



# Installation Instructions

NOTE: Read the entire instruction manual before starting the installation.


- SAFETY CONSIDERATIONS** ..... 1
- GENERAL** ..... 2
- Rated Indoor Airflow (cfm)** ..... 2
- INSTALLATION** ..... 6
- Jobsite Survey** ..... 6
- Step 1 — Plan for Unit Location** ..... 6
  - ROOF MOUNT
- Step 2 — Plan for Sequence of Unit Installation** .... 7
  - CURB-MOUNTED INSTALLATION
  - PAD-MOUNTED INSTALLATION
  - FRAME-MOUNTED INSTALLATION
- Step 3 — Inspect Unit** ..... 7
- Step 4 — Provide Unit Support** ..... 7
  - ROOF CURB MOUNT
  - SLAB MOUNT (HORIZONTAL UNITS ONLY)
  - ALTERNATE UNIT SUPPORT (IN LIEU OF CURB OR SLAB MOUNT)
- Step 5 — Field Fabricate Ductwork** ..... 9
  - FOR UNITS WITH ACCESSORY OR OPTIONAL ELECTRIC HEATERS
- Step 6 — Rig and Place Unit** ..... 9
  - POSITIONING ON CURB
- Step 7 — Convert to Horizontal and Connect Ductwork (when required)** ..... 10
- Step 8 — Install Outside Air Hood** ..... 11
  - ECONOMIZER HOOD PACKAGE REMOVAL AND SETUP - FACTORY OPTION
  - ECONOMIZER HOOD
- Step 9 — Install External Condensate Trap and Line** ..... 12
- Step 10 — Make Electrical Connections** ..... 12
  - FIELD POWER SUPPLY
  - UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR
  - UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR
  - ALL UNITS
  - CONVENIENCE OUTLETS
  - HACR
  - FACTORY-OPTION THRU-BASE CONNECTIONS
  - UNITS WITHOUT THRU-BASE CONNECTIONS
  - FIELD CONTROL WIRING
  - THERMOSTAT
  - UNIT WITHOUT THRU-BASE CONNECTION KIT
  - HEAT ANTICIPATOR SETTINGS
- Electric Heaters** ..... 23
  - SINGLE POINT BOXES AND SUPPLEMENTARY FUSES
  - SINGLE POINT BOXES WITHOUT FUSES
  - LOW-VOLTAGE CONTROL CONNECTIONS
- Humidi-MiZer® System Control Connections** ..... 24
  - HUMIDI-MIZER SYSTEM – SPACE RH CONTROLLER
- RTU Open Controller (Factory-Installed Option)** . . . 25
- SystemVu™ Controller (Factory-Installed Option)** . 25
- Integrated Staging Control (ISC) Board** ..... 26

- **ISC BOARD - SEQUENCE OF OPERATION**
- EconoMiSer® X (Factory Option)** ..... 28
- SYSTEM COMPONENTS
- SPECIFICATIONS
- INPUTS
- OUTPUTS
- ENVIRONMENTAL
- ECONOMIZER MODULE WIRING DETAILS
- INTERFACE OVERVIEW
- SETUP AND CONFIGURATION
- ENTHALPY SETTINGS
- TWO-SPEED FAN OPERATION
- CHECKOUT
- TROUBLESHOOTING
- Staged Air Volume (SAV™) with Variable Frequency Drive** ..... 42
- Multi-Speed VFD Display Kit (Field-Installed Accessory)** ..... 42
  - ALPHA NUMERIC DISPLAY
  - MENU KEY
  - NAVIGATION KEYS AND STATUS LEDES
  - OPERATION KEYS AND LEDES
  - CONNECTING THE KEYPAD TO THE VFD
  - PROGRAM THE VFD FOR 3 DISCRETE INDOOR FAN SPEEDS
- Smoke Detectors** ..... 50
  - COMPLETING INSTALLATION OF RETURN AIR SMOKE SENSOR
  - ADDITIONAL APPLICATION DATA
- Step 11 — Adjust Factory-Installed Options** ..... 51
  - SMOKE DETECTORS
- Step 12 — Install Accessories** ..... 51
- Pre-Start and Start-Up** ..... 51
- Step 13 — Check Belt Tension** ..... 51
  - BELT FORCE — DEFLECTION METHOD
  - BELT TENSION METHOD
- START-UP CHECKLIST** ..... CL-1

## SAFETY CONSIDERATIONS

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

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

It is important to recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit

and in instructions or manuals, be alert to the potential for personal injury.

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

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD**

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

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lock(s) and lockout tag(s). Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate. Unit may have more than one power switch.

**⚠ WARNING**

**UNIT OPERATION AND SAFETY HAZARD**

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

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

**⚠ WARNING**

**PERSONAL INJURY AND ENVIRONMENTAL HAZARD**

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

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

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

**⚠ WARNING**

**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.

**GENERAL**

See Fig. 1 for unit options. See Fig. 2 and 3 for unit dimensions.

**Rated Indoor Airflow (cfm)**

Table 1 lists the rated indoor airflow for the AHRI efficiency rating for the units covered in this document.

**Table 1 — Rated Indoor Airflow (cfm)**

<b>MODEL NUMBER</b>	<b>FULL LOAD AIRFLOW (CFM)</b>
<b>50LC**07</b>	2250

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

**Unit Heat Type**

50 - Electric Cooling/Heating  
Packaged Rooftop

**Model Series - WeatherExpert®**

LC - Ultra High Efficiency

**Heat Options**

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

**Refrig. Systems Options**

0 = Three stage cooling capacity control with TXV  
A = Three stage cooling capacity control with TXV and Humidi-MiZer® System

**Cooling Tons**

07 - 6 ton

**Sensor Options**

A = None  
B = RA Smoke Detector  
C = SA Smoke Detector  
D = RA + SA Smoke Detector  
E = CO<sub>2</sub>  
F = RA Smoke Detector and CO<sub>2</sub>  
G = SA Smoke Detector and CO<sub>2</sub>  
H = RA + SA Smoke Detector and CO<sub>2</sub>

**Indoor Fan Options**

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

**Coil Options: Fin/Tube (Condenser- Evaporator - Hail Guard)**

A = Al/Cu - Al/Cu  
B = Precoat Al/Cu - Al/Cu  
C = E-coat Al/Cu - Al/Cu  
D = E-coat Al/Cu - E-coat Al/Cu  
E = Cu/Cu - Al/Cu  
F = Cu/Cu - Cu/Cu  
M = Al/Cu -Al/Cu — Louvered Hail Guard  
N = Precoat Al/Cu - Al/Cu — Louvered Hail Guard  
P = E-coat Al/Cu - Al/Cu — Louvered Hail Guard  
Q = E-coat Al/Cu - E-coat Al/Cu — Louvered Hail Guard  
R = Cu/Cu - Al/Cu — Louvered Hail Guard  
S = Cu/Cu - Cu/Cu — Louvered Hail Guard

**Packaging**

0 = Standard  
1 = LTL

**Electrical Options**

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

**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

**Intake / Exhaust Options**

A = None  
B = Standard Leak Temperature Economizer with Barometric Relief  
E = Standard Leak Enthalpy Economizer with Barometric Relief  
N = Ultra Low Leak Temperature Economizer with Barometric Relief  
R = Ultra Low Leak Enthalpy Economizer with Barometric Relief

**Base Unit Controls**

0 = Electro-mechanical Controls  
1 = RTU Open Multi-Protocol Controller  
4 = SystemVu™ Controller

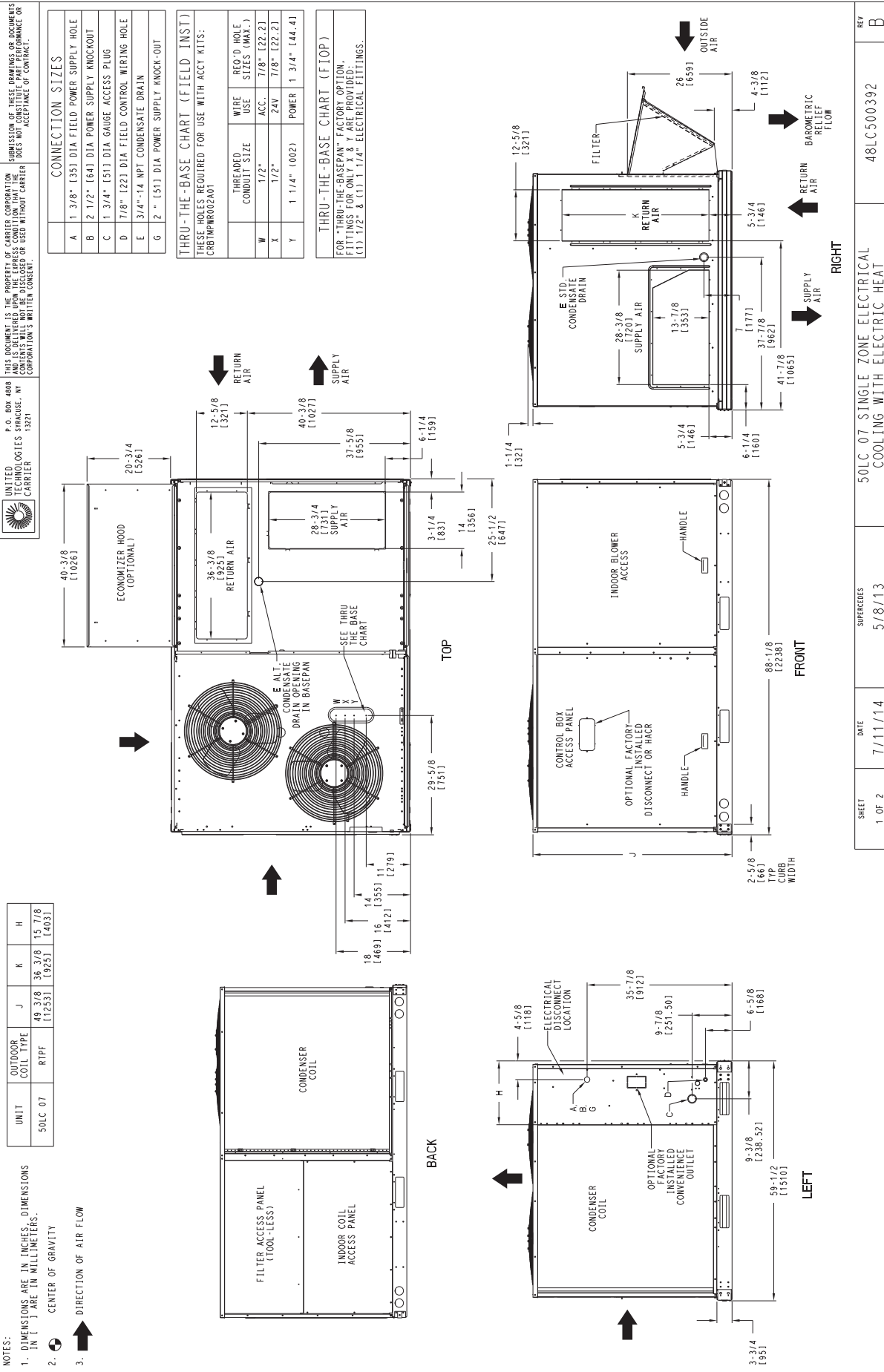
**Design Revision**

- = Factory Design Revision

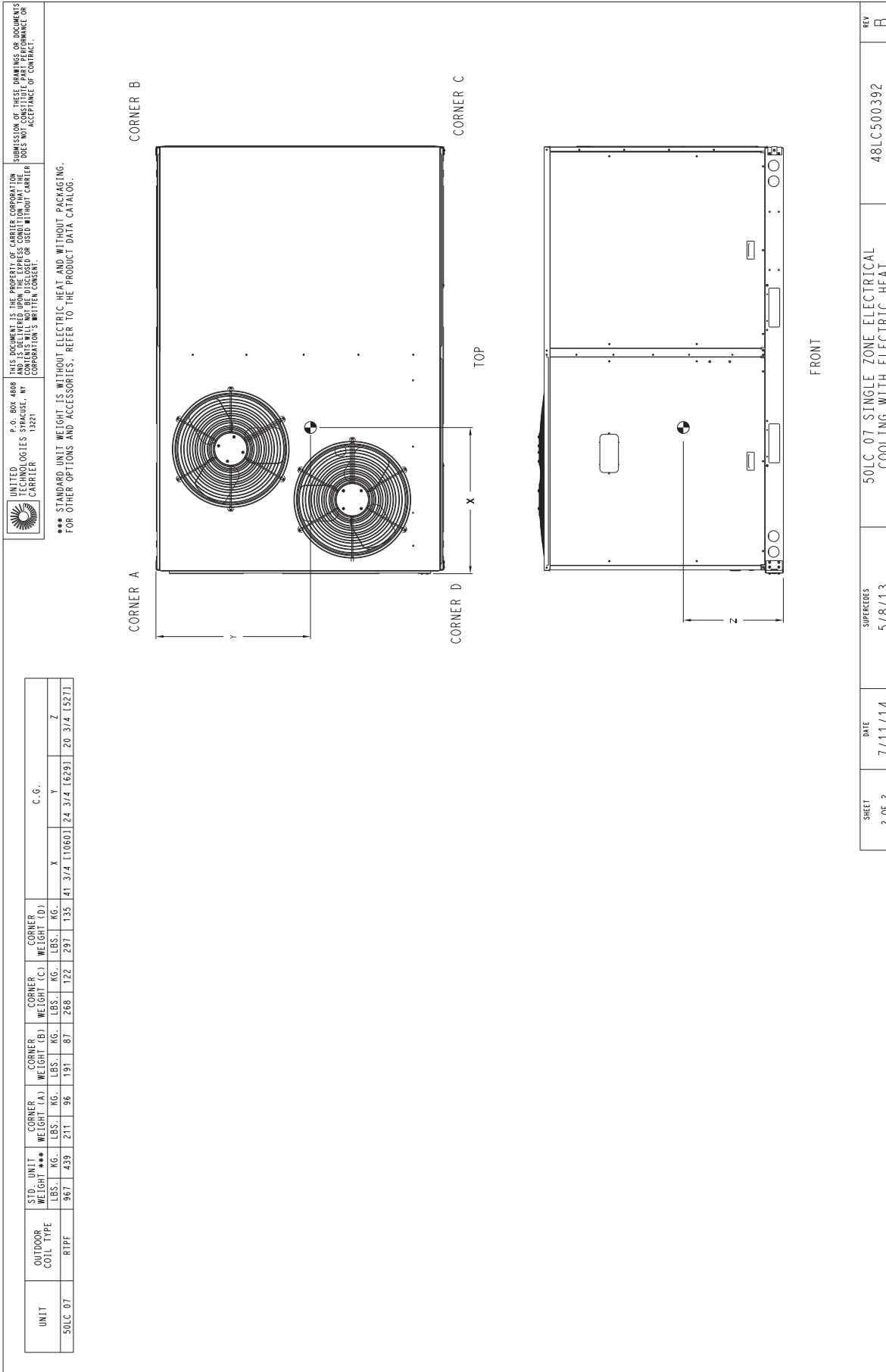
**Voltage**

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

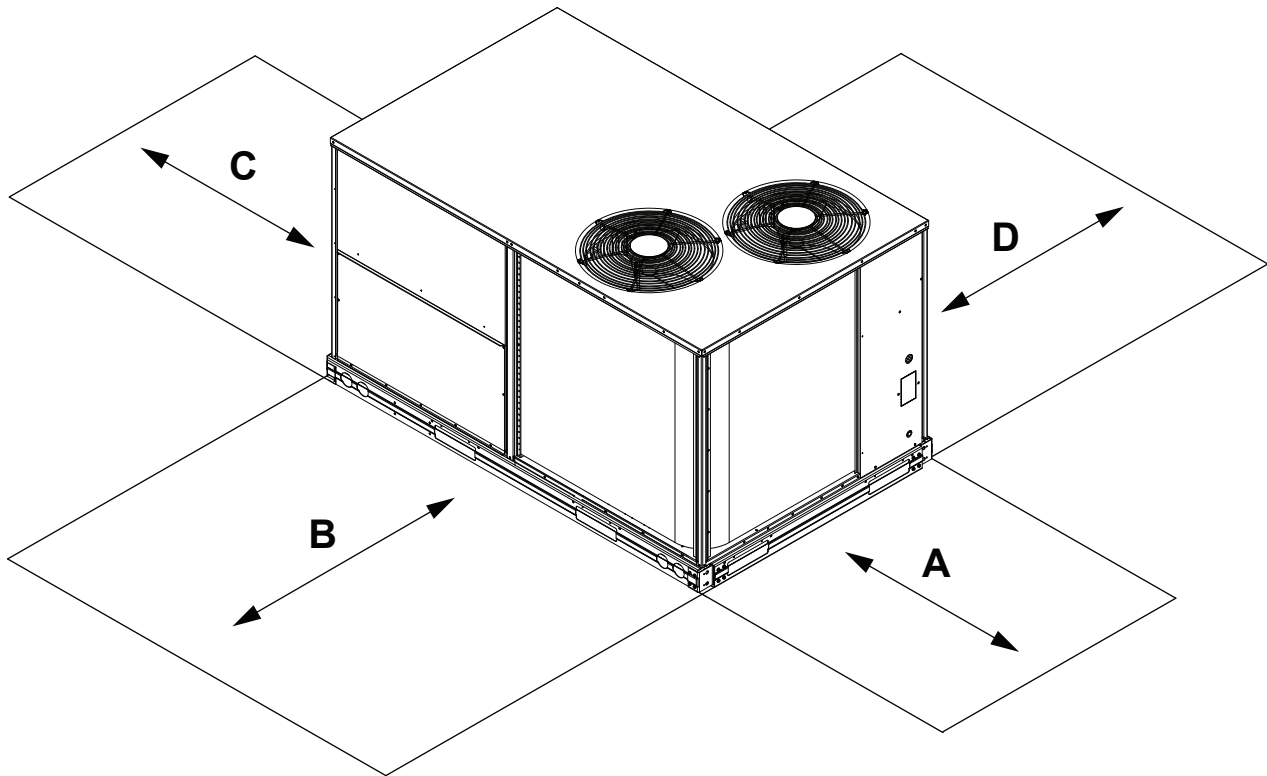
**Fig. 1 — 50LC 07 Model Number Nomenclature**



**Fig. 2 — Unit Dimensional Drawing**



**Fig. 2 — Unit Dimensional Drawing (cont)**



LOCATION	DIMENSION	CONDITION
A	48-in. (1219 mm)	Unit disconnect is mounted on panel
	18-in. (457 mm)	No disconnect, convenience outlet option
	18-in. (457 mm)	Recommended service clearance
	12-in. (305 mm)	Minimum clearance
B	42-in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36-in. (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check sources of flue products within 10 ft of unit fresh air intake hood
C	36-in. (914 mm)	Side condensate drain is used
	18-in. (457 mm)	Minimum clearance
D	42-in. (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36-in. (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)

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

**Fig. 3 — Service Clearance Dimensional Drawing**

## INSTALLATION

### Jobsite Survey

Complete the following checks before installation.

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

### Step 1 — Plan for Unit Location

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

NOTE: Consider also the effect of adjacent units.

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.

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements.

Refer to “Step 9 — Install External Condensate Trap and Line” on page 12 for required trap dimensions.

### ROOF MOUNT

Check building codes for weight distribution requirements. Unit operating weight is shown in Table 2.

**Table 2 — Operating Weights**

50LC**07	UNITS LB (KG)
<b>Base Unit</b>	967 (439)
<b>Economizer</b>	
<b>Vertical</b>	75 (34)
<b>Horizontal</b>	122 (55)
<b>Powered Outlet</b>	35 (16)
<b>Curb</b>	
<b>14-in. (356 mm)</b>	143 (65)
<b>24-in. (610 mm)</b>	245 (111)

**Step 2 — Plan for Sequence of Unit Installation**

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

Review the following for recommended sequences for installation steps.

**CURB-MOUNTED INSTALLATION**

1. Install curb
2. Install field-fabricated ductwork inside curb
3. Install accessory thru-base service connection package (affects curb and unit) (refer to accessory installation instructions for details)
4. Prepare bottom condensate drain connection to suit planned condensate line routing (refer to “Step 9 — Install External Condensate Trap and Line” on page 12 for details)
5. Rig and place unit
6. Install outdoor air hood
7. Install condensate line trap and piping
8. Make electrical connections
9. Install other accessories

**PAD-MOUNTED INSTALLATION**

1. Prepare pad and unit supports
2. Check and tighten the bottom condensate drain connection plug
3. Rig and place unit
4. Convert unit to side duct connection arrangement
5. Install field-fabricated ductwork at unit duct openings
6. Install outdoor air hood
7. Install condensate line trap and piping
8. Make electrical connections
9. Install other accessories

**FRAME-MOUNTED INSTALLATION**

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

**Step 3 — Inspect Unit**

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

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

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

Locate the carton containing the outside air hood parts; see Fig. 11. Do not remove carton until unit has been rigged and located in final position.

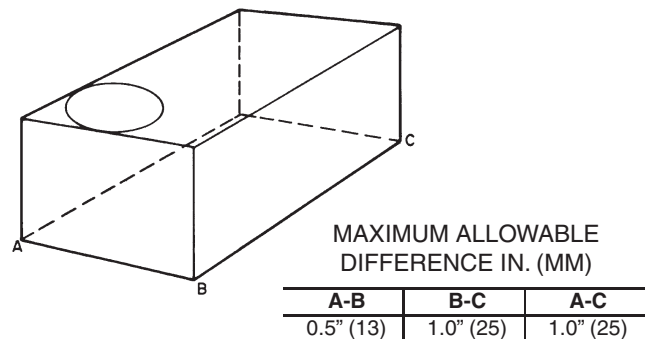
**Step 4 — Provide Unit Support**

**ROOF CURB MOUNT**

Accessory roof curb details and dimensions are shown in Fig. 5. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 5. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 4. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



**Fig. 4 — Unit Leveling Tolerances**

Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb and not to the unit. The accessory thru-the-base power and gas connection package must be installed before the unit is set on the roof curb.*

If electric and control wiring is to be routed through the basepan, attach the accessory thru-the-base service connections to the basepan in accordance with the accessory installation instructions.

**SLAB MOUNT (HORIZONTAL UNITS ONLY)**

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

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

**ALTERNATE UNIT SUPPORT (IN LIEU OF CURB OR SLAB MOUNT)**

A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4-in. x 4-in. (102 mm x 102 mm) pads on each side.

ROOF CURB ACCESSORY #	A	CONNECTOR PKG. ACC.	GAS CONNECTION TYPE	GAS FITTING	POWER WIRING FITTING	CONTROL WIRING FITTING	ACCESSORY CONVENIENCE OUTLET WIRING CONNECTOR
CRRFCURB003A01	14" [356]	CRBTMPWR002A01	THRU THE CURB	3/4" [19] NPT	1 - 1/4" [31.7] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRRFCURB004A01	24" [610]	CRBTMPWR004A01	THRU THE BOTTOM				

- NOTES:
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
  2. INSULATED PANELS: 2x5.4 (1") THK POLYURETHANE FOAM, 44.5 (1.34") # DENSITY.
  3. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  4. ROOFCURB: 18 GAGE STEEL.
  5. CURB: 18 GAGE STEEL.
  6. SERVICE HOLES TO CURBS: (PLACES OF DUCT REST ON CURB).
  7. SERVICE CLEARANCE FEET ON EACH SIDE.
  8. SERVICE CLEARANCE FEET ON EACH SIDE.
  9. DIRECTION OF AIR FLOW.
  10. CONNECTOR PACKAGE CRBTMPWR002A01 IS FOR THRU-THE-CURB GAS TYPE PACKAGE CRBTMPWR004A01 IS FOR THRU-THE-BOTTOM TYPE GAS CONNECTIONS.

