48LC*B
Single Package Rooftop
Gas Heating/Electric Cooling Unit with
Multi−Zone VAV (Variable Air Volume) Operation
with Puron® (R−410A) Refrigerant
Sizes: 14, 17, 20, 24, 26

Carrier
United Technologies
turn to the experts

Installation Instructions

NOTE: Read the entire instruction manual before starting the installation

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SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloths for brazing operations and have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and appropriate national electrical codes (in USA, ANSI/NFPA70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

It is important to recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

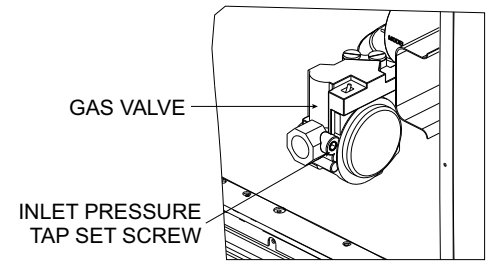
Disconnect gas piping from unit when leak testing at pressure greater than 0.5 psig (3450 Pa). Pressures greater than 0.5 psig (3450 Pa) will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig (3450 Pa), it must be replaced before use.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

⚠ WARNING

FIRE HAZARD

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

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

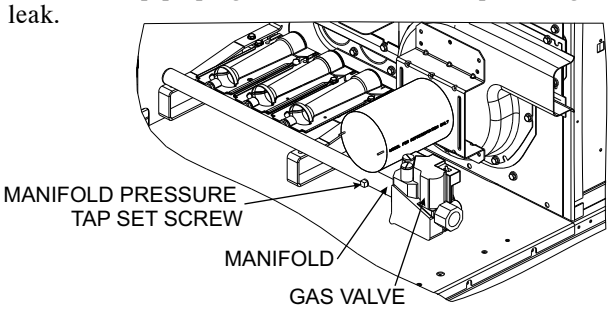


⚠ WARNING

FIRE HAZARD

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

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



⚠ WARNING

CARBON-MONOXIDE POISONING HAZARD

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

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

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

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing service or maintenance operations on unit, always turn off main power switch to unit and install lock(s) and lockout tag(s). Unit may have more than one power switch.

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

Puron® (R-410A) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron refrigerant equipment.

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

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

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

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

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

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

Rated Indoor Airflow (cfm)

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

Model Number	Full Load Airflow (cfm)
48LC*B14	4375
48LC*B17	4875
48LC*B20	5690
48LC*B24	6500
48LC*B26	7500

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

Unit Heat Type
48 - Gas Heat Packaged Rooftop

Model Series - WeatherExpert®
LC - Ultra High Efficiency

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

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

Cooling Tons
14 - 12.5 ton
17 - 15 ton
20 - 17.5 ton
24 - 20 ton
26 - 23 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 Motor Options
1 = Standard Static / Vertical Supply, Return Air Flow
2 = Medium Static / Vertical Supply, Return Air Flow
3 = High Static / Vertical Supply, Return Air Flow
4 = Ultra High Static / Vertical Supply, Return Air Flow
5 = Standard Static / Horizontal Supply, Return Air Flow
6 = Medium Static / Horizontal Supply, Return Air Flow
7 = High Static / Horizontal Supply, Return Air Flow
8 = Ultra High Static / Horizontal Supply, Return Air Flow

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 = Temperature Standard Leak Economizer with Barometric Relief
C = Temperature Standard Leak Economizer with Centrifugal Power Exhaust - Vertical Only
E = Enthalpy Standard Leak Economizer with Barometric Relief
F = Enthalpy Standard Leak Economizer with Centrifugal Power Exhaust - Vertical Only
N = Temperature Ultra Low Leak Economizer with Barometric Relief
P = Temperature Ultra Low Leak Economizer with Centrifugal Power Exhaust - Vertical Only
R = Enthalpy Ultra Low Leak Economizer with Barometric Relief
S = Enthalpy Ultra Low Leak Economizer with Centrifugal Power Exhaust - Vertical Only

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

Packaging
0 = Standard
1 = LTL

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

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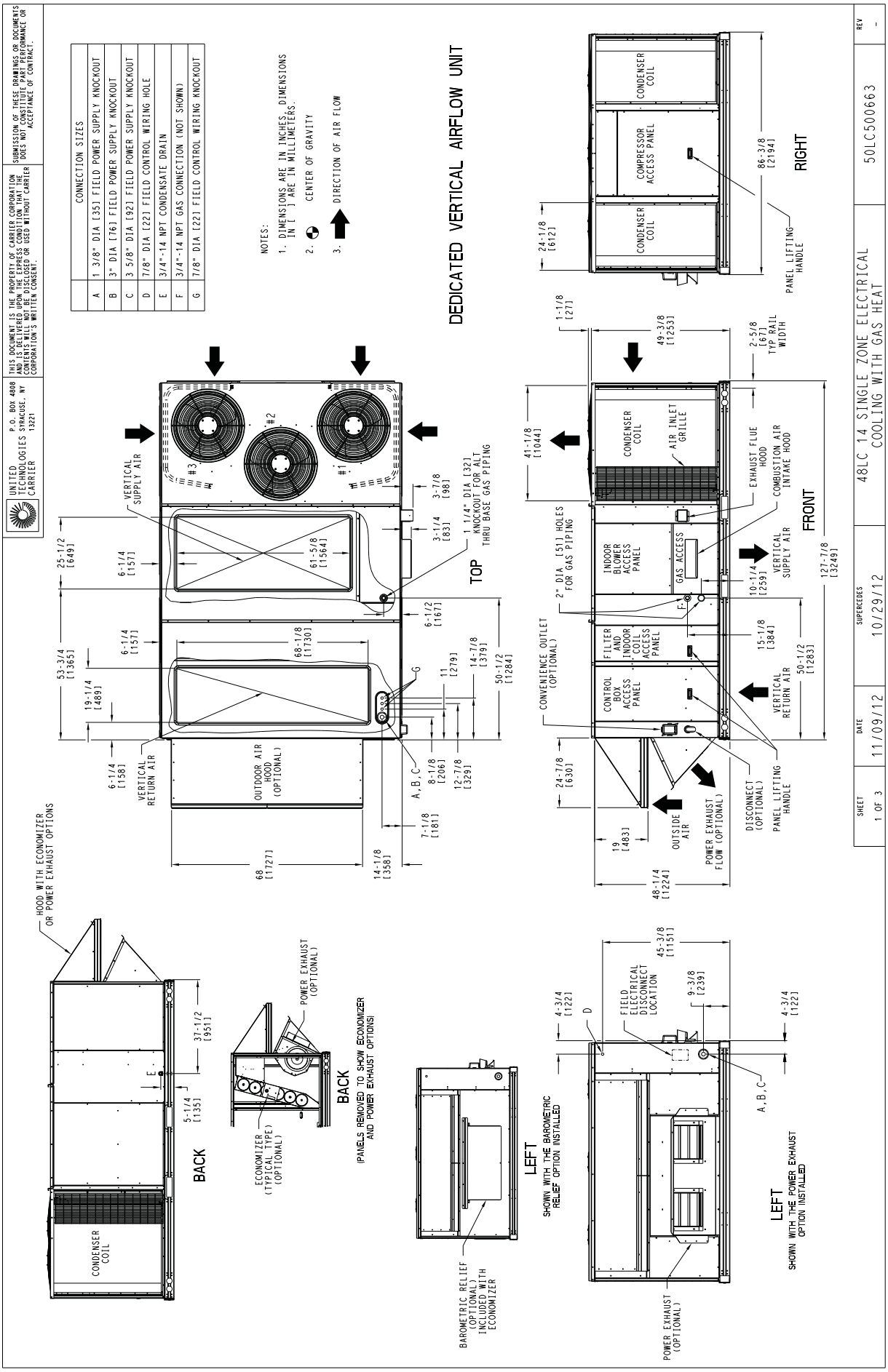
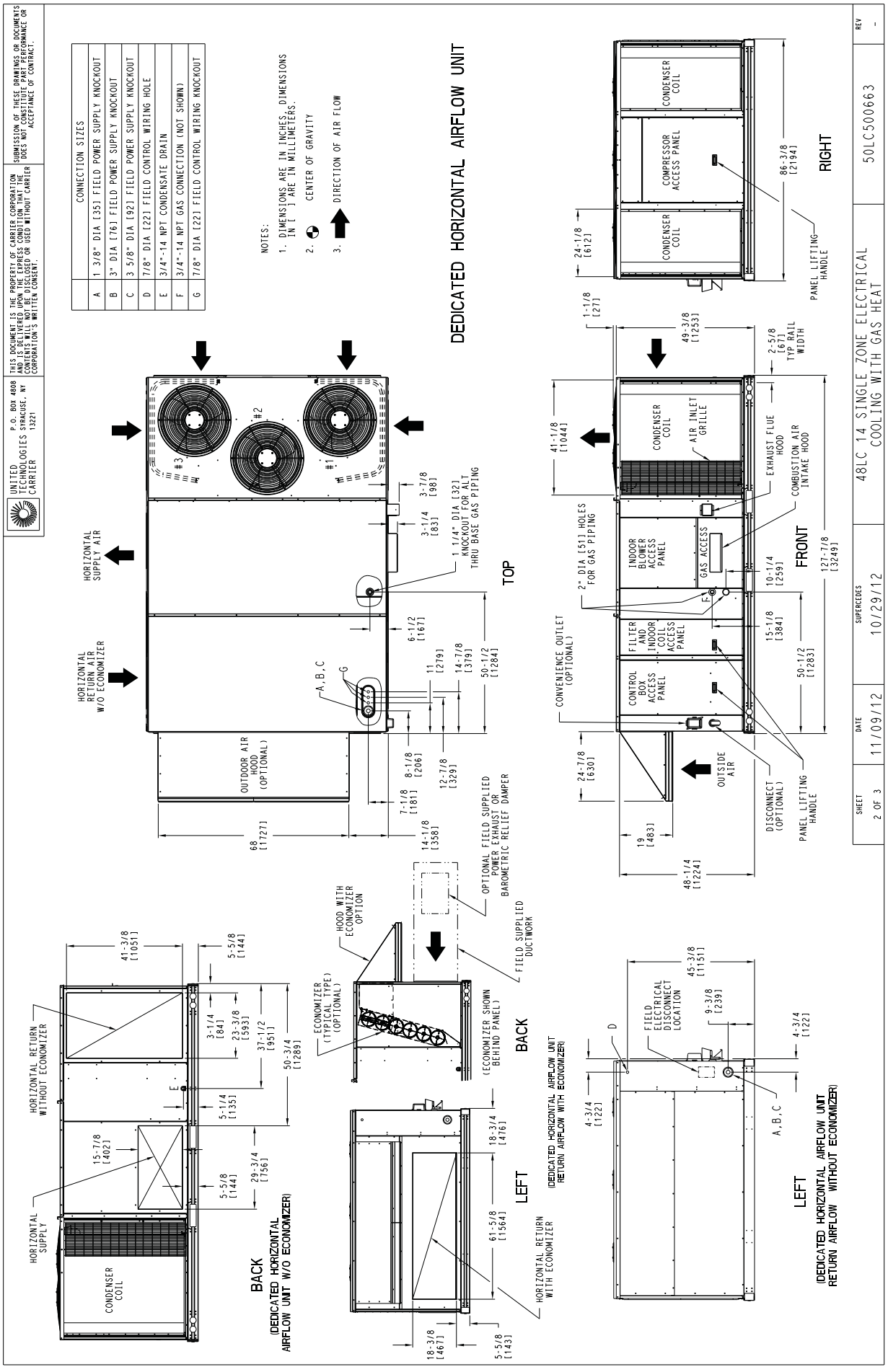
Fig. 1 - 48LC*B14-26 Model Number Nomenclature (Example)



C13057

Fig. 2 - Unit Dimensional Drawing – 14 Size Unit, Sheet 1 of 3

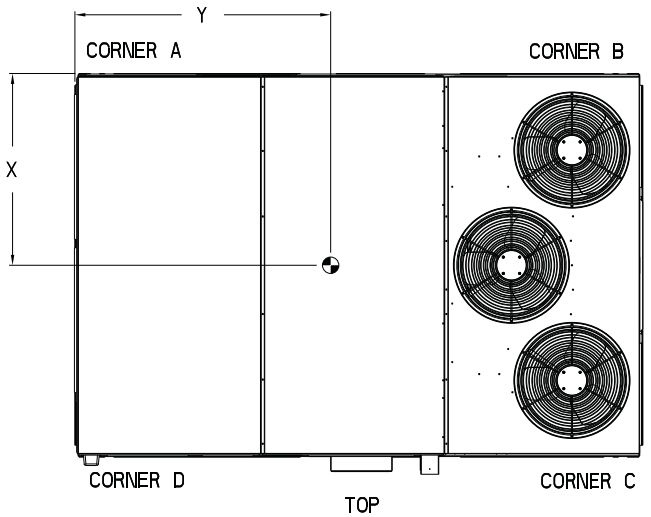


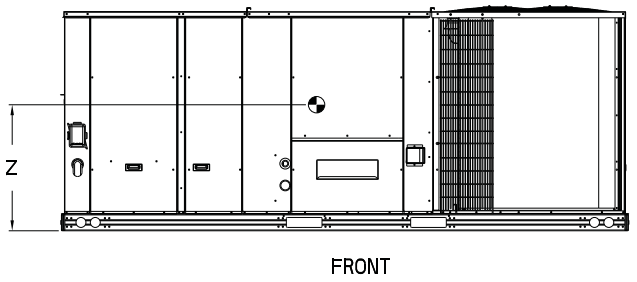
C13058

Fig. 2 (cont.) - Unit Dimensional Drawing – 14 Size Unit, Sheet 2 of 3

UNIT	BASE UNIT OPERATING 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
48LC14	1853	842.3	457.5	208.0	532.4	242.0	481.3	218.8	413.6	188.0	40 29/32 [1039.02]	68 21/32 [1743.87]	16 1/2 [419.1]

* BASE UNIT WEIGHT IS WITH LOW GAS HEAT, STD ID FAN MOTOR, AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





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

SHEET	DATE	SUPERCEDES			REV
3 OF 3	11/09/12	10/29/12	48LC 14 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50LC500663	-

