124	125/125	103/114	290/290
		ULTRA HIGH	NONE	–	–	53/52	60/60	55/54	292	56/55	60/60	60/59	296	57/56	70/60	61/60	297	61/60	70/70	65/64	301
			288A	7.5/10.0	20.9/24.1	53/52	60/60	55/54	292/292	56/55	60/60	60/59	296/296	57/56	70/60	61/60	297/297	61/60	70/70	65/64	301/301
			291A	12.4/16.5	34.4/39.7	60/66	60/70	55/60	292/292	65/71	70/80	60/65	296/296	66/72	70/80	61/66	297/297	71/77	80/80	65/70	301/301
			294A	25.2/33.5	69.9/80.6	105/117	110/125	96/107	292/292	110/122	110/125	100/112	296/296	111/123	125/125	102/113	297/297	116/128	125/150	106/117	301/301
	460–3–60	STD	NONE	–	–	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			289A	10.0	12.0	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			292A	16.5	19.9	29	30	26	113	31	35	28	115	32	35	29	115	34	35	31	117
			295A	33.5	40.3	54	60	50	113	57	60	52	115	57	60	52	115	59	60	54	117
		MED	NONE	–	–	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			289A	10.0	12.0	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			292A	16.5	19.9	29	30	26	113	31	35	28	115	32	35	29	115	34	35	31	117
			295A	33.5	40.3	54	60	50	113	57	60	52	115	57	60	52	115	59	60	54	117
		HIGH	NONE	–	–	26	30	28	141	28	30	30	143	29	35	30	143	30	35	32	145
			289A	10.0	12.0	26	30	28	141	28	30	30	143	29	35	30	143	30	35	32	145
			292A	16.5	19.9	31	35	29	141	34	35	31	143	34	35	31	143	36	40	33	145
			295A	33.5	40.3	57	60	52	141	59	60	54	143	60	60	55	143	62	70	57	145
		ULTRA HIGH	NONE	–	–	28	30	29	146	30	35	31	148	30	35	32	148	32	35	34	150
			289A	10.0	12.0	28	30	29	146	30	35	31	148	30	35	32	148	32	35	34	150
			292A	16.5	19.9	33	35	30	146	36	40	32	148	36	40	33	148	38	40	35	150
			295A	33.5	40.3	59	60	54	146	61	70	56	148	62	70	56	148	64	70	58	150
	575–3–60	STD	NONE	–	–	20	25	21	84	24	25	25	88	22	25	23	86	25	30	27	90
			293A	16.5	15.9	24	25	22	84	29	30	26	88	26	30	23	86	31	35	28	90
			296A	33.5	32.2	44	45	40	84	49	50	45	88	46	50	42	86	51	60	47	90
		MED	NONE	–	–	20	25	21	84	24	25	25	88	22	25	23	86	25	30	27	90
			293A	16.5	15.9	24	25	22	84	29	30	26	88	26	30	23	86	31	35	28	90
			296A	33.5	32.2	44	45	40	84	49	50	45	88	46	50	42	86	51	60	47	90
		HIGH	NONE	–	–	22	25	23	97	25	30	27	101	23	25	25	99	27	30	29	103
			293A	16.5	15.9	26	30	23	97	31	35	28	101	28	30	25	99	33	35	30	103
			296A	33.5	32.2	46	50	42	97	51	60	47	101	48	50	44	99	53	60	49	103
		ULTRA HIGH	NONE	–	–	24	25	25	111	27	30	29	115	25	30	27	113	29	35	31	117
			293A	16.5	15.9	28	30	25	111	33	35	30	115	30	30	27	113	35	35	32	117
			296A	33.5	32.2	48	50	44	111	53	60	49	115	51	60	46	113	55	60	50	117

See “Legend and Notes for Tables 8 and 9” on page 46.

Table 8 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont.)