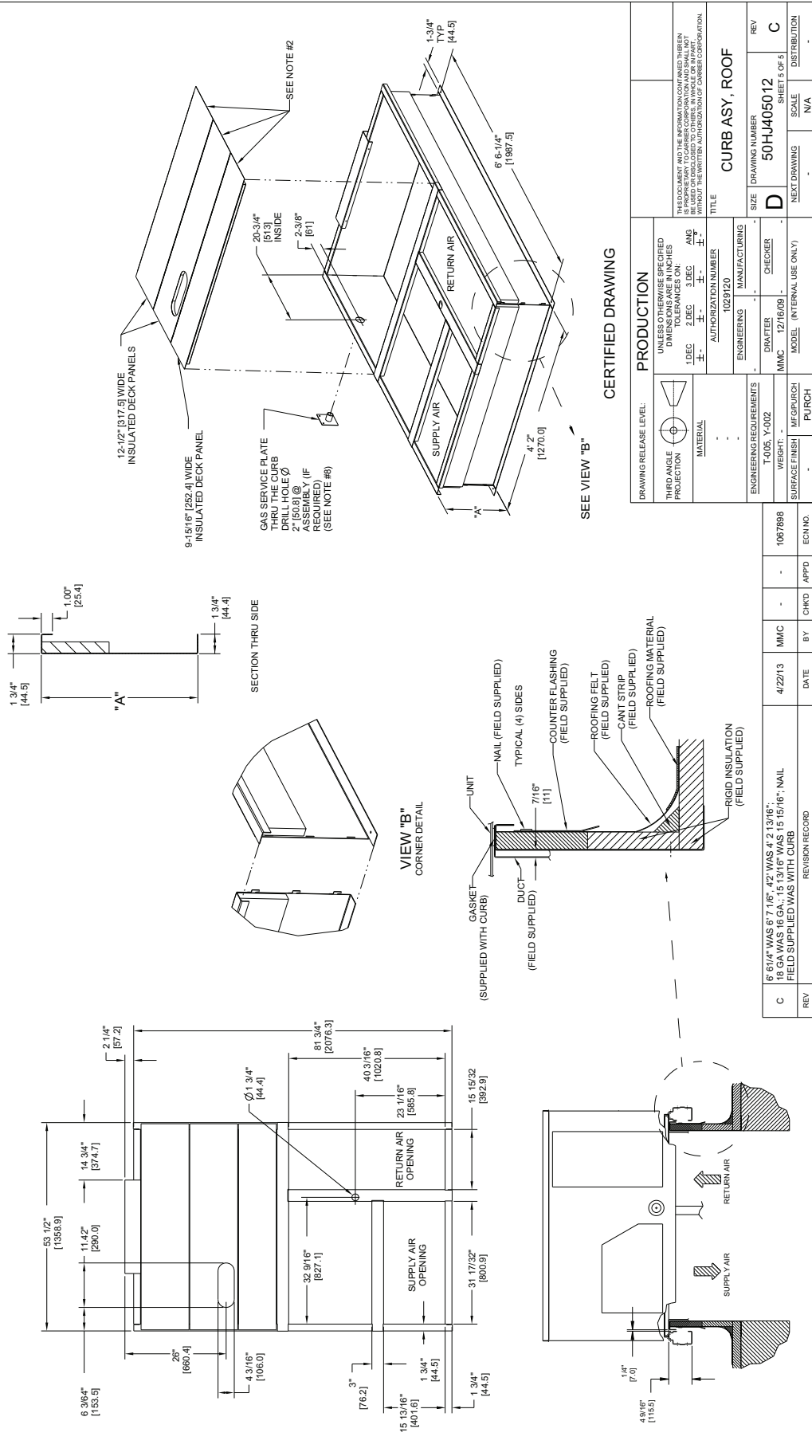


Fig. 5 — Roof Curb Details

**CERTIFIED DRAWING**

DRAWING RELEASE LEVEL: **PRODUCTION**

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:

DEC.	± .125
FAC.	± .006
FAC.	± .002
ANG.	± .5

MATERIAL: \_\_\_\_\_

AUTHORIZATION NUMBER: 1029120

ENGINEERING: \_\_\_\_\_

MANUFACTURING: \_\_\_\_\_

ENGINEERING REQUIREMENTS: 1005, Y-1002

DESIGNER: \_\_\_\_\_

CHECKER: \_\_\_\_\_

DATE: 12/16/09

WEIGHT: \_\_\_\_\_

MMC: \_\_\_\_\_

MODEL: (INTERNAL USE ONLY)

SURFACE FINISH: \_\_\_\_\_

MFSPURCH: \_\_\_\_\_

PURCH: \_\_\_\_\_

TITLE: **CURB ASY., ROOF**

SIZE: DRAWING NUMBER: **50HJ405012**

REV: **C**

DISTRIBUTION: \_\_\_\_\_

SCALE: \_\_\_\_\_

NEXT DRAWING: \_\_\_\_\_

REVISION RECORD

REV	DATE	BY	CHKD	APPD	ECN/NO
C	4/22/13	MMC			1067888

6" 61/4" WAS 6 7/16"; 42" WAS 42 1/32"

18 GA WAS 18 GA.; 15 13/16" WAS 15 15/16"; NAIL FIELD SUPPLIED WAS WITH CURB



## Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.35 in. wg (87 Pa) with economizer or 0.45 in. wg (112 Pa) without economizer.

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

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

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

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

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

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.

#### FOR UNITS WITH ACCESSORY OR OPTIONAL ELECTRIC HEATERS

Horizontal applications require a minimum clearance to combustible surfaces of 1-in. (25 mm) from duct for first 12-in. (305 mm) away from unit. Vertical applications do not require a minimum clearance.

Outlet grilles must not lie directly below unit discharge.

### ⚠ WARNING

#### PERSONAL INJURY HAZARD

Failure to follow this warning could cause personal injury.

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

## Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are required. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 2 and Fig. 6 for additional information.

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

Rigging materials under unit (cardboard or wood) must be removed PRIOR to placing the unit on the roof curb.

When using the standard side drain connection, ensure the red plug in the alternate bottom connection is tight. Do this before setting the unit in place. The red plug can be tightened with a 1/2-in. square socket drive extension. For further details, see “Step 9 — Install External Condensate Trap and Line” on page 12.

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

### ⚠ CAUTION

#### UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

If using top crate as spreader bar, once unit is set, carefully lower wooden crate off building roof top to ground. Ensure that no people or obstructions are below prior to lowering the crate.

#### POSITIONING ON CURB

Position unit on roof curb so that the following clearances are maintained: 1/4-in. (6.4 mm) clearance between the roof curb and the base rail inside the front and back, 0.0-in. clearance between the roof curb and the base rail inside on the duct end of the unit. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately 3<sup>5</sup>/<sub>16</sub>-in. (84 mm).

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

After the unit is in position remove all shipping materials and top skid, making sure to remove the wire ties which hold the fan section to the top skid. Recycle or dispose of all shipping materials.

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

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

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

REQUIRED SPREADER BARS

914-1371 (36"-54")

"B"

"C"

"A"

SEE DETAIL "A"  
VOIR DÉTAIL "A"

PLACE ALL SEAL STRIP IN PLACE BEFORE PLACING UNIT ON ROOF CURB.  
INSTALLER TOUTES LES BANDES D'ISOLATION EN PLACE AVANT DE PLACER L'APPAREIL SUR LE REBORD DE TOIT.

DUCT END PASSAGES CONDUITES

**DETAIL A  
DÉTAIL "A"**

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

48TM504503 REV -

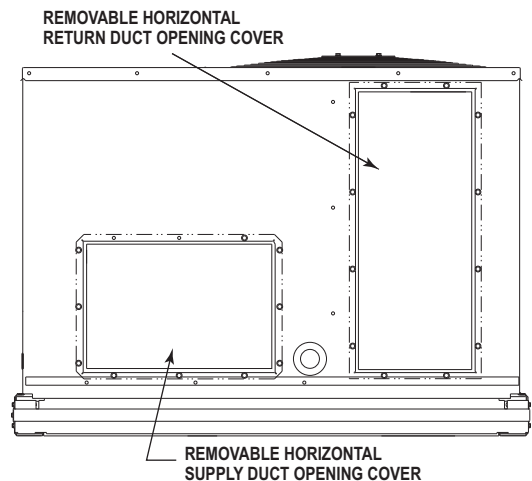
**Fig. 6 — Rigging Label**

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

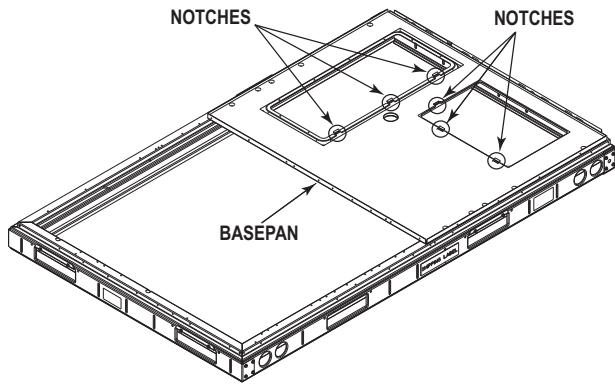
Unit is shipped in the vertical duct configuration. Unit without factory-installed economizer or return-air smoke detector option may be field-converted to horizontal ducted configuration. To convert to horizontal configuration, remove screws from side duct opening covers (see Fig. 7) and remove covers. Use the screws to install the covers on vertical duct openings with the insulation-side down. The panels must be inserted into the notches on the basepan to properly seal. The notches are covered by the tape used to secure the insulation to the basepan and are not easily seen. See Fig. 8 for position of the notches in the basepan. Seals around duct openings must be tight. Secure with screws as shown in Fig. 9. Cover seams with foil duct tape.

Field-supplied flanges should be attached to horizontal duct openings and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.

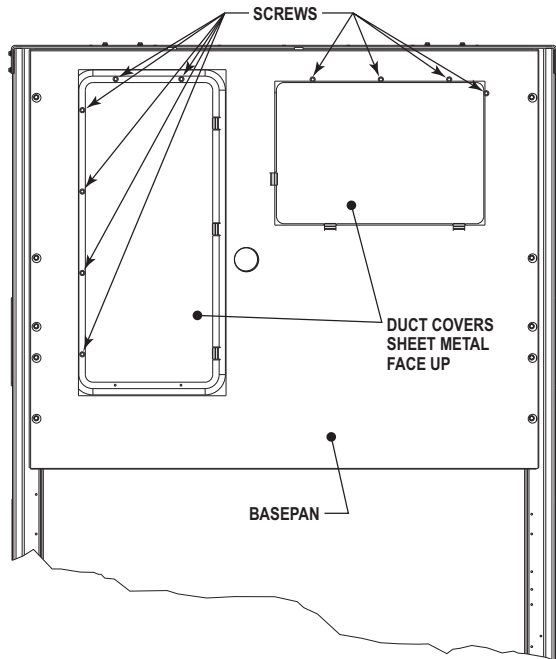
Do not cover or obscure visibility to the unit's informative data plate when insulating horizontal ductwork.



**Fig. 7 — Horizontal Conversion Panels**



**Fig. 8 — Location of Notches**

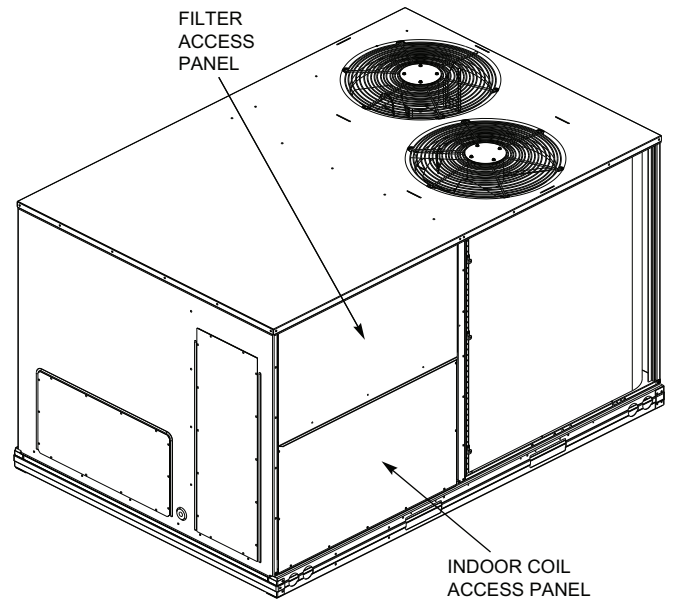


**Fig. 9 — Horizontal Duct Panels In Place**

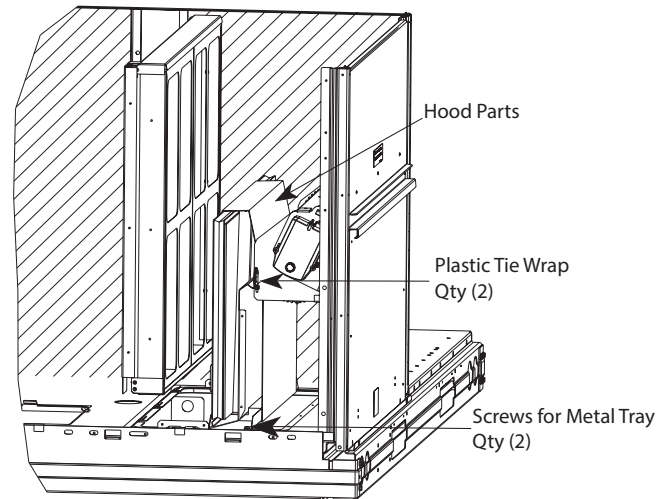
### Step 8 — Install Outside Air Hood

#### ECONOMIZER HOOD PACKAGE REMOVAL AND SETUP - FACTORY OPTION

1. The hood is shipped in knock-down form and must be field-assembled. The indoor coil access panel is used as the hood top while the hood sides, divider and filter are packaged together, attached to a metal support tray using plastic stretch wrap, and shipped in the return-air compartment behind the indoor coil access panel. The hood assembly's metal tray is attached to the basepan and also attached to the damper using two plastic tie-wraps.
2. To gain access to the hood, remove the filter access panel. (See Fig. 10.)
3. Locate the (2) screws holding the metal tray to the basepan and remove. Locate and cut the (2) plastic tie-wraps securing the assembly to the damper. (See Fig. 11.) Be careful to not damage any wiring or cut tie-wraps securing any wiring.
4. Carefully lift the hood assembly (with metal tray) through the filter access opening and assemble per the steps outlined in Economizer Hood, below.



**Fig. 10 — Typical Access Panel Locations**



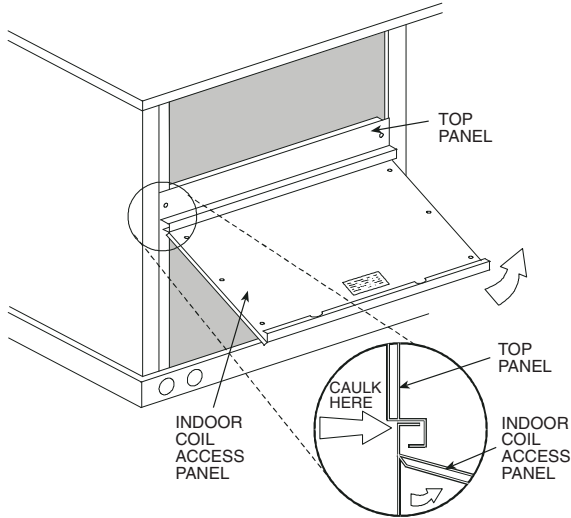
**Fig. 11 — Economizer Hood Parts Location**

#### ECONOMIZER HOOD

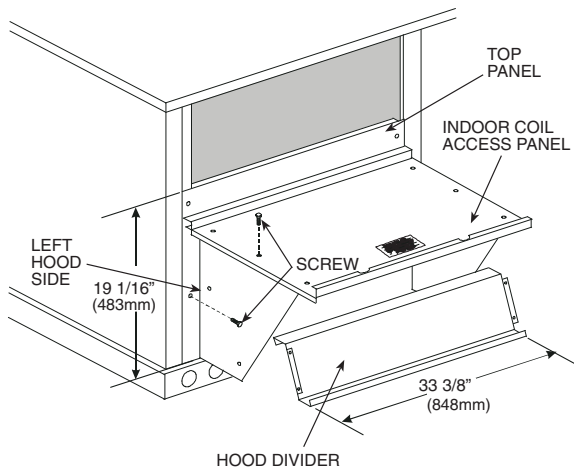
NOTE: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be discarded. Save the aluminum filter for use in the power exhaust hood assembly.

1. The indoor coil access panel will be used as the top of the hood. Remove the screws along the sides and bottom of the indoor coil access panel. See Fig. 12.
2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 13.
3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. Insert the hood divider between the hood sides. See Fig. 13 and Fig. 14. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Open the filter clips which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place. See Fig. 14.

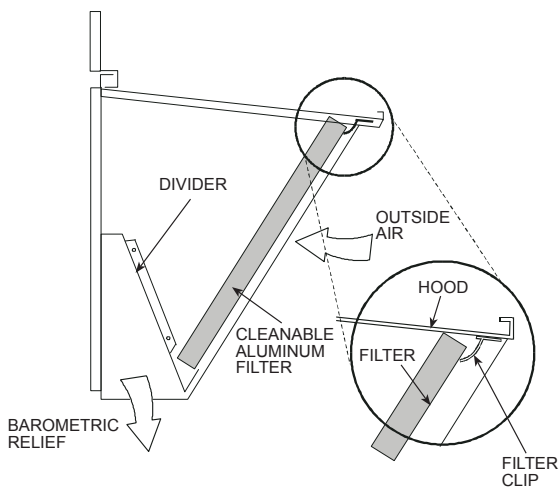
6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.



**Fig. 12 — Indoor Coil Access Panel Relocation**



**Fig. 13 — Economizer Hood Construction**



**Fig. 14 — Economizer Filter Installation**

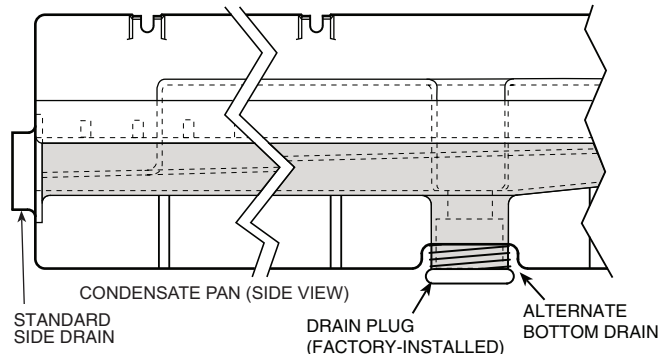
**Step 9 — Install External Condensate Trap and Line**

The unit has one  $\frac{3}{4}$ -in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 15. Unit airflow configuration does not

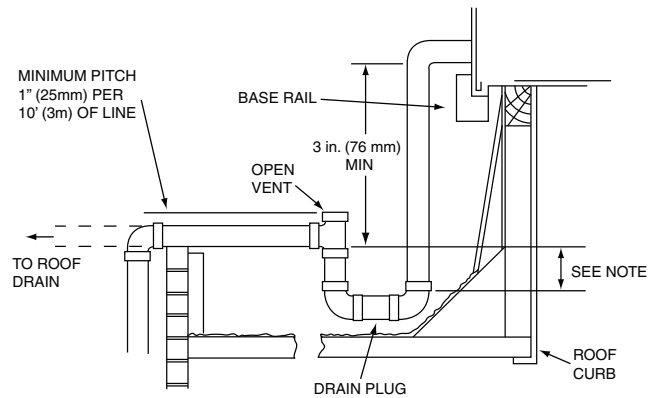
determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

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

The piping for the condensate drain and external trap can be completed after the unit is in place. See Fig. 16.



**Fig. 15 — Condensate Drain Pan (Side View)**



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

**Fig. 16 — 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 ( $\frac{3}{4}$ -in.).*

**Step 10 — Make Electrical Connections**

<b>⚠ WARNING</b>
<p><b>ELECTRIC SHOCK HAZARD</b></p> <p>Failure to follow this warning could result in personal injury or death.</p> <p>Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC; ANSI/NFPA 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.</p>

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

**FIELD POWER SUPPLY**

***If equipped with optional powered convenience outlet***

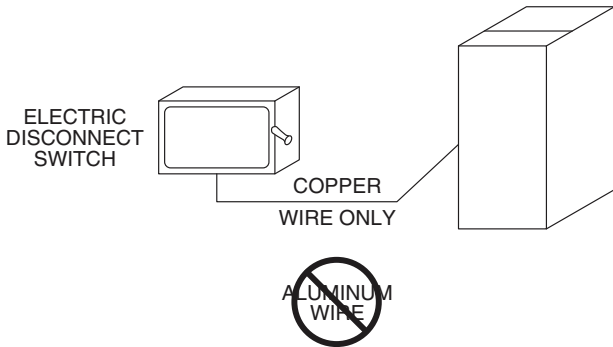
The power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of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

Refer to Fig. 30 for power transformer connections and the discussion on connecting the convenience outlet on page 20.

Field power wires are connected to the unit at line-side pressure lugs on compressor contactor C and indoor fan terminal block (IFTB) (see wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch or HACR. Max wire size is #2 ga AWG (copper only) per pole on contactors. #2 ga AWG per pole on optional disconnect or HACR and 4/0 AWG per pole on terminal or fuse block on units with single point box. See Fig. 18 and unit label diagram for field power wiring connections. See Fig. 19-23 for typical wiring diagrams.

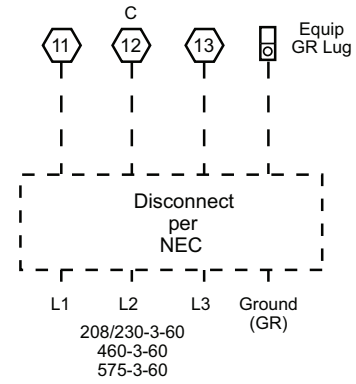
**⚠ WARNING**

**FIRE HAZARD**  
 Failure to follow this warning could result in intermittent operation or performance satisfaction.  
 Do not connect aluminum wire between disconnect switch and unit. Use only copper wire.