Fig. 2 (cont.) - Unit Dimensional Drawing – 14 Size Unit, Sheet 3 of 3

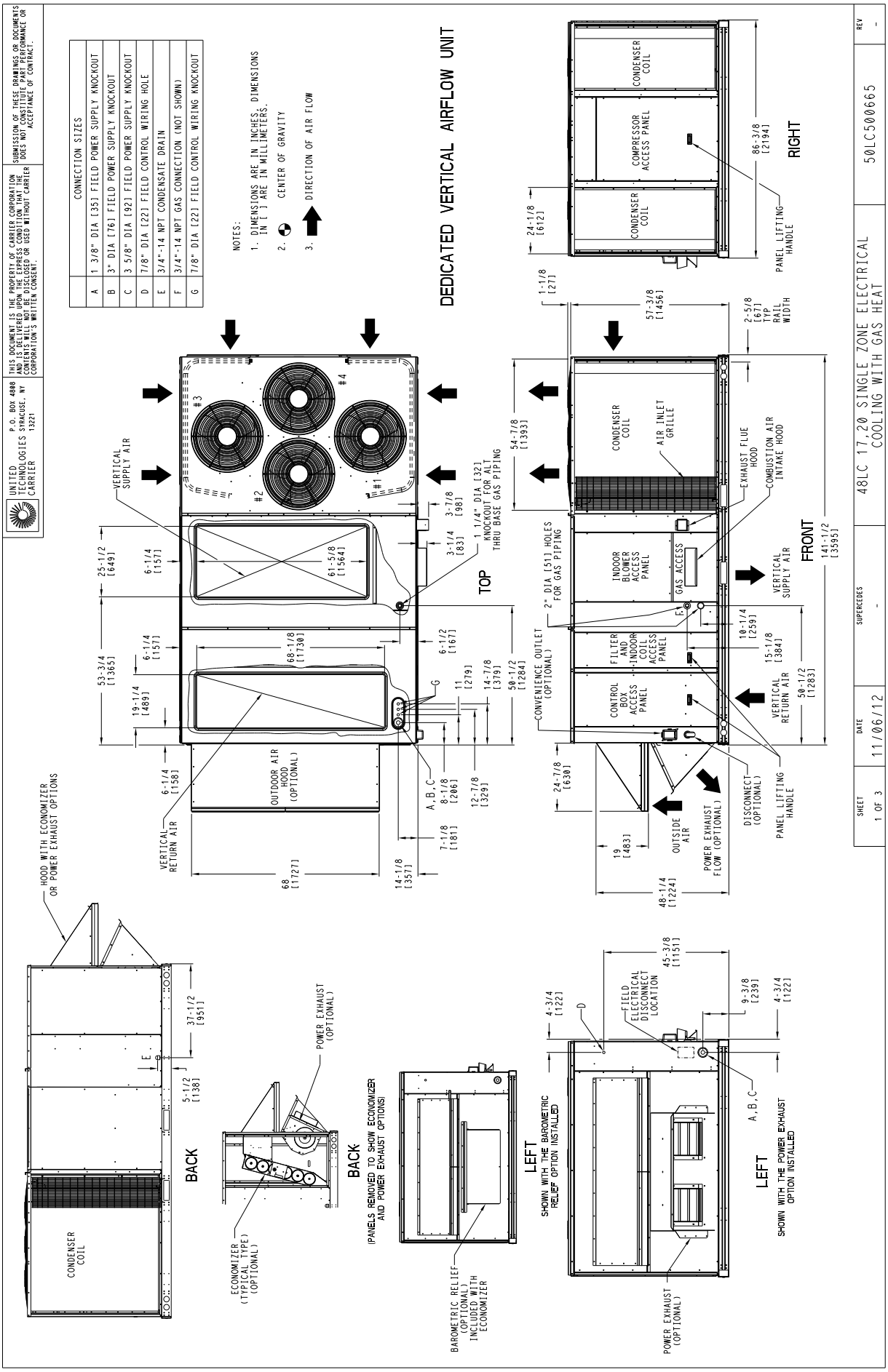


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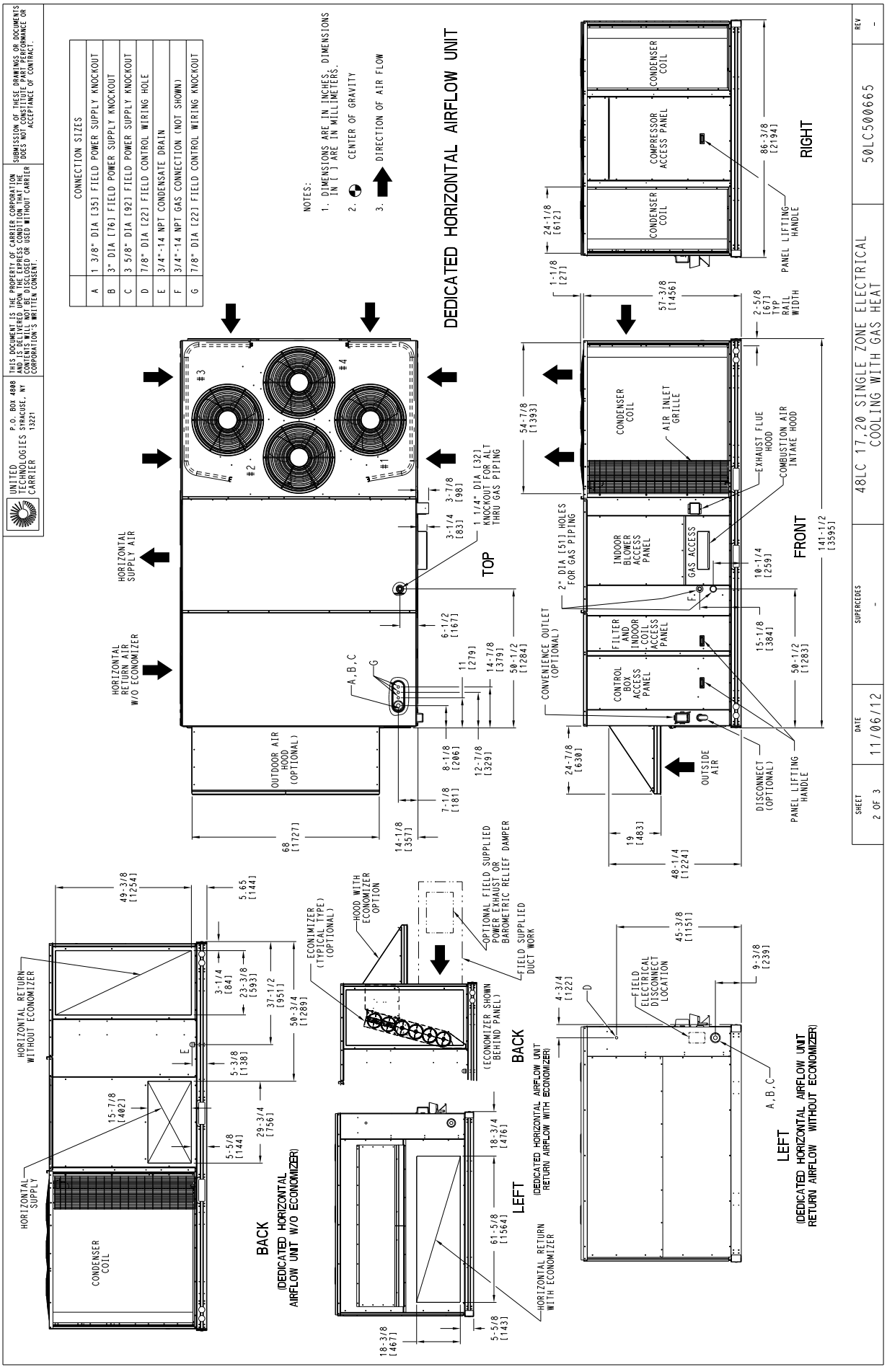
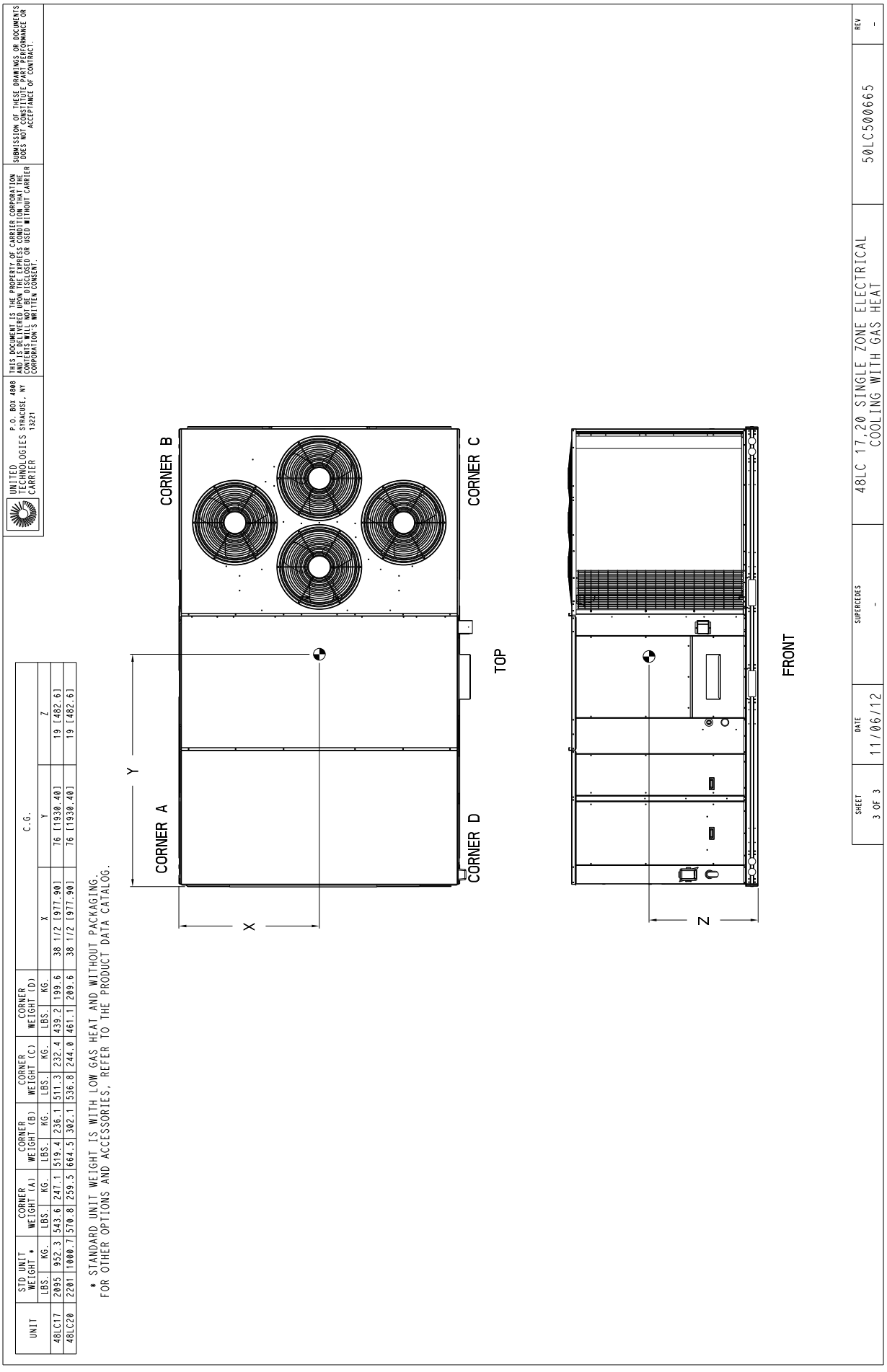
Fig. 3 - Unit Dimensional Drawing – 17 and 20 Size Units, Sheet 1 of 3



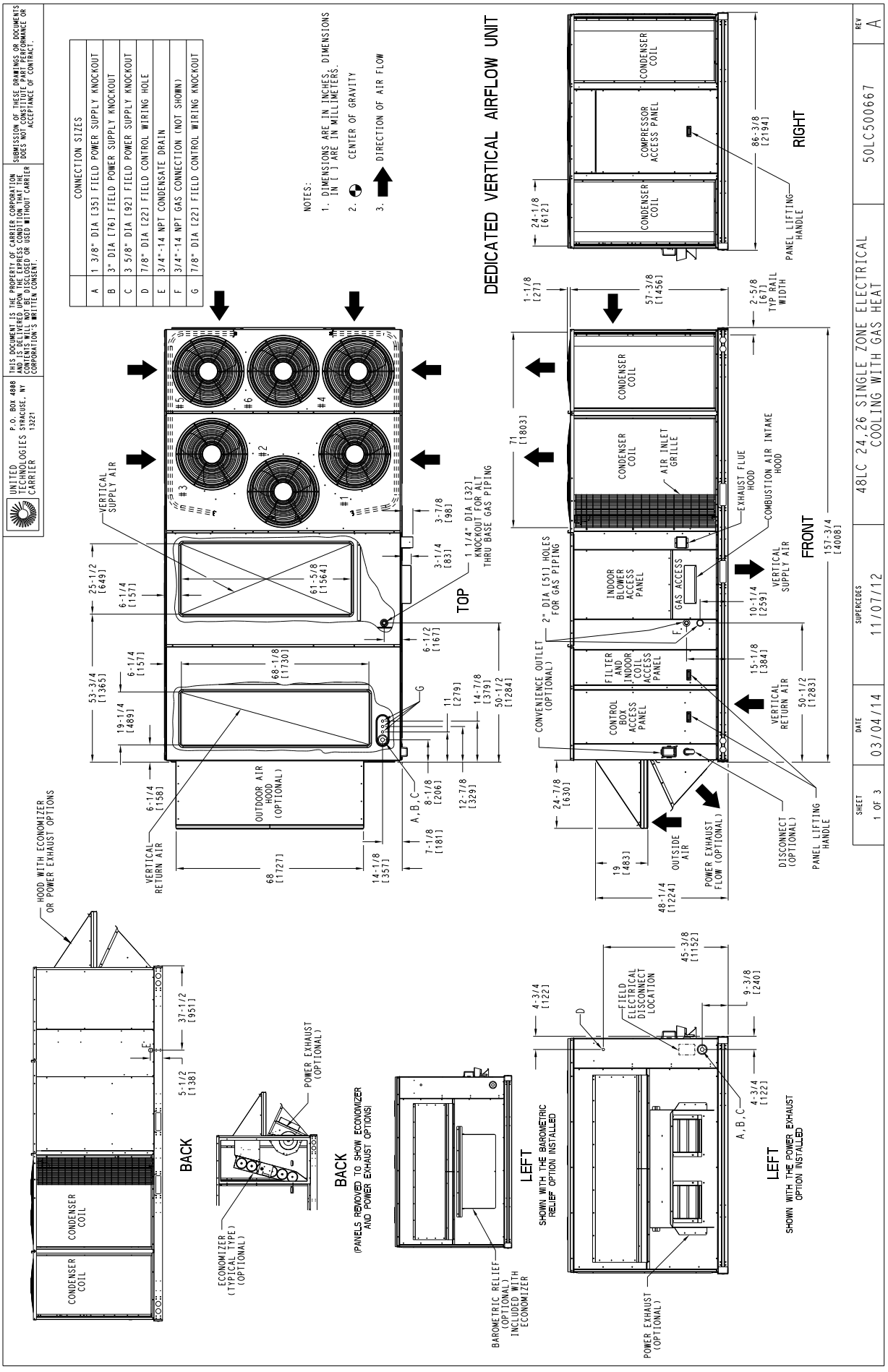
C13033

Fig. 3 (cont.) - Unit Dimensional Drawing – 17 and 20 Size Units, Sheet 2 of 3



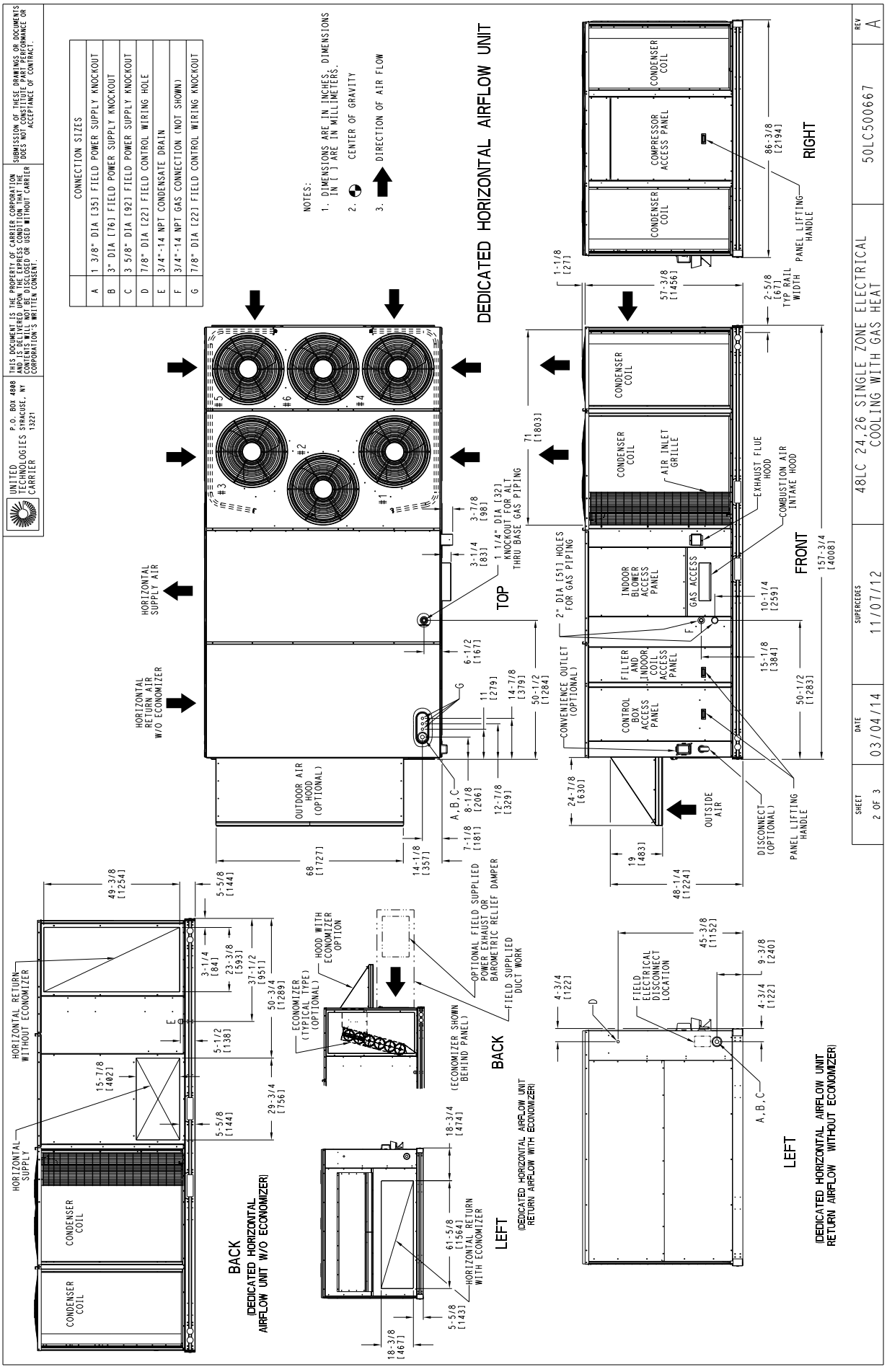
C13034

Fig. 3 (cont.) - Unit Dimensional Drawing – 17 and 20 Size Units, Sheet 3 of 3



C14106

Fig. 4 - Unit Dimensional Drawing – 24 and 26 Size Units, Sheet 1 of 3

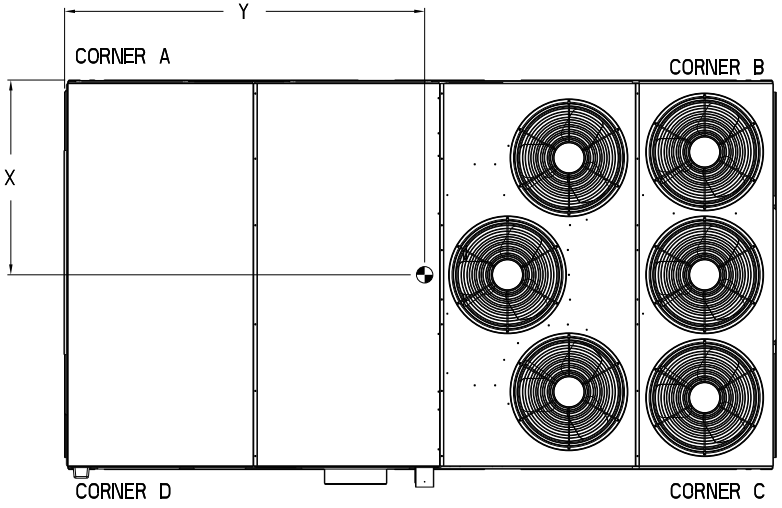


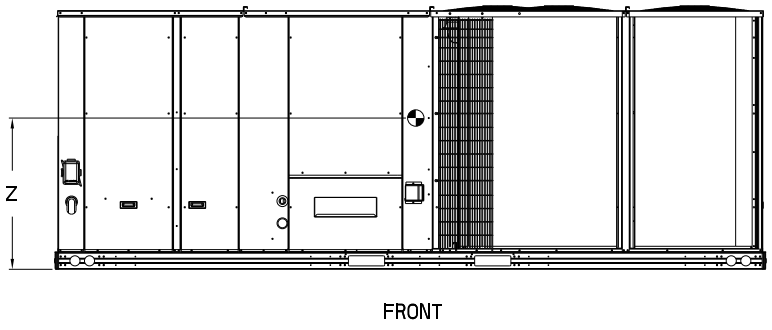
C14107

Fig. 4 (cont.) - Unit Dimensional Drawing – 24 and 26 Size Units, Sheet 2 of 3

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
48LC24	2347	1067.0	485.0	220.4	568.8	258.5	715.5	325.2	610.1	277.3	48 [1219.20]	85 1/32 [2159.79]	19 [482.6]
48LC26	2492	1132.6	563.2	256.0	627.7	285.3	702.4	319.3	630.3	286.5	45 1/2 [1155.70]	83 1/32 [2108.99]	19 [482.6]

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

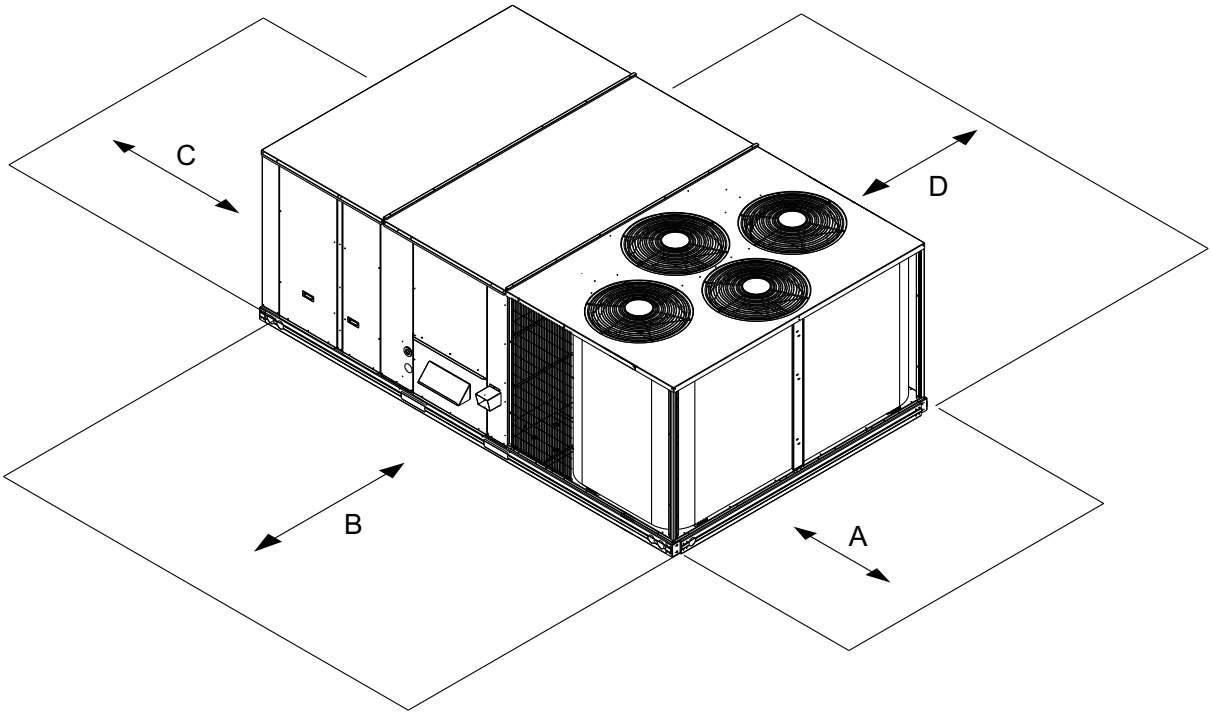




SHEET	DATE	SUPERCEDES			REV
3 OF 3	03/04/14	11/07/12	48LC 24,26 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50LC500667	A

Fig. 4 (cont.) - Unit Dimensional Drawing – 24 and 26 Size Units, Sheet 3 of 3

C14108



C12384

LOCATION	DIMENSION	CONDITION
A	36–in (914 mm)	• Recommended clearance for air flow and service
B	42–in (1067 mm)	• Recommended clearance for air flow and service
C	18–in (457 mm)	• No Convenience Outlet • No field installed disconnect on economizer hood side (Factory–installed disconnect installed).
	36–in (914 mm)	• Convenience Outlet installed. • Vertical surface behind servicer is electrically non–conductive (e.g.: wood, fiberglass).
	42–in (1067 mm)	• Convenience Outlet installed. • Vertical surface behind servicer is electrically conductive (e.g.: metal, masonry).
	96–in (2438 mm)	• Economizer and/or Power Exhaust installed. • Check for sources of flue products with 10 feet (3 meters) of economizer fresh air intake.
D	42–in (1067 mm)	• Recommended clearance for service.