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
						NO P.E.				w/ P.E. (pwrd fr/unit)				NO P.E.				w/ P.E. (pwrd fr/unit)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B12	208/230–3–60	STD	NONE	–	–	51/50	60/60	52/52	252	54/54	60/60	56/56	256	55/55	60/60	58/57	257	59/59	70/70	62/62	261
			288A	7.5/10.0	20.9/24.1	51/50	60/60	52/52	252/252	54/54	60/60	56/56	256/256	55/55	60/60	58/57	257/257	59/59	70/70	62/62	261/261
			291A	12.4/16.5	34.4/39.7	52/59	60/60	52/53	252/252	57/63	60/70	56/58	256/256	58/65	60/70	58/59	257/257	63/69	70/70	62/63	261/261
			294A	25.2/33.5	69.9/80.6	97/110	100/110	89/101	252/252	101/114	110/125	93/105	256/256	103/116	110/125	94/106	257/257	107/120	110/125	98/110	261/261
			291A+294A	37.6/50.0	104.3/120.3	140/129	150/150	128/146	252/252	144/134	150/150	132/151	256/256	146/135	150/150	134/152	257/257	150/140	175/150	138/156	261/261
		MED	NONE	–	–	52/51	60/60	54/53	278	56/55	70/60	58/57	282	57/56	70/70	59/58	283	61/60	70/70	64/63	287
			288A	7.5/10.0	20.9/24.1	52/51	60/60	54/53	278/278	56/55	70/60	58/57	282/282	57/56	70/70	59/58	283/283	61/60	70/70	64/63	287/287
			291A	12.4/16.5	34.4/39.7	54/60	60/60	54/55	278/278	59/65	70/70	58/59	282/282	60/66	70/70	59/60	283/283	65/71	70/80	64/65	287/287
			294A	25.2/33.5	69.9/80.6	99/111	100/125	90/102	278/278	103/116	110/125	95/106	282/282	105/117	110/125	96/107	283/283	109/122	110/125	100/112	287/287
			291A+294A	37.6/50.0	104.3/120.3	142/131	150/150	130/147	278/278	146/135	150/150	134/152	282/282	148/137	150/150	135/153	283/283	152/141	175/150	140/157	287/287
		HIGH	NONE	–	–	57/56	70/70	59/58	313	61/60	80/70	64/63	317	62/61	80/80	65/64	318	66/65	80/80	69/68	322
			288A	7.5/10.0	20.9/24.1	57/56	70/70	59/58	313/313	61/60	80/70	64/63	317/317	62/61	80/80	65/64	318/318	66/65	80/80	69/68	322/322
			291A	12.4/16.5	34.4/39.7	60/66	70/70	59/60	313/313	65/71	80/80	64/65	317/317	66/72	80/80	65/66	318/318	71/77	80/80	69/70	322/322
			294A	25.2/33.5	69.9/80.6	105/117	110/125	96/107	313/313	110/122	110/125	100/112	317/317	111/123	125/125	102/113	318/318	116/128	125/150	106/117	322/322
			291A+294A	37.6/50.0	104.3/120.3	148/137	150/150	136/153	313/313	153/141	175/175	140/157	317/317	154/143	175/175	141/158	318/318	159/147	175/175	145/163	322/322
	460–3–60	STD	NONE	–	–	26	30	27	126	28	30	29	128	28	30	30	128	30	35	32	130
			289A	10.0	12.0	26	30	27	126	28	30	29	128	28	30	30	128	30	35	32	130
			292A	16.5	19.9	30	30	27	126	32	35	29	128	33	35	30	128	35	35	32	130
			295A	33.5	40.3	56	60	51	126	58	60	53	128	58	60	53	128	61	70	55	130
			292A+295A	50.0	60.2	65	70	74	126	68	80	76	128	68	80	76	128	70	80	78	130
		MED	NONE	–	–	26	30	27	140	28	30	29	142	28	30	30	142	30	35	32	144
			289A	10.0	12.0	26	30	27	140	28	30	29	142	28	30	30	142	30	35	32	144
			292A	16.5	19.9	30	30	27	140	32	35	29	142	33	35	30	142	35	35	32	144
			295A	33.5	40.3	56	60	51	140	58	60	53	142	58	60	53	142	61	70	55	144
			292A+295A	50.0	60.2	65	70	74	140	68	80	76	142	68	80	76	142	70	80	78	144
		HIGH	NONE	–	–	29	35	30	157	30	35	32	159	31	35	33	159	33	40	35	161
			289A	10.0	12.0	29	35	30	157	30	35	32	159	31	35	33	159	33	40	35	161
			292A	16.5	19.9	33	35	30	157	36	40	32	159	36	40	33	159	38	40	35	161
			295A	33.5	40.3	59	60	54	157	61	70	56	159	62	70	56	159	64	70	58	161
			292A+295A	50.0	60.2	69	80	77	157	71	80	79	159	71	80	79	159	74	80	81	161
	575–3–60	STD	NONE	–	–	22	25	23	107	26	30	27	111	24	25	25	109	28	30	29	113
			293A	16.5	15.9	25	25	23	107	29	30	27	111	27	30	25	109	32	35	29	113
			296A	33.5	32.2	45	45	41	107	50	50	45	111	47	50	43	109	52	60	47	113
			293A+296A	50.0	48.1	53	60	59	107	58	60	64	111	55	60	61	109	60	60	66	113
		MED	NONE	–	–	23	25	24	116	27	30	28	120	25	30	26	118	29	30	30	122
			293A	16.5	15.9	26	30	24	116	31	35	28	120	28	30	26	118	33	35	30	122
			296A	33.5	32.2	46	50	42	116	51	60	47	120	48	50	44	118	53	60	49	122
			293A+296A	50.0	48.1	54	60	60	116	59	60	65	120	56	60	62	118	61	70	67	122
		HIGH	NONE	–	–	25	30	26	130	29	30	30	134	26	30	28	132	30	35	32	136
			293A	16.5	15.9	28	30	26	130	33	35	30	134	30	30	28	132	35	35	32	136
			296A	33.5	32.2	48	50	44	130	53	60	49	134	51	60	46	132	55	60	50	136
			293A+296A	50.0	48.1	56	60	62	130	61	70	67	134	58	60	64	132	63	70	69	136