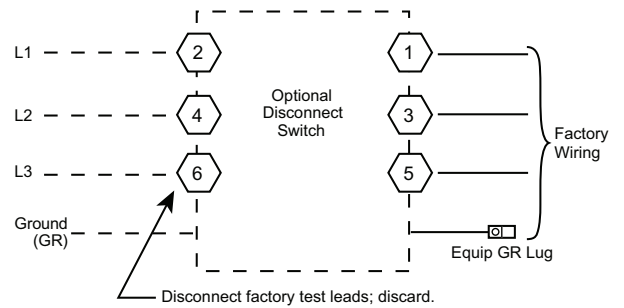


**Fig. 17 — Disconnect Switch and Unit**

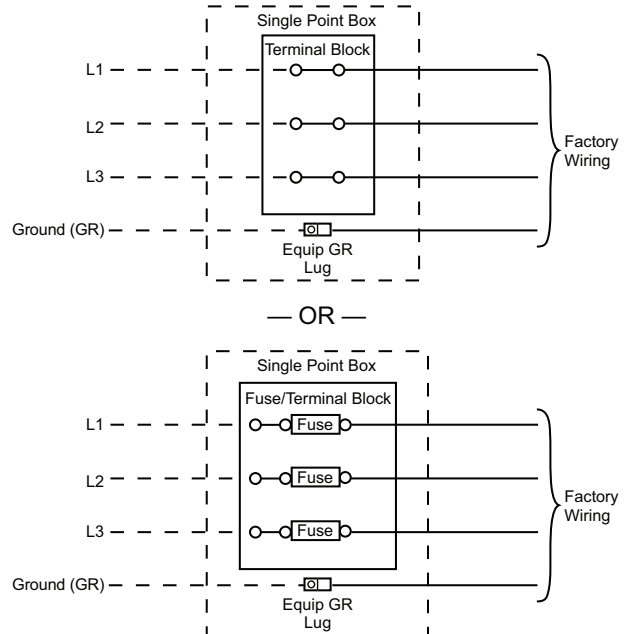
**Units Without Single Point Box, Disconnect or HACR Option**



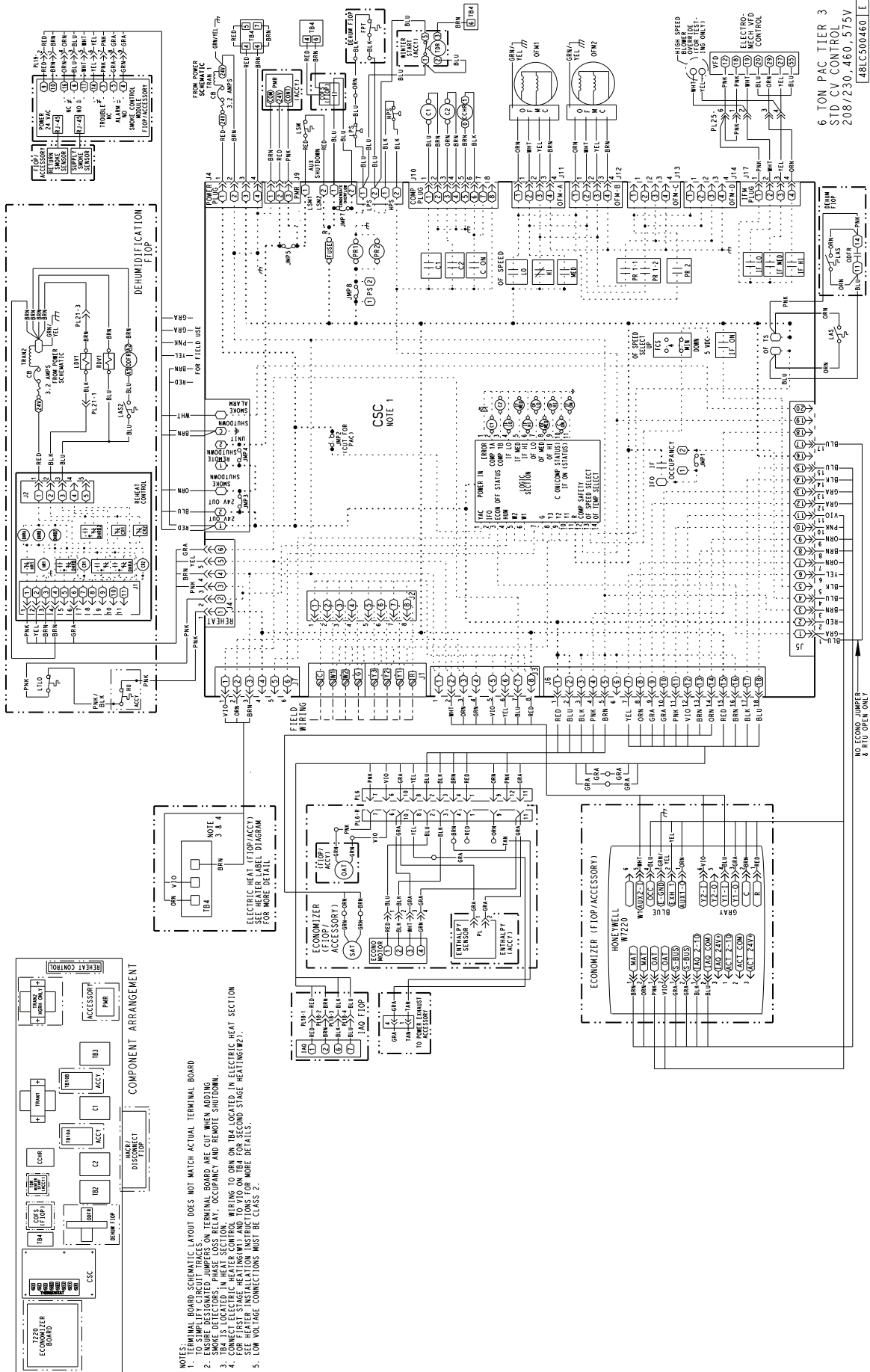
**Units With Disconnect or HACR Option**



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

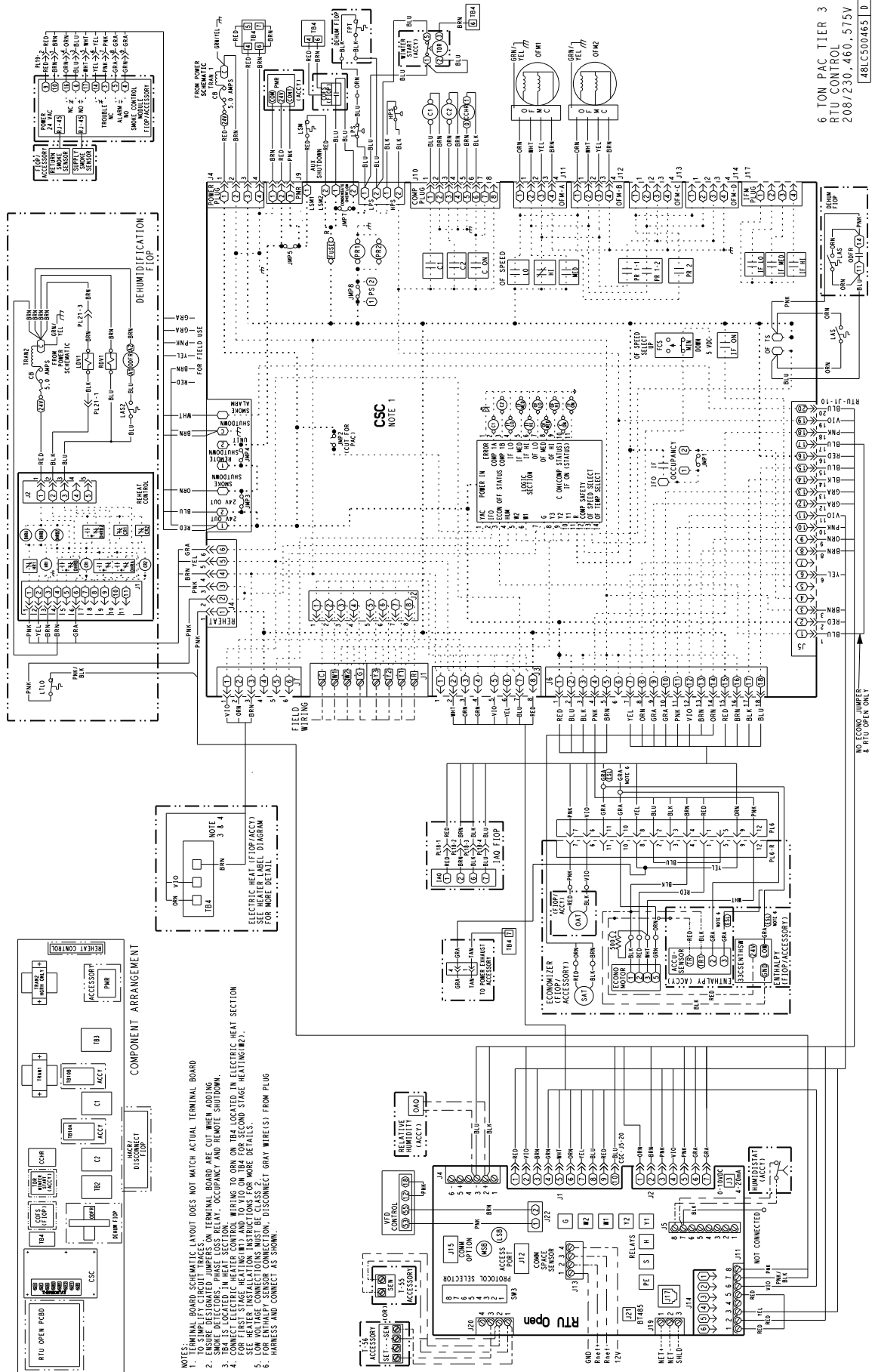


**Fig. 18 — Power Wiring Connections**



6 TON PAC TIER 3  
 STD CV CONTROL  
 208/230/460/575V  
 48LC500460 E

Fig. 19 — 50LC 07 Electro-mechanical Control Wiring Diagram



6 TON PAC TIER 3  
 RTU CONTROL  
 208/230/460/575V

48LC500465 D

- NOTES:
1. TERMINAL BOARD SCHEMATIC LAYOUT DOES NOT MATCH ACTUAL TERMINAL BOARD
  2. TO SIMPLIFY CIRCUIT TRACES ON TERMINAL BOARD, ARE OUT WHEN ADDING
  3. SMOKE DETECTORS, PHASE LOSS RELAY, OCCUPANCY AND REMOTE SHUTDOWN
  4. TBA IS LOCATED IN HEAT SECTION
  5. WIRING TO ORN ON TBA LOCATED IN ELECTRIC HEAT SECTION
  6. FOR FIRST STAGE HEATING (HT) AND TO V10 ON TBA FOR SECOND STAGE HEATING (H2).
  7. SEE HEATER INSTALLATION INSTRUCTIONS FOR MORE DETAILS.
  8. FOR EXHAUST SENSOR CONNECTION, DISCONNECT GRAY WIRE(S) FROM PLUG HARNESS AND CONNECT AS SHOWN.

Fig. 20 — 50LC 07 RTU Open Control Wiring Diagram

6 TON PAC TIER 3  
PIC CONTROL FLOP  
208/230, 460, 575V

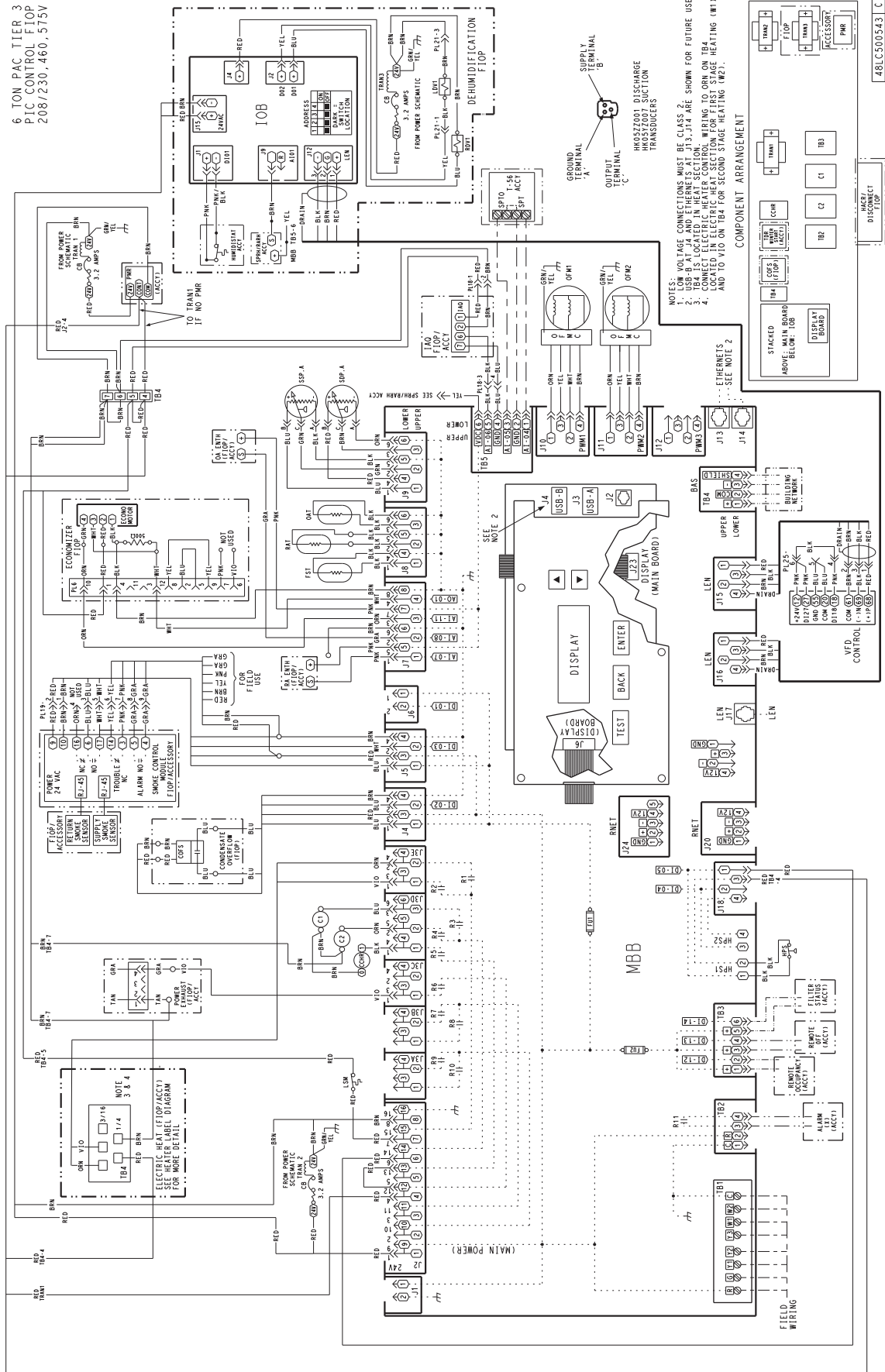
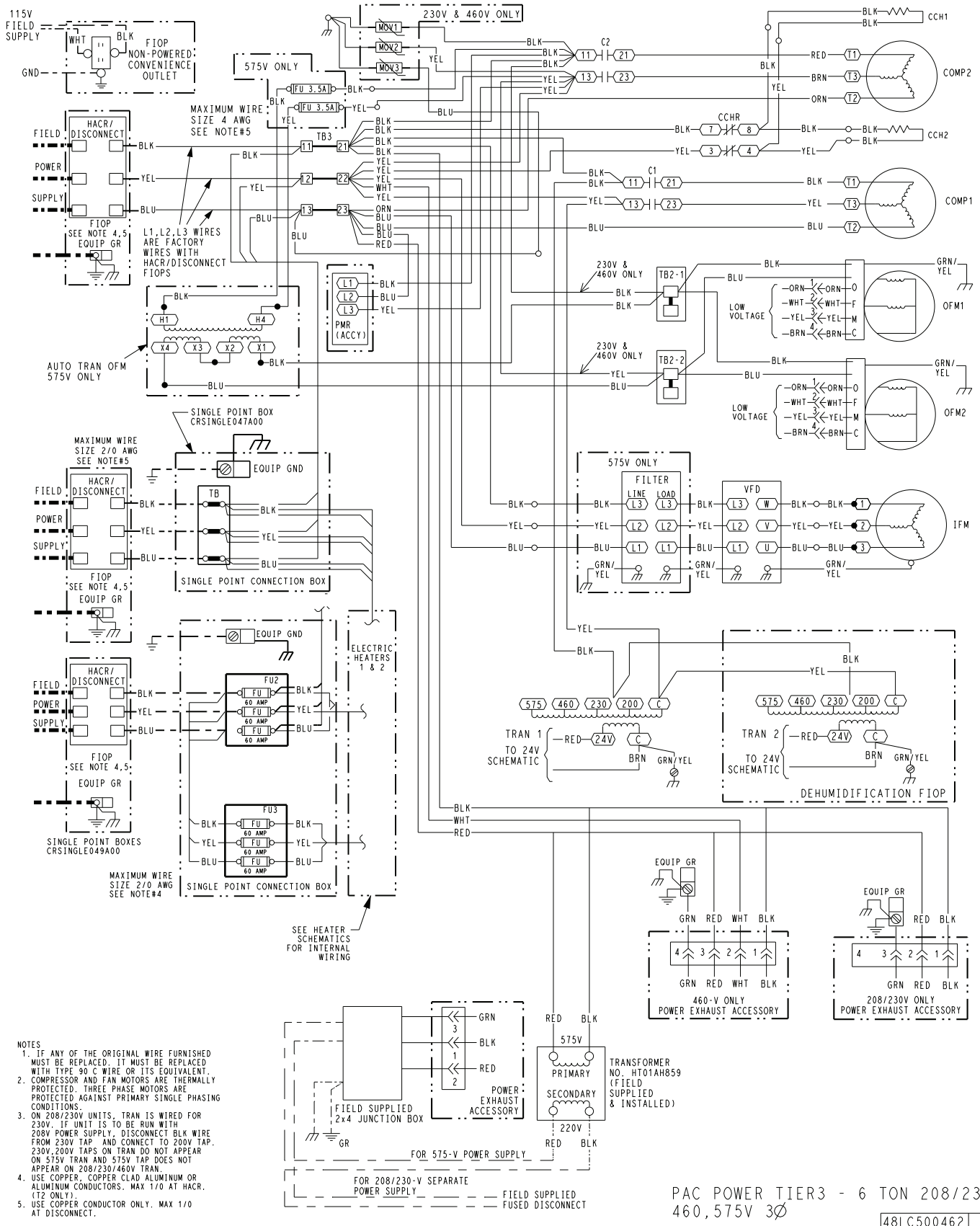
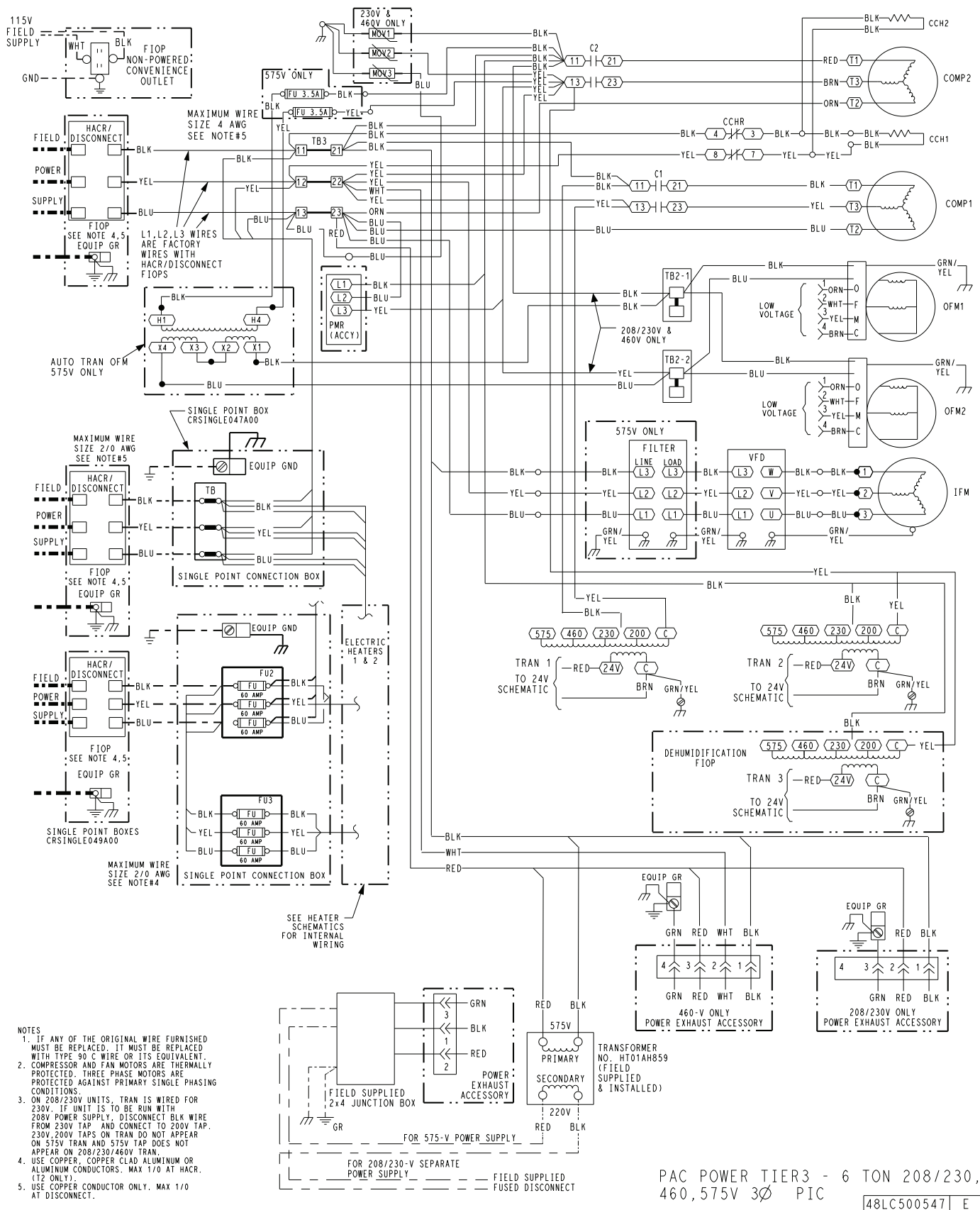


Fig. 21 — 50LC 07 SystemVu™ Control Wiring Diagram





**Fig. 22 — 50LC 07 Power Wiring Diagram, Electro-mechanical and RTU Open Controls (208/230-v, 460-v, and 575-v Units)**



**Fig. 23 — 50LC 07 Power Wiring Diagrams, SystemVu™ Controls (208/230-v, 460-v, and 575-v Units)**

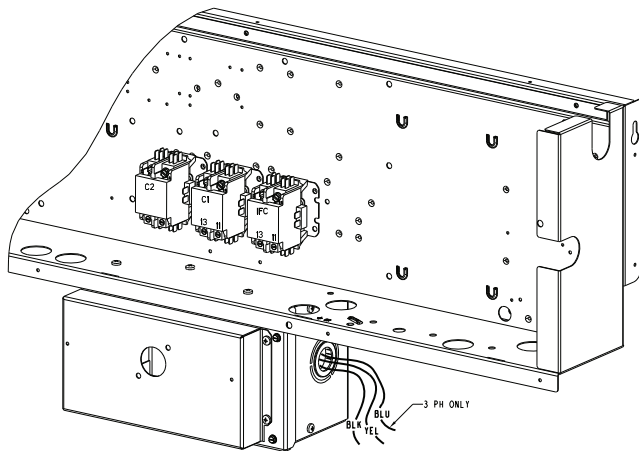
**UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR**

The factory-installed optional non-fused disconnect (NFD) or HACR switch is located in a weatherproof enclosure located under the main control box. The manual switch handle and shaft is shipped in the disconnect or HACR enclosure. Assemble the shaft and handle to the switch at this point. Discard the factory test leads (see Fig. 18).

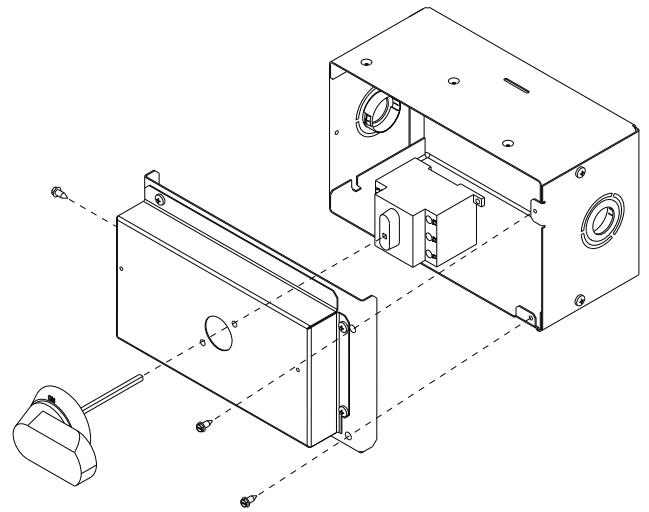
Connect field power supply conductors to LINE side terminals when the switch enclosure cover is removed to attach the handle.