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

Fig. 5 - Service Clearance Dimensional Drawing

Table 1 – Operating Weights

48LC*B	UNIT LB (KG)				
	14	17	20	24	26
Base Unit	1853 (842.3)	2095 (952.3)	2201 (1000.7)	2347 (1067.0)	2492 (1132.6)
Economizer	246 (112)	246 (112)	246 (112)	246 (112)	246 (112)
Powered Outlet	35 (16)	35 (16)	35 (16)	35 (16)	35 (16)
Curb					
14–in/356 mm	240 (109)	240 (109)	255 (116)	255 (116)	273 (124)
24–in/610 mm	340 (154)	340 (154)	355 (161)	355 (161)	355 (161)

INSTALLATION

Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 5.

NOTE: Consider also the effect of adjacent units.

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

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

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

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

Locate mechanical draft system flue assembly at least 4 ft (1.2 m) from any opening through which combustion products could enter the building, and at least 4 ft (1.2 m) from any adjacent building (or per local code). Locate the flue assembly at least 10 ft (3.05 m) from an adjacent unit's fresh air intake hood if within 3 ft (0.91 m) of same elevation (or per local code). When unit is located adjacent to public walkways, flue assembly must be at least 7 ft (2.1 m) above grade.

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 11 — Install External Condensate Trap and Line – for required trap dimensions.

Roof Mount —

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

Step 2 — Plan for Sequence of Unit Installation

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

Curb-mounted installation —

Install curb
Install field-fabricated ductwork inside curb
Install thru-base service connection fittings (affects curb and unit)
Rig and place unit
Remove top skid
Install outside air hood
Install smoke detector tube
Install combustion air hood
Install flue hood
Install gas piping
Install condensate line trap and piping
Make electrical connections
Install other accessories

Pad-mounted installation —

Prepare pad and unit supports
Rig and place unit
Remove duct covers and top skid
Install smoke detector return air sensor tube
Install field-fabricated ductwork at unit duct openings
Install outside air hood
Install combustion air hood
Install flue hood
Install gas piping
Install condensate line trap and piping
Make electrical connections
Install other accessories

Frame-mounted installation —

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

Step 3 — Inspect unit

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

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

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

Locate the carton containing the outside air hood parts; see Figs. 7 and 14. Do not remove carton until unit has been rigged and located in final position.

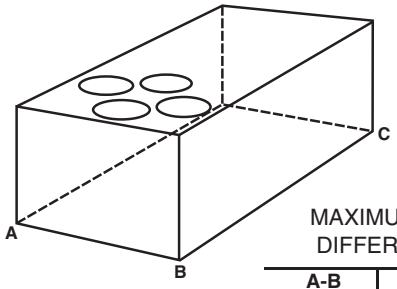
Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Figs. 8, 9 and 10. 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 Figs. 8, 9 and 10. 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. 6. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

A-B	B-C	A-C
0.25” (6)	0.5” (12)	0.5” (12)

C10628

Fig. 6 - 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. Thru-the-base power connection must be installed before the unit is set on the roof curb.* If field-installed thru-the-roof curb gas connections are desired remove knockout in basepan located in the gas section, see Fig. 7 for location. Gas connections and power connections to the unit must be field installed after the unit is installed on the roof curb.

If electric and control wiring is to be routed through the basepan, remove knockouts in basepan located in control box area of access panel; see Fig. 2, 3, or 4 for basepan knockout locations for location. Attach the service connections to the basepan.

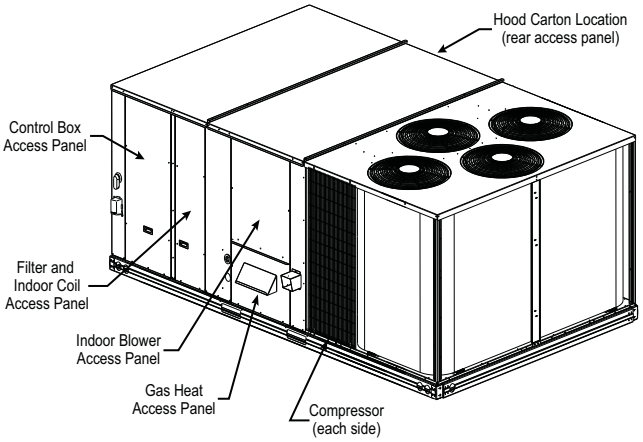


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Fig. 7 - Typical Access Panel and Compressor Locations

Slab Mount (Horizontal Units Only) —

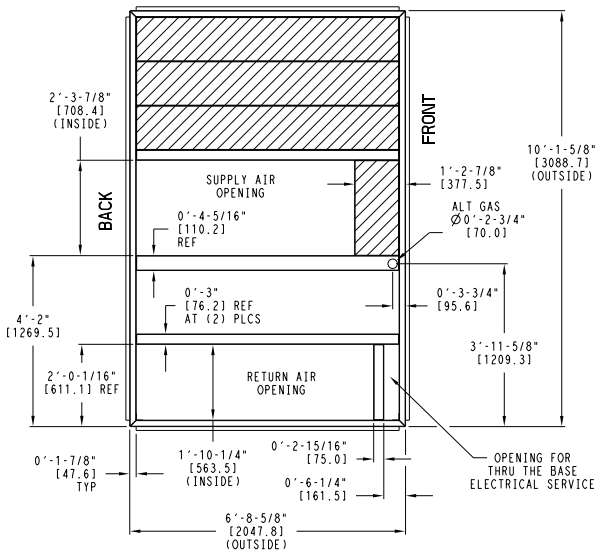
Provide a level concrete slab that extends a minimum of 6–in. (150 mm) beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

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

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

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

UNIT SIZE	"A"	ROOF CURB ACCESSORY
14	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB045A00 CRRFCURB046A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

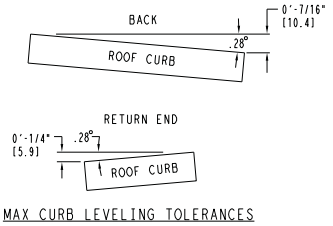
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

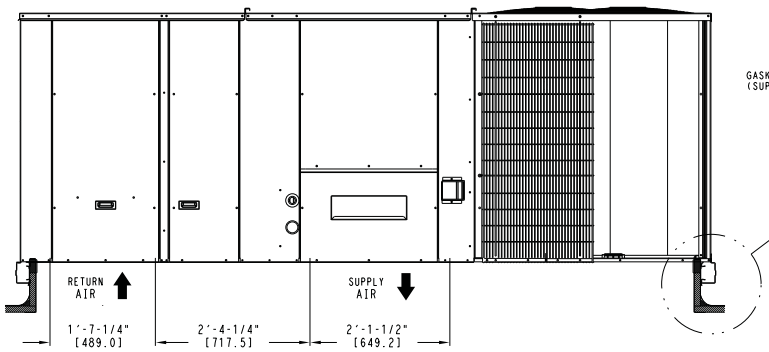
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

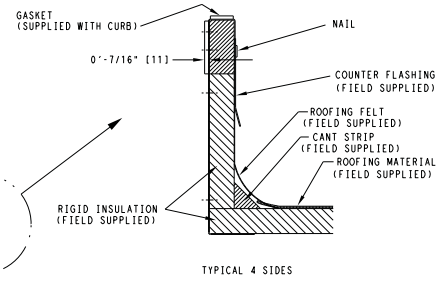
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

DIRECTION OF AIR FLOW

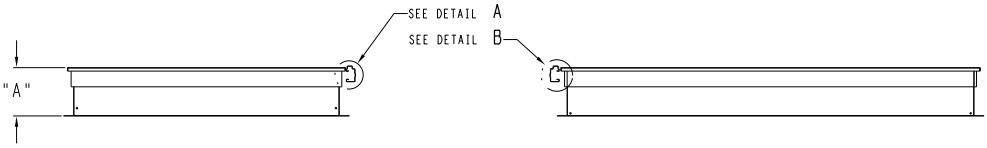


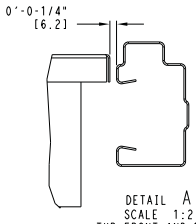
MAX CURB LEVELING TOLERANCES



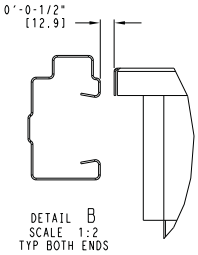


TYPICAL 4 SIDES

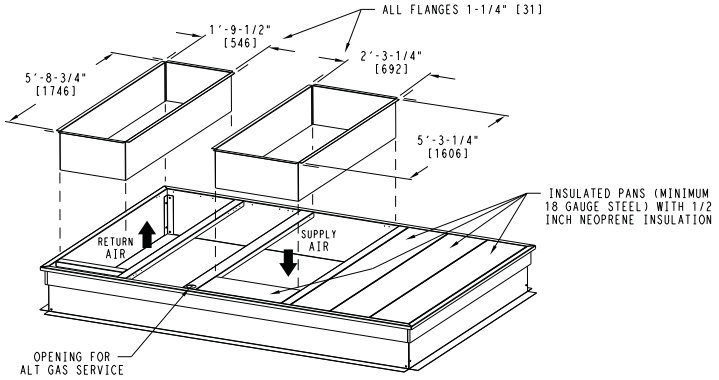




DETAIL A
SCALE 1:2
TYP FRONT AND BACK



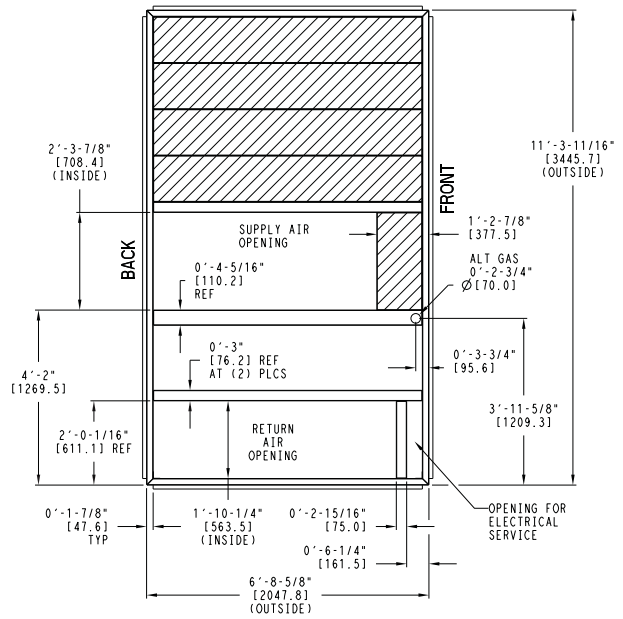
DETAIL B
SCALE 1:2
TYP BOTH ENDS



C13054

Fig. 8 - Roof Curb Details – 14 Size Unit

UNIT SIZE	"A"	ROOF CURB ACCESSORY
17, 20	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB047A00 CRRFCURB048A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

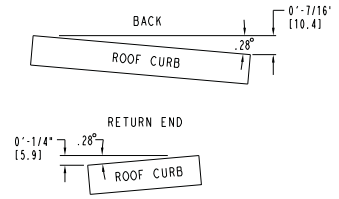
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

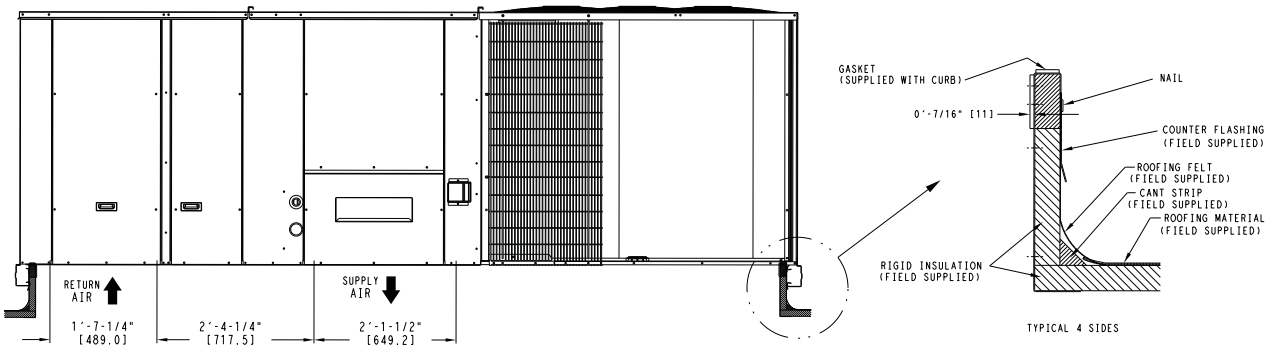
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

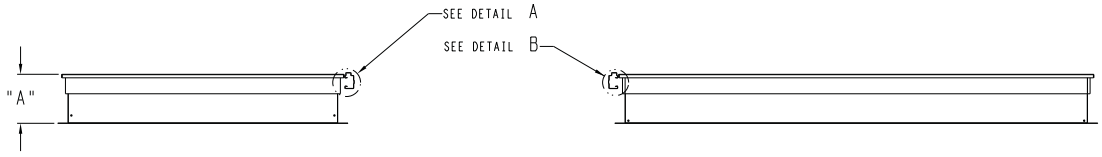
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

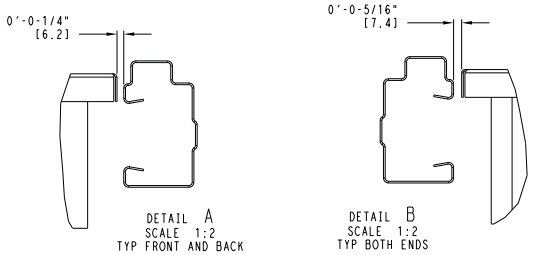
➡ DIRECTION OF AIR FLOW

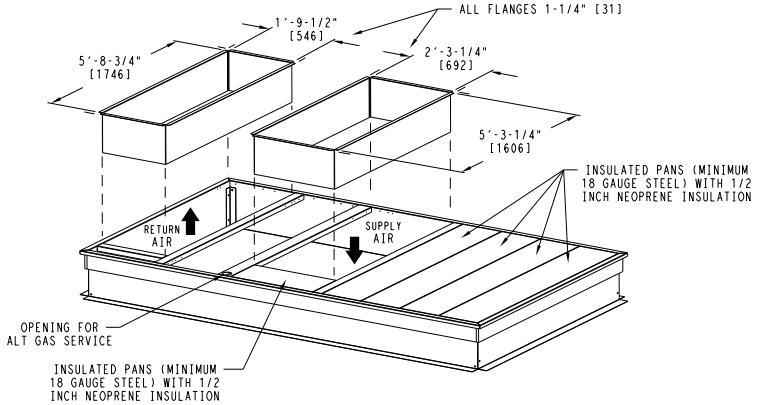


MAX CURB LEVELING TOLERANCES





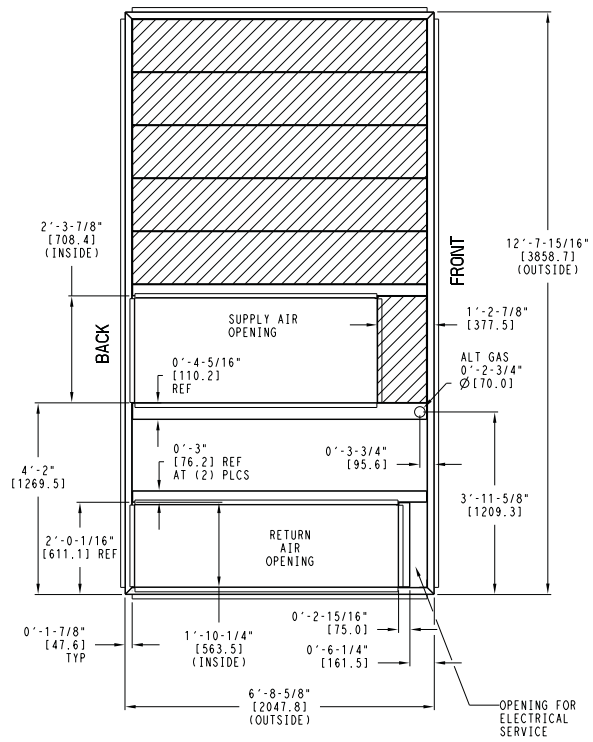




C13055

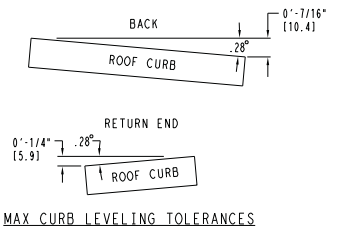
Fig. 9 - Roof Curb Details – 17 and 20 Size Units

UNIT SIZE	"A"	ROOF CURB ACCESSORY
24, 26	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB049A00 CRRFCURB050A00

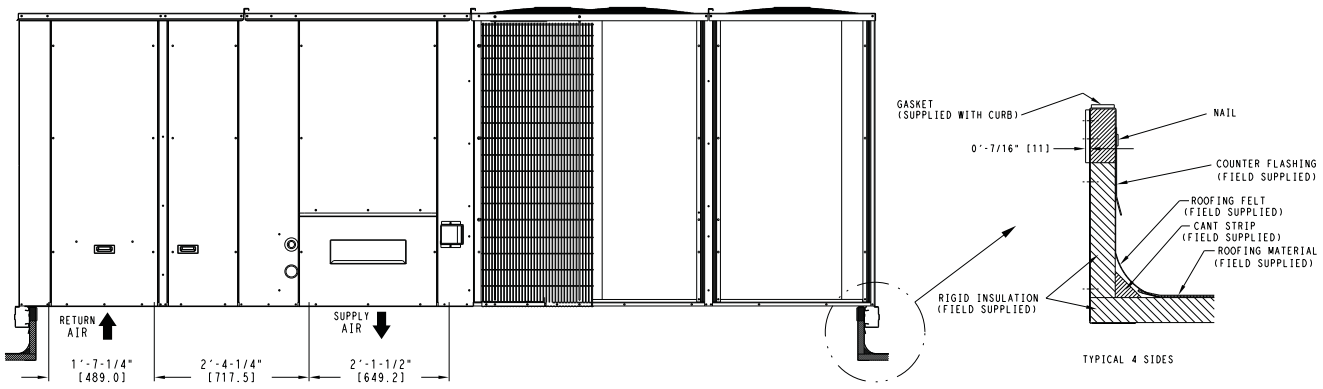


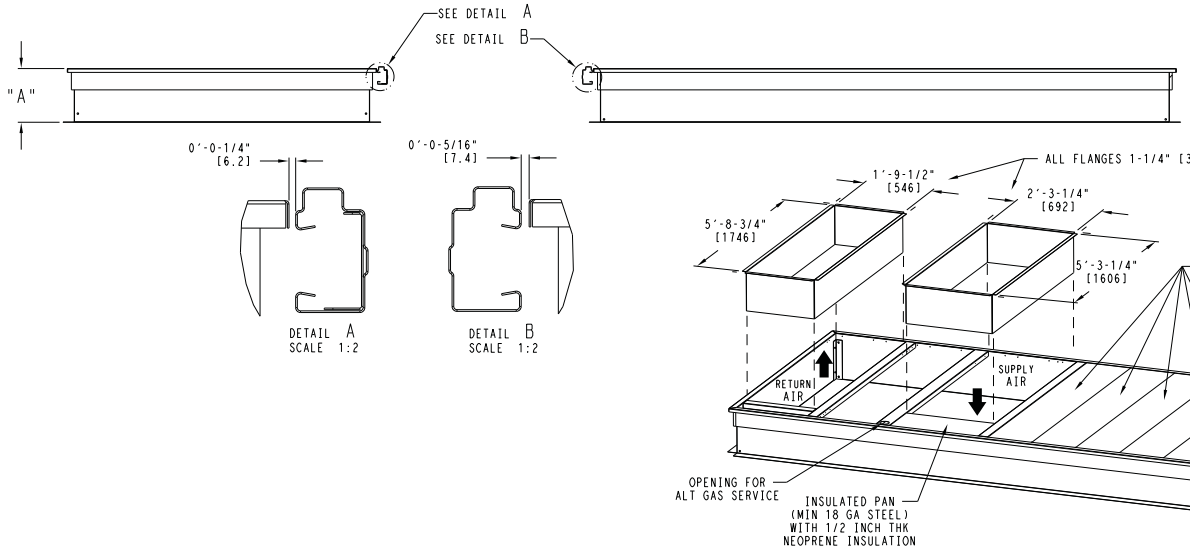
NOTES:
1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
2 BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
3 DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4 ROOF CURB GALVANIZED STEEL.
5 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
6 SERVICE CLEARANCE 4 ft ON EACH SIDE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