See “Legend and Notes for Tables 8 and 9” on page 46.

Table 9 – Unit Wire Sizing Data with Factory Installed HACR Breaker

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			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)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B08	208/230–3–60	STD	NONE	–	–	42/42	50/50	44/44	200	46/46	50/50	48/48	204	47/47	60/60	49/49	205	51/51	60/60	54/53	209
			288A	7.5/10.0	20.9/24.1	42/42	50/50	44/44	200/200	46/46	50/50	48/48	204/204	47/47	60/60	49/49	205/205	51/51	60/60	54/53	209/209
			291A	12.4/16.5	34.4/39.7	57/57	60/60	46/52	200/200	62/62	70/70	51/56	204/204	63/63	70/70	52/58	205/205	68/68	70/70	56/62	209/209
			294A	25.2/33.5	69.9/80.6	108/108	110/110	87/99	200/200	113/113	125/125	91/104	204/204	114/114	125/125	93/105	205/205	119/119	125/125	97/109	209/209
		MED	NONE	–	–	42/42	50/50	44/44	200	46/46	50/50	48/48	204	47/47	60/60	49/49	205	51/51	60/60	54/53	209
			288A	7.5/10.0	20.9/24.1	42/42	50/50	44/44	200/200	46/46	50/50	48/48	204/204	47/47	60/60	49/49	205/205	51/51	60/60	54/53	209/209
			291A	12.4/16.5	34.4/39.7	57/57	60/60	46/52	200/200	62/62	70/70	51/56	204/204	63/63	70/70	52/58	205/205	68/68	70/70	56/62	209/209
			294A	25.2/33.5	69.9/80.6	108/108	110/110	87/99	200/200	113/113	125/125	91/104	204/204	114/114	125/125	93/105	205/205	119/119	125/125	97/109	209/209
		HIGH	NONE	–	–	45/45	50/50	47/46	230	49/49	60/60	51/50	234	50/50	60/60	53/52	235	53/53	60/60	57/56	239
			288A	7.5/10.0	20.9/24.1	45/45	50/50	47/46	230/230	49/49	60/60	51/50	234/234	50/50	60/60	53/52	235/235	53/53	60/60	57/56	239/239
			291A	12.4/16.5	34.4/39.7	60/60	60/60	49/55	230/230	65/65	70/70	54/59	234/234	66/66	70/70	55/60	235/235	71/71	80/80	59/65	239/239
			294A	25.2/33.5	69.9/80.6	111/111	125/125	90/102	230/230	116/116	125/125	95/106	234/234	117/117	125/125	96/107	235/235	122/122	125/125	100/112	239/239
		ULTRA HIGH	NONE	–	–	47/47	60/60	50/48	254	51/51	60/60	54/53	258	52/52	60/60	55/54	259	56/56	60/60	59/58	263
			288A	7.5/10.0	20.9/24.1	47/47	60/60	50/48	254/254	51/51	60/60	54/53	258/258	52/52	60/60	55/54	259/259	56/56	60/60	59/58	263/263
			291A	12.4/16.5	34.4/39.7	62/62	70/70	52/57	254/254	67/67	70/70	56/61	258/258	68/68	70/70	58/62	259/259	73/73	80/80	62/67	263/263