**To field install the NFD shaft and handle**

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



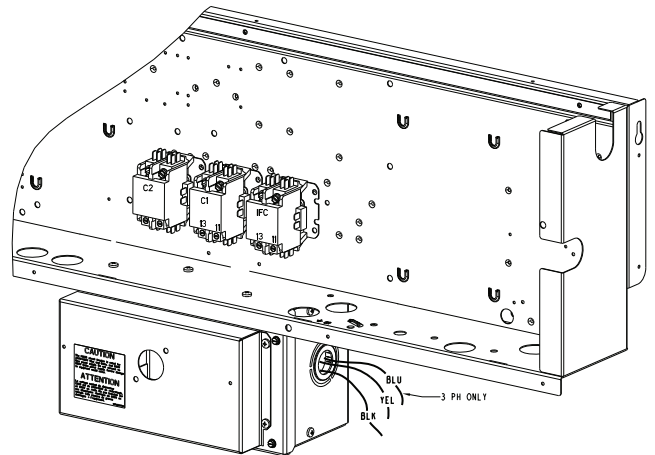
**Fig. 24 — Location of Non-Fused Disconnect Enclosure**



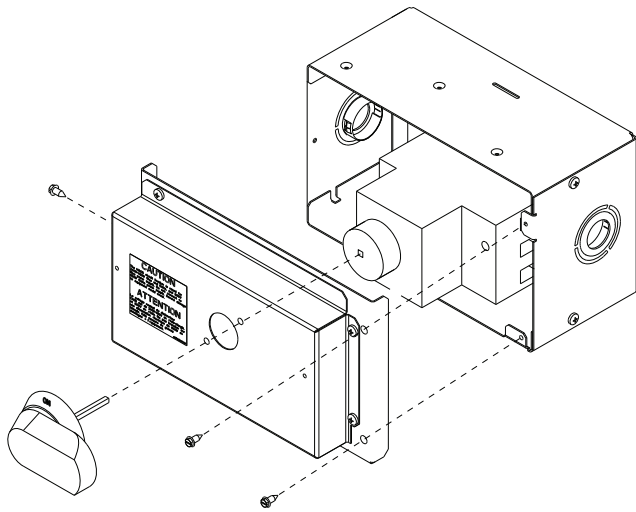
**Fig. 25 — Handle and Shaft Assembly for NFD**

**To field install the HACR shaft and handle**

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



**Fig. 26 — Location of HACR Enclosure**



**Fig. 27 — Handle and Shaft Assembly for HACR**

**UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR**

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

**ALL UNITS**

All field wiring must comply with NEC and all local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 16 and unit label diagram for power wiring connections to the unit and equipment ground. Maximum wire size is #4 ga AWG (copper only) per pole on contactors and #2 ga AWG (copper only) per pole on optional non-fused disconnect or HACR.

Provide a ground-fault and short-circuit over-current protection device (fuse or breaker) per NEC Article 440 (or local codes). Refer to unit informative data plate for MOCP (Maximum Over-current Protection) device size.

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

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

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the 1/4-in. female spade connector from the 230-v connection and moving it to the 200-v 1/4-in. male terminal on the primary side of the transformer. Refer to unit label diagram for additional information.

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

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

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.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227} = 1.78\%$$

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.

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

**CONVENIENCE OUTLETS**

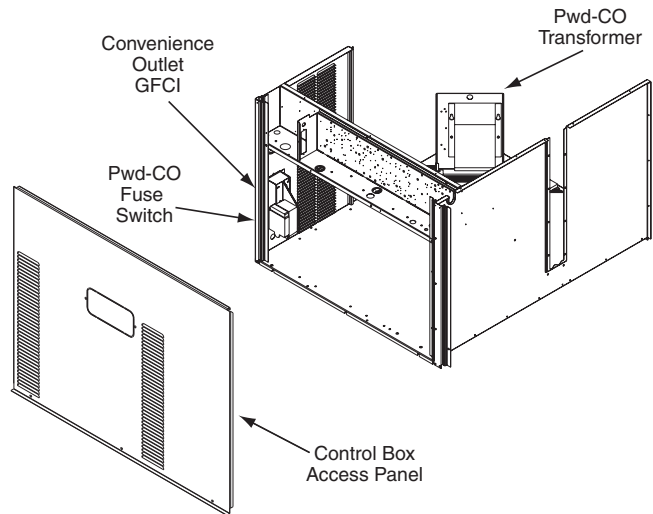
**⚠ WARNING**

**ELECTRICAL OPERATION HAZARD**

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

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

Two types of convenience outlets are offered on 50LC models: non-powered and unit-powered. Both types provide a 125-v GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the end panel of the unit. See Fig. 28.



**Fig. 28 — 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.

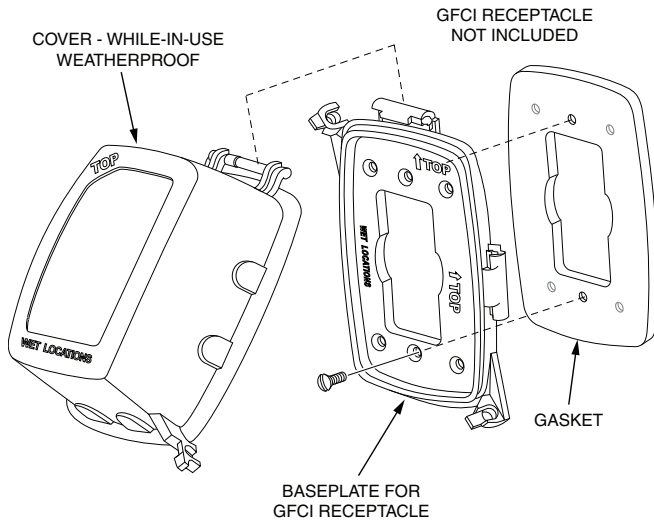
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

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. 29. 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. 29 — Weatherproof Cover Installation**

**Non-powered type**

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

**Unit-powered type**

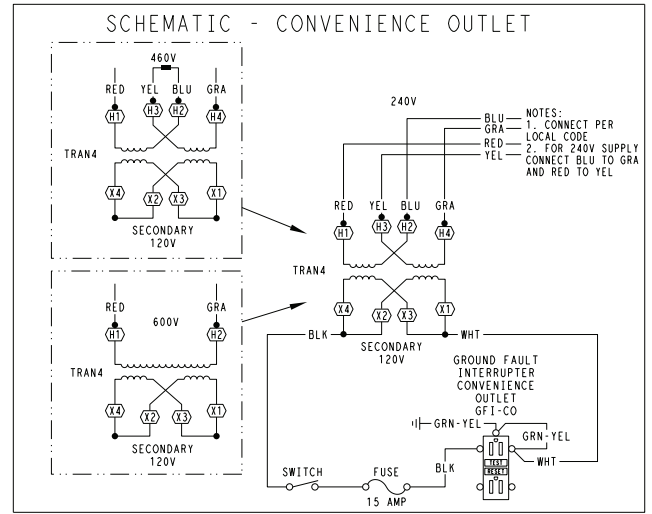
A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 28.

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect or HACR breaker switch; this will provide service power to the unit when the unit disconnect switch or HACR switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect or HACR switch is open. See Fig. 30.

**Using unit-mounted convenience outlets**

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

Fuse on power type: The factory fuse is a Bussman<sup>1</sup> "Fusetron" T-15, non-renewable screw-in (Edison base) type plug fuse.



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

**Fig. 30 — Powered Convenience Outlet Wiring**

**Duty Cycle**

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

**Convenience outlet usage rating**

See Fig. 31.



**Fig. 31 — Convenience Outlet Utilization Notice Label**

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.

**HACR**

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

1. Bussman and Fusetron are trademarks of Cooper Technologies Company.

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.

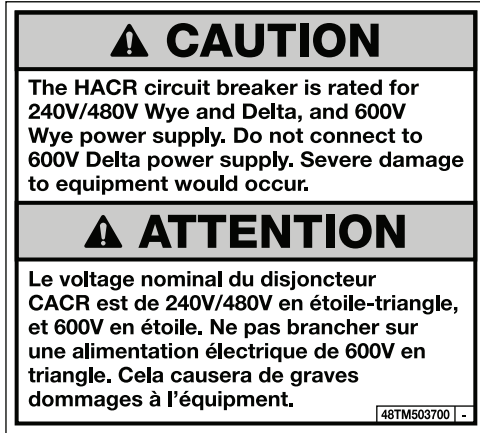


Fig. 32 — HACR Caution Label

FACTORY-OPTION THRU-BASE CONNECTIONS

This service connection kit consists of two 1/2-in. electrical bulkhead connectors and a 3/4-in. electrical bulkhead connector, all factory-installed in the embossed (raised) section of the unit basepan in the condenser section. The 3/4-in. bulkhead connector enables the low-voltage control wires to pass through the basepan. The 1/2-in. electrical bulkhead connector allows the high-voltage power wires to pass through the basepan. See Fig. 33.

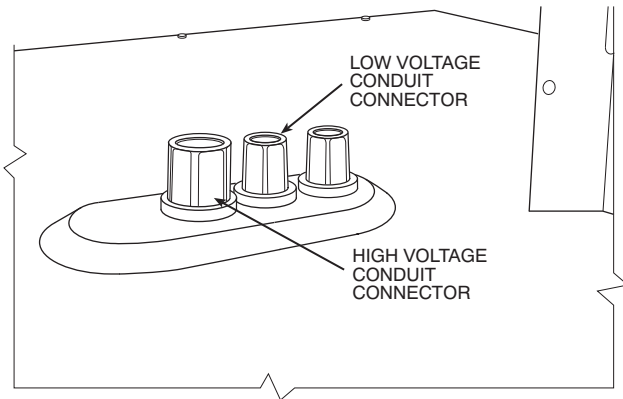


Fig. 33 — Thru-Base Connection Fittings

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquid tight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage and low voltage through appropriate conduits. Connect the power conduit to the internal disconnect (if unit is so equipped) or to the external disconnect (through unit side panel). A hole must be field cut in the main control box bottom on the left side so the 24-v control connections can be made. Connect the control power conduit to the unit control box at this hole.

UNITS WITHOUT THRU-BASE CONNECTIONS

1. Install power wiring conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 18.

FIELD CONTROL WIRING

The 50LC unit requires an external temperature control device such as a thermostat (field-supplied).

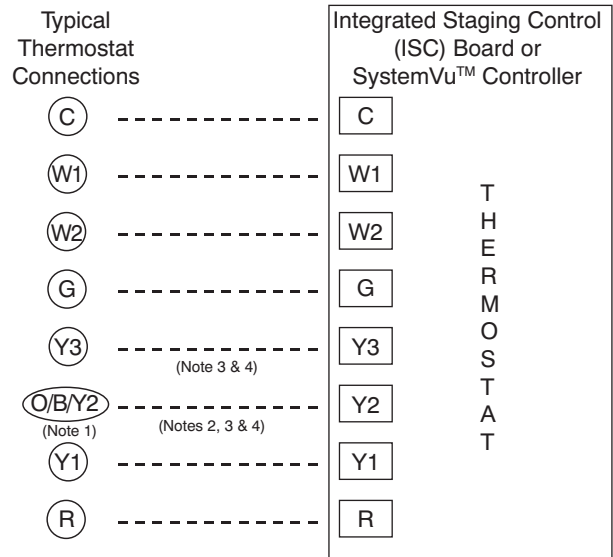
THERMOSTAT

Install a Carrier-approved accessory thermostat according to installation instructions included with the accessory. For complete economizer function and 3 stage compressor operation select a three-stage cooling thermostat. If a 3-stage cooling thermostat is not available, use a 2-stage cooling thermostat instead, but note that this will limit cooling to just 2 stages. When electric heat is installed in the 50LC unit, the thermostat must be capable of energizing the G terminal (to energize the Indoor Fan Contactor) whenever there is a space call for heat (energizing the W1 terminal). The accessory thermostats listed on the unit price pages can provide this signal but they are not configured to enable this signal as shipped.

Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

If the thermostat contains a logic circuit requiring 24-v power, use a thermostat cable or equivalent single leads of different colors with minimum of eight leads. If the thermostat does not require a 24-v source (no "C" connection required), use a thermostat cable or equivalent with minimum of seven leads. Check the thermostat installation instructions for additional features which might require additional conductors in the cable.

For wire runs up to 50 ft (15 m), use no. 18 AWG (American Wire Gage) insulated wire (35°C minimum). For 50 to 75 ft (15 to 23 m), use no. 16 AWG insulated wire (35°C minimum). For over 75 ft (23 m), use no. 14 AWG insulated wire (35°C minimum). All wire sizes larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.



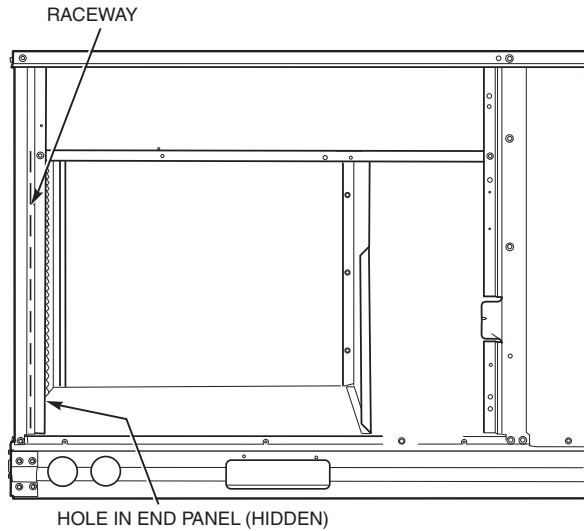
- Note 1: Typical multi-function marking. Follow manufacturer's configuration Instructions to select Y2.
- Note 2: Y2 to Y3 connection required for 2-stage cooling operation and when integrated economizer function is desired.
- Note 3: To Connect a 2-Stage Thermostat: Y2 to Y3 connection required for 2-stage cooling operation which provides low and high cooling states.
- Note 4: SystemVu controller is default configured for 3-stage cooling and 2-stage heating thermostats; it can be configured for other thermostat types.
- Field Wiring

Fig. 34 — Low-Voltage Connections

UNIT WITHOUT THRU-BASE CONNECTION KIT

Pass the thermostat control wires through the hole provided in the corner post; then feed the wires through the raceway built into the corner post to the control box. Pull the wires over to the terminal strip on the upper-left corner of the Controls Connection Board. See Fig. 35.

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



**Fig. 35 — Field Control Wiring Raceway**

**HEAT ANTICIPATOR SETTINGS**

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

**Electric Heaters**

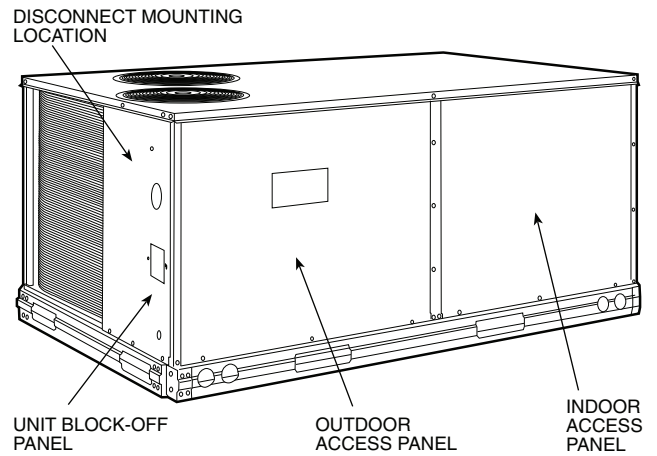
50LC units may be equipped with factory or field-installed electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor. One or two heater modules may be used in a unit.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. See Fig. 36 - 38.

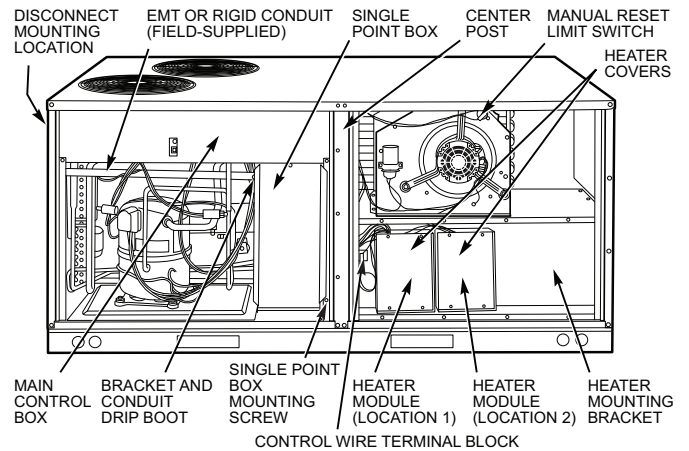
Not all available heater modules may be used in every unit. Use only those heater modules that are UL/ETL listed for use in a specific size unit. Refer to the label on the unit cabinet for the list of approved heaters.

Unit heaters are marked with heater model numbers. However, heaters are ordered as and shipped in cartons marked with a corresponding heater sales package part number. See Table 3 for correlation between heater model number and sales package part number.

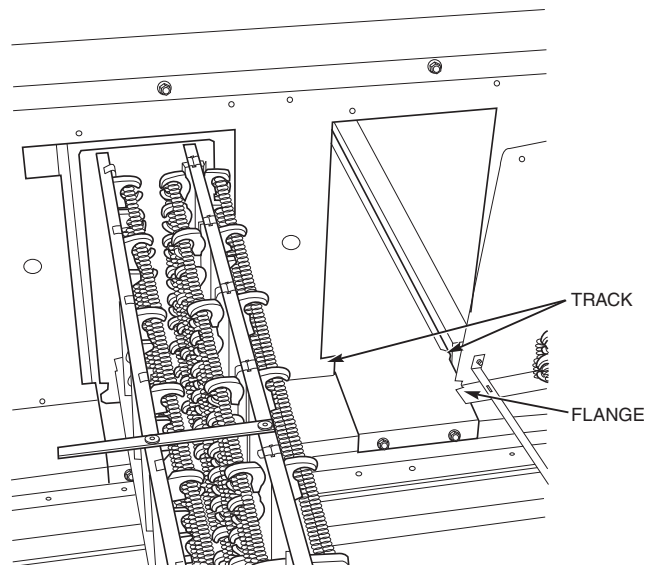
NOTE: The value in position 9 of the part number differs between the sales package part number (value is 1) and a bare heater model number (value is 0).



**Fig. 36 — Access Panel Locations**



**Fig. 37 — Component Locations**



**Fig. 38 — Typical Module Installation**

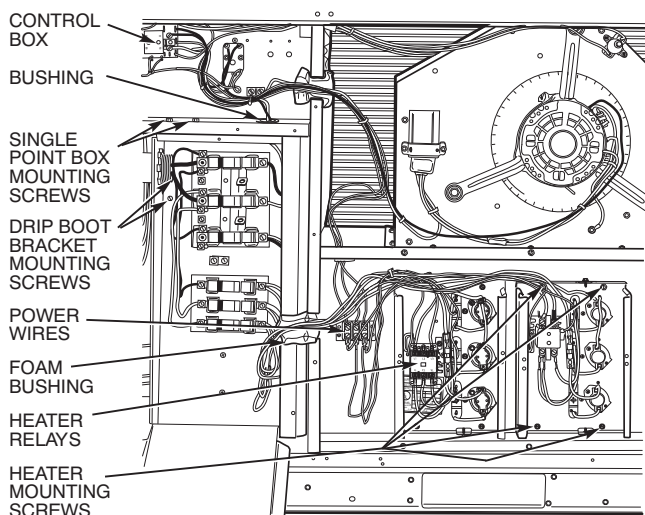
**Table 3 — Heater Model Number**

<b>BARE HEATER MODEL NUMBER</b>	<b>C</b>	<b>R</b>	<b>H</b>	<b>E</b>	<b>A</b>	<b>T</b>	<b>E</b>	<b>R</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>A</b>	<b>0</b>	<b>0</b>
Heater Sales Package PNO Includes: Bare Heater Carton and packing materials Installation sheet	<b>C</b>	<b>R</b>	<b>H</b>	<b>E</b>	<b>A</b>	<b>T</b>	<b>E</b>	<b>R</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>A</b>	<b>0</b>	<b>0</b>

**SINGLE POINT BOXES AND SUPPLEMENTARY FUSES**

When the unit MOCP device value exceeds 60-A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory single point boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The single point box has a hinged access cover. See Fig. 39. The single point box also includes a set of power taps and pigtails to complete the wiring between the single point box and the unit's main control box terminals. Refer to the accessory heater and single point box installation instructions for details on tap connections or field-installed electric heat accessory.

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



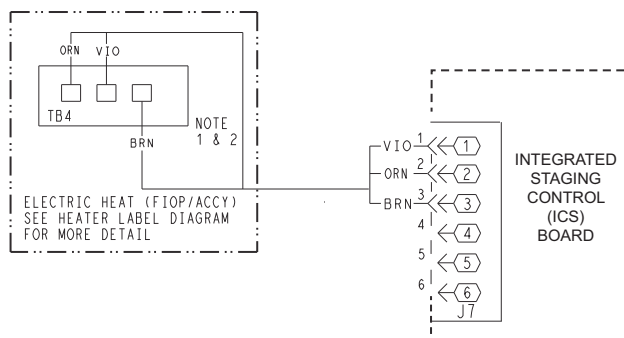
**Fig. 39 — Typical Single Point Installation**

**SINGLE POINT BOXES WITHOUT FUSES**

Some unit heater applications not requiring supplemental fuses require a special single point box without any fuses. The accessory single point boxes contain a set of power taps and pigtails to complete the wiring between the single point box and the unit's main control box terminals. Refer to accessory heater and single point box installation instructions for details on tap connections or field-installed electric heat accessory.

**LOW-VOLTAGE CONTROL CONNECTIONS**

Pull the low-voltage control leads from the heater module(s) - VIO and BRN (two of each if two modules are installed; identify for Module #1) - to the 4-pole terminal board TB4 located on the heater bulkhead to the left of Heater #1. Connect the VIO lead from Heater #1 to terminal TB4-1. For 2-stage heating, connect the VIO lead from Heater #2 to terminal TB4-2. For 1-stage heating with 2 heater modules connect the VIO lead from both Heater #1 and #2 to terminal TB4-1. Connect both BRN leads to terminal TB4-3. See Fig. 40.



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

**Fig. 40 — Optional or Accessory Electric Heater Control Connections**

**Humidi-MiZer® System Control Connections**

NOTE: It is suggested to ensure the Auto-Changeover function of an installed thermostat is enabled when used in conjunction with the Humidi-MiZer Adaptive Dehumidification system.

**HUMIDI-MIZER SYSTEM – SPACE RH CONTROLLER**

The Humidi-MiZer dehumidification system requires a field-supplied and installed space relative humidity control device. This device may be a separate humidistat control (contact closes on rise in space RH above control setpoint) or a combination thermostat-humidistat control device with isolated contact set for dehumidification control.

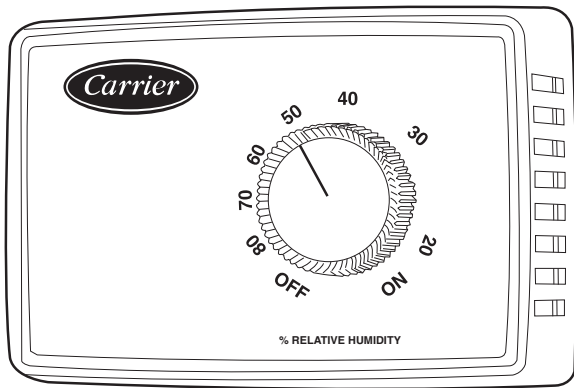
NOTE: Use of a humidistat device is not permitted on 50LC units equipped with RTU Open control; these units require use of a field-supplied RH sensor (33ZCSENSRH-02 or 33ZHSENDRH-02), or a ZS series sensor with humidity sensing. System-Vu™ controls require a Space Humidistat (HL38MG029), a Wall Mount Space Humidity Sensor (33ZCSENSRH-01), or a Duct Mount Humidity Sensor (33ZCSENDRH-01).