➡ DIRECTION OF AIR FLOW



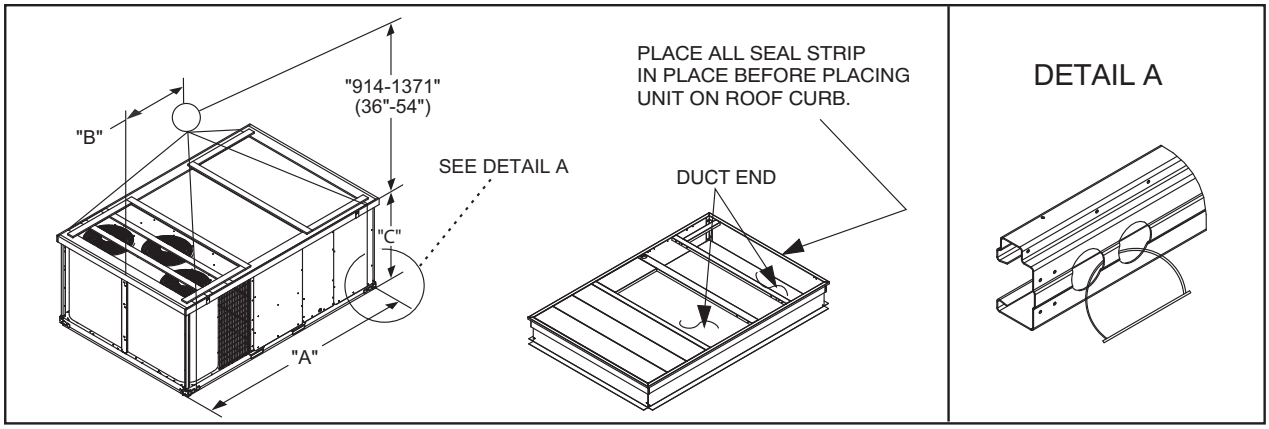
MAX CURB LEVELING TOLERANCES





C13056

Fig. 10 - Roof Curb Details – 24 and 26 Size Units



C09107

UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
48LC*B14	2135	970	127.8	3249	59.1	1501	52.3	1328
48LC*B17	2377	1080	141.5	3595	65.5	1664	60.3	1532
48LC*B20	2483	1129	141.5	3595	65.5	1664	60.3	1532
48LC*B24	2629	1195	157.8	4007	72.8	1849	60.3	1532
48LC*B26	2774	1261	157.8	4007	7208	1849	60.3	1532

NOTES:

1. Dimensions in ( ) are inches.
2. Hook rigging shackles through holes in base rail, as shown in detail "A." Holes in base rails are centered around the unit center of gravity. Use wooden top to prevent rigging straps from damaging unit.

Fig. 11 - Rigging Details

Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.5 in. wg (87 Pa).

For vertical ducted applications, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.*

Fabricate supply ductwork so that the cross sectional dimensions are equal to or greater than the unit supply duct opening dimensions for the first 18 in. (458 mm) of duct length from the unit basepan.

Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through unconditioned spaces must be insulated and covered with a vapor barrier.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance is not required around ductwork.

⚠ CAUTION

PROPERTY DAMAGE HAZARD

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

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

Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 (on page 14) and Fig. 11 for additional information.

Lifting holes are provided in base rails as shown in Fig. 11. Refer to rigging instructions on unit.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

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

Positioning on Curb —

Position unit on roof curb so that the following clearances are maintained: $^1/_4$ in. (6 mm) clearance between the roof curb and the base rail inside the right and left, $^1/_2$ in. (12 mm) clearance between the roof curb and the base rail inside the front and back. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately equal to Details A and B in Figs. 8, 9 and 10.

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

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

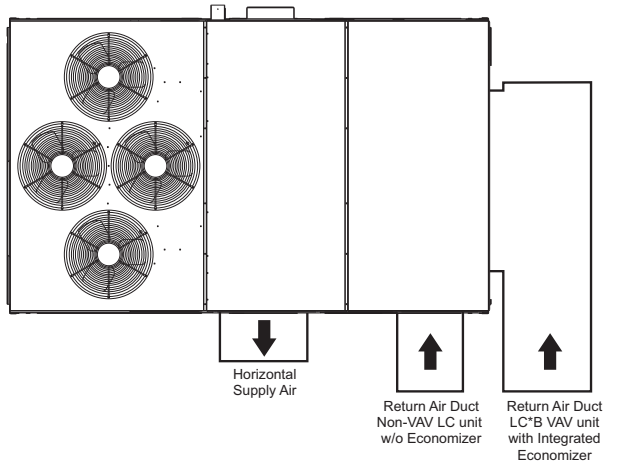
Flue vent discharge must have a minimum horizontal clearance of 48 in. (1220 mm) from electric and gas meters, gas regulators, and gas relief equipment. Minimum distance between unit and other electrically live parts is 48 inches (1220 mm).

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

After unit is in position, remove rigging skids and shipping materials.

Step 7 — Horizontal Duct Connection

Refer to Figs. 2, 3 and 4 for locations and sizes of the horizontal duct connections. Note that there are two different return air duct connection locations – one for non-VAV units without an economizer (on back side of unit) and a different one for LC*B VAV units with the integrated economizer (on left end, under the economizer hood). The supply air duct connection is on the back side. See Fig. 12 for top view depicting typical horizontal duct arrangements.



C150385

	Supply	Non–VAV Unit Return	LC*B–VAV Unit Return
Location	Back	Back	Left end
Height – In. (mm)	$15^{7}/_{8}$ (402)	$49^{3}/_{8}$ (1253)	$18^{3}/_{8}$ (467)
Width – in. (mm)	$29^{3}/_{4}$ (756)	$23^{3}/_{8}$ (593)	$61^{5}/_{8}$ (1564)

Fig. 12 - Horizontal Duct Opening Dimensions

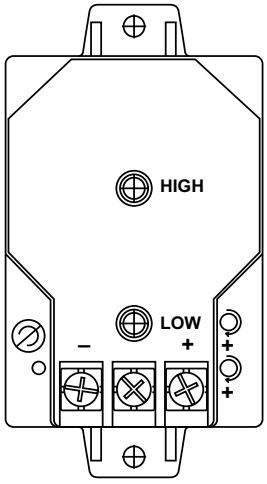
Field-supplied ($^{3}/_{4}$-inch) flanges should be attached to horizontal duct openings (see Fig. 12) and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.

Step 8 — 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. 13. 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.

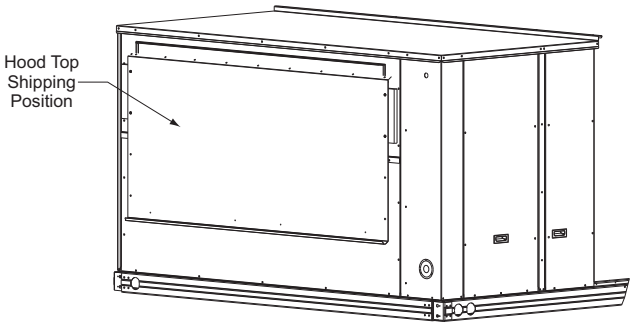


C150384

Fig. 13 - Duct Pressure Transducer

Step 9 — Install Outside Air Hood

The outside air hood for the economizer is shipped in knock-down form and requires field assembly. The panel for the hood top is shipped on the end of the unit (see Fig. 14). The remaining parts for the hood assembly (including side panels, filters and tracks) are shipped in a carton that is secured to the rear of the blower assembly. Access the carton location through rear panel (see Fig. 15).



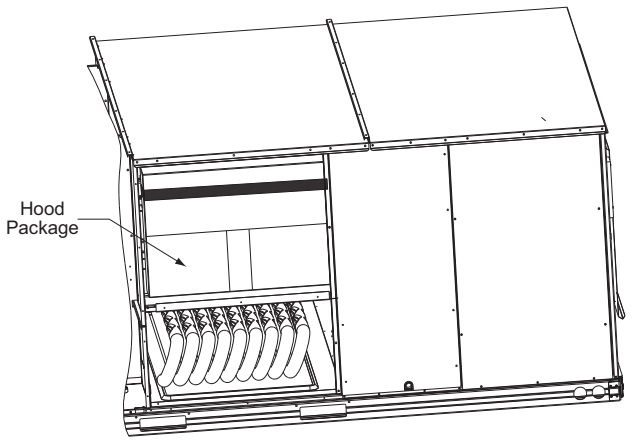
C09134

Fig. 14 - Hood Top – Shipping Position

To remove the hood parts package:

1. Remove the back blower access panel.
2. Locate and cut the strap, being careful to not damage any wiring.
3. Carefully lift the hood package carton through the back blower access opening.

See Fig. 16 for identification of the various parts of the hood assembly.

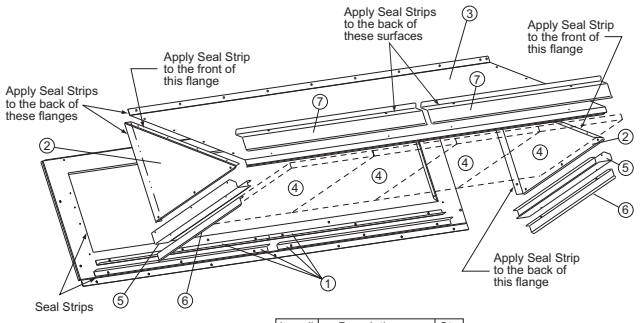


C09133

Fig. 15 - Hood Package – Shipping Location

To assemble the outside air hood:

1. Remove hood top panel from shipping position on unit end.
2. Install four angles to the upper end panel using the screws provided.
3. Apply seal strip to mating flanges on the side plates of the hood (see Fig. 16).
4. Secure side plates to panel using the screws provided.
5. Apply seal strip to mating flange of the hood (see Fig. 16).
6. Secure top flange using screws provided in kit.
7. Install outdoor air screens by sliding them into the channel formed by the four angles installed in step 2. Make sure that the screens extend across the entire length of the hood.
8. Install side filter supports using the screws provided.
9. Install side drip angles using the screws provided.
10. Run a continuous length of seal strip across the hood covering the engagement holes in the lower hood.

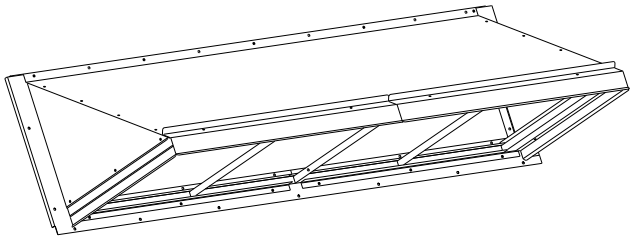


Item #	Description	Qty
1	Angles	4
2	Side Plates	2
3	Hood	1
4	Outdoor Air Screens	4
5	Side Filter Supports	2
6	Side Drip Angles	2
7	Top Diverters	2

C09079

Fig. 16 - Hood Part Identification and Seal Strip Application Areas

11. Install top diverter using the screws provided.
12. On units with barometric relief, remove screws at bottom of relief damper. **Do not discard damper door**.

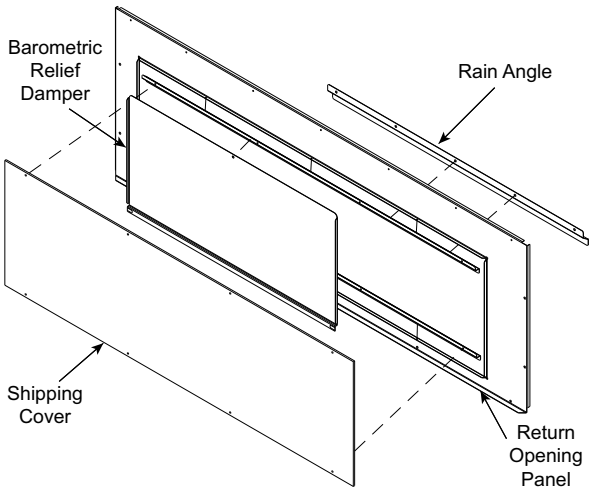


C09090

Fig. 17 - Hood Assembly – Completed

Step 10 — Economizer - Horizontal Airflow Units

The barometric relief damper ships attached to the exterior return opening panel on the unit. Remove shipping cover to access the barometric relief damper, rain angle, and parts bag. These items are to be repositioned on the side of the field supplied ductwork. In addition, the barometric relief hood should be used and can be ordered separately (PN: CRBARHOD001A00) or can be field supplied.



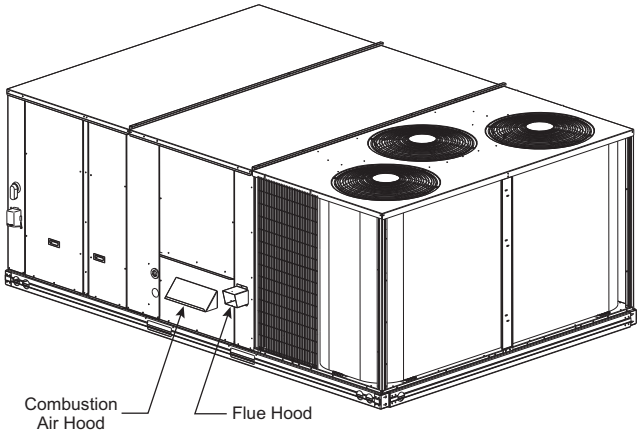
C150319

Fig. 18 - Barometric Relief Damper - Shipping Location

Step 11 — Install Flue Hood and Combustion Air Hood

The flue hood is shipped screwed to the fan deck inside the burner compartment. Remove the burner access panel and then remove the flue hood from its shipping location. Using the screws provided, install flue hood in the location shown in Fig. 19.

The combustion air hood is attached to the back of the burner access panel. Remove the two screws securing the hood to the back of the burner access panel. Using the two screws, re-attach the hood to the front of the burner access panel as shown in Fig. 19.



C10744

Fig. 19 - Flue Hood and Combustion Air Hood Details

Step 12 — Install Gas Piping

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

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

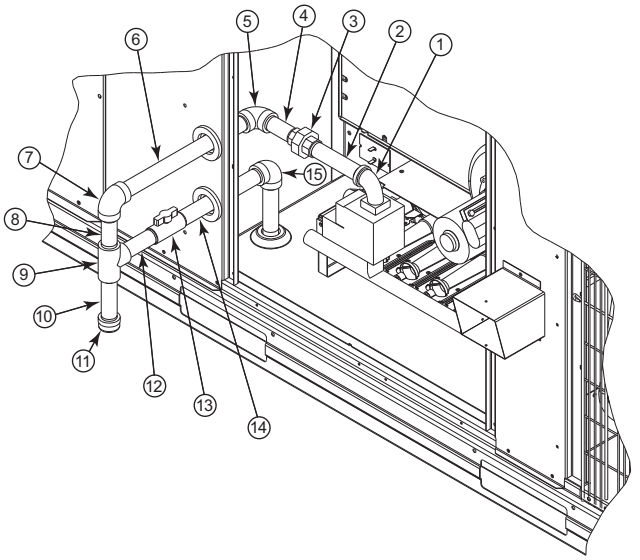
NOTE: Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. In U.S.A. the input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level. In Canada the input rating must be derated by 10% for altitudes of 2000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

For natural gas applications, gas pressure at unit gas connection must not be less than 5 in. wg (1246 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating. For liquified petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13 in. wg (3240 Pa) at the unit connection.

Gas Supply Line —

The gas supply pipe enters the unit adjacent to the burner access panel on the front side of the unit, through the grommeted hole. The gas connection to the unit is made to the $^3/_4$ in. FPT gas inlet port on the unit gas valve.

Table 2 lists typical $^3/_4$ inch NPT (National Pipe Thread) field supplied pipe fittings required for Thru-Base gas supply, starting from the unit gas valve (see Fig. 20).



C10999

Fig. 20 - Gas Supply Line Piping with Thru-Base

Table 2 – Typical $^3/_4$-in NPT Field Supplied Piping Parts

Item	Qty	Description
1	1	90 Deg Street Elbow
2	1	5 Inch Long Nipple
3	1	Ground–Joint Union
4	1	3 Inch Long Nipple
5	1	90 Deg Elbow
6	1	12 Inch Long Nipple
7	1	90 Deg Elbow
8	1	3 Inch Long Nipple
9	1	TEE
10	1	4 Inch Long Nipple (Sediment Trap)
11	1	Cap
12	1	3 $^1/_2$ Inch Long Nipple
13	1	NIBCO® Ball Valve (GB30)
14	1	8 Inch Long Nipple
15	1	90 Deg Elbow

Pipe gas supply into 90 degree elbow item 15 (see Table 2) through the hole in the unit basepan.

For typical $^3/_4$ inch NPT field supplied fittings required for NON Thru-Base gas supply starting from the unit gas valve, omit items 14 and 15 from Table 2 and pipe gas supply into TEE. See Fig. 21.