			294A	25.2/33.5	69.9/80.6	113/113	125/125	93/104	254/254	118/118	125/125	97/108	258/258	119/119	125/125	98/109	259/259	124/124	125/125	103/114	263/263
	460–3–60	STD	NONE	–	–	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			289A	10.0	12.0	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			292A	16.5	19.9	29	30	26	102	31	35	28	104	32	35	29	104	34	35	31	106
			295A	33.5	40.3	54	60	50	102	57	60	52	104	57	60	52	104	59	60	54	106
		MED	NONE	–	–	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			289A	10.0	12.0	23	25	24	102	24	30	26	104	25	30	26	104	27	30	28	106
			292A	16.5	19.9	29	30	26	102	31	35	28	104	32	35	29	104	34	35	31	106
			295A	33.5	40.3	54	60	50	102	57	60	52	104	57	60	52	104	59	60	54	106
		HIGH	NONE	–	–	23	25	25	118	25	30	27	120	26	30	27	120	27	30	29	122
			289A	10.0	12.0	23	25	25	118	25	30	27	120	26	30	27	120	27	30	29	122
			292A	16.5	19.9	30	30	27	118	32	35	29	120	33	35	30	120	35	35	32	122
			295A	33.5	40.3	56	60	51	118	58	60	53	120	58	60	53	120	61	70	55	122
		ULTRA HIGH	NONE	–	–	25	30	26	130	26	30	28	132	27	30	28	132	29	30	30	134
			289A	10.0	12.0	25	30	26	130	26	30	28	132	27	30	28	132	29	30	30	134
			292A	16.5	19.9	31	35	29	130	34	35	31	132	34	35	31	132	36	40	33	134
			295A	33.5	40.3	57	60	52	130	59	60	54	132	60	60	55	132	62	70	57	134
	575–3–60	STD	NONE	–	–	19	20	20	78	23	25	24	82	21	25	22	80	24	30	26	84
			293A	16.5	15.9	24	25	22	78	29	30	26	82	26	30	23	80	31	35	28	84
			296A	33.5	32.2	44	45	40	78	49	50	45	82	46	50	42	80	51	60	47	84
		MED	NONE	–	–	19	20	20	78	23	25	24	82	21	25	22	80	24	30	26	84
			293A	16.5	15.9	24	25	22	78	29	30	26	82	26	30	23	80	31	35	28	84
			296A	33.5	32.2	44	45	40	78	49	50	45	82	46	50	42	80	51	60	47	84
		HIGH	NONE	–	–	21	25	22	91	24	30	26	95	22	25	24	93	26	30	28	97
			293A	16.5	15.9	26	30	23	91	31	35	28	95	28	30	25	93	33	35	30	97
			296A	33.5	32.2	46	50	42	91	51	60	47	95	48	50	44	93	53	60	49	97
		ULTRA HIGH	NONE	–	–	21	25	22	91	24	30	26	95	22	25	24	93	26	30	28	97
			293A	16.5	15.9	26	30	23	91	31	35	28	95	28	30	25	93	33	35	30	97
			296A	33.5	32.2	46	50	42	91	51	60	47	95	48	50	44	93	53	60	49	97

See “Legend and Notes for Tables 8 and 9” on page 46.