**To connect the Carrier humidistat (HL38MG029)**

1. Route the humidistat 2-conductor cable (field-supplied) through the hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 35) to the 24-v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Use wire nuts to connect humidistat cable to the leads in the low-voltage wiring (as shown in Fig. 42), connecting PNK to PNK and PNK/BLK to PNK/BLK.

NOTE: 50LC\*\*07 units require a 3-stage cooling thermostat device and are not compatible with Carrier's Edge® Pro thermostats.





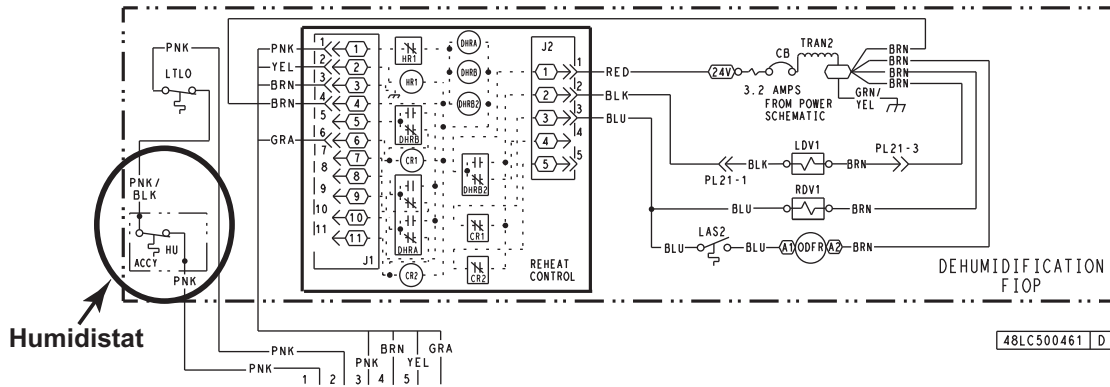
**Fig. 41 — Accessory Field-Installed Humidistat**

**RTU Open Controller (Factory-Installed Option)**

For details on operating 50LC\*\*07 units equipped with the factory-installed RTU Open controller option, refer to *48/50LC 07-26 Factory Installed Option RTU Open Multi-Protocol Controller Controls, Start-up, Operation and Troubleshooting manual*.

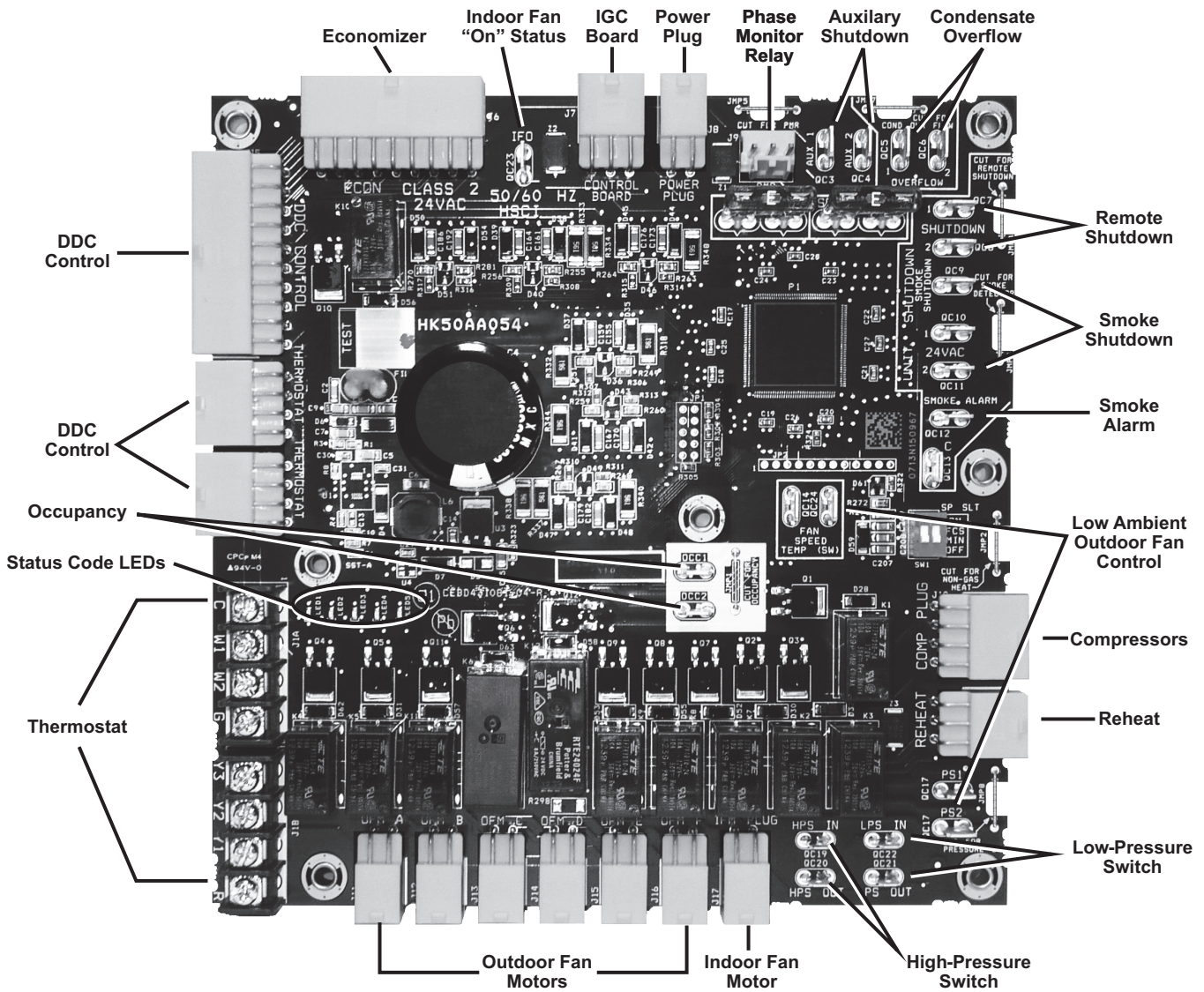
**SystemVu™ Controller (Factory-Installed Option)**

For details on operating 50LC\*\*07 units equipped with the factory-installed SystemVu control option, refer to *48/50LC 04-26 Single Package Rooftop Units with SystemVu Controls Version 2.X Controls, Start-up, Operation and Troubleshooting manual*.



**Fig. 42 — Typical Humidi-MiZer Adaptive Dehumidification System Humidistat Wiring**

# Integrated Staging Control (ISC) Board



**Fig. 43 — Integrated Staging Control (ISC) Board**

**Table 4 — Status Code Descriptions for ISC Board LEDs**

ERROR #	ERROR NAME	LED INDICATION				
		LED01	LED02	LED03	LED04	LED05
1	Check Smoke Detector/PMR/AUX		RED			
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 thermostat wiring.	RED	RED		RED	RED
8	Call for heat (W1/W2) with no G. 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 thermostat and G wiring.	RED	RED			RED
11	Check ISC Board and the thermostat wiring	RED			RED	RED
12	Check ISC Board and the thermostat wiring	RED				
13	Check ISC Board and the thermostat wiring	RED			RED	
14	Check ISC Board and the thermostat wiring					RED
15	Check ISC Board and the thermostat 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.

## ISC BOARD - SEQUENCE OF OPERATION

### General

The Carrier Integrated Staging Control (ISC) is intended for use with a standard thermostat or direct digital controls (DDC) capable of three cooling stages. 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. 43 for LED locations and Table 4 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 through connection should a smoke alarm signal be connected. In the case of the RTU Open option, the RTU Open controller provides the signal which is passed through 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 (24 vac) 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.

### Ventilation

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

### Cooling

In the Cooling Mode, the small and large compressors will be sequenced to maintain the thermostat temperature setpoint. The table below shows the cooling operation based on the following conditions.

The outdoor fan and VFD controlled indoor-fan will operate at low, medium and high speed. The RPM is factory set by the CFM and static pressure requirements for the unit installed.

INPUT	OUTPUT			
	Compressor C1	Compressor C2	Indoor Fan Speed	Outdoor Fan Speed
First Stage Cooling (Y1)	On	Off	Low	Low (700 rpm)
Second Stage Cooling (Y2)	Off	On	Medium	Medium (800 rpm)
Third Stage Cooling (Y3)	On	On	High	High (1000 rpm)

### Humidi-MiZer® System (Optional)

In the Dehumidification Mode, both compressors will run and Indoor airflow will be rise to High Speed.

At subcooler reheating mode (reheat-1), during part load conditions when the room temperature and humidity are above the set point, the unit initiates the sub-cooling mode of operation; a call for cooling and dehumidification. RDV (Reheat Discharge Valve) and TWV (Three Way Valve) close; Indoor and Outdoor airflow will rise until reaching 100% of Speed.

At hot-gas-bypass reheating mode (reheat-2), when there is a call for dehumidification without a call for cooling, a portion of the hot

gas from the compressor bypasses the condenser coil when RDV opens and hot gas is fed into the liquid line, TWV closes in this mode and the system provides mainly latent cooling. Indoor airflow will rise until reaching 100% of Speed, Outdoor airflow will run at High speed as long as outdoor temperature is above 80°F (26.7°C); when operating in this mode below 80°F (26.7°C) OAT, the system outdoor fan will operate as shown in the table below based on size.

LC SIZE	RPM	NUMBER OF FANS ON	NUMBER OF FANS OFF
07	250	2	0

### Economizer (Optional)

When the economizer is in Free Cooling Mode and a demand for cooling exists (Y1 on the thermostat), the economizer will modulate the outdoor-air damper to provide a 50°F (10°C) to 55°F (13°C) mixed-air temperature into the zone and run the indoor fan at high speed. As mixed-air temperature fluctuates above 55°F (13°C) or below 50°F (10°C), dampers will be modulated (open or close) to bring the mixed-air temperature back within control. Upon more call for cooling (Y2 on the thermostat), the outdoor-air damper will maintain its current position, compressor C1 will run and the outdoor fan will run at low speed. If there is further demand for cooling, the outdoor-air damper will maintain its current position, compressor C2 will run and the outdoor-fan will run at medium speed. The VFD-controlled indoor fan will operate at high speed regardless of the cooling demand.

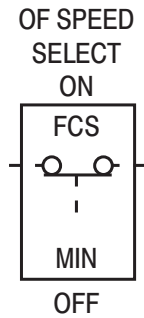
If the increase in cooling capacity causes the mixed-air temperature to drop below 45°F (7°C), the outdoor-air damper will return to the minimum position. If the mixed-air temperature continues to fall, the outdoor-air damper will close. Control returns to normal once the mixed-air temperature rises above 48°F (9°C). The power exhaust fans will be energized and de-energized, if installed, as the outdoor-air damper opens and closes.

In field-installed accessory CO<sub>2</sub> sensors connected to the economizer, a demand controlled ventilation strategy will begin to operate. As the CO<sub>2</sub> level in the zone increases above the CO<sub>2</sub> setpoint, the minimum position of the damper will be increased proportionally. As the CO<sub>2</sub> level decreases because of the increase of fresh air, the outdoor-air damper will be proportionally closed. For economizer operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

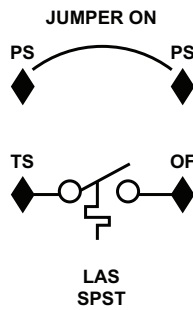
### Low Ambient Cooling Operation down to 40°F (4°C)

In Low Ambient RTU conditions when the temperature is between 55°F (13°C) and 40°F (4°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. 44) is in the ON 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 OFF position, the outdoor fans will run in the Minimum Fan Speed Mode (MIN) set to 160 rpm regardless of the cooling demand.

50LC Size 07 units have a SPST normally open Low Ambient Switch wired across the TS and OF terminal and a jumper placed across the PS terminal (see Fig. 45). 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.



**Fig. 44 — Outdoor Fan Speed Select Switch**



**Fig. 45 — Schematic of SPST Low Ambient Switch**

Table 5 shows the operation of the outdoor fan for size 07 units.

**Table 5 — Low Ambient Temperature Outdoor Fan Control**

LC SIZE	NO. OF FANS ON	NO. OF FANS OFF	SWITCH	OUTDOOR FAN SELECT SWITCH	RPM
07	2	0	SPST	Up	250

### Heating

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

### EconoMiSer® X (Factory Option)

The EconoMiSer X system is an expandable economizer control system, which includes a W7220 economizer module (controller) with an LCD and keypad (see Fig. 46). The W7220 can be configured with optional sensors.



**Fig. 46 — W7220 Economizer Module**

The W7220 economizer module can be used as a stand-alone economizer module wired directly to a commercial set-back space thermostat and sensors to provide outside air dry-bulb economizer control.

The W7220 economizer module can be connected to optional sensors for single or differential enthalpy control. The W7220 economizer module provides power and communications for the sensors.

The W7220 economizer module automatically detects sensors by polling to determine which sensors are present. If a sensor loses communications after it has been detected, the W7220 economizer controller indicates a device fail error on its LCD.

### SYSTEM COMPONENTS

The EconoMiSer X system includes an economizer module, 20k mixed air sensor, damper actuator, and either a 20k outdoor air temperature sensor or S-Bus enthalpy sensors.

### Economizer Module

The module is the core of the EconoMiSer X system. The module is mounted in the unit's control box, and includes the user interface for the system. The W7220 economizer module provides the basic inputs and outputs to provide simple economizer control. When used with the optional sensors, the economizer module provides more advanced economizer functionality.

### S-Bus Enthalpy Control Sensors

The sensor is a combination temperature and humidity sensor which is powered by and communicates on the S-Bus. Up to three sensors may be configured with the W7220 economizer module.

### CO<sub>2</sub> Sensor (optional)

The CO<sub>2</sub> sensor can be added for Demand Controlled Ventilation (DCV).

### SPECIFICATIONS

#### W7220 Economizer Module

The module is designed for use with 2 to 10 vdc or bus communicating actuator. The module includes terminals for CO<sub>2</sub> sensor, Mixed Air sensor, and an Outdoor Dry Bulb sensor. Enthalpy and other options are available with bus sensors.

#### User Interface

Provides status for normal operation, setup parameters, check-out tests, and alarm and error conditions with a 2-line 16 character LCD display and four button keypad.

#### Electrical

- Rated Voltage — 20 to 30 vac RMS, 50/60 Hz
- Transformer — 100 va maximum system input

- Nominal Power Consumption (at 24 vac, 60 Hz) — 11.5 VA without sensors or actuators
- Relay Digital Output Rating at 30 vac (maximum power from Class 2 input only) — 1.5A run: 3.5A inrush at 0.45PF (200,000 cycles) or 7.5A inrush at 0.45PF (100,000 cycles)
- External Sensors Power Output — 21 vdc ± 5% at 48mA

**IMPORTANT:** All inputs and outputs must be Class 2 wiring.

**INPUTS**

**Sensors**

NOTE: A Mixed Air (MA) analog sensor is required on all W7220 units; either an Outdoor Air (OA) sensor for dry bulb change over or an OA bus sensor for outdoor enthalpy change over is required in addition to the MA sensor. An additional Return Air (RA) bus sensor can be added to the system for differential enthalpy or dry bulb changeover. For differential dry bulb changeover, a 20k ohm sensor is required in the OA and a bus sensor in the RA. DIP switch on RA bus sensor must be set in the RA position.

Dry Bulb Temperature (optional) and Mixed Air (required), 20k NTC

2-wire (18 to 22 AWG);  
 Temperature range -40°F to 150°F (-40°C to 66°C)  
 Temperature accuracy: 0°F/+2°F (-18°C/-17°C)

Temperature and Humidity, C7400S1000 (optional)

S-Bus; 2-wire (18 to 22 AWG)  
 Temperature: range -40°F to 150°F (-40°C to 65°C)  
 Temperature accuracy: 0°F/+2°F (-18°C/-17°C)  
 Humidity: range 0 to 100% RH with 5% accuracy.

NOTE: Up to three (3) S-Bus sensors may be connected to the W7220 economizer module for outdoor air (OA), return air (RA) and discharge (supply) air (DA).

4 Binary Inputs

1-wire 24 vac + common GND (see page 30 for wiring details).

24 vac power supply

20 to 30 vac 50/60Hz; 100 VA Class 2 transformer.

**OUTPUTS**

**Actuator Signal**

2 to 10 vdc; minimum actuator impedance is 2k ohm; bus two-wire output for bus communicating actuators.

**Exhaust fan, Y1, Y2 and AUX1 O**

All Relay Outputs (at 30 vac):

Running: 1.5A maximum

Inrush: 7.5A maximum

**ENVIRONMENTAL**

**Operating Temperature**

-40°F to 150°F (-40°C to 65°C).

Exception of display operation down to -4°F (-20°C) with full recovery at -4°F (-20°C) from exposure to -40°F (-40°C)

**Storage Temperature**

-40°F to 150°F (-40°C to 65°C)

**Shipping Temperature**

-40°F to 150°F (-40°C to 65°C)

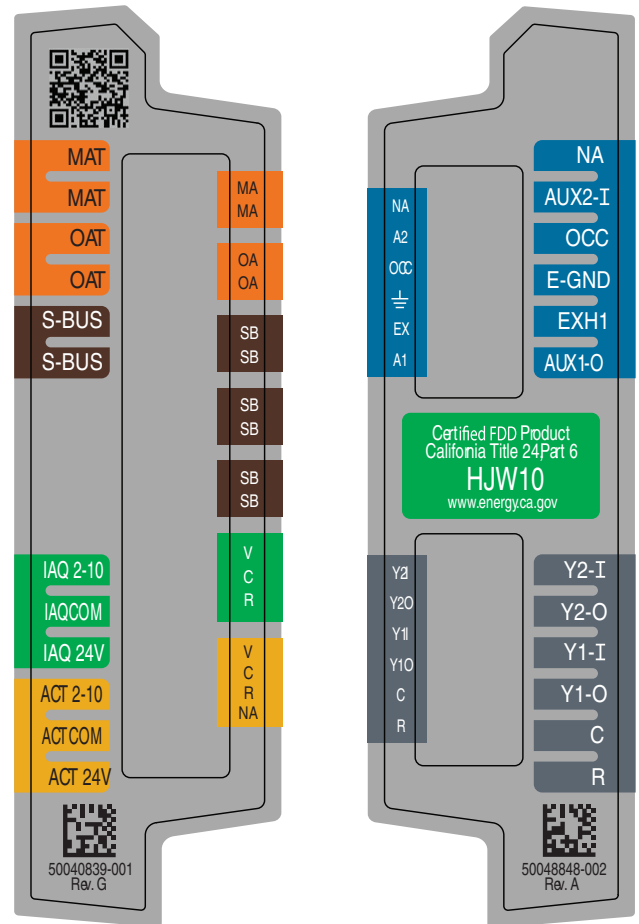
**Relative Humidity**

5% to 95% RH non-condensing

**ECONOMIZER MODULE WIRING DETAILS**

Use Fig. 47 and Tables 6 and 7 to locate the wiring terminals for the Economizer module.

NOTE: The four terminal blocks are removable. Slide out each terminal block, wire it, and then slide it back into place.



**Fig. 47 — W7220 Wiring Terminals**

**Table 6 — Economizer Module (Left Hand Terminal Blocks)**

LABEL	TYPE	DESCRIPTION
<b>Top Left Terminal Block</b>		
<b>MAT</b>	20k NTC and COM	Mixed Air Temperature Sensor (Polarity Insensitive Connection)
<b>OAT</b>	20k NTC and COM	Outdoor Air Temperature Sensor (Polarity Insensitive Connection)
<b>S-BUS</b>	S-BUS (Sylk* Bus)	Enthalpy Control Sensor (Polarity Insensitive Connection)
<b>Bottom Left Terminal Block</b>		
<b>IAQ 2-10</b>	2-10 vdc	Air Quality Sensor Input (e.g. CO <sub>2</sub> sensor)
<b>IAQ COM</b>	COM	Air Quality Sensor Common
<b>IAQ 24V</b>	24 vac	Air Quality Sensor 24 vac Source
<b>ACT 2-10</b>	2-10 vdc	Damper Actuator Output (2-10 vdc)
<b>ACT COM</b>	COM	Damper Actuator Output Common
<b>ACT 24v</b>	24 vac	Damper Actuator 24 vac Source

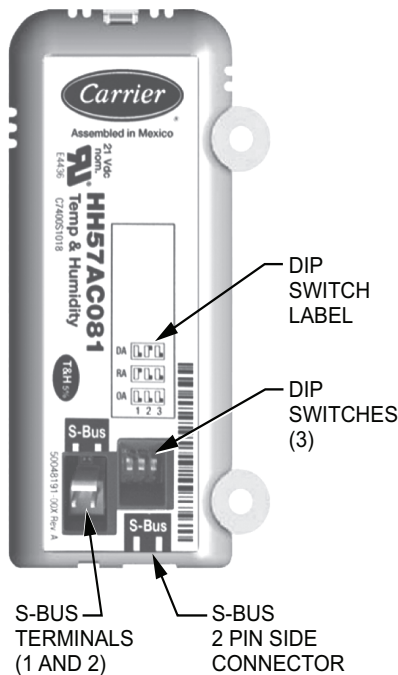
\*Sylk is a trademark of Honeywell International Inc.

**Table 7 — Economizer Module (Right Hand Terminal Blocks)**

LABEL	TYPE	DESCRIPTION
<b>Top Right Terminal Blocks</b>		
AUX2 I	24 vac IN	The first terminal is not used.
OCC	24 vac IN	Shut Down (SD) or HEAT (W) Conventional only and Heat Pump Changeover (O-B) in Heat Pump mode.
E-GND	E-GND	Occupied/Unoccupied Input
EXH1	24 vac OUT	Exhaust Fan 1 Output
AUX1 O	24 vac OUT	Programmable: Exhaust fan 2 output or ERV or System alarm output
<b>Bottom Right Terminal Blocks</b>		
Y2-I	24 vac IN	Y2 in - Cooling Stage 2 Input from space thermostat
Y2-O	24 vac OUT	Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling
Y1-I	24 vac IN	Y1 in - Cooling Stage 2 Input from space thermostat
Y1-O	24 vac OUT	Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling
C	COM	24 vac Common
R	24 vac	24 vac Power (hot)

**S-Bus Sensor Wiring**

The labels on the sensors and controller are color coded for ease of installation. Orange labeled sensors can only be wired to orange terminals on the controller. Brown labeled sensors can only be wired to S-bus (brown) terminals. Use Fig. 48 and Table 8 to locate the wiring terminals for each S-Bus and enthalpy control sensor.



**Fig. 48 — S-Bus Sensor DIP Switches**

**Table 8 — HH57AC081 Sensor Wiring Terminations**

TERMINAL		TYPE	DESCRIPTION
NUMBER	LABEL		
1	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)
2	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)

Use Fig. 48 and Table 9 to set the DIP switches for the desired use of the sensor.