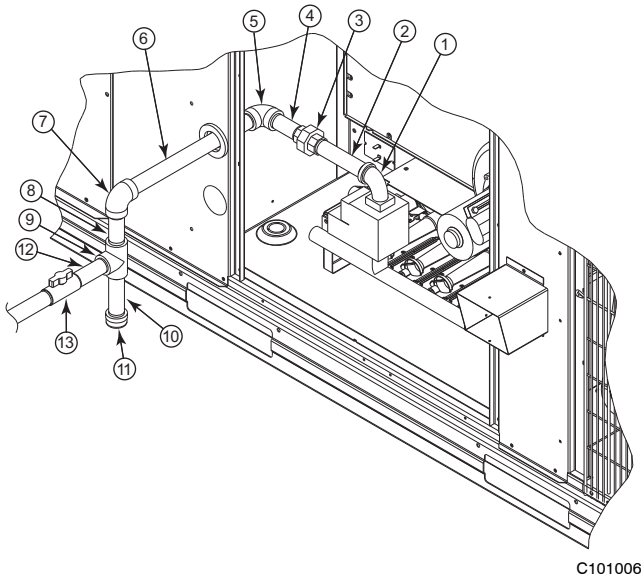


Fig. 21 - Gas Supply Line Piping

Table 3 – Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN	MAX
48LC*B	14, 17, 20, 24, 26	5.0 in. wg (1246 Pa)	13.0 in. wg (3240 Pa)

Table 4 – Liquid Propane Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN	MAX
48LC*B	14, 17, 20, 24, 26	11.0 in. wg (2740 Pa)	13.0 in. wg (3240 Pa)

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

Table 5 – Natural Gas Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48LC*B	14, 17, 20, 24, 26	3.0 in. wg (747 Pa)	2.0 in. Wg (498 Pa)

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

Table 6 – Natural Gas Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48LC*B	14, 17, 20, 24, 26	11.0 in. wg (2740 Pa)	7.3 in. Wg (1818 Pa)
48LCSB	14 only	9.8 in. wg (2441 Pa)	6.5 in. Wg (1619 Pa)

⚠ CAUTION

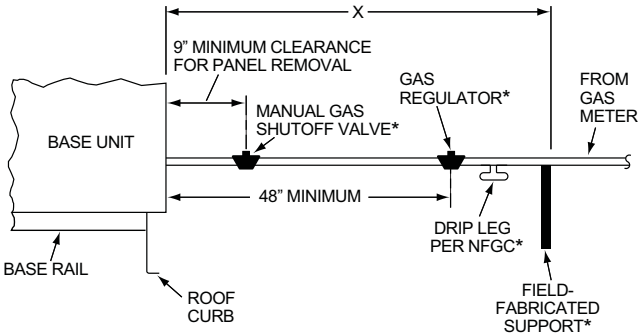
EQUIPMENT DAMAGE HAZARD

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

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

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

The gas supply line can approach the unit in two ways: horizontally from outside the unit (across the roof), or through unit basepan. Observe clearance to gas line components per Fig. 22.



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

C11121

Fig. 22 - Gas Piping Guide

Factory-Option Thru-Base Connections —

Electrical Connections: Knockouts are located in the control box area. Remove the appropriate size knockout for high voltage connection. Use the field supplied connector depending on wiring or conduit being utilized. Remove the 7/8-in (22mm) knockout and appropriate connector for low voltage wiring. If non-unit powered convenience outlet is being utilized, remove the 7/8-in (22mm) knockout and utilize appropriate connector for 115 volt line. See "Step 14 — Making Electrical Connections" for details.

Gas Connections: Remove the knockout in the base pan and route 3/4-in. gas line up through the opening. Install an elbow and route gas line through opening in panel after first removing plastic bushing. Install a gas shut off followed by a drip leg and ground-joint union. Route gas line into gas section through the grommet (Part #: KA56SL112) at the gas inlet and into the gas valve. See Fig. 20 and Table 2. If a regulator is installed, it must be located 4 feet (1.22 meters) from the flue outlet.

Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 21 for typical piping arrangements for gas piping that has been routed through the sidewall of the base pan.

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to the NFPA 54/ANSI Z223.1 NFGC latest edition (in Canada, CAN/CSA

B149.1). In the absence of local building codes, adhere to the following pertinent recommendations:

1. Avoid low spots in long runs of pipe. Grade all pipe $^1/_4$-in. in every 15 ft (7 mm in every 5 m) to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft (1.8 m). For pipe sizes larger than $^1/_2$-in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. If using PTFE (Teflon) tape, ensure the material is Double Density type and is labeled for use on gas lines. Apply tape per manufacturer's instructions.
4. Pressure-test all gas piping in accordance with local and national plumbing and gas codes before connecting piping to unit.

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

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

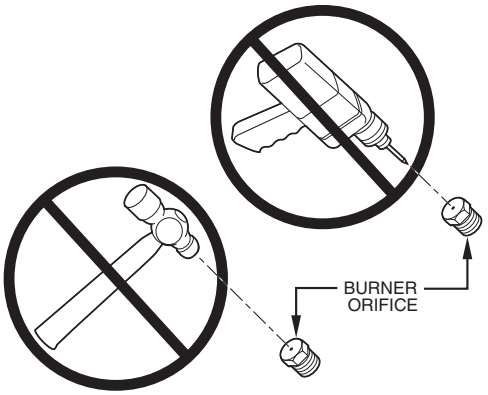
⚠ WARNING

FIRE OR EXPLOSION HAZARD

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

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

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

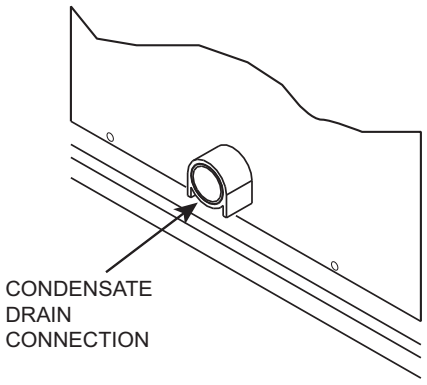


A93059

Fig. 23 - Orifice Hole

Step 13 — Install External Condensate Trap & Line

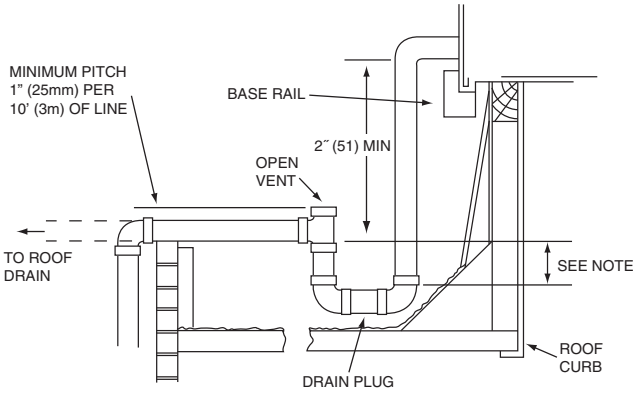
The unit has one $^3/_4$-in. condensate drain connection on the end of the condensate pan (see Fig. 24). See Figs. 2, 3 and 4, item "E", in the view labeled "BACK (HORIZONTAL DISCHARGE)" (located on sheet 2 of 3 of each figure) for the location of the condensate drain connection.



C10729

Fig. 24 - Condensate Drain Pan Connection

The piping for the condensate drain and external trap can be completed after the unit is in place. Hand tighten fittings to the drain pan fitting. Provide adequate support for the drain line. Failure to do so can result in damage to the drain pan. See Fig. 25.



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

C08022

Fig. 25 - Condensate Drain Piping Details

All units must have an external trap for condensate drainage. Install a trap at least 4-in. (102 mm) deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1-in. per 10 ft (25 mm in 3 m) of run. Do not use a pipe size smaller than the unit connection ($^3/_4$-in.).

Step 14 — Make Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

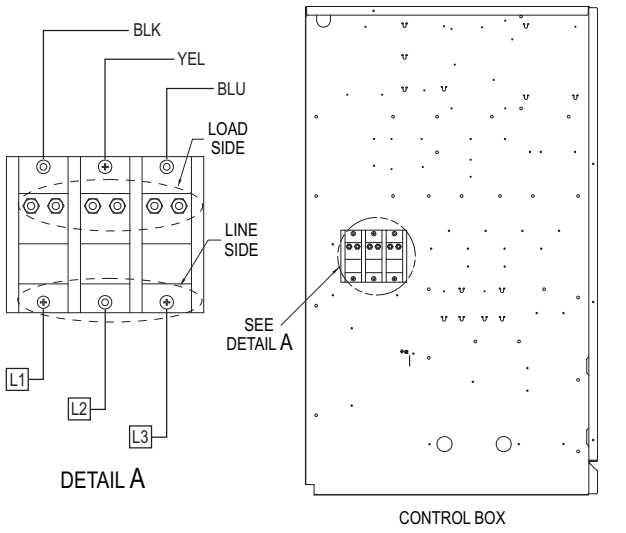
Failure to follow this warning could result in personal injury or death.

Do not use gas piping as an electrical ground. Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code); ANSI/NFPA 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.

NOTE: Field-supplied wiring shall conform with the limitations of minimum 63°F (33°C) rise.

Field Power Supply —

If equipped with optional Powered Convenience Outlet: The power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of the unit-mounted disconnect. (Check with local codes to ensure this method is acceptable in your area.) If a de-energize via unit disconnect switch operation of the convenience outlet is desired, connect the source leads to the load side of the unit disconnect. On a unit without a unit-mounted disconnect or HACR, connect the source leads to the terminal block with unit field power leads. See Fig. 26.



C11181

Fig. 26 - Location of TB1

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

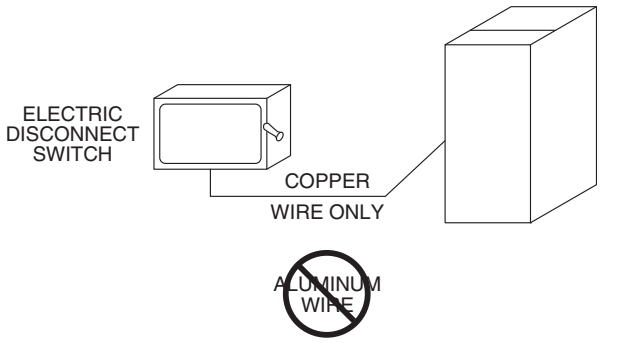
NOTE: Make field power connections directly to line connection pressure lugs only.

⚠ WARNING

FIRE HAZARD

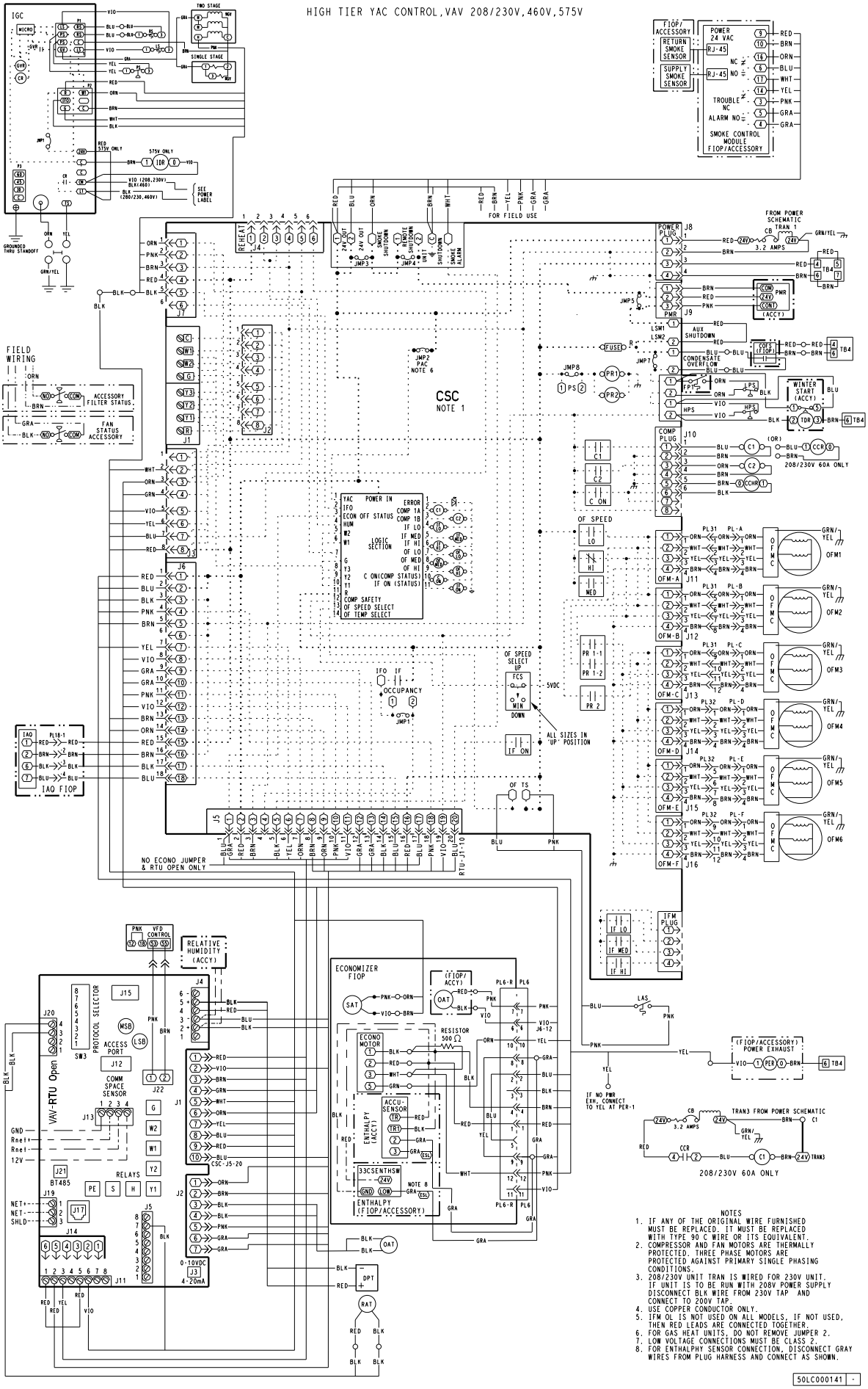
Failure to follow this warning could result in intermittent operation or unsatisfactory performance.

Do not connect aluminum wire between disconnect switch and air conditioning unit. Use only copper wire. (See Fig. 27.)



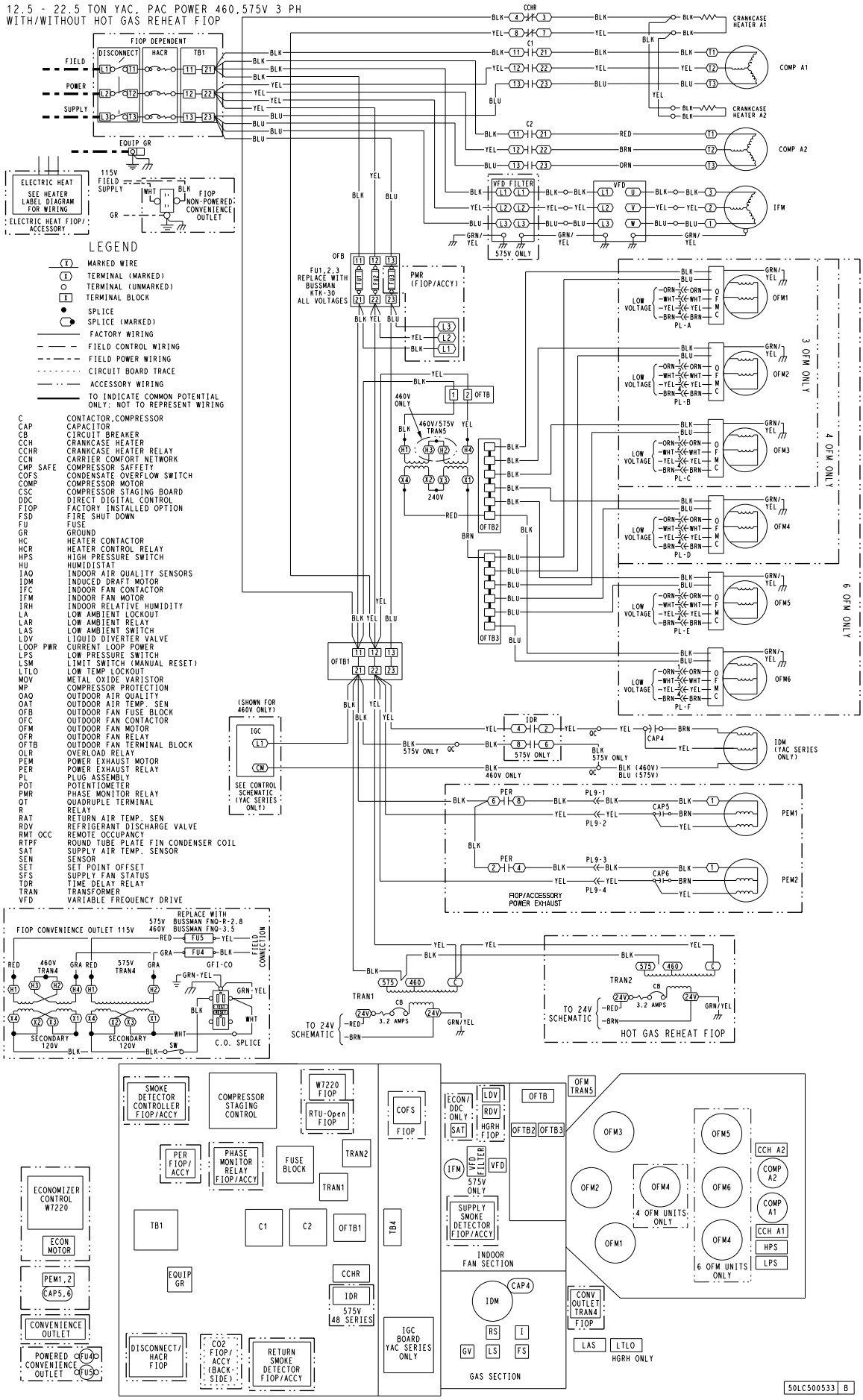
A93033

Fig. 27 - Disconnect Switch and Unit



C150330

Fig. 28 - 48LC*B14-26 VAV-RTU Open Control Wiring Diagram



C150372

Fig. 29 - 48LC*B14-26 Power Wiring Diagram

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

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

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

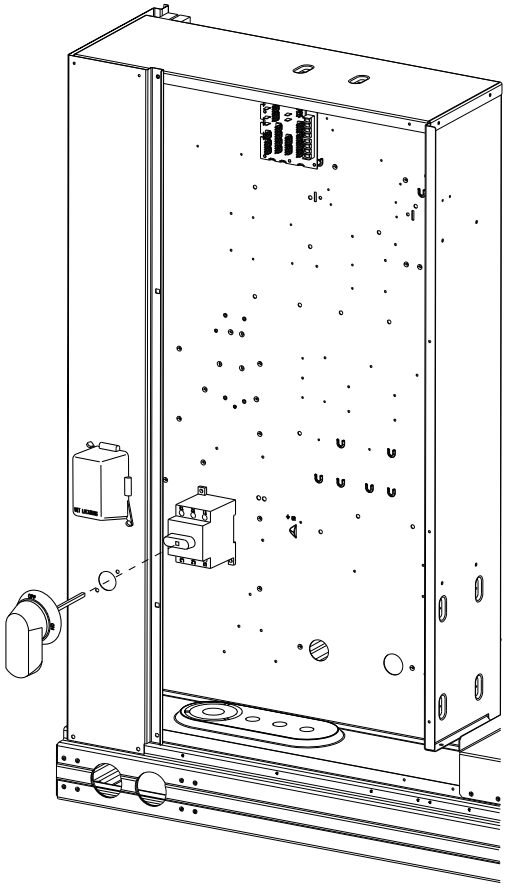
The factory-installed option non-fused disconnect switch (NFD) or HACR is located in the main control box. The manual switch handle and shaft are shipped in the control box and must be mounted on the corner post adjacent to the control box (see Fig. 30 or 31). Note that the tape covering the hole for the shaft in the corner post must be removed prior to handle and shaft installation.

To field install the NFD shaft and handle:

1. Open the control box panel.
2. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob or on the silver metal collar is at OFF).
3. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
4. Measure the tip of the shaft to the outside surface of the corner post to be 0.88”.
5. Tighten the locking screw to secure the shaft to the NFD.
6. Turn the handle to OFF position with red arrow pointing at OFF.
7. Install the handle on to the corner post vertically with the red arrow pointing up.
8. Secure the handle to the corner post with (2) screws and lock washers supplied.