Table 9 – Unit Wire Sizing Data with Factory Installed HACR Breaker (cont)

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			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)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B09	208/230–3–60	STD	NONE	–	–	45/45	60/60	46/46	227	49/49	60/60	51/50	231	50/50	60/60	52/52	232	53/53	60/60	56/56	236
			288A	7.5/10.0	20.9/24.1	45/45	60/60	46/46	227/227	49/49	60/60	51/50	231/231	50/50	60/60	52/52	232/232	53/53	60/60	56/56	236/236
			291A	12.4/16.5	34.4/39.7	57/57	60/60	46/52	227/227	62/62	70/70	51/56	231/231	63/63	70/70	52/58	232/232	68/68	70/70	56/62	236/236
			294A	25.2/33.5	69.9/80.6	108/108	110/110	87/99	227/227	113/113	125/125	91/104	231/231	114/114	125/125	93/105	232/232	119/119	125/125	97/109	236/236
		MED	NONE	–	–	45/45	60/60	46/46	227	49/49	60/60	51/50	231	50/50	60/60	52/52	232	53/53	60/60	56/56	236
			288A	7.5/10.0	20.9/24.1	45/45	60/60	46/46	227/227	49/49	60/60	51/50	231/231	50/50	60/60	52/52	232/232	53/53	60/60	56/56	236/236
			291A	12.4/16.5	34.4/39.7	57/57	60/60	46/52	227/227	62/62	70/70	51/56	231/231	63/63	70/70	52/58	232/232	68/68	70/70	56/62	236/236
			294A	25.2/33.5	69.9/80.6	108/108	110/110	87/99	227/227	113/113	125/125	91/104	231/231	114/114	125/125	93/105	232/232	119/119	125/125	97/109	236/236
		HIGH	NONE	–	–	50/50	60/60	52/51	281	54/54	60/60	56/55	285	55/55	60/60	58/56	286	58/58	70/70	62/61	290
			288A	7.5/10.0	20.9/24.1	50/50	60/60	52/51	281/281	54/54	60/60	56/55	285/285	55/55	60/60	58/56	286/286	58/58	70/70	62/61	290/290
			291A	12.4/16.5	34.4/39.7	62/62	70/70	52/57	281/281	67/67	70/70	56/61	285/285	68/68	70/70	58/62	286/286	73/73	80/80	62/67	290/290
			294A	25.2/33.5	69.9/80.6	113/113	125/125	93/104	281/281	118/118	125/125	97/108	285/285	119/119	125/125	98/109	286/286	124/124	125/125	103/114	290/290
		ULTRA HIGH	NONE	–	–	53/53	60/60	55/54	292	56/56	60/60	60/59	296	57/57	70/70	61/60	297	61/61	70/70	65/64	301
			288A	7.5/10.0	20.9/24.1	53/53	60/60	55/54	292/292	56/56	60/60	60/59	296/296	57/57	70/70	61/60	297/297	61/61	70/70	65/64	301/301
			291A	12.4/16.5	34.4/39.7	66/66	70/70	55/60	292/292	71/71	80/80	60/65	296/296	72/72	80/80	61/66	297/297	77/77	80/80	65/70	301/301
			294A	25.2/33.5	69.9/80.6	117/117	125/125	96/107	292/292	122/122	125/125	100/112	296/296	123/123	125/125	102/113	297/297	128/128	150/150	106/117	301/301
	460–3–60	STD	NONE	–	–	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			289A	10.0	12.0	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			292A	16.5	19.9	29	30	26	113	31	35	28	115	32	35	29	115	34	35	31	117
			295A	33.5	40.3	54	60	50	113	57	60	52	115	57	60	52	115	59	60	54	117
		MED	NONE	–	–	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			289A	10.0	12.0	24	30	25	113	26	30	27	115	27	30	28	115	28	30	30	117
			292A	16.5	19.9	29	30	26	113	31	35	28	115	32	35	29	115	34	35	31	117
			295A	33.5	40.3	54	60	50	113	57	60	52	115	57	60	52	115	59	60	54	117
		HIGH	NONE	–	–	26	30	28	141	28	30	30	143	29	35	30	143	30	35	32	145
			289A	10.0	12.0	26	30	28	141	28	30	30	143	29	35	30	143	30	35	32	145
			292A	16.5	19.9	31	35	29	141	34	35	31	143	34	35	31	143	36	40	33	145
			295A	33.5	40.3	57	60	52	141	59	60	54	143	60	60	55	143	62	70	57	145
		ULTRA HIGH	NONE	–	–	28	30	29	146	30	35	31	148	30	35	32	148	32	35	34	150
			289A	10.0	12.0	28	30	29	146	30	35	31	148	30	35	32	148	32	35	34	150
			292A	16.5	19.9	33	35	30	146	36	40	32	148	36	40	33	148	38	40	35	150
			295A	33.5	40.3	59	60	54	146	61	70	56	148	62	70	56	148	64	70	58	150
	575–3–60	STD	NONE	–	–	20	25	21	84	24	25	25	88	22	25	23	86	25	30	27	90
			293A	16.5	15.9	24	25	22	84	29	30	26	88	26	30	23	86	31	35	28	90
			296A	33.5	32.2	44	45	40	84	49	50	45	88	46	50	42	86	51	60	47	90
		MED	NONE	–	–	20	25	21	84	24	25	25	88	22	25	23	86	25	30	27	90
			293A	16.5	15.9	24	25	22	84	29	30	26	88	26	30	23	86	31	35	28	90
			296A	33.5	32.2	44	45	40	84	49	50	45	88	46	50	42	86	51	60	47	90
		HIGH	NONE	–	–	22	25	23	97	25	30	27	101	23	25	25	99	27	30	29	103
			293A	16.5	15.9	26	30	23	97	31	35	28	101	28	30	25	99	33	35	30	103
			296A	33.5	32.2	46	50	42	97	51	60	47	101	48	50	44	99	53	60	49	103
		ULTRA HIGH	NONE	–	–	24	25	25	111	27	30	29	115	25	30	27	113	29	35	31	117
			293A	16.5	15.9	28	30	25	111	33	35	30	115	30	30	27	113	35	35	32	117
			296A	33.5	32.2	48	50	44	111	53	60	49	115	51	60	46	113	55	60	50	117