**Table 9 — HH57AC081 Sensor DIP Switch**

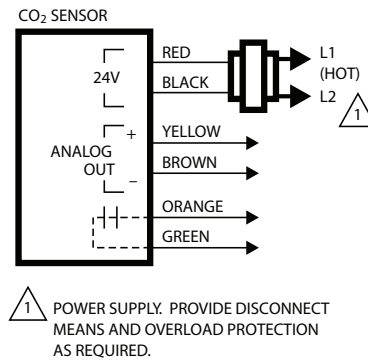
USE	DIP SWITCH POSITIONS FOR SWITCHES 1, 2, AND 3		
	1	2	3
DA	OFF	ON	OFF
RA	ON	OFF	OFF
OA	OFF	OFF	OFF

NOTE: When an S-Bus sensor is connected to an existing network, it will take 60 minutes for the network to recognize and auto-configure itself to use the new sensor.

During the 60-minute setup period, no alarms for sensor failures (except SAT) will be issued and no economizing function will be available.

**CO<sub>2</sub> Sensor Wiring**

When using a CO<sub>2</sub> sensor, the black and brown common wires are internally connected and only one is connected to “IAQ COM” on the W7220. Use the power from the W7220 to power the CO<sub>2</sub> sensor OR make sure the ground for the power supplies are common. See Fig. 49 for CO<sub>2</sub> sensor wiring.



**Fig. 49 — CO<sub>2</sub> Sensor Wiring**

**INTERFACE OVERVIEW**

This section describes how to use the EconoMiSer® user interface for:

- Keypad and menu navigation
- Settings and parameter changes
- Menu structure and selection

**User Interface**

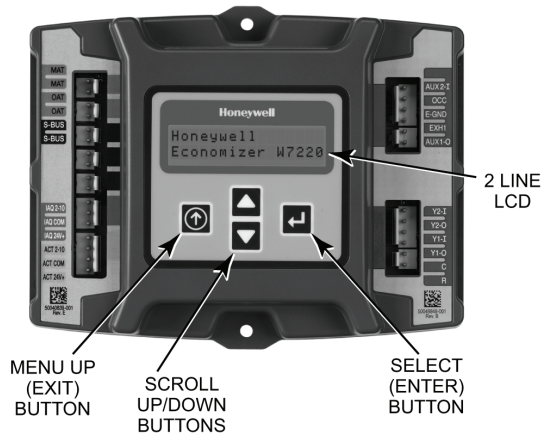
The user interface consists of a 2-line LCD display and a 4-button keypad on the front of the economizer controller.

**Keypad**

Use the four navigation buttons (see Fig. 50) to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.

To use the keypad when working with menus:

- Press the ▲ (Up arrow) button to move to the previous menu.
- Press the ▼ (Down arrow) button to move to the next menu.
- Press the ↵ (Enter) button to display the first item in the currently displayed menu.
- Press the ⏪ (Menu Up/Exit) button to exit a menu's item and return to the list of menus.



**Fig. 50 — W7220 Controller Navigation Buttons**

To use the keypad when working with Setpoints, System and Advanced Settings, Checkout tests and Alarms:

1. Navigate to the desired menu.
2. Press the ↵ (Enter) button to display the first item in the currently displayed menu.
3. Use the ▲ and ▼ buttons to scroll to the desired parameter.
4. Press the ↵ (Enter) button to display the value of the currently displayed item.
5. Press the ▲ button to increase (change) the displayed parameter value.
6. Press the ▼ button to decrease (change) the displayed parameter value.

NOTE: When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment or decrement.

1. Press the ↵ (Enter) button to accept the displayed value and store it in nonvolatile RAM. “CHANGE STORED” displays.
2. Press the ↵ (Enter) button to return to the current menu parameter.
3. Press the ⏪ (Menu Up/Exit) button to return to the previous menu.

### Menu Structure

Table 10 illustrates the complete hierarchy of menus and parameters for the EconoMiSer® X system.

The Menus in display order are:

- STATUS
- SETPOINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

NOTE: Some parameters in the menu use the letters MA or MAT, indicating a mixed air temperature sensor location before the cooling coil. This unit application has the control sensor located after the cooling coil, in the fan section, where it is designated as (Cooling) Supply Air Temperature or SAT sensor.

### SETUP AND CONFIGURATION

Before being placed into service, the W7220 Economizer module must be set up and configured for the installed system.

**IMPORTANT:** During setup, the economizer module is live at all times.

The setup process uses a hierarchical menu structure that is easy to use. Press the ▲ and ▼ arrow buttons to move forward and backward through the menus and press the button to select and confirm setup item changes.

### Time-Out and Screensaver

When no buttons have been pressed for 10 minutes, the LCD displays a screen saver, which cycles through the Status items. Each Status items displays in turn and cycles to the next item after 5 seconds.

**Table 10 — W7220 Menu Structure\***

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME Notes
STATUS	ECON AVAIL	NO	YES/NO	FIRST STAGE COOLING DEMAND (Y1-IN) YES = economizing available; the system can use outside air for free cooling when required
	ECONOMIZING	NO	YES/NO	FIRST STAGE COOLING RELAY OUTPUT YES = outside air being used for first stage cooling
	OCCUPIED	NO	YES/NO	OCCUPIED YES = OCC signal received from space thermostat or unitary controller YES = 24 vac on terminal OCC NO = 0 vac on terminal OCC
	HEAT PUMP	N/A**	COOL HEAT	HEAT PUMP MODE Displays COOL or HEAT when system is set to heat pump (Non-conventional)
	COOL Y1—IN	OFF	ON/OFF	FIRST STAGE COOLING DEMAND (Y1-IN) Y1-I signal from space thermostat or unitary controller for cooling stage 1. ON = 24 vac on terminal Y1-I OFF = 0 vac on terminal Y1-I
	COOL Y1—OUT	OFF	ON/OFF	FIRST STAGE COOLING RELAY OUTPUT Cool stage 1 Relay Output to stage 1 mechanical cooling (Y1—OUT terminal)
	COOL Y2—IN	OFF	ON/OFF	SECOND STAGE COOLING DEMAND (Y2-IN) Y2-I signal from space thermostat or unitary controller for second stage cooling. ON = 24 vac on terminal Y2-I OFF = 0 vac on terminal Y2-I
	COOL Y2—OUT	OFF	ON/OFF	SECOND STAGE COOLING RELAY OUTPUT Cool Stage 2 Relay Output to mechanical cooling (Y2—OUT terminal)
	MA TEMP	____ °F (or ____ °C)	-40°F to 150°F (-40°C to 66°C)	SUPPLY AIR TEMPERATURE, Cooling Mode Displays value of measured mixed air from MAT sensor. Displays ____ °F if not connected, short or out of range.
	DA TEMP	____ °F (or ____ °C)	-40°F to 150°F (-40°C to 66°C)	DISCHARGE AIR TEMPERATURE, after Heating section Displays when Discharge Air Sylk Bus sensor is connected and displays measured discharge temperature. Displays ____ °F if sensor sends invalid value, if not connected, short or out of range.
	OA TEMP	____ °F (or ____ °C)	-40°F to 140°F (-40°C to 60°C)	OUTSIDE AIR TEMP Displays measured value of outdoor air temperature. Displays ____ °F if sensor sends invalid value, short or out of range.
	OA HUM	__ %	0 to 100%	OUTSIDE AIR RELATIVE HUMIDITY Displays measured value of outdoor humidity from OA Sylk Bus sensor. Displays __ % if not connected short, or out of range.
	RA TEMP	____ °F (or ____ °C)	0°F to 140°F (-18°C to 60°C)	RETURN AIR TEMPERATURE Displays measured value of return air temperature from RAT Sylk Bus sensor. Displays ____ °F if sensor sends invalid value, if not connected, short or out of range
	RA HUM	__ %	0 to 100%	RETURN AIR RELATIVE HUMIDITY Displays measured value of return air humidity from RA Sylk Bus sensor. Displays __ % if sensor sends invalid value, if not connected, short or out of range
	IN CO2	___ ppm	0 to 2000 ppm	SPACE/RETURN AIR CO <sub>2</sub> Displays value of measured CO <sub>2</sub> from CO <sub>2</sub> sensor. Invalid if not connected, short or out of range. May be adjusted in Advanced menu by Zero offset and Span.
	DCV STATUS	N/A	ON/OFF	DEMAND CONTROLLED VENTILATION STATUS Displays ON if above set point and OFF if below set point, and ONLY if a CO <sub>2</sub> sensor is connected.
	DAMPER OUT	2.0v	2.0 to 10.0v	Displays voltage output to the damper actuator.***
	ACT POS	N/A	0 to 100%	Displays actual position of actuator
	ACT COUNT	N/A	1 to 65,535	Displays number of times actuator has cycled. 1 cycle equals 180 degrees of actuator movement in any direction.
	ACTUATOR	N/A	OK/Alarm (on Alarm menu)	Displays ERROR if voltage or torque is below actuator range.
EXH1 OUT	OFF	ON/OFF	EXHAUST STAGE 1 RELAY OUTPUT Displays ON when damper position reaches programmed percentage set point. Output of EXH1 terminal: ON = relay closed OFF = relay open	



**Table 10 — W7220 Menu Structure\* (cont)**

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME Notes
STATUS (cont)	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT Output of AUX1 O terminal Displays ON when damper position reaches programmed percentage set point. ON = 24 vac output OFF = No output Displays only if AUX1 O = EXH2
	ERV	OFF	ON/OFF	ENERGY RECOVERY VENTILATOR Output of AUX1 O terminal; displays only if AUX1 O = ERV ON = 24 vac output OFF = No Output
	MECH COOL ON or HEAT STAGES ON	0	0, 1, or 2	Displays stage of mechanical cooling that is active. Displays the stage of heat pump heating that is active.
	FAN SPEED	N/A	LOW or HIGH	SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT IN)	N/A	ON/OFF	HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.
SETPOINTS	MAT SET	53°F (12°C)	38°F to 70°F (3°C to 21°C); increment by 1 degree	SUPPLY AIR SETPOINT The economizer will modulate the OA damper to maintain the mixed air temperature at the set point
	LOW T LOCK	32°F (0°C)	-45°F to 80°F (-43°C to 27°C); increment by 1 degree	COMPRESSOR LOW TEMPERATURE LOCKOUT Set point determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout. At or below the set point, the Y1-O and Y2-O will not be energized on the controller.
	DRYBLB SET	63°F (17°C)	48°F to 80°F (9°C to 27°C); increment by 1 degree	OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT <i>Dry bulb set point will only appear if using dry bulb changeover.</i> Set point determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63°F unit will economize at 62°F and below and not economize at 64°F and above. There is a 2°F deadband.
	ENTH CURVE	ES3	ES1,ES2,ES3,ES4, or ES5	ENTHALPY CHANGEOVER CURVE ES curve will only appear if using enthalpy changeover. Enthalpy boundary "curves" for economizing using single enthalpy. See page 40 for description of enthalpy curves.
	DCV SET	1100ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROLLED VENTILATION Displays only if CO <sub>2</sub> sensor is connected. Set point for Demand Controlled Ventilation of space. Above the set point, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the set point.
	MIN POS	2.8 V	2 to 10 vdc	VENTILATION MINIMUM POSITION Displays ONLY if a CO <sub>2</sub> sensor is NOT connected. With 2-speed fan units, MIN POS L (low speed fan) and MIN POS H (high speed fan) settings are required. Default for MIN POS L is 3.2V and MIN POS H is 2.8V.
	VENTMAX	2.8 V	2 to 10 vdc	DCV MAXIMUM DAMPER POSITION Displays only if a CO <sub>2</sub> sensor is connected. Used for Vbz (ventilation max cfm) set point. VENTMAX is the same setting as MIN POS would be if unit did not have CO <sub>2</sub> sensor.
			100 to 9990 cfm; increment by 10	If OA, MA, RA, and CO <sub>2</sub> sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 CFM.
			2 to 10 vdc	With 2-speed fan units, VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required. Default for VENTMAX L is 3.2V and VENTMAX H is 2.8V
	VENTMIN	2.25 V	2 to 10 vdc or 100 to 9990 cfm increment by 10	DCV MINIMUM DAMPER POSITION Displays only if a CO <sub>2</sub> sensor is connected. Used for Va (ventilation min cfm) set point. This is the ventilation for less than maximum occupancy of the space.
			100 to 9990 cfm; increment by 10	If OA, MA, RA, and CO <sub>2</sub> sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 CFM.
2 to 10 vdc			With 2-speed fan units VENTMIN L (low speed fan) and VENTMIN H (high speed fan) settings are required. Default for VENTMIN L is 2.5V and VENTMIN H is 2.25V	
ERV OAT SP††	32°F (0°C)	0°F to 50°F (-18°C to 10°C); increment by 1 degree	ENERGY RECOVERY VENTILATOR UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only when AUX1 O = ERV	

**Table 10 — W7220 Menu Structure\* (cont)**

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME Notes
SETPOINTS (cont)	EXH1 SET	50%	0 to 100%; increment by 1	EXHAUST FAN STAGE 1 SETPOINT Set point for OA damper position when exhaust fan 1 is powered by the economizer. With 2-speed fan units, Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required. Default for Exh1 L is 65% and Exh1 H is 50%
	EXH2 SET	75%	0 to 100%; increment by 1	EXHAUST FAN STAGE 2 SETPOINT Set point for OA damper position when exhaust fan 2 is powered by the economizer. Only used when AUX1 O is set to EHX2. With 2-speed fan units, Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required. Default for Exh2 L is 80% and Exh2 H is 75%
SYSTEM SETUP	INSTALL	01/01/10	N/A	Display order = MM/DD/YY Setting order = DD, MM, then YY.
	UNITS DEG	°F	°F or °C	Sets economizer controller in degrees Fahrenheit or Celsius
	EQUIPMENT	CONV	CONV or HP	CONV = conventional; HP O/B = Enable Heat Pump mode. Use AUX2 I for Heat Pump input from thermostat or controller.
	AUX2 IN	W	Shutdown (SD) Heat (W1) HP(O) HP(B)	In CONV mode: SD = Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. NOTE: If using 2-speed fan mode, you must program CONV mode for W. Shutdown is not available in 2-speed fan mode. In HP O/B mode: HP(O) = energize heat pump on Cool (default); HP(B) = energize heat pump on heat.
	FAN SPEED	2 speed	1 speed/2 speed	Sets the economizer controller for operation of 1 speed or 2 speed supply fan. The controller does not control the fan, but positions the OA and RA dampers to heating or cooling mode. NOTE: 2-speed fan option also needs Heat (W1) programmed in AUX 2 In.
	FAN CFM	5000 cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter only if using DCVCAL ENA = AUTO This is the capacity of the RTU. The value is found on the nameplate label for the specific unit.
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 O relay • NONE = not configured (output is not used) • ERV = Energy Recovery Ventilator†† • EXH2 = second damper position 24 vac out for second exhaust fan • SYS = use output as an alarm signal
	OCC	INPUT	INPUT or ALWAYS	OCCUPIED MODE BY EXTERNAL SIGNAL When using a setback thermostat with occupancy out (24 vac), the 24 vac is input "INPUT" to the OCC terminal. If no occupancy output from the thermostat, then change program to "ALWAYS" OR add a jumper from terminal R to OCC terminal.
	FACTORY DEFAULT	NO	NO or YES	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to the factory default values.
ADVANCED SETUP	MA LO SET	45°F (7°C)	35°F to 65°F (2°C to 18°C); Increment by 1 degree	SUPPLY AIR TEMPERATURE LOW LIMIT Temperature to activate Freeze Protection (close damper or modulate to MIN POS if temp falls below set value).
	FREEZE POS	CLO	CLO or MIN	FREEZE PROTECTION DAMPER POSITION Damper position when freeze protection is active (closed or MIN POS).
	CO2 ZERO	0ppm	0 to 500 ppm; Increment by 10	CO <sub>2</sub> ppm level to match CO <sub>2</sub> sensor start level.
	CO2 SPAN	2000ppm	1000 to 3000 ppm; Increment by 50	CO <sub>2</sub> ppm span to match CO <sub>2</sub> sensor, e.g.: 500-1500 sensor output would be 500 CO <sub>2</sub> zero and 1000 CO <sub>2</sub> span.
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 hrs or OFF	COOLING STAGE 3 DELAY Delay after stage 2 cool has been active. Turns on second stage of cooling when economizer is first stage call and mechanical cooling is second stage call. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling
	SD DMPR POS	CLO	CLO or OPN	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., fans, etc. will shut off.
	DA LO ALM	45°F (7°C)	NONE 35°F to 65°F (2°C to 18°C); Increment by 5°F	Used for alarm for when the DA air temperature is too low. Set lower range of alarm, below this temperature the alarm will show on the display.

**Table 10 — W7220 Menu Structure\* (cont)**

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME Notes
<b>ADVANCED SETUP (cont)</b>	DA HI ALM	80°F (27°C)	NONE 70°F to 180°F (21°C to 82°C); Increment by 5°F	Used for alarm for when the DA air temperature is too high. Sets upper range of alarm; above this temperature, the alarm will show on the display.
	DCVCAL ENA	MAN	MAN (manual) AUTO	Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA, and MA sensor conditions. Requires all (RA, OA, MA, CO <sub>2</sub> ) sensors. This operation is not operable with a 2-speed fan unit.
	MAT T CAL	0.0°F	± 2.5°F	SUPPLY AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OAS T CAL	0.0°F	± 2.5°F	OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OA H CAL	0% RH	±10% RH	OUTSIDE AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	RA T CAL	0.0°F	± 2.5°F	RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	RA H CAL	0% RH	±10% RH	RETURN AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	DA T CAL	0.0°F	± 2.5°F	DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON SECOND STAGE ECONOMIZING When in economizing mode, this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.
<b>CHECKOUT***</b>	DAMPER MINIMUM POSITION	N/A	N/A	The checkout for the damper minimum position is based on the system. See Table 11.
	DAMPER OPEN	N/A	N/A	Position damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure to pause in the mode to allow exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE	N/A	N/A	Positions damper to the fully closed position
	CONNECT Y1-O	N/A	N/A	Closes the Y1-O relay (Y1-O)
	CONNECT Y2-O	N/A	N/A	Closes the Y2-O relay (Y2-O)
	CONNECT AUX1-O	N/A	N/A	Energizes the AUX output. If Aux setting is: • NONE — no action taken • ERV — 24 vac out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation.†† • SYS — 24 vac out. Issues a system alarm
CONNECT EXH1	N/A	N/A	Closes the power exhaust fan 1 relay (EXH1)	
<b>ALARMS</b>	Alarms display only when they are active. The menu title "ALARMS(#)" includes the number of active alarms in parenthesis ( ). When using SYLK bus sensors, "SYLK" will appear on the screen, and when using 20k OA temperature sensors, "SENS T" will appear on the screen			
	MA T SENS ERR	N/A	N/A	SUPPLY AIR TEMPERATURE SENSOR ERROR Mixed air sensor has failed or become disconnected - check wiring, then replace sensor if the alarm continues.
	CO2 SENS ERR	N/A	N/A	CO <sub>2</sub> SENSOR ERROR CO <sub>2</sub> sensor has failed, gone out of range or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK T ERR	N/A	N/A	OUTSIDE AIR S-BUS SENSOR ERROR
	OA SYLK H ERR	N/A	N/A	Outdoor air enthalpy sensor has failed or become disconnected - check wiring, then replace sensor if the alarm continues.
	RA SYLK T ERR	N/A	N/A	RETURN AIR S-BUS SENSOR ERROR
	RA SYLK H ERR	N/A	N/A	Return air enthalpy sensor has failed or become disconnected - check wiring, then replace sensor if the alarm continues.
	DA SYLK T ERR	N/A	N/A	DISCHARGE AIR S-BUS SENSOR ERROR Discharge air sensor has failed or become disconnected - check wiring, then replace sensor if the alarm continues.
	OA SENS T ERR	N/A	N/A	OUTSIDE AIR TEMPERATURE SENSOR ERROR Outdoor air temperature sensor has failed or become disconnected - check wiring, then replace if the alarm continues.
ACT ERROR	N/A	N/A	ACTUATOR ERROR Actuator has failed or become disconnected - check for stall, over voltage, under voltage and actuator count. Replace actuator if damper is movable and supply voltage is between 21.6 V and 26.4 V. Check actuator count on STATUS menu.	

**Table 10 — W7220 Menu Structure\* (cont)**

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME Notes
<b>ALARMS (cont)</b>	FREEZE ALARM	N/A	N/A	Check if outdoor temperature is below the LOW Temp Lockout on set point menu. Check if Mixed air temperature on STATUS menu is below the Lo Set point on Advanced menu. When conditions are back in normal range, the alarm will go away.
	SHUTDOWN ACTIVE	N/A	N/A	AUX2 IN is programmed for SHUTDOWN and 24 V has been applied to AUX2 IN terminal.
	DMP CAL RUNNING	N/A	N/A	DAMPER CALIBRATION ROUTINE RUNNING If DCV Auto enable has been programmed, this alarm will display when the W7220 is completing a calibration on the dampers. Wait until the calibration is completed and the alarm will go away. Must have OA, MA and RA sensors for DCV calibration; set up is in the Advanced setup menu.
	DA SENS ALM	N/A	N/A	DISCHARGE AIR TEMPERATURE SENSOR ALARM Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.
	SYS ALARM	N/A	N/A	When AUX1-O is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1-O terminal has 24 vac out.
	ACT UNDER V	N/A	N/A	ACTUATOR VOLTAGE LOW Voltage received by actuator is above expected range.
	ACT OVER V	N/A	N/A	ACTUATOR VOLTAGE HIGH Voltage received by actuator is below expected range.
	ACT STALLED	N/A	N/A	ACTUATOR STALLED Actuator stopped before achieving commanded position.

**LEGEND**

- CLO** — Compressor Lockout
- ERV** — Energy Recovery Ventilator
- LCD** — Liquid Crystal Display
- MA** — Mixed Air
- MAT** — Mixed Air Temperature
- N/A** — Not Applicable
- OA** — Outdoor Air
- OAT** — Outdoor Air Temperature
- OCC** — Occupied
- RA** — Return Air
- RAT** — Return Air Temperature
- RTU** — Rooftop Unit
- SYS** — System

**NOTES:**

1. STATUS → OCCUPIED — The factory-standard Occupancy signal originates with a thermostat or other controller call for indoor fan operation at UCB terminal G. This signal passes through the Unit Control Board's OCCUPANCY jumper to the ECONO connector and to the W7220's OCC input terminal. An external timeclock or relay is required to implement an Occupancy schedule on the economizer damper position.
2. STATUS → MA TEMP, SETPOINTS → MAT SET — The W7220 menu parameters and labels include designations MA, MAT and Mixed Air for the economizer cooling control sensor. On these rooftop units, the economizer control sensor is located downstream of the evaporator/indoor coil in the supply fan section where this sensor is designated as Supply Air Temperature (SAT) sensor.
3. SETPOINTS → DRYBLB SET — This point is not displayed if a Return Air (differential) temperature sensor or an Outdoor Air enthalpy sensor is connected.
4. SYSTEM SETUP parameters must be configured as noted for 2-Speed unit operation:  
EQUIPMENT = CONV  
AUX2 I = W  
FAN SPEED = 2SPEED

\* Table 10 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration. For example, if you do not have a DCV (CO<sub>2</sub>) sensor, then none of the DCV parameters appear.

† When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

\*\* N/A = Not Applicable.

†† ERV Operation: When in cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode, the ERV terminal will be energized when the OA is below the ERV OAT set point in the set point menu.

\*\*\* After 10 minutes without a command or mode change, the controller will change to normal operation.

For damper minimum position settings and checkout menu readings, see Table 11. For dry bulb operation with a 1-speed indoor fan, with or without DCV, see Tables 12 and 13. For enthalpy operation with a 1-speed indoor fan, with or without DCV, see Tables 14 and 15. For dry bulb operation with a 2 speed indoor fan, with or without DCV, see Tables 16 and 17. For enthalpy operation with a 2 speed indoor fan, with or without DCV, see Tables 18 and 19.