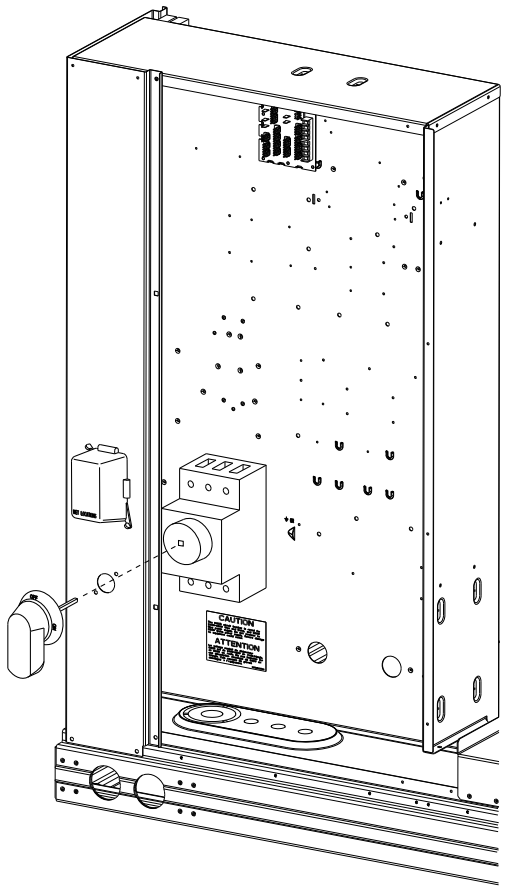
To field install the HACR shaft and handle:

1. Open the control box panel.
2. Make sure the HACR shipped from the factory is at OFF position (the white arrow pointing at OFF).
3. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
4. Measure the tip of the shaft to the outside surface of the corner post to be 0.88”.
5. Tighten the locking screw to secure the shaft to the HACR.
6. Turn the handle to OFF position with red arrow pointing at OFF.
7. Install the handle on to the corner post vertically with the red arrow pointing up.
8. Secure the handle to the corner post with (2) screws and lock washers supplied.



C12385

Fig. 30 - Handle and Shaft Assembly for NFD



C12386

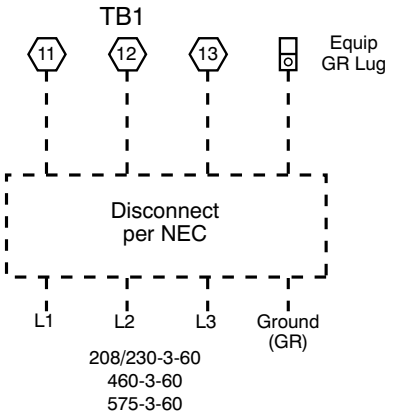
Fig. 31 - Handle and Shaft Assembly for HACR

All Units -

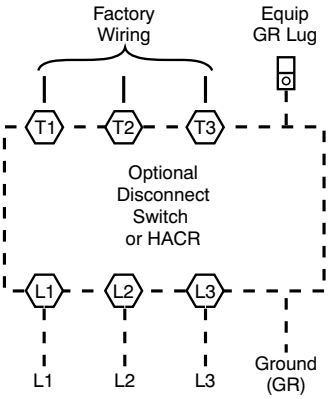
All field wiring must comply with NEC and all local code requirements.

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 32 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is 2/0 AWG per pole.

Units Without Disconnect or HACR Option



Units With Disconnect or HACR Option



C12387

Fig. 32 - Power Wiring Connections

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 additional ground-fault and short circuit over current protection device unless required by local codes.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. See Tables 14 and 15. 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 14 and 15 (see Note 2 on page 53) to determine the percent of voltage imbalance.

⚠ 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.

Convenience Outlets —

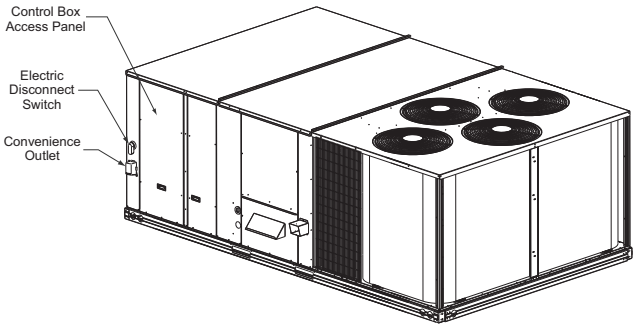
⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

Two types of convenience outlets are offered on 48LC*B models: Non-unit powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. See Fig. 33.



C10641

Fig. 33 - Convenience Outlet Location

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

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

DISCONNECT ALL POWER TO UNIT AND CONVENIENCE OUTLET. LOCK-OUT AND TAG-OUT ALL POWER.

Remove the blank cover plate at the convenience outlet; discard the blank cover.

Loosen the two screws at the GFCI duplex outlet, until approximately $^1/_2$-in (13 mm) under screw heads are exposed. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).

Mount the weatherproof cover to the backing plate as shown in Fig. 34. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.

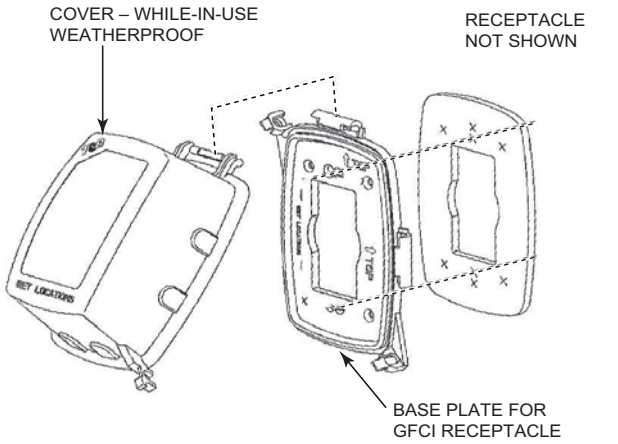


Fig. 34 - Weatherproof Cover Installation

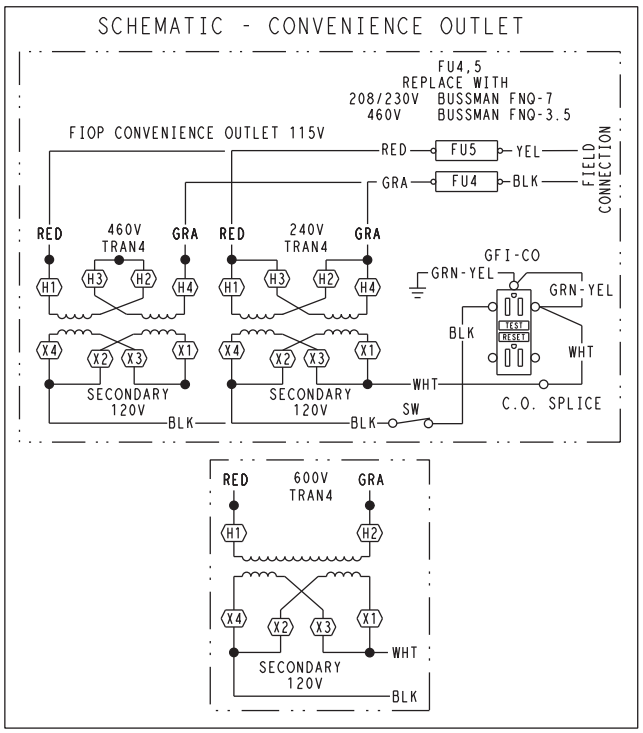
Non-unit powered type: This type requires the field installation of a general-purpose 125-volt 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size, fuse or breaker requirements and disconnect switch size and location. Route 125-v power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

Unit-powered type: A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a control box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 33.

The primary leads to the convenience outlet transformer are not factory-connected. 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. See Fig. 35.

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.

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.



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

Fig. 35 - Powered Convenience Outlet Wiring

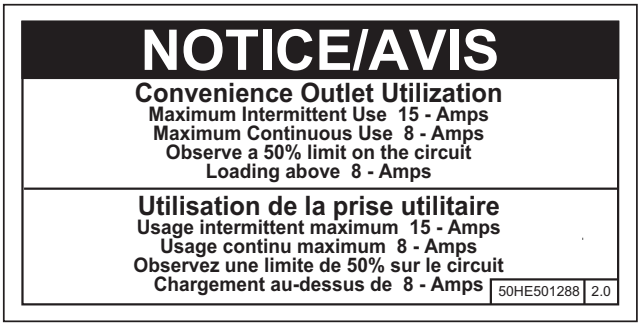
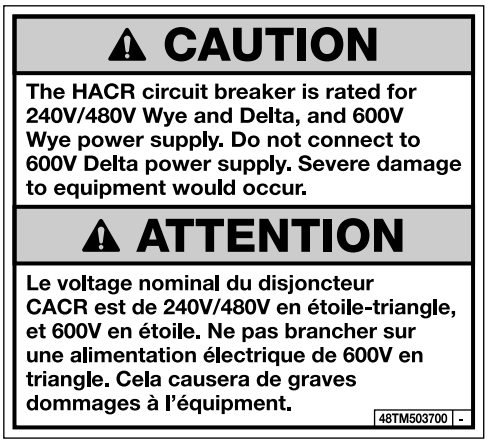


Fig. 36 - Convenience Outlet Utilization Notice

HACR —

The amp rating of the HACR factory installed option is based on the size, voltage, indoor motor and other electrical options of the unit as shipped from the factory. If field installed accessories are added or changed in the field (i.e., power exhaust), 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 —

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

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

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

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

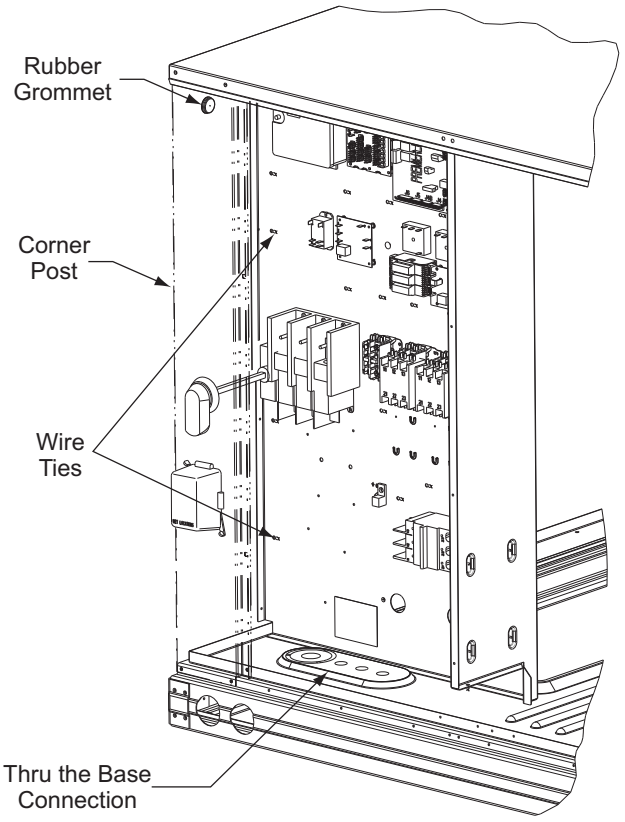
Units Without Thru-Base Connections —

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 32.

Unit Without Thru-Base Connection Kit —

Correctly rated low voltage wire can be routed through the rubber grommet located on the corner post adjacent to the control box access panel. Route wire through the grommet and then route the wire behind the corner post utilizing the factory provided wire ties secured to the control box. This will insure separation of the field low voltage wire and the high voltage circuit. Route the low voltage wire to the Integrated Staging Control (ISC) board. See Fig. NO TAG.

NOTE: If utilizing the through the base connections, route the low voltage wire through the wire ties to the Integrated Staging Control (ISC) board (see Fig. 38).



C10734

Fig. 38 - Field Control Wiring Raceway

Heat Anticipator Settings —

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

Transformer Connection for 208-v Power Supply —

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. *If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the $^{1}/_{4}$-in. female spade connector from the 230-v connection and moving it to the 208-v $^{1}/_{4}$-in. male terminal on the primary side of the transformer.* Refer to unit label diagram for additional information.

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

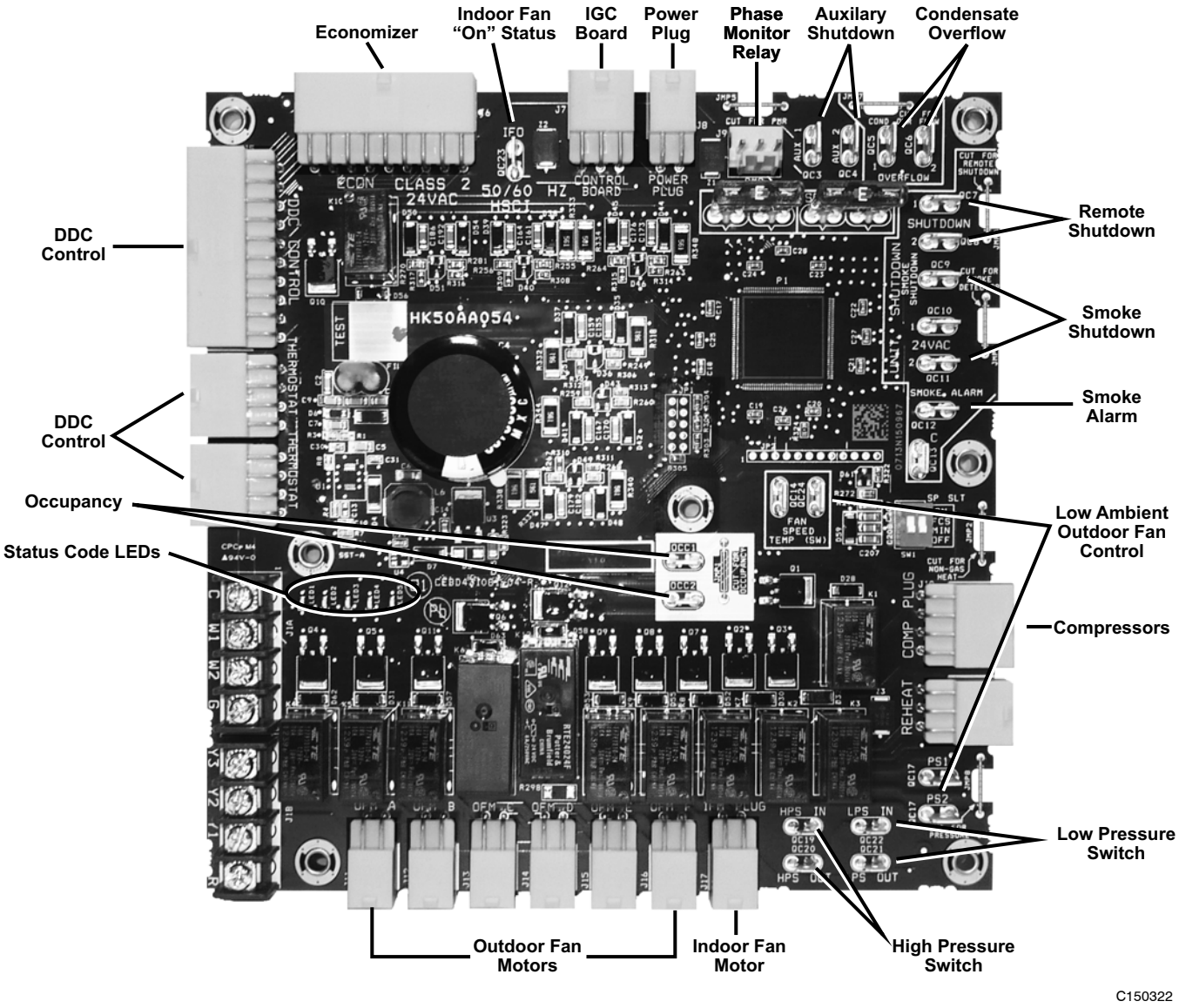


Fig. 39 - Integrated Staging Control (ISC) Board

Sequence of Operation

General —

The Carrier Integrated Staging Control (ISC) is intended for use with the VAV-RTU Open controller. After initial power to the board, a Green LED will blink with a 1 second duty cycle indicating the unit is running properly. In the event of the ISC board failing, the Green LED will be OFF or continuously ON. When the unit is not running properly, the Green LED will blink along with Red LED lights. The Red LED light configuration will indicate the type of error the board has identified. See Fig. 39 for LED locations and Table 7 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 7 – Status Code Descriptions for ISC Board LEDs

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

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

Field Test/Commissioning –

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

Ventilation —

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

Supply Air Temperature Control –

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

Minimum Ventilation –

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

Demand Controlled Ventilation [DCV] –

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

Mechanical Cooling Cycle –

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

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

Integrated Cooling Cycle -

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

Economizer Cooling Cycle –

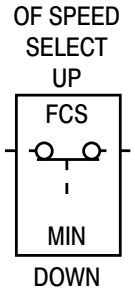
The control will provide the ability to utilize outdoor air for maintaining the supply air setpoint should the outdoor air be suitable. The economizer control will utilize an OAT temperature check, a RAT temperature check if RAT is available or a SPT temperature check comparison and optionally, an OA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

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

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

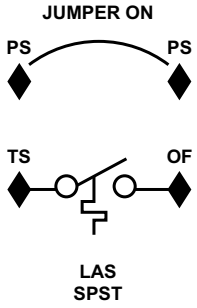
At temperatures below 45°F (7°C), unit will utilize economizer for SA temperature control.

LC Size 14 through 26 Units have a SPST normally open Low Ambient Switch wired across the TS and OF terminal and a jumper placed across the PS terminal (see Fig. 41). When the LAS is active, the switch will close making contact to the OF terminal. This is done for units that require all outdoor fans to run at the same pre-set factory Low Ambient Speed.



C13327

Fig. 40 - Outdoor Fan Speed Select Switch



C13328

Fig. 41 - Schematic of SPST Low Ambient Switch

The Low Ambient Temperature Outdoor Fan Control Table (below) shows the operation of the outdoor fan for each unit.

Table 8 – Low Ambient Temperature Outdoor Fan Control

LC Size	No. of Fans On	No. of Fans Off	Switch	Outdoor Fan Select Switch	RPM
14	3	0	SPST	Up	250
17	4	0	SPST	Up	250
20	4	0	SPST	Up	250
24	6	0	SPST	Up	250
26	6	0	SPST	Up	250

Heating —

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

The IGC board starts its gas ignition process. A check is made to ensure that the rollout switch and limit switch are closed. If the check was successful, the induced draft motor is energized, and when its speed is satisfactory, as proven by the "hall effect" sensor, the ignition activation period begins. The burners will ignite within 5 seconds. If

the burners do not light, there is a 22-second delay before another 5 second attempt. This sequence is repeated for 15 minutes or until the burners light. If, after the 15 minutes, the burners still have not lit, heating is locked out. To reset the control, break 24VAC power to the VAV-RTU Open.