See “Legend and Notes for Tables 8 and 9” on page 46.

Table 9 – Unit Wire Sizing Data with Factory Installed HACR Breaker (cont)

UNIT	NO M. V–Ph–HZ	IFM TYPE	ELEC. HTR			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)			
			CRHEATER***A00	Nom (kW)	FLA	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
50LC*B12	208/230–3–60	STD	NONE	–	–	51/51	60/60	52/52	252	54/54	60/60	56/56	256	55/55	60/60	58/57	257	59/59	70/70	62/62	261
			288A	7.5/10.0	20.9/24.1	51/51	60/60	52/52	252/252	54/54	60/60	56/56	256/256	55/55	60/60	58/57	257/257	59/59	70/70	62/62	261/261
			291A	12.4/16.5	34.4/39.7	59/59	60/60	52/53	252/252	63/63	70/70	56/58	256/256	65/65	70/70	58/59	257/257	69/69	70/70	62/63	261/261
			294A	25.2/33.5	69.9/80.6	110/110	110/110	89/101	252/252	114/114	125/125	93/105	256/256	116/116	125/125	94/106	257/257	120/120	125/125	98/110	261/261
			291A+294A	37.6/50.0	104.3/120.3	140/140	150/150	128/146	252/252	144/144	150/150	132/151	256/256	146/146	150/150	134/152	257/257	150/150	175/175	138/156	261/261
		MED	NONE	–	–	52/52	60/60	54/53	278	56/56	70/70	58/57	282	57/57	70/70	59/58	283	61/61	70/70	64/63	287
			288A	7.5/10.0	20.9/24.1	52/52	60/60	54/53	278/278	56/56	70/70	58/57	282/282	57/57	70/70	59/58	283/283	61/61	70/70	64/63	287/287
			291A	12.4/16.5	34.4/39.7	60/60	60/60	54/55	278/278	65/65	70/70	58/59	282/282	66/66	70/70	59/60	283/283	71/71	80/80	64/65	287/287
			294A	25.2/33.5	69.9/80.6	111/111	125/125	90/102	278/278	116/116	125/125	95/106	282/282	117/117	125/125	96/107	283/283	122/122	125/125	100/112	287/287
			291A+294A	37.6/50.0	104.3/120.3	142/142	150/150	130/147	278/278	146/146	150/150	134/152	282/282	148/148	150/150	135/153	283/283	152/152	175/175	140/157	287/287
		HIGH	NONE	–	–	57/57	70/70	59/58	313	61/61	80/80	64/63	317	62/62	80/80	65/64	318	66/66	80/80	69/68	322
			288A	7.5/10.0	20.9/24.1	57/57	70/70	59/58	313/313	61/61	80/80	64/63	317/317	62/62	80/80	65/64	318/318	66/66	80/80	69/68	322/322
			291A	12.4/16.5	34.4/39.7	66/66	70/70	59/60	313/313	71/71	80/80	64/65	317/317	72/72	80/80	65/66	318/318	77/77	80/80	69/70	322/322
			294A	25.2/33.5	69.9/80.6	117/117	125/125	96/107	313/313	122/122	125/125	100/112	317/317	123/123	125/125	102/113	318/318	128/128	150/150	106/117	322/322
			291A+294A	37.6/50.0	104.3/120.3	148/148	150/150	136/153	313/313	153/153	175/175	140/157	317/317	154/154	175/175	141/158	318/318	159/159	175/175	145/163	322/322
	460–3–60	STD	NONE	–	–	26	30	27	126	28	30	29	128	28	30	30	128	30	35	32	130
			289A	10.0	12.0	26	30	27	126	28	30	29	128	28	30	30	128	30	35	32	130
			292A	16.5	19.9	30	30	27	126	32	35	29	128	33	35	30	128	35	35	32	130