**Table 11 — Damper Minimum Position Settings and Readings on Checkout Menu**

FAN SPEED	DEMAND CONTROLLED VENTILATION (CO <sub>2</sub> SENSOR)	SETPOINTS	CHECKOUT
1	NO	MIN POS	VMAX-HS
1		N/A	N/A
2		MIN POS H	VMAX-HS
2		MIN POS L	VMAX-LS
1	YES	VENT MIN	VMAX-HS
1		VENT MAX	VMAX-HS
2		VENT MIN H	VMAX-HS
2		VENT MAX H	VMAX-LS
2		VENT MIN L	N/A
2		VENT MAX L	N/A

**Table 12 — Dry Bulb Operation without DCV (CO<sub>2</sub> Sensor) — 1 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	Off	Off	High	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	High	24-v/On	0-v/Off	MIN POS	Closed
		On	On	High	24-v/On	24-v/On	MIN POS	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	High	0-v/Off	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	MIN POS to Full-Open	Closed to Full-Open

\*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y-I and Y2-I have not been satisfied.

**Table 13 — Dry Bulb Operation with DCV (CO<sub>2</sub> Sensor) — 1 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO <sub>2</sub> set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	VENTMIN to Full-Open	Closed to Full-Open
Above CO <sub>2</sub> set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN to VENTMAX	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	VENTMIN to Full-Open	Closed to Full-Open

\*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y-I and Y2-I have not been satisfied.

**Table 14 — Enthalpy Operation without DCV (CO<sub>2</sub> Sensor) — 1 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	Off	Off	High	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	High	24-v/On	0-v/Off	MIN POS	Closed
		On	On	High	24-v/On	24-v/On	MIN POS	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	High	0-v/Off	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	MIN POS to Full-Open	Closed to Full-Open

\*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y-I and Y2-I have not been satisfied.

**Table 15 — Enthalpy Operation with DCV (CO<sub>2</sub> Sensor) — 1 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO <sub>2</sub> set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off†	VENTMIN to Full-Open	Closed to Full-Open
Above CO <sub>2</sub> set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN L to VENTMAX	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H to VENTMAX	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN L to VENTMAX	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	DELAY* 24-v/On	0-v/Off†	VENTMIN to Full-Open	Closed to Full-Open

\*With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

†With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y-I and Y2-I have not been satisfied.

**Table 16 — Dry Bulb Operation without DCV (CO<sub>2</sub> Sensor) — 2 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NONE	No	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	24-v/On	0-v/Off	MIN POS L	Closed
		On	On	High	24-v/On	24-v/On	MIN POS H	Closed
NONE	Yes	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	0-v/Off	0-v/Off	MIN POS L to Full-Open	Closed to Full-Open
		On	On	High	DELAY* 24-v/On	0-v/Off†	MIN POS H to Full-Open	Closed to Full-Open

\*With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

†With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y-I and Y2-I have not been satisfied.

**Table 17 — Dry Bulb Operation with DCV (CO<sub>2</sub> Sensor) — 2 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO <sub>2</sub> Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO <sub>2</sub> Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	DELAY* 24v/On	0v/Off†	VENTMIN to Full-Open	Closed to Full-Open

\*With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

†With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

**Table 18 — Enthalpy Operation without DCV (CO<sub>2</sub> Sensor) — 2 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NO CO <sub>2</sub> SENSOR	NO	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	24v/On	0v/Off	MIN POS	Closed
		ON	ON	HIGH	24v/On	24v/On	MIN POS	Closed
	YES	OFF	OFF	LOW	0v/Off	0v/Off	MIN POS	Closed
		ON	OFF	LOW	0v/Off	0v/Off	MIN POS to Full Open	Closed to Full-Open
		ON	ON	HIGH	DELAY* 24v/On	0v/Off†	MIN POS to Full Open	Closed to Full-Open

\*With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

†With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.

**Table 19 — Enthalpy Operation with DCV (CO<sub>2</sub> Sensor) — 2 Speed Fan**

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below CO <sub>2</sub> Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	24v/On	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
Above CO <sub>2</sub> Set	No	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	24v/On	0v/Off	VENTMIN to VENTMAX	Closed
		ON	ON	HIGH	24v/On	24v/On	VENTMIN to VENTMAX	Closed
	Yes	OFF	OFF	LOW	0v/Off	0v/Off	VENTMIN to VENTMAX	Closed
		ON	OFF	LOW	0v/Off	0v/Off	VENTMIN to Full-Open	Closed to Full-Open
		ON	ON	HIGH	DELAY* 24v/On	0v/Off*	VENTMIN to Full-Open	Closed to Full-Open

\*With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

†With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2–O after the delay if the call for Y1–I and Y2–I have not been satisfied.

**ENTHALPY SETTINGS**

When the OA temperature, enthalpy and dew point are below the respective set points, the Outdoor Air can be used for economizing. Figure 51 shows the new single enthalpy boundaries in the W7220. There are 5 boundaries (set points ES1 through ES5), which are defined by dry bulb temperature, enthalpy and dew point.

Refer to Table 20 for ENTH CURVE set point values.

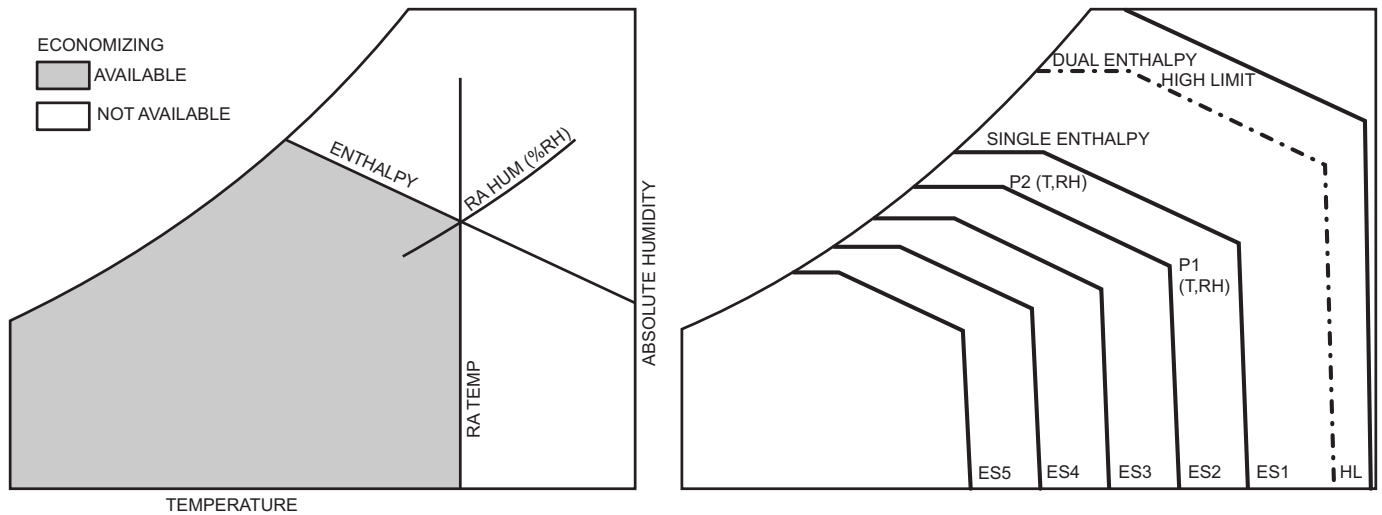
The W7220 calculates the enthalpy and dew point using the OA temperature and humidity input from the OA enthalpy sensor.

When the OA temperature, OA humidity and OA dew point are all below the selected boundary, the economizer sets the economizing mode to YES, economizing is available.

When all of the OA conditions are above the selected boundary, the conditions are not good to economize and the mode is set to NO.

Figure 51 shows the 5 current boundaries. There is also a high limit boundary for differential enthalpy. The high limit boundary is ES1 when there are no stages of mechanical cooling energized and HL (high limit) when a compressor stage is energized.





**Fig. 51 — Single Enthalpy Curve Boundaries**

**Table 20 — Single Enthalpy and Dual Enthalpy High Limit Curves**

ENTHALPY CURVE	TEMP. DRY BULB (F)	TEMP. DEWPOINT (F)	ENTHALPY (btu/lb/da)	POINT P1		POINT P2	
				TEMP. (F)	HUMIDITY (%RH)	TEMP. (F)	HUMIDITY (%RH)
ES1	80	60	28.0	80	36.8	66.3	80.1
ES2	75	57	26.0	75	39.6	63.3	80.0
ES3	70	54	24.0	70	42.3	59.7	81.4
ES4	65	51	22.0	65	44.8	55.7	84.2
ES5	60	48	20.0	60	46.9	51.3	88.5
HL	86	66	32.4	86	38.9	72.4	80.3

**TWO-SPEED FAN OPERATION**

NOTE: Two-Speed Fan operation applies to size 07 models only.

The W7220 controller has the capability to work with a system using a 2-speed supply fan. The W7220 does not control the supply directly but uses the following input status to determine the speed of the supply fan and controls the OA damper to the required position, see Table 21.

**Table 21 — Fan Speed**

STATE	FAN SPEED
OCC	Low
Y1	Low
Y2	High
W	High

The W (heating mode) is not controlled by the W7220 but it requires the status to know where to position the OA damper for minimum position for the fan speed.

The 2 speed fan delay is available when the system is programmed for 2 speed fan (in the System Setup menu item). The 2 speed fan delay is defaulted to 5 minutes and can be changed in the Advanced Setup menu item. When the unit has a call for Y1 In and in the free cooling mode and there is a call for Y2 In, the 2-speed fan delay starts and the OA damper will modulate 100% open, the supply fan should be set to high speed by the unit controller.

After the delay one of two actions will happen:

- The Y2 In call will be satisfied with the damper 100% open and fan on high speed and the call will turn off
- OR
- If the call for additional cooling in the space has not been satisfied then the first stage of mechanical cooling will be enabled through Y1 Out or Y2 Out.

**CHECKOUT**

Inspect all wiring connections at the economizer module’s terminals, and verify compliance with the installation wiring diagrams. For checkout, review the Status of each configured parameter and perform the Checkout tests.

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 30.

**Power Up**

After the W7220 module is mounted and wired, apply power.

**Initial Menu Display**

On initial start up, Honeywell displays on the first line and economizer W7220 on the second line. After a brief pause, the revision of the software appears on the first line and the second line will be blank.

**Power Loss (Outage or Brownout)**

All set points and advanced settings are restored after any power loss or interruption.

NOTE: All settings are stored in non-volatile flash memory.

**Status**

Use the Status menu (see Table 10) to check the parameter values for the various devices and sensors configured.

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 30.

**Checkout Tests**

Use the Checkout menu (see page 35) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 30.

To perform a Checkout test:

1. Scroll to the desired test in the Checkout menu using the ▲ and ▼ buttons.
2. Press the ↵ (Enter) button to select the item. RUN? appears.
3. Press the ↵ (Enter) button to start the test. The unit pauses and then displays IN PROGRESS. When the test is complete, DONE appears.
4. When all desired parameters have been tested, press the ⬆ (Menu Up) button to end the test.

The Checkout tests can all be performed at the time of installation or at any time during the operation of the system as a test that the system is operable.

**⚠ CAUTION**

Failure to follow this caution may result in damage to equipment. Be sure to allow enough time for compressor startup and shutdown between checkout tests so that you do not short-cycle the compressors.

**TROUBLESHOOTING**

**Alarms**

The economizer module provides alarm messages that display on the 2-line LCD.

NOTE: Upon power up, the module waits 60 minutes before checking for alarms. This allows time for all the configured devices (e.g. sensors, actuator) to become operational. The exception is the SAT sensor which will alarm immediately.

If one or more alarms are present and there has been no keypad activity for at least 5 minutes, the Alarms menu displays and cycles through the active alarms.

You can also navigate to the Alarms menu at any time.

**Clearing Alarms**

Once the alarm has been identified and the cause has been removed (e.g. replaced faulty sensor) the alarm can be cleared from the display.

To clear an alarm, perform the following:

1. Navigate to the desired alarm.
2. Press the ↵ (Enter) button. ERASE? displays.
3. Press the ↵ (Enter) button. ALARM ERASED displays.
4. Press the ⬆ (Menu up/Exit) button to complete the action and return to the previous menu.

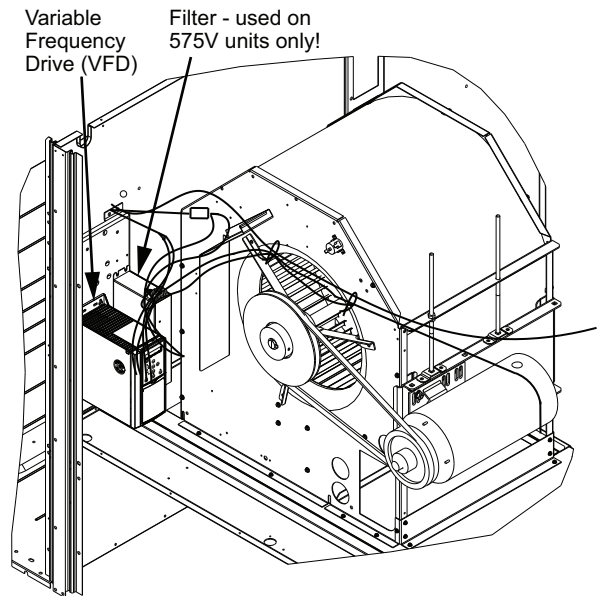
NOTE: If the alarm still exists after clearing it, it is redisplayed within 5 seconds.

**Staged Air Volume (SAV™) with Variable Frequency Drive**

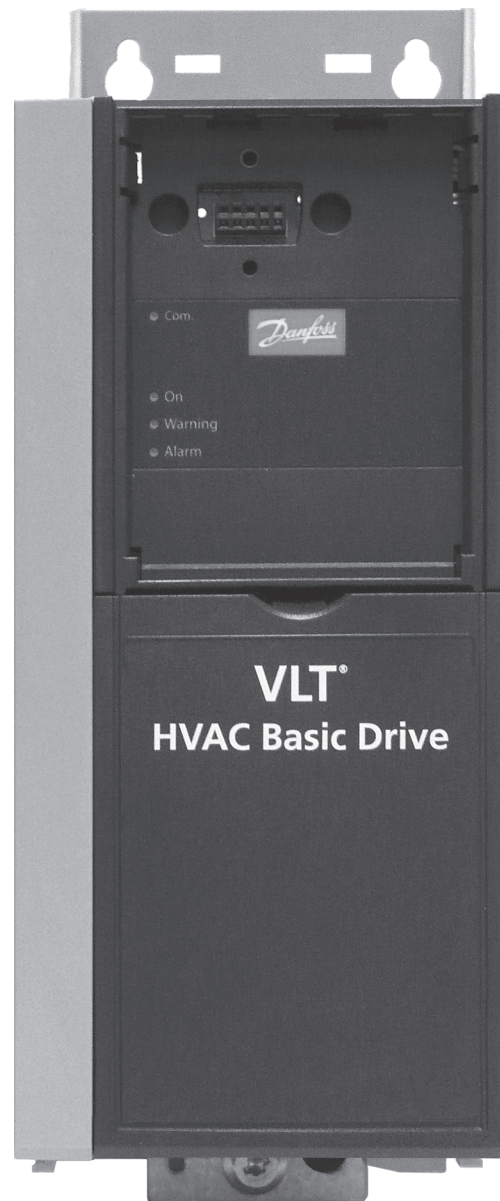
The Staged Air Volume (SAV) system utilizes a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed in sequence with the unit's ventilation, cooling and heating operation. Per ASHRAE 90.1-2016, during the first stage of cooling operation the SAV system will adjust the fan motor to provide 66% of the design airflow rate for the unit. When the call for the second stage of cooling is required, the SAV system will allow the design airflow rate for the unit established (100%). During the heating mode, the SAV system will allow total design airflow rate (100%) operation. During ventilation mode, the SAV system will operate the fan motor at 66% speed. See Fig. 52 and 53.

**Multi-Speed VFD Display Kit (Field-Installed Accessory)**

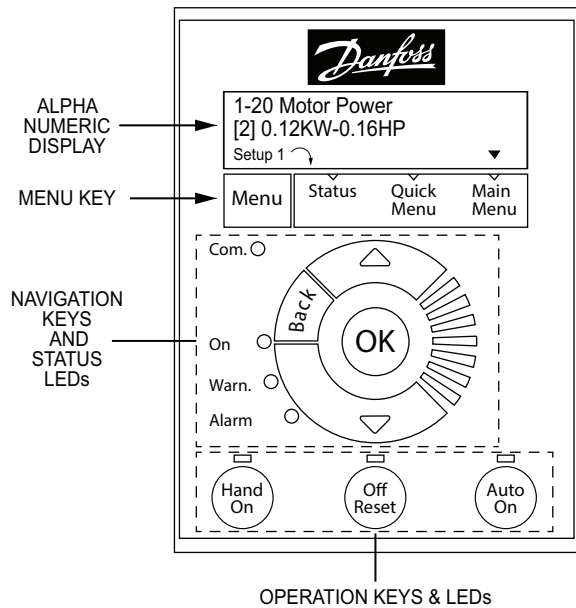
NOTE: The Remote VFD Keypad is part of the Multi-Speed VFD display kit (PN: CRDISKIT002A00) which is a field-installed accessory. It is not included with the 50LC 07 base unit.



**Fig. 52 — VFD Location**



**Fig. 53 — Variable Frequency Drive (VFD)**

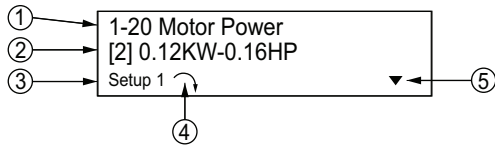


**Fig. 54 — VFD Keypad**

The VFD keypad (as shown in Fig. 54) consists of the following sections.

**ALPHA NUMERIC DISPLAY**

The LCD display is backlit with 2 alpha-numeric lines. All data is displayed on the LCD. See Fig. 55.



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.

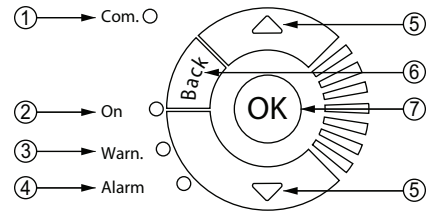
**Fig. 55 — LCD Alpha Numeric Display**

**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 Fig. 55.)

**NAVIGATION KEYS AND STATUS LEDs**

The Navigation keys and Status LEDs are detailed in Fig. 56.

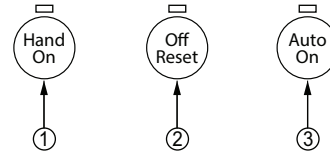


1	<b>Com. LED:</b> Flashes when bus communications is communicating.
2	<b>Green LED/On:</b> Control selection is working.
3	<b>Yellow LED/Warn.:</b> Indicates a warning.
4	<b>Flashing Red LED/Alarm:</b> Indicates an alarm.
5	<b>Arrows ▲ ▼:</b> Use the Up and Down arrow keys to navigate between parameter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

**Fig. 56 — Navigation Keys and Status LEDs**

**OPERATION KEYS AND LEDS**

Figure 57 details the functions of the Operating keys. An illuminated yellow LED above the key indicates the active key.



1	<b>Hand On key:</b> Starts the motor and enables control of the variable frequency drive (VFD) via the VFD Keypad option. <b>NOTE:</b> 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	<b>Off/Reset key:</b> Stops the motor (off). If in alarm mode the alarm will be reset.
3	<b>Auto On key:</b> The variable frequency drive is controlled either via control terminals or serial communication.

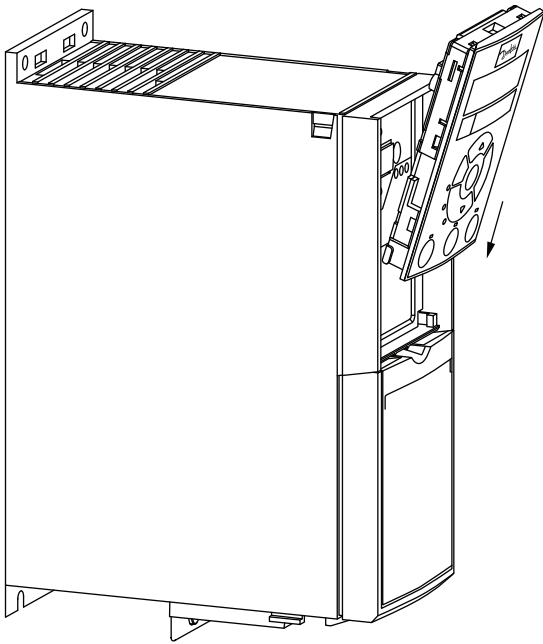
**Fig. 57 — Operating Keys**

**CONNECTING THE KEYPAD TO THE VFD**

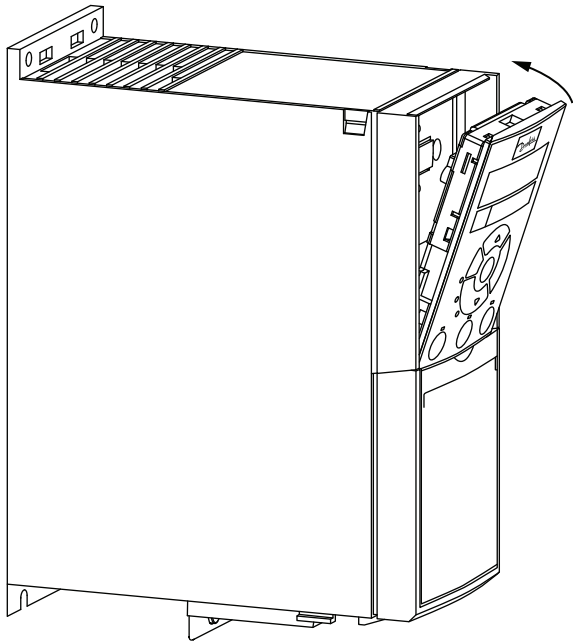
The VFD keypad can be mounted directly to the variable frequency drive, provided there is easy access to the front panel of the VFD. If there is no easy access to the VFD front panel, use the cable included with the kit to connect the keypad to the VFD.

**Connecting the Keypad Directly to the VFD**

1. Place the bottom of the VFD keypad into the variable frequency drive as shown in Fig. 58.
2. Push the top of the VFD keypad into the variable frequency drive as shown in Fig. 59.



**Fig. 58 — Align Bottom of VFD Keypad with Opening in VFD Front Panel**

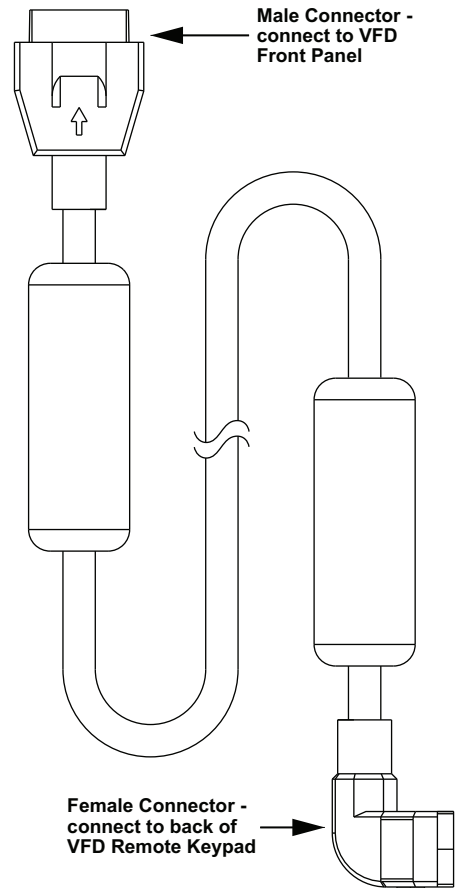


**Fig. 59 — Secure Keypad in Place**

***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). See Fig. 60.

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.