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

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

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

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

Morning Warm-up –

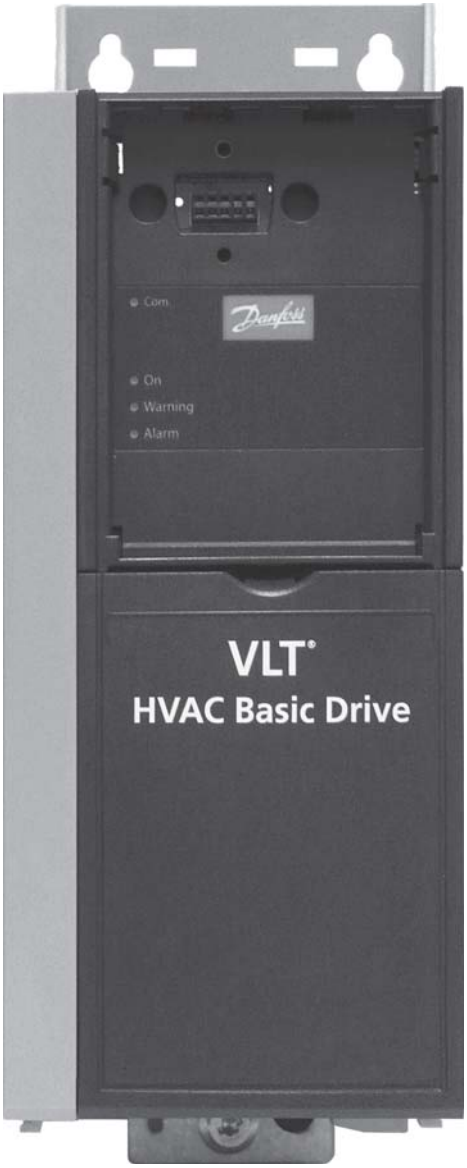
The control will provide a Morning Warm-up cycle the first time if transition from unoccupied to occupied and if the heating is required and the unit goes into heating immediately. Whenever the unit enters the heating mode, before any heat stage is enabled, the control will provide a Linkage mode to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

Occupied Heating –

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

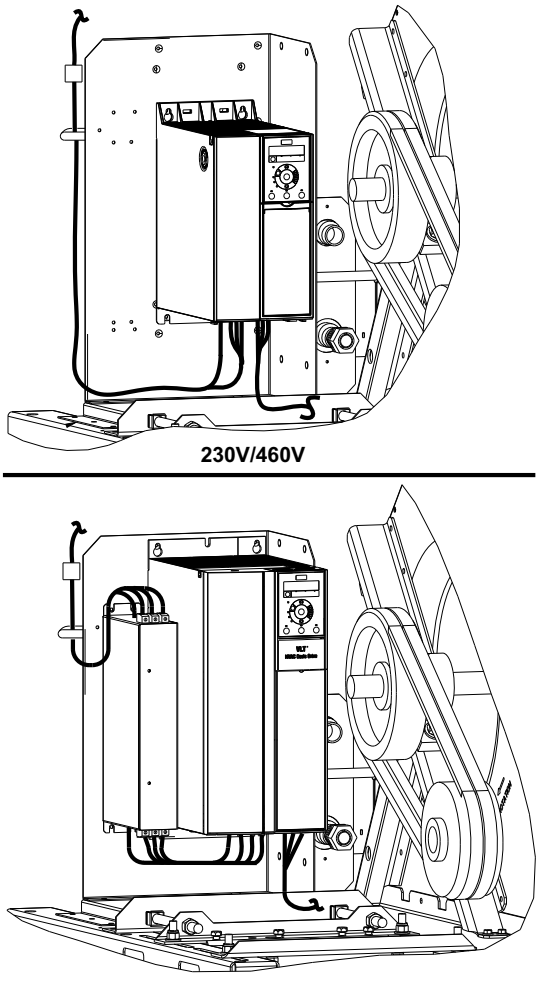
Variable Air Volume (VAV) with Variable Frequency Drive

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



C13110

Fig. 42 - Variable Frequency Drive (VFD)

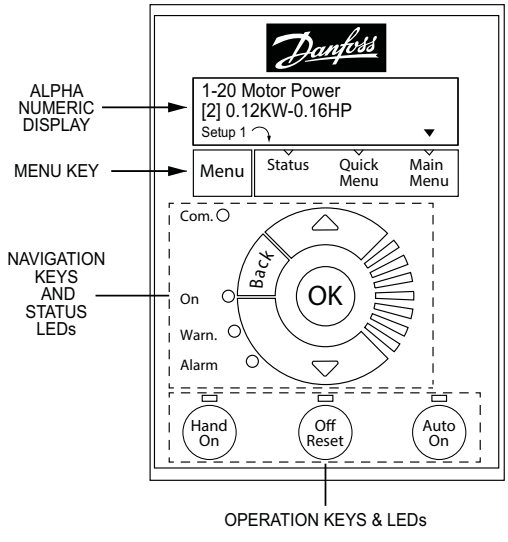


C13209

Fig. 43 - VFD Location

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

NOTE: The Remote VFD Keypad is part of the Multi-Speed VFD display kit (PN: CRDISKIT002A00) which is a field-installed option. It is not included with the 48LC*B14-26 base units.

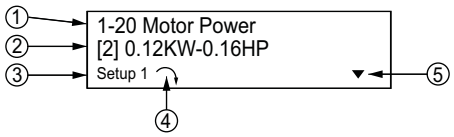


C13112

Fig. 44 - VFD Keypad

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

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

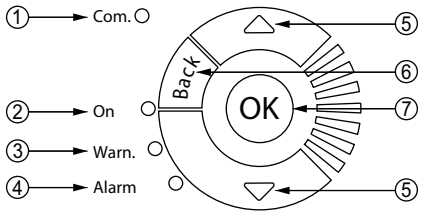


C13113

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

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

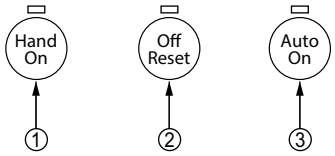
Navigation Keys and Status LEDs: The Navigation keys and Status LEDs are detailed in the following table.



C13114

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

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



C13115

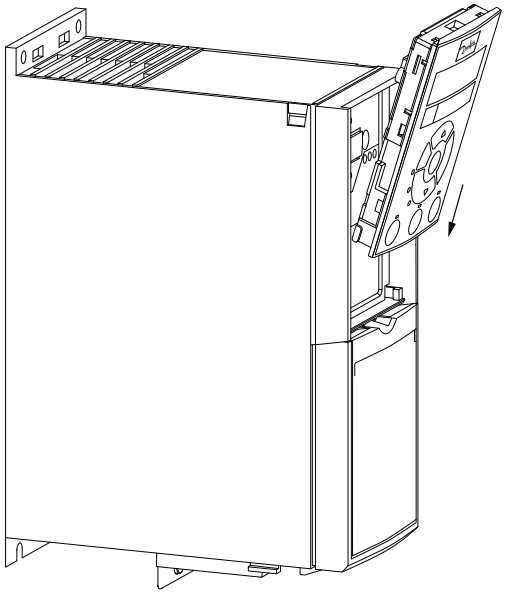
1	**Hand On** key: Starts the motor and enables control of the variable frequency drive (VFD) via the VFD Keypad option. **NOTE**: Please note that terminal 27 Digital Input *(5-12 Terminal 27 Digital Input)* has coast inverse as default setting. This means that the Hand On key will not start the motor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

Connecting the Keypad to the VFD

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

Connecting the Keypad Directly to the VFD —

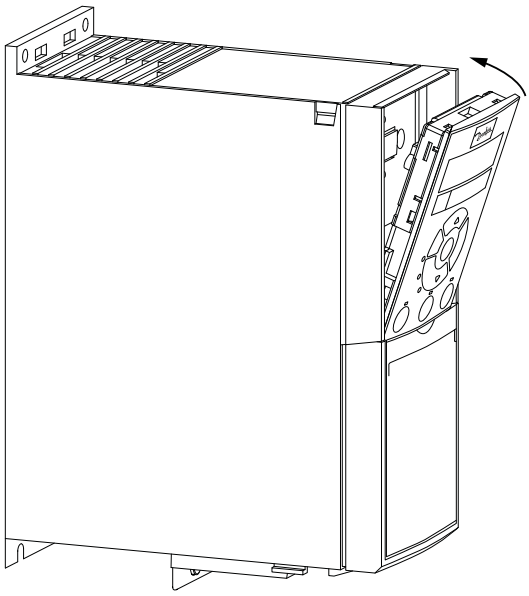
1. Place the bottom of the VFD keypad into the variable frequency drive as shown in Fig. 45.



C13116

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

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

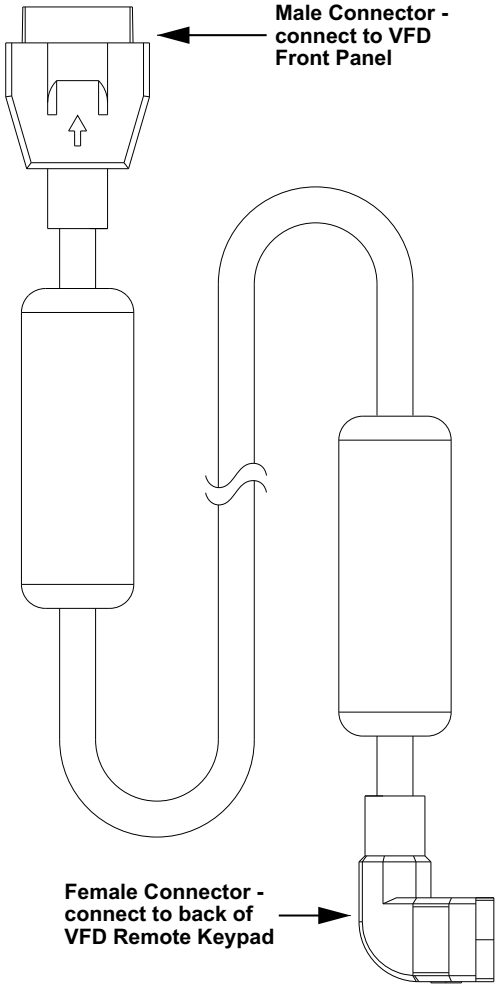


C13117

Fig. 46 - Secure Keypad in Place

Using the Cable to Connect the Keypad to the VFD —

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



C13118

Fig. 47 - VFD Remote Keypad Cable

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

Program the VFD for Indoor Fan Control

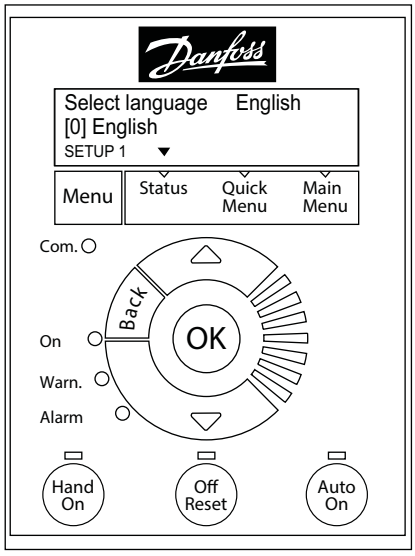
IMPORTANT: 48LC*B14-26 units are programmed at the Factory for variable indoor fan speeds. The following procedure is only to be used to recover this function after an event such as a system crash.

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

To program the VFD for variable indoor fan motor speeds:

1. At Power-Up:

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



C13119

Fig. 48 - Keypad with Power Up Screen Displayed

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

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

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

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

NOTE: Press the **Back** key to return to the previous display

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

0-01 Language
[0] English

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

0-03 Regional Settings
[0] International

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

0-03 Regional Settings
[1] North America

   h. Press **OK**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4. Entering Grid Type:

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

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

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

0–01 Language
[0] English

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

0–06 Grid Type
[102] 200–240V/60Hz

d. Press **OK** to highlight the number in the bracket and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to select the desired voltage and Hertz for the unit.

e. Press **OK** to accept the selection and continue.

5. Entering Motor Data:

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

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

b. Press ▼**(Down Arrow)** once to highlight the bottom row.

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

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

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

1–1* Motor Selection
1–2* Motor Data

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

1-20 Motor Power
[9] 1.5kW – 2 hp

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

f. Press **OK** and then use the ▲ and ▼ (**Up** and **Down Arrow**) keys to scroll to the proper motor horsepower. Press **OK** again to set the selected hp.

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

1-22 Motor Voltage
230V

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

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

1-23 Motor Frequency
60Hz

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

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

1-24 Motor Current
6.61A

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

NOTE: The Max Amps is greater than the nameplate value. Check the VFD Unit Parameters (see Tables 9 - 13 on pages 44 - 48) 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 9 - 13. 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 9 - 13. 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 9 - 13. 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 9 - 13. 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**) keys 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 9 – 13, column labeled “Preset References 3–10[1]” for the proper % for each unit)
[2]MM.MM%	Medium Speed (see Tables 9 – 13, 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 Tables 9 – 13 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 9 – VFD Unit Parameters - 48LC*B Size 14

						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	14	STD	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
460V	14	STD	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
575V	14	STD	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
208/230V	14	MID	HD60FK658	HK30WA372	131L9797	[1]	[102]	[13]	230	60	13.6	1745	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
460V	14	MID	HD60FK658	HK30WA379	131L9866	[1]	[122]	[13]	460	60	6.8	1745	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
575V	14	MID	HD60FE576	HK30WA387	134F0217	[1]	[132]	[13]	575	60	6.0	1745	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
208/230V	14	HIGH	HD60FK657	HK30WA373	131L9798	[1]	[102]	[14]	230	60	21.2	1760	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
460V	14	HIGH	HD60FK657	HK30WA380	131L9867	[1]	[122]	[14]	460	60	9.7	1760	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
575V	14	HIGH	HD60FL576	HK30WA384	131N0229	[1]	[132]	[14]	575	60	7.2	1745	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
208/230V	14	ULTRA	HD62FK654	HK30WA374	131L9799	[1]	[102]	[15]	230	60	28.0	1760	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
460V	14	ULTRA	HD62FK654	HK30WA381	131L9868	[1]	[122]	[15]	460	60	13.7	1760	2.0	[1]	1.0	[4]	0%	53.43%	79.57%
575V	14	ULTRA	HD62FL576	HK30WA384	131N0229	[1]	[132]	[15]	575	60	8.9	1750	2.0	[1]	1.0	[4]	0%	53.43%	79.57%

			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	14	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	14	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	14	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	14	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	14	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	14	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	14	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	14	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	14	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	14	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	14	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	14	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 10 – VFD Unit Parameters - 48LC*B Size 17

						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	17	STD	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
460V	17	STD	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
575V	17	STD	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
208/230V	17	MID	HD60FK657	HK30WA373	131L9798	[1]	[102]	[14]	230	60	21.2	1760	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
460V	17	MID	HD60FK657	HK30WA380	131L9867	[1]	[122]	[14]	460	60	9.7	1760	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
575V	17	MID	HD60FL576	HK30WA384	131N0229	[1]	[132]	[14]	575	60	7.2	1745	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
208/230V	17	HIGH	HD62FK654	HK30WA374	131L9799	[1]	[102]	[15]	230	60	28.0	1760	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
460V	17	HIGH	HD62FK654	HK30WA381	131L9868	[1]	[122]	[15]	460	60	13.7	1760	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
575V	17	HIGH	HD62FL576	HK30WA384	131N0229	[1]	[132]	[15]	575	60	8.9	1750	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
208/230V	17	ULTRA	HD64FK654	HK30WA375	131L9800	[1]	[102]	[16]	230	60	37.3	1755	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
460V	17	ULTRA	HD64FK654	HK30WA386	131L9869	[1]	[122]	[16]	460	60	16.9	1755	2.0	[1]	1.0	[4]	0%	56.64%	82.40%
575V	17	ULTRA	HD64FL576	HK30WA388	131N0233	[1]	[132]	[16]	575	60	12.6	1755	2.0	[1]	1.0	[4]	0%	56.64%	82.40%

			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	17	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	17	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	17	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	17	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	17	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	17	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	17	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	17	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	17	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	17	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	17	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	17	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 11 – VFD Unit Parameters - 48LC*B Size 20

						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	20	STD	HD60FE656	HK30WA372	131L9797	[1]	[102]	[11]	230	60	11.7	1750	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
460V	20	STD	HD60FE656	HK30WA378	131L9865	[1]	[122]	[11]	460	60	5.4	1750	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
575V	20	STD	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
208/230V	20	MID	HD60FK657	HK30WA373	131L9798	[1]	[102]	[14]	230	60	21.2	1760	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
460V	20	MID	HD60FK657	HK30WA380	131L9867	[1]	[122]	[14]	460	60	9.7	1760	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
575V	20	MID	HD60FL576	HK30WA384	131N0229	[1]	[132]	[14]	575	60	7.2	1745	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
208/230V	20	HIGH	HD62FK654	HK30WA374	131L9799	[1]	[102]	[15]	230	60	28.0	1760	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
460V	20	HIGH	HD62FK654	HK30WA381	131L9868	[1]	[122]	[15]	460	60	13.7	1760	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
575V	20	HIGH	HD62FL576	HK30WA384	131N0229	[1]	[132]	[15]	575	60	8.9	1750	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
208/230V	20	ULTRA	HD64FK654	HK30WA375	131L9800	[1]	[102]	[16]	230	60	37.3	1755	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
460V	20	ULTRA	HD64FK654	HK30WA386	131L9869	[1]	[122]	[16]	460	60	16.9	1755	2.0	[1]	1.0	[4]	0%	52.57%	61.63%
575V	20	ULTRA	HD64FL576	HK30WA388	131N0233	[1]	[132]	[16]	575	60	12.6	1755	2.0	[1]	1.0	[4]	0%	52.57%	61.63%

			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	20	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	20	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	20	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	20	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	20	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	20	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	20	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	20	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	20	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	20	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	20	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	20	ULTRA	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 12 – VFD Unit Parameters - 48LC*B Size 24

						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	24	STD	HD60FK657	HK30WA373	131L9798	[1]	[102]	[14]	230	60	21.2	1760	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
460V	24	STD	HD60FK657	HK30WA380	131L9867	[1]	[122]	[14]	460	60	9.7	1760	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
575V	24	STD	HD60FL576	HK30WA384	131N0229	[1]	[132]	[14]	575	60	7.2	1745	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
208/230V	24	MID	HD62FK654	HK30WA374	131L9799	[1]	[102]	[15]	230	60	28.0	1760	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
460V	24	MID	HD62FK654	HK30WA381	131L9868	[1]	[122]	[15]	460	60	13.7	1760	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
575V	24	MID	HD62FL576	HK30WA384	131N0229	[1]	[132]	[15]	575	60	8.9	1750	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
208/230V	24	HIGH	HD64FK654	HK30WA375	131L9800	[1]	[102]	[16]	230	60	37.3	1755	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
460V	24	HIGH	HD64FK654	HK30WA386	131L9869	[1]	[122]	[16]	460	60	16.9	1755	2.0	[1]	1.0	[4]	0%	52.33%	64.48%
575V	24	HIGH	HD64FL576	HK30WA388	131N0233	[1]	[132]	[16]	575	60	12.6	1755	2.0	[1]	1.0	[4]	0%	52.33%	64.48%

			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	24	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	24	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	24	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	24	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	24	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	24	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	24	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	24	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	24	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 13 – VFD Unit Parameters - 48LC*B Size 26

						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	26	STD	HD60FK657	HK30WA373	131L9798	[1]	[102]	[14]	230	60	21.2	1760	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
460V	26	STD	HD60FK657	HK30WA380	131L9867	[1]	[122]	[14]	460	60	9.7	1760	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
575V	26	STD	HD60FL576	HK30WA384	131N0229	[1]	[132]	[14]	575	60	7.2	1745	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
208/230V	26	MID	HD62FK654	HK30WA374	131L9799	[1]	[102]	[15]	230	60	28.0	1760	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
460V	26	MID	HD62FK654	HK30WA381	131L9868	[1]	[122]	[15]	460	60	13.7	1760	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
575V	26	MID	HD62FL576	HK30WA384	131N0229	[1]	[132]	[15]	575	60	8.9	1750	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
208/230V	26	HIGH	HD64FK654	HK30WA375	131L9800	[1]	[102]	[16]	230	60	37.3	1755	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
460V	26	HIGH	HD64FK654	HK30WA386	131L9869	[1]	[122]	[16]	460	60	16.9	1755	2.0	[1]	1.0	[4]	0%	60.00%	72.00%
575V	26	HIGH	HD64FL576	HK30WA388	131N0233	[1]	[132]	[16]	575	60	12.6	1755	2.0	[1]	1.0	[4]	0%	60.00%	72.00%

			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	26	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	26	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	26	STD	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	26	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	26	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	26	MID	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
208/230V	26	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
460V	26	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]
575V	26	HIGH	100%	100%	0%	0%	0%	10.00	10.00	100%	[8]	[16]	[17]	[18]	2	[10]	0	[60]	[3]	600	[0]

Table 14 – Unit Wire/Fuse or HACR Breaker Sizing Data

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
14	208/ 230–3–60	STD	59.1/58.3	80/80	61/60	343	70.9/70.1	90/90	75/74	363	63.9/63.1	80/80	67/66	348	75.7/74.9	90/90	80/79	368
		MED	64.1/63.2	80/80	67/66	378	75.9/75.0	90/90	81/80	398	68.9/68.0	90/90	73/72	383	80.7/79.8	100/100	86/85	403
		HIGH	71.7	90	76	382	83.5	100	89	402	76.5	90	81	387	88.3	100	95	407
		ULTRA	79.7	100	84	456	91.5	100	97	476	84.5	100	89	461	96.3	110	103	481
	460–3–60	STD	31.3	40	33	167	37.5	45	40	179	33.5	40	35	169	39.7	50	42	181
		MED	33.9	45	36	184	40.1	50	43	196	36.1	45	38	186	42.3	50	45	198
		HIGH	37.2	45	40	186	43.4	50	47	198	39.4	50	42	188	45.6	50	49	200
		SUPER	41.8	50	44	223	48.0	60	51	235	44.0	50	47	225	50.2	60	54	237
	575–3–60	STD	24.4	30	26	119	29.2	35	31	127	26.1	30	28	121	30.9	35	33	129
		MED	26.1	30	28	133	30.9	35	33	141	27.8	30	30	135	32.6	40	35	143
		HIGH	27.1	30	29	131	31.9	35	34	139	28.8	35	31	133	33.6	40	36	141
		ULTRA	29.0	35	31	158	33.8	40	36	166	30.7	35	33	160	35.5	40	38	168
17	208/ 230–3–60	STD	67.4/66.6	90/90	70/69	371	79.2/78.4	100/100	83/82	391	72.2/71.4	90/90	75/74	376	84.0/83.2	100/100	89/88	396
		MED	80.0	100	84	410	91.8	100	98	430	84.8	100	90	415	96.6	110	103	435
		HIGH	86.9	100	92	484	98.7	125	105	504	91.7	100	97	489	103.5	125	111	509
		ULTRA	98.5	125	103	524	110.3	125	116	544	103.3	125	108	529	115.1	150	122	549
	460–3–60	STD	34.8	45	36	193	41.0	50	43	205	37.0	45	39	195	43.2	50	46	207
		MED	40.7	50	43	212	46.9	60	50	224	42.9	50	46	214	49.1	60	53	226
		HIGH	44.9	50	48	249	51.1	60	55	261	47.1	60	50	251	53.3	60	57	263
		ULTRA	48.9	60	51	269	55.1	60	59	281	51.1	60	54	271	57.3	70	61	283
	575–3–60	STD	30.0	40	32	154	34.8	40	37	162	31.7	40	33	156	36.5	45	39	164
		MED	32.7	40	35	166	37.5	45	40	174	34.4	40	37	168	39.2	45	42	176
		HIGH	34.4	40	37	193	39.2	45	42	201	36.1	45	39	195	40.9	50	44	203
		ULTRA	38.7	50	41	204	43.5	50	46	212	40.4	50	43	206	45.2	50	48	214

See “Legend and Notes for Tables 14 and 15” on page 53.