			295A	33.5	40.3	56	60	51	126	58	60	53	128	58	60	53	128	61	70	55	130
			292A+295A	50.0	60.2	65	70	74	126	68	80	76	128	68	80	76	128	70	80	78	130
		MED	NONE	–	–	26	30	27	140	28	30	29	142	28	30	30	142	30	35	32	144
			289A	10.0	12.0	26	30	27	140	28	30	29	142	28	30	30	142	30	35	32	144
			292A	16.5	19.9	30	30	27	140	32	35	29	142	33	35	30	142	35	35	32	144
			295A	33.5	40.3	56	60	51	140	58	60	53	142	58	60	53	142	61	70	55	144
			292A+295A	50.0	60.2	65	70	74	140	68	80	76	142	68	80	76	142	70	80	78	144
		HIGH	NONE	–	–	29	35	30	157	30	35	32	159	31	35	33	159	33	40	35	161
			289A	10.0	12.0	29	35	30	157	30	35	32	159	31	35	33	159	33	40	35	161
			292A	16.5	19.9	33	35	30	157	36	40	32	159	36	40	33	159	38	40	35	161
			295A	33.5	40.3	59	60	54	157	61	70	56	159	62	70	56	159	64	70	58	161
			292A+295A	50.0	60.2	69	80	77	157	71	80	79	159	71	80	79	159	74	80	81	161
	575–3–60	STD	NONE	–	–	22	25	23	107	26	30	27	111	24	25	25	109	28	30	29	113
			293A	16.5	15.9	25	25	23	107	29	30	27	111	27	30	25	109	32	35	29	113
			296A	33.5	32.2	45	45	41	107	50	50	45	111	47	50	43	109	52	60	47	113
			293A+296A	50.0	48.1	53	60	59	107	58	60	64	111	55	60	61	109	60	60	66	113
		MED	NONE	–	–	23	25	24	116	27	30	28	120	25	30	26	118	29	30	30	122
			293A	16.5	15.9	26	30	24	116	31	35	28	120	28	30	26	118	33	35	30	122
			296A	33.5	32.2	46	50	42	116	51	60	47	120	48	50	44	118	53	60	49	122
			293A+296A	50.0	48.1	54	60	60	116	59	60	65	120	56	60	62	118	61	70	67	122
		HIGH	NONE	–	–	25	30	26	130	29	30	30	134	26	30	28	132	30	35	32	136
			293A	16.5	15.9	28	30	26	130	33	35	30	134	30	30	28	132	35	35	32	136
			296A	33.5	32.2	48	50	44	130	53	60	49	134	51	60	46	132	55	60	50	136
			293A+296A	50.0	48.1	56	60	62	130	61	70	67	134	58	60	64	132	63	70	69	136

See “Legend and Notes for Tables 8 and 9” on page 46.

Legend and Notes for Tables 8 and 9

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 convenient outlet
UNPWR CO	–	Unpowered convenient outlet

NOTES:

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

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

Example: Supply voltage is 230-3-60

AB = 224 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 50LC*B08-12 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. Return Air smoke detectors are arranged for vertical return configurations only. 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. 54 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. 55, 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. 55, Step 2.
3. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 55, Step 3.
4. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.