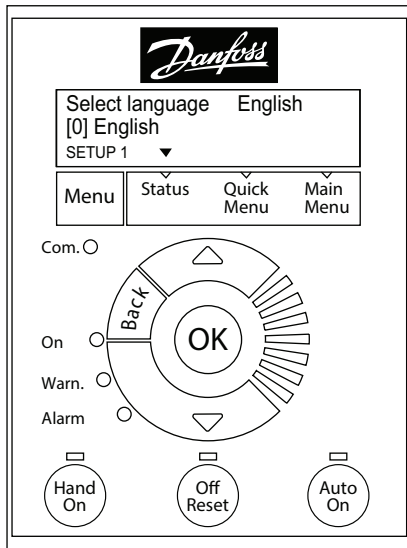


**Fig. 60 — VFD Remote Keypad Cable**

**PROGRAM THE VFD FOR 3 DISCRETE INDOOR FAN SPEEDS**

**IMPORTANT:** 50LC 07 units are programmed at the factory for 3 discrete 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.



**Fig. 61 — Keypad with Power Up Screen Displayed**

**To program the VFD for 3 discreet indoor fan motor speeds**

1. At Power-Up:  
At the first power up, the LCD displays the Select Language screen (see Fig. 61). 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.
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 shows the following.

```
0—** Operation / Display
1—** Load and Motor
```

- c. Press the OK key and the display changes to:

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

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

```
0—01 Language
[0] English
```

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

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

```
0—03 Regional Settings
[0] International
```

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

```
0—03 Regional Settings
[1] North America
```

- h. Press OK.

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

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

```
0—** Operation / Display
1—** Load and Motor
```

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

```
4—** Limits / Warnings
5—** Digital In/Out
```

- c. Press OK. The display changes to:

```
5—0* Digital I/O Mode
5—1* Digital Inputs
```

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

```
5—10 Terminal 18 Digital In...
[8] Start
```

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

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

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

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

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

4. Entering Grid Type:

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

```
0—** Operation / Display
1—** Load and Motor
```

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

- c. Press OK, the display changes to:

```
1—0* General Settings
1—1* Motor Selection
```

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

1—1* Motor Selection
1—2* Motor Data

- e. Press OK; the following display appears:

1-20 Motor Power
[9] 1.5kW - 2 hp

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

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

1-22 Motor Voltage
230V

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

1-23 Motor Frequency
60Hz

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

1-24 Motor Current
6.61A

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

NOTE: The Max Amps is greater than the nameplate value. Check the VFD Unit Parameters (see Table 22 on page 49) 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 shows the following:

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

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

1—0* General Settings
1—1* Motor Selection

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

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

- e. Press OK, the following display appears:

1-71 Start Delay
2.0s

- f. Press OK to highlight the number and then use the ▲ and ▼ (Up and Down Arrow) keys to select the number provided in Table 22. Press OK again to set the selected value.

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

1-73 Flying Start
[1] Enabled

- h. Press OK to highlight the number in the bracket and then use the ▲ and ▼ (Up and Down Arrow) keys to select the number provided in Table 22. Press OK again to set the selected value.

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

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

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

1—7* Start Adjustments
1—8* Stop Adjustments

- k. Press OK, the following display appears:

1-80 Function at Stop
[0] Coast

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

1-82 Min Speed for Functio...
1.0 Hz

- m. Press OK to highlight the number and then use the ▲ and ▼ (Up and Down Arrow) keys to select the number provided in Table 22. Press OK again to set the selected value.

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

1—7* Start Adjustments
1—8* Stop Adjustments

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

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

- p. Press OK, the following display appears:

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

- q. Press OK to highlight the number in the bracket then use the ▲ and ▼ (Up and Down Arrow) keys to select the number provided in Table 22. 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 shows the following:

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

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

2—** Brakes
3—** Reference / Ramps

- c. Press OK, the following display appears:

3—0* Reference Limits
3—1* References

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

3-02 Minimum Reference
0.000

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

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

3-03 Maximum Reference
60.000

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

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

3—0* Reference Limits
3—1* References

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

3-10 Preset Reference
[0]0.00%

- h. Press OK once to highlight the number in the bracket. Press OK again; the highlight moves to the current percent value. Use the ▲ and ▼ (Up and Down Arrow) keys and the table below to enter the required Preset Reference values.

[0]0.00%	Stop
[1]LL.LL%	Low Speed (see Table 22, column labeled "Preset References 3—10[1]" for the proper % for each unit)
[2]MM.MM%	Medium Speed (see Table 22, column labeled "Preset References 3—10[2]" for the proper % for each unit)
[3]100%	Override (High Speed)
[4]100%	High Speed (100% or close to 100% to achieve the required CFM at high speed)
[5]0.00%	Stop
[6]0.00%	Stop
[7]0.00%	Stop

8. Setting the Ramp Time:

- a. Press the Back key until the following display appears:

3—0* Reference Limits
3—1* References

- b. Press ▼ (Down Arrow) twice, the following display appears:

3—1* References
3—4* Ramp 1

- c. Press OK, the following display appears:

3-41 Ramp 1 Ramp up Time
3.00s

- d. Press OK again to highlight the bottom row and use the ▲ and ▼ (Up and Down Arrow) keys to select 10.00s. Press OK again to set the selected Ramp up Time.

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

3-42 Ramp 1 Ramp Down Time
3.00s

- f. Press OK again to highlight the bottom row and use the ▲ and ▼ (Up and Down Arrow) keys to select 10.00s. Press OK again to set the selected Ramp Down Time.

9. Setting Limits:

- a. Press the Back key until the following display appears:

2—** Brakes
3—** Reference / Ramps

- b. Press ▼ (Down Arrow) once, the following display appears:

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

- c. Press OK, the following display appears:

4—1* Motor Limits
4—4* Adj. Warning 2

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

4-10 Motor Speed Direction
[2] Both Directions

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

4-12 Motor Speed Low Limi...
0.0Hz

- f. Press ▼ (Down Arrow) again, the following display appears:

4-14 Motor Speed High Limi...
65.0Hz

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

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

4-18 Current Limit
110%

NOTE: Press OK to highlight the % value and then use the ▲ and ▼ (Up and Down Arrow) keys to enter the required value. See Table 22 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 22 — VFD Unit Parameters - 50LC 07 Units**

					REGIONAL SETTINGS	GRID TYPE	MOTOR POWER	MOTOR VOLTAGE	MOTOR FREQUENCY (Hz)	MOTOR CURRENT (MUST-HOLD AMPS)	MOTOR NOMINAL SPEED (RPM)
Motor Option	Voltage	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
STD	208/230V	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695
	460V	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690
	575V	HD56FR579	HK30WA382	131N0225	[1]	[132]	[9]	575	60	3.1	1690
MID	208/230V	HD56FR233	HK30WA370	131L9795	[1]	[102]	[9]	230	60	5.8	1695
	460V	HD56FR463	HK30WA376	131L9863	[1]	[122]	[9]	460	60	2.9	1690
	575V	HD56FR579	HK30WA382	131N0225	[1]	[132]	[9]	575	60	3.1	1690
HIGH	208/230V	HD58FE654	HK30WA371	131L9796	[1]	[102]	[10]	230	60	9.2	1735
	460V	HD58FE654	HK30WA377	131L9864	[1]	[122]	[10]	460	60	4.2	1735
	575V	HD58FE577	HK30WA383	131N0227	[1]	[132]	[11]	575	60	4.9	1710

		START DELAY (SEC)	FLYING START	MIN SPEED FOR FUNCTION (Hz)	MOTOR THERMAL PROTECTION	PRESET REFERENCE							
Motor Option	Voltage	1-71	1-73	1-82	1-90	3-10 [0]	3-10 [1]	3-10 [2]	3-10 [3]	3-10 [4]	3-10 [5]	3-10 [6]	3-10 [7]
STD	208/230V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	460V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	575V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
MID	208/230V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	460V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	575V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
HIGH	208/230V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	460V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%
	575V	2.0	[1]	1.0	[4]	0%	66.50%	66.50%	100%	100%	0%	0%	0%

		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
Motor Option	Voltage	3-41	3-42	4-18	5-10	5-11	5-12	5-13
STD	208/230V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	460V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	575V	10.00	10.00	100%	[8]	[16]	[17]	[18]
MID	208/230V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	460V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	575V	10.00	10.00	100%	[8]	[16]	[17]	[18]
HIGH	208/230V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	460V	10.00	10.00	100%	[8]	[16]	[17]	[18]
	575V	10.00	10.00	100%	[8]	[16]	[17]	[18]

**Table 22 — VFD Unit Parameters - 50LC 07 Units (cont)**

		TERMINAL 53 LOW VOLTAGE	TERMINAL 53 HIGH VOLTAGE	TERMINAL 53 LOW REFERENCE	TERMINAL 53 HIGH REFERENCE	RESET MODE	AUTO. RESTART TIME (S)	RFI FILTER
Motor Option	Voltage	6-10	6-11	6-14	6-15	14-20	14-21	14-50
STD	208/230V	2	[10]	0	[60]	[3]	600	[0]
	460V	2	[10]	0	[60]	[3]	600	[0]
	575V	2	[10]	0	[60]	[3]	600	[0]
MID	208/230V	2	[10]	0	[60]	[3]	600	[0]
	460V	2	[10]	0	[60]	[3]	600	[0]
	575V	2	[10]	0	[60]	[3]	600	[0]
HIGH	208/230V	2	[10]	0	[60]	[3]	600	[0]
	460V	2	[10]	0	[60]	[3]	600	[0]
	575V	2	[10]	0	[60]	[3]	600	[0]

**Smoke Detectors**

Smoke detectors are available as factory-installed options on 50LC models. Smoke detectors may be specified for supply air only, for return air without or with economizer, or in combination of supply air and return air. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to the Integrated Staging Control (ISC) board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

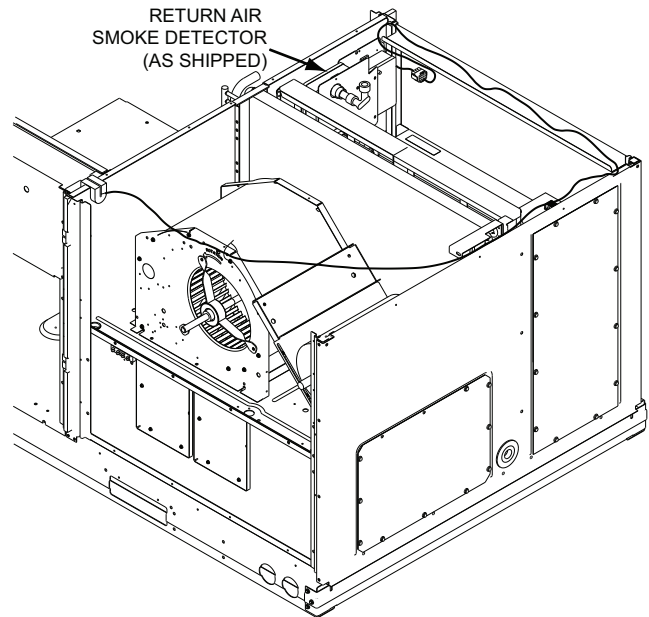
Units equipped with factory-optional return air smoke detectors require a relocation of the sensor module at unit installation. See Fig. 62 for the as-shipped location.

**COMPLETING INSTALLATION OF RETURN AIR SMOKE SENSOR**

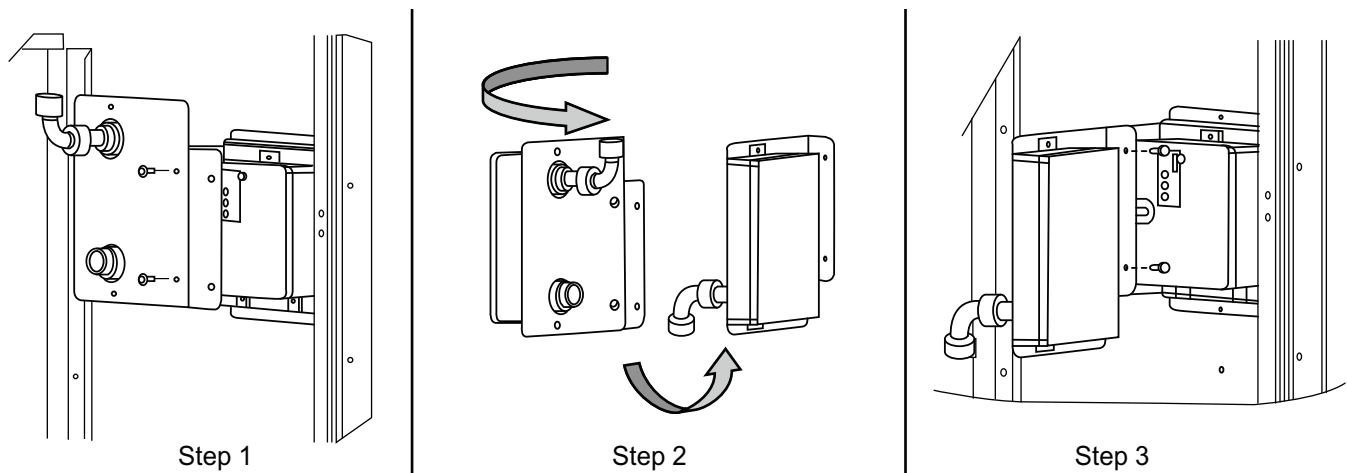
1. Unscrew the two screws holding the return air smoke detector assembly. See Fig. 63, Step 1. Save the screws.
2. Turn the assembly 90 degrees and then rotate end to end. Make sure that the elbow fitting is pointing down. See Fig. 63, Step 2.
3. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 63, Step 3.
4. Connect the flexible tube on the sampling inlet to the sampling tube on the base pan.

**ADDITIONAL APPLICATION DATA**

Refer to *Factory Installed Smoke Detectors for Small and Medium Rooftop Units 2 to 25 Tons* for discussions on additional control features of these smoke detectors, including multiple unit coordination.



**Fig. 62 — Return Air Smoke Detector (Shipping Position)**



**Fig. 63 — Completing Installation of Return Air Smoke Sensor**

**Step 11 — Adjust Factory-Installed Options**

**SMOKE DETECTORS**

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

**Step 12 — Install Accessories**

Available field installed accessories include:

- Roof Curb (must be installed before unit)
- Thru-base connection kit (must be installed before unit is set on curb)
- Electric heaters and single-point connection kits
- EconoMi\$er® X (with control)
- Power Exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- CO<sub>2</sub> sensor
- Temperature and Humidity sensors
- Louvered hail guard
- Phase monitor control

Refer to separate installation instructions for information on installing these accessories. See Price Pages for a complete list of field-installed accessories.

**Pre-Start and Start-Up**

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

**Step 13 — Check Belt Tension**

Measure the belt span length as shown in Fig. 64. Calculate the required deflection by multiplying the belt span length by 1/64. For example, if the belt span length is 32 inches:

$$32 \times \frac{1}{64} = \frac{1}{2}\text{-in. deflection.}$$

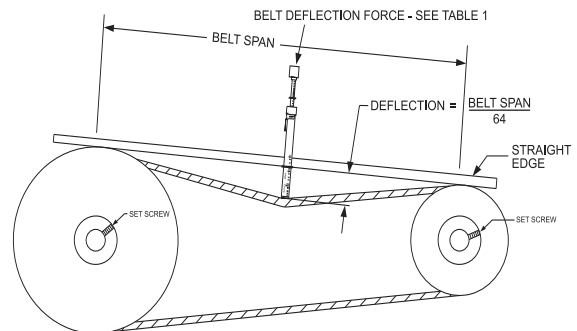
**BELT FORCE — DEFLECTION METHOD**

Check the belt tension with a spring-force belt force deflection gage (available from drive belt manufacturer).

1. Place a straightedge along the belt between the two pulleys. Measure the distance between the motor shaft and the blower shaft.
2. Set the tension gage to the desired tension (see Table 1 in Fig. 64). Place the large O-ring at that point.

3. Press the tension checker downward on the belt until the large O-ring is at the bottom of the straightedge.
4. Adjust the belt tension as needed.

Adjust belt tension by loosening the motor mounting plate front bolts and rear bolt (see Fig. 65) and slide the plate towards the fan (to reduce tension) or away from the fan (to increase tension). Ensure the blower shaft and motor shaft are parallel to each other (pulleys aligned). Tighten all bolts securely when finished.



BELT CROSS SECTION	SMALLEST SHEAVE DIAMETER	BELT DEFLECTION FORCE (LBS)			
		UNNOTCHED BELTS		NOTCHED BELTS	
		USED	NEW	USED	NEW
A, AX	3.0-3.6	3.7	5.5	4.1	6.1
	3.8-4.8	4.5	6.8	5.0	7.4
	5.0-7.0	5.4	8.0	5.7	8.4
B, BX	3.4-4.2	—	—	4.9	7.2
	4.4-5.6	5.3	7.9	7.1	10.5
	5.8-8.6	6.3	9.4	8.5	12.6

Table 1

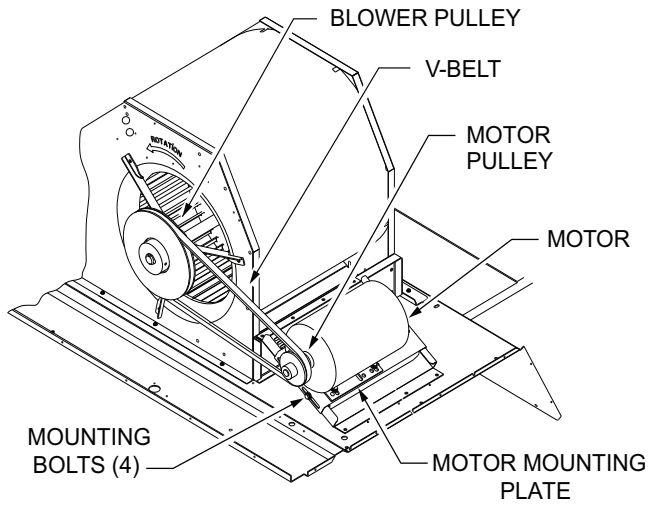
BELT CONDITION	TENSION FORCE IN BELT (LBS)
New	100
Used	80

Table 2

**Fig. 64 — V-Belt Force Label**

**BELT TENSION METHOD**

Requires belt tension gage that measures tension in belt in units of lbs force.



**Fig. 65 — Belt Drive Motor Mounting**





# START-UP CHECKLIST FOR 50LC SINGLE PACKAGE ROOFTOP COOLING ONLY

(Remove and Store in Job File)

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

## I. PRELIMINARY INFORMATION

MODEL NO. \_\_\_\_\_

JOB NAME \_\_\_\_\_

SERIAL NO. \_\_\_\_\_

ADDRESS \_\_\_\_\_

START-UP DATE \_\_\_\_\_

TECHNICIAN NAME \_\_\_\_\_

ADDITIONAL ACCESSORIES \_\_\_\_\_

## II. PRE-START-UP

Verify that all packaging materials have been removed from unit (Y/N) \_\_\_\_\_

Verify installation of outdoor air hood (Y/N) \_\_\_\_\_

Verify that condensate connection is installed per instructions (Y/N) \_\_\_\_\_

Verify that all electrical connections and terminals are tight (Y/N) \_\_\_\_\_

Check that indoor-air filters are clean and in place (Y/N) \_\_\_\_\_

Check that outdoor-air inlet screens are in place (Y/N) \_\_\_\_\_

Verify that unit is level (Y/N) \_\_\_\_\_

Check fan wheels and propeller for location in housing/orifice and verify setscrew is tight (Y/N) \_\_\_\_\_

Verify that fan sheaves are aligned and belts are properly tensioned (Y/N) \_\_\_\_\_

Verify that scroll compressors are rotating in the correct direction (Y/N) \_\_\_\_\_

Verify installation of thermostat (Y/N) \_\_\_\_\_

## III. START-UP

### ELECTRICAL

Supply Voltage L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L3-L1 \_\_\_\_\_

Compressor Amps 1 L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

Compressor Amps 2 L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

Supply Fan Amps L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

### TEMPERATURES

Outdoor-air Temperature \_\_\_\_\_ °F DB (Dry Bulb)

Return-air Temperature \_\_\_\_\_ °F DB \_\_\_\_\_ °F Wb (Wet Bulb)

Cooling Supply Air Temperature \_\_\_\_\_ °F

### PRESSURES

Refrigerant Suction CIRCUIT A \_\_\_\_\_ PSIG

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

Refrigerant Discharge CIRCUIT A \_\_\_\_\_ PSIG

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

Verify Refrigerant Charge using Charging Charts (Y/N) \_\_\_\_\_

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

**GENERAL**

Economizer minimum vent and changeover settings to job requirements (if equipped) (Y/N) \_\_\_\_\_

Verify smoke detector unit shutdown by utilizing magnet test (Y/N) \_\_\_\_\_

**IV. HUMIDI-MIZER® START-UP**

NOTE: Units equipped with either SystemVu™ or RTU Open controls have Service Test menus or modes that can assist with the Humidi-MiZer System Start-Up function and provide the means to make the observations listed for this start-up.

**STEPS**

- 1. Check CTB for jumper 5, 6, 7 (Jumper 5, 6, 7 must be cut and open) (Y/N) \_\_\_\_\_
- 2. Open humidistat contacts (Y/N) \_\_\_\_\_
- 3. Start unit In cooling (Close Y1) (Y/N) \_\_\_\_\_

**OBSERVE AND RECORD**

- A. Suction pressure \_\_\_\_\_ PSIG
  - B. Discharge pressure \_\_\_\_\_ PSIG
  - C. Entering air temperature \_\_\_\_\_ ° F
  - D. Liquid line temperature at outlet or reheat coil \_\_\_\_\_ ° F
  - E. Confirm correct rotation for compressor (Y/N) \_\_\_\_\_
  - F. Check for correct ramp-up of outdoor fan motor as condenser coil warms (Y/N) \_\_\_\_\_
4. Check unit charge per charging chart (Y/N) \_\_\_\_\_  
(Jumper 32L Motormaster® temperature sensor during this check. Remove jumper when complete.)
5. Switch unit to high-latent mode (sub-cooler) by closing humidistat with Y1 closed (Y/N) \_\_\_\_\_

**OBSERVE**

- A. Reduction in suction pressure (5 to 7 psi expected) (Y/N) \_\_\_\_\_
  - B. Discharge pressure unchanged (Y/N) \_\_\_\_\_
  - C. Liquid temperature drops to 50°F to 55°F range (Y/N) \_\_\_\_\_
  - D. LSV solenoid energized (valve closes) (Y/N) \_\_\_\_\_
6. Switch unit to dehumid (reheat) by opening Y1 (Y/N) \_\_\_\_\_

**OBSERVE**

- A. Suction pressure increases to normal cooling level
  - B. Discharge pressure decreases (35 to 50 psi) (Limited by Motormaster control)
  - C. Liquid temperature returns to normal cooling level
  - D. LSV solenoid energized (valve closes)
  - E. DSV solenoid energized, valve opens
7. With unit in dehumid mode close W1 compressor and outdoor fan stop; LSV and DSV solenoids de-energized (Y/N) \_\_\_\_\_
8. Open W1 restore unit to dehumid mode (Y/N) \_\_\_\_\_
9. Open humidistat input compressor and outdoor fan stop; LSV and DSV solenoids de-energized (Y/N) \_\_\_\_\_
10. Restore set-points for thermostat and humidistat (Y/N) \_\_\_\_\_

**REPEAT PROCESS FOR 2 COMPRESSOR SYSTEMS.**

CUT ALONG DOTTED LINE