Table 14 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont.)

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
20	208/ 230–3–60	STD	73.3/72.5	100/100	76/75	412	85.1/84.3	100/100	90/89	432	78.1/77.3	100/100	82/81	417	89.9/89.1	100/100	95/95	437
		MED	85.9	100	91	451	97.7	125	104	471	90.7	100	96	456	102.5	125	110	476
		HIGH	92.8	100	99	525	104.6	125	112	545	97.6	125	104	530	109.4	125	118	550
		ULTRA	104.4	125	109	565	116.2	150	123	585	109.2	125	115	570	121.0	150	128	590
	460–3–60	STD	37.2	50	39	231	43.4	50	46	243	39.4	50	42	233	45.6	50	49	245
		MED	43.1	50	46	250	49.3	60	53	262	45.3	50	48	252	51.5	60	56	264
		HIGH	47.3	60	50	287	53.5	60	58	299	49.5	60	53	289	55.7	60	60	301
		ULTRA	51.3	60	54	307	57.5	70	61	319	53.5	60	57	309	59.7	70	64	321
	575–3–60	STD	31.8	40	34	182	36.6	45	39	190	33.5	40	36	184	38.3	45	41	192
		MED	34.5	40	37	194	39.3	45	42	202	36.2	45	39	196	41.0	50	44	204
		HIGH	36.2	45	39	221	41.0	50	44	229	37.9	45	41	223	42.7	50	46	231
		ULTRA	40.5	50	43	232	45.3	50	48	240	42.2	50	45	234	47.0	60	50	242
24	208/ 230–3–60	STD	101.9	125	108	538	113.7	125	121	558	106.7	125	113	543	118.5	150	127	563
		MED	108.7	125	115	612	120.5	150	129	632	113.5	125	121	617	125.3	150	135	637
		HIGH	119.0	150	126	652	130.8	150	140	672	123.8	150	132	657	135.6	150	145	677
	460–3–60	STD	56.6	70	60	278	62.8	80	67	290	58.8	70	62	280	65.0	80	70	292
		MED	60.6	70	65	315	66.8	80	72	327	62.8	80	67	317	69.0	80	74	329
		HIGH	63.8	80	68	335	70.0	80	75	347	66.0	80	71	337	72.2	90	78	349
	575–3–60	STD	45.0	50	48	206	49.8	60	54	214	46.7	50	50	208	51.5	60	56	216
		MED	46.7	50	50	233	51.5	60	56	241	48.4	60	52	235	53.2	60	58	243
		HIGH	50.4	60	54	244	55.2	60	60	252	52.1	60	56	246	56.9	70	62	254
26	208/ 230–3–60	STD	124.9	175	129	629	136.7	175	142	649	129.7	175	134	634	141.5	175	148	654
		MED	131.7	175	137	703	143.5	175	150	723	136.5	175	142	708	148.3	175	156	728
		HIGH	141.0	175	147	743	152.8	200	161	763	145.8	175	153	748	157.6	200	167	768
	460–3–60	STD	64.9	80	68	322	71.1	90	75	334	67.1	90	70	324	73.3	90	78	336
		MED	68.9	90	73	359	75.1	90	80	371	71.1	90	75	361	77.3	100	82	373
		HIGH	72.1	90	76	379	78.3	100	83	391	74.3	90	79	381	80.5	100	86	393
	575–3–60	STD	53.9	60	56	235	58.7	70	62	243	55.6	70	58	237	60.4	80	64	245
		MED	55.6	70	58	262	60.4	80	64	270	57.3	70	60	264	62.1	80	66	272
		HIGH	59.3	70	62	273	64.1	80	68	281	61.0	80	64	275	65.8	80	70	283

See “Legend and Notes for Tables 14 and 15” on page 53.

Table 15 – Unit Wire Sizing Data with Factory Installed HACR Breaker

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
14	208/ 230–3–60	STD	59.1/59.1	80/80	61/60	343	70.9/70.9	90/90	75/74	363	63.9/63.9	80/80	67/66	348	75.7/75.7	90/90	80/79	368
		MED	64.1/64.1	80/80	67/66	378	75.9/75.9	90/90	81/80	398	68.9/68.9	90/90	73/72	383	80.7/80.7	100/100	86/85	403
		HIGH	71.7	90	76	382	83.5	100	89	402	76.5	90	81	387	88.3	100	95	407
		ULTRA	79.7	100	84	456	91.5	100	97	476	84.5	100	89	461	96.3	110	103	481
	460–3–60	STD	31.3	40	33	167	37.5	45	40	179	33.5	40	35	169	39.7	50	42	181
		MED	33.9	45	36	184	40.1	50	43	196	36.1	45	38	186	42.3	50	45	198
		HIGH	37.2	45	40	186	43.4	50	47	198	39.4	50	42	188	45.6	50	49	200
		ULTRA	41.8	50	44	223	48.0	60	51	235	44.0	50	47	225	50.2	60	54	237
	575–3–60	STD	24.4	30	26	119	29.2	35	31	127	26.1	30	28	121	30.9	35	33	129
		MED	26.1	30	28	133	30.9	35	33	141	27.8	30	30	135	32.6	40	35	143
		HIGH	27.1	30	29	131	31.9	35	34	139	28.8	35	31	133	33.6	40	36	141
		ULTRA	29.0	35	31	158	33.8	40	36	166	30.7	35	33	160	35.5	40	38	168
17	208/ 230–3–60	STD	67.4/67.4	90/90	70/69	371	79.2/79.2	100/100	83/82	391	72.2/72.2	90/90	75/74	376	84.0/84.0	100/100	89/88	396
		MED	80.0	100	84	410	91.8	100	98	430	84.8	100	90	415	96.6	110	103	435
		HIGH	86.9	100	92	484	98.7	125	105	504	91.7	100	97	489	103.5	125	111	509
		ULTRA	98.5	125	103	524	110.3	125	116	544	103.3	125	108	529	115.1	150	122	549
	460–3–60	STD	34.8	45	36	193	41.0	50	43	205	37.0	45	39	195	43.2	50	46	207
		MED	40.7	50	43	212	46.9	60	50	224	42.9	50	46	214	49.1	60	53	226
		HIGH	44.9	50	48	249	51.1	60	55	261	47.1	60	50	251	53.3	60	57	263
		ULTRA	48.9	60	51	269	55.1	60	59	281	51.1	60	54	271	57.3	70	61	283
	575–3–60	STD	30.0	40	32	154	34.8	40	37	162	31.7	40	33	156	36.5	45	39	164
		MED	32.7	40	35	166	37.5	45	40	174	34.4	40	37	168	39.2	45	42	176
		HIGH	34.4	40	37	193	39.2	45	42	201	36.1	45	39	195	40.9	50	44	203
		ULTRA	38.7	50	41	204	43.5	50	46	212	40.4	50	43	206	45.2	50	48	214

See “Legend and Notes for Tables 14 and 15” on page 53.

Table 15 - Unit Wire Sizing Data with Factory Installed HACR Breaker (cont.)

48LC*B UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE		MCA	HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
20	208/ 230–3–60	STD	73.3/73.3	100/100	76/75	412	85.1/85.1	100/100	90/89	432	78.1/78.1	100/100	82/81	417	89.9/89.9	100/100	95/95	437
		MED	85.9	100	91	451	97.7	125	104	471	90.7	100	96	456	102.5	125	110	476
		HIGH	92.8	100	99	525	104.6	125	112	545	97.6	125	104	530	109.4	125	118	550
		ULTRA	104.4	125	109	565	116.2	150	123	585	109.2	125	115	570	121.0	150	128	590
	460–3–60	STD	37.2	50	39	231	43.4	50	46	243	39.4	50	42	233	45.6	50	49	245
		MED	43.1	50	46	250	49.3	60	53	262	45.3	50	48	252	51.5	60	56	264
		HIGH	47.3	60	50	287	53.5	60	58	299	49.5	60	53	289	55.7	60	60	301
		ULTRA	51.3	60	54	307	57.5	70	61	319	53.5	60	57	309	59.7	70	64	321
	575–3–60	STD	31.8	40	34	182	36.6	45	39	190	33.5	40	36	184	38.3	45	41	192
		MED	34.5	40	37	194	39.3	45	42	202	36.2	45	39	196	41.0	50	44	204
		HIGH	36.2	45	39	221	41.0	50	44	229	37.9	45	41	223	42.7	50	46	231
		ULTRA	40.5	50	43	232	45.3	50	48	240	42.2	50	45	234	47.0	60	50	242
24	208/ 230–3–60	STD	101.9	125	108	538	113.7	125	121	558	106.7	125	113	543	118.5	150	127	563
		MED	108.7	125	115	612	120.5	150	129	632	113.5	125	121	617	125.3	150	135	637
		HIGH	119.0	150	126	652	130.8	150	140	672	123.8	150	132	657	135.6	150	145	677
	460–3–60	STD	56.6	70	60	278	62.8	80	67	290	58.8	70	62	280	65.0	80	70	292
		MED	60.6	70	65	315	66.8	80	72	327	62.8	80	67	317	69.0	80	74	329
		HIGH	63.8	80	68	335	70.0	80	75	347	66.0	80	71	337	72.2	90	78	349
	575–3–60	STD	45.0	50	48	206	49.8	60	54	214	46.7	50	50	208	51.5	60	56	216
		MED	46.7	50	50	233	51.5	60	56	241	48.4	60	52	235	53.2	60	58	243
		HIGH	50.4	60	54	244	55.2	60	60	252	52.1	60	56	246	56.9	70	62	254
26	208/ 230–3–60	STD	124.9	175	129	629	136.7	175	142	649	129.7	175	134	634	141.5	175	148	654
		MED	131.7	175	137	703	143.5	175	150	723	136.5	175	142	708	148.3	175	156	728
		HIGH	141.0	175	147	743	152.8	200	161	763	145.8	175	153	748	157.6	200	167	768
	460–3–60	STD	64.9	80	68	322	71.1	90	75	334	67.1	90	70	324	73.3	90	78	336
		MED	68.9	90	73	359	75.1	90	80	371	71.1	90	75	361	77.3	100	82	373
		HIGH	72.1	90	76	379	78.3	100	83	391	74.3	90	79	381	80.5	100	86	393
	575–3–60	STD	53.9	60	56	235	58.7	70	62	243	55.6	70	58	237	60.4	80	64	245
		MED	55.6	70	58	262	60.4	80	64	270	57.3	70	60	264	62.1	80	66	272
		HIGH	59.3	70	62	273	64.1	80	68	281	61.0	80	64	275	65.8	80	70	283

See “Legend and Notes for Tables 14 and 15” on page 53.

Legend and Notes for Tables 14 and 15

LEGEND:

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

NOTES:

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

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

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 48LC*B14-26 models. 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. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit's Integrated Staging Control (ISC) board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

Return Air Sensor Tube Installation –

The return air sampling tube is shipped in the unit s supply fan section, attached to the blower housing (see Fig. 49. Its operating location is in the return air section of the unit (see Fig. 50, unit without economizer, or Fig. 51, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.

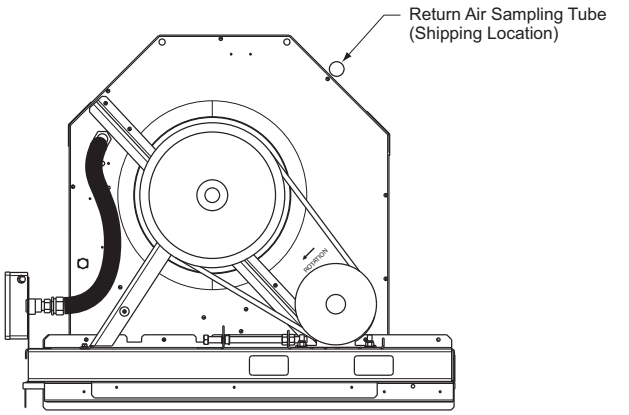


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Fig. 49 - Typical Supply Air Smoke Detector Sensor Location

To install the return air sensor sampling tube:

1. Remove the tube from its shipping location.
2. Open the unit end to access the return air sensor (located on right-hand partition)
3. Orient the tube's sampling holes into the return air flow direction. For vertical application, position the sampling holes on the bottom of the tube, facing into the bottom return duct opening. For horizontal application, position the sampling holes on the side of the tube, facing the unit's end panel.
4. Insert the sampling tube into the return air sensor module until the tube snaps into position.
5. Replace end panel or outside air hood.

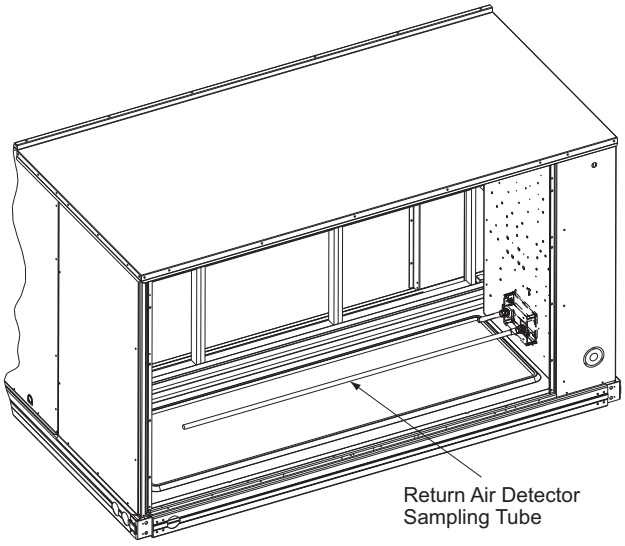

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Fig. 50 - Return Air Sampling Tube Location in Unit without Economizer

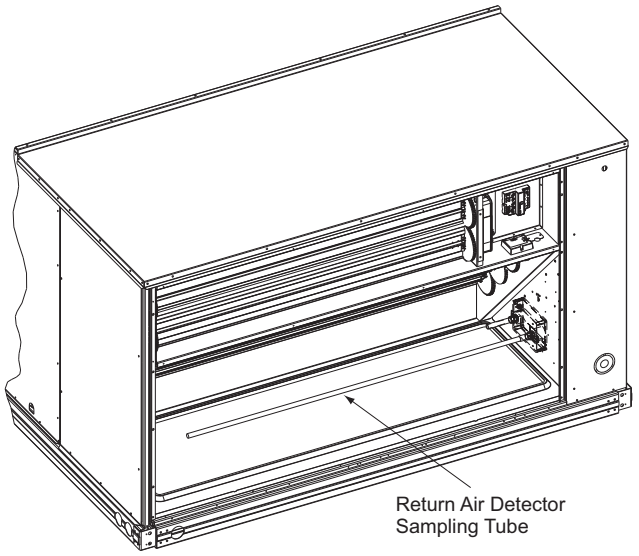

Fig. 51 - Return Air Sampling Tube Location in Unit with Economizer

Smoke Detector Test Magnet —

Locate the magnet; it is shipped in the control box area.

Additional Application Data —

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

Step 15 — Install Accessories

Available accessories include:

Curb
Thru-base connection kit (must be installed before unit is set on curb)
Power Exhaust
Outdoor enthalpy sensor
Differential enthalpy sensor
CO_2 sensor
Louvered hail guard
Phase monitor control

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

Pre-Start and Start-Up

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

Edition Date: 11/15 518A
Catalog No: 48LCB–14–26–01SI
Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.
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

☐ VERIFY INSTALLATION OF OUTDOOR AIR HOOD

☐ VERIFY INSTALLATION OF FLUE EXHAUST AND INLET HOOD

☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS

☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT

☐ VERIFY GAS PRESSURE TO UNIT GAS VALVE IS WITHIN SPECIFIED RANGE

☐ CHECK GAS PIPING FOR LEAKS

☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE

☐ CHECK THAT OUTDOOR AIR INLET SCREENS ARE IN PLACE

☐ VERIFY THAT UNIT IS LEVEL

☐ CHECK FAN WHEELS AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND VERIFY SETSCREW IS TIGHT

☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED

☐ VERIFY THAT SCROLL COMPRESSORS ARE ROTATING IN THE CORRECT DIRECTION

☐ VERIFY THAT CRANKCASE HEATERS HAVE BENN ENERGIZED FOR AT LEAST 24 HOURS

II. START-UP

ELECTRICAL

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

TEMPERATURES

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

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

COOLING SUPPLY AIR TEMPERATURE _____ °F

GAS HEAT SUPPLY AIR _____ °F

PRESSURES

GAS INLET PRESSURE		_____	IN. WG
GAS MANIFOLD PRESSURE	STAGE 1	_____	IN. WG
	STAGE 2	_____	IN. WG
REFRIGERANT SUCTION	CIRCUIT A	_____	PSIG
	CIRCUIT B	_____	PSIG
REFRIGERANT DISCHARGE	CIRCUIT A	_____	PSIG
	CIRCUIT B	_____	PSIG

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

GENERAL

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

☐ VERIFY SMOKE DETECTOR UNIT SHUTDOWN BY UTILIZING MAGNET TEST

REPEAT PROCESS FOR 2 COMPRESSOR SYSTEMS

Edition Date: 11/15 518A

Catalog No: 48LCB–14–26–01SI

Replaces: New