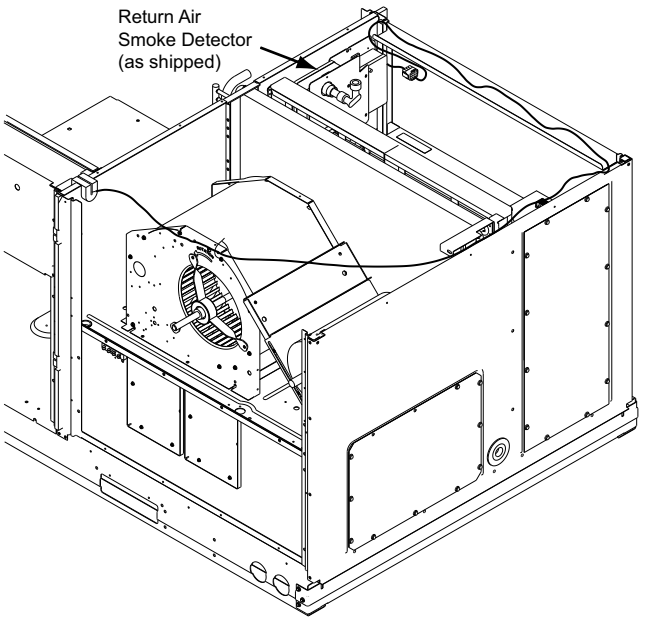


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Fig. 54 - Return Air Smoke Detector, Shipping Position

Additional Application Data —

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

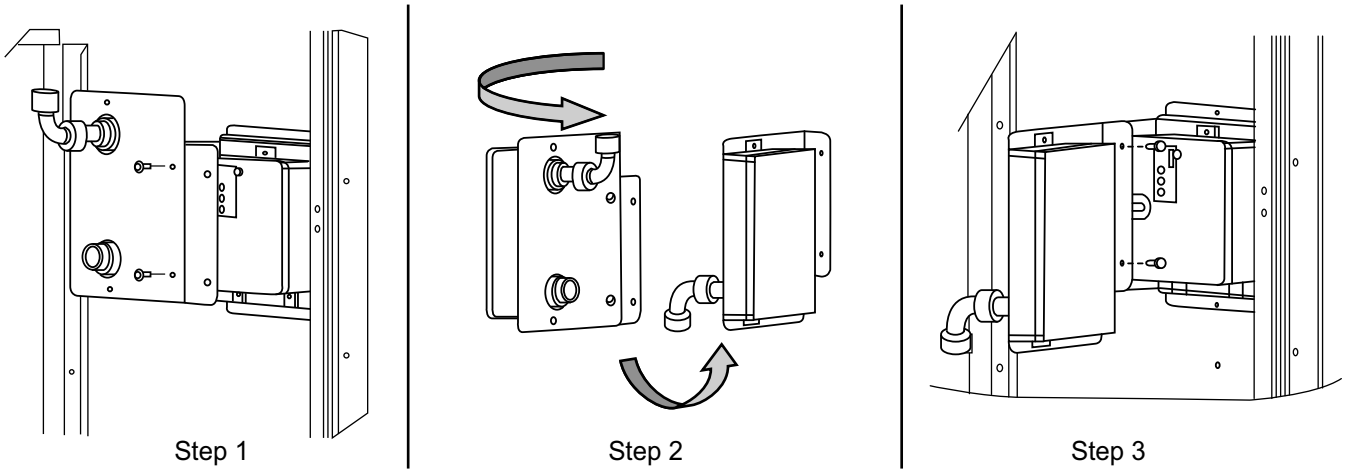

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Fig. 55 - Completing Installation of Return Air Smoke Sensor

Step 13 — 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 14 — Install Accessories

Available accessories include:

- Roof Curb (must be installed before unit)
- Thru-base connection kit (must be installed before unit is set on curb)
- Power Exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Outdoor coil protector grille
- Electric Heaters
- Single Point kits
- 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).

Edition Date: 11/15

Catalog No: 50LCB−8−12−01SI

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

☐ 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 CORRRECT DIRECTION

II. START-UP

ELECTRICAL

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

TEMPERATURES

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

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

COOLING SUPPLY AIR TEMPERATURE _____ °F

PRESSURES

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

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

GENERAL

☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS (IF EQUIPPED)

☐ VERIFY SMOKE DETECTOR UNIT SHUTDOWN BY UTILIZING MAGNET TEST

Edition Date: 11/15

Catalog No: 50LCB−8−12−01SI

Replaces: New