Installation Instructions

NOTE: Read the entire instruction manual before starting the installation

TABLE OF CONTENTS

SAFETY CONSIDERATIONS ....................... 2

INSTALLATION ............................... 9

Jobsite Survey .................................. 9
Step 1 - Plan for Unit Location .................. 9
    Roof Mount .................................. 9
Step 2 - Plan for Sequence of Unit Installation .... 13
    Curb-Mount Installation ..................... 13
    Pad-Mount Installation ...................... 13
    Frame-Mount Installation .................... 13
Step 3 - Inspect Unit ............................ 13
Step 4 - Provide Unit Support ................... 13
    Roof Curb Mount ............................ 13
    Slab Mount (Horizontal Units Only) ........ 13
    Alternate Unit Support
        (In Lieu of Curb or Slab Mount) .......... 13
Step 5 - Field Fabricate Ductwork ............... 14
    For Units with Accessory Electric Heaters ... 14
Step 6 - Rig and Place Unit ..................... 14
    Positioning on Curb ........................ 14
Step 7 - Horizontal Duct Connection .......... 15
Step 8 - Install Outside Air Hood — Factory Option.. 16
Step 9 - Check Pulley Alignment and Belt Tension .. 17
    Pulley Alignment ............................ 17
    Belt Tension .................................. 17
Step 10 - Install External Condensate Trap and Line.. 18
Step 11 - Make Electrical Connections .......... 18
    Units without Factory-Installed Disconnect ... 19
    Units with Factory-Installed Disconnect .... 19
    All Units .................................... 19
    Factory-Option Thru-Base Connections ....... 20
    Units without Thru-Base Connections ....... 20
    Field Control Wiring ........................ 20

...
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 for special requirements. In absence of local codes, it is recommended that the USA standard ANSI/NFPA 70, National Electrical Code (NEC), be followed.

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.
Fig. 1 - Unit Dimensional Drawing – 17 and 20 Size Units
Fig. 1 - Unit Dimensional Drawing - 17 and 20 Size Units (cont.)
Fig. 2 - Unit Dimensional Drawing – 24 and 28 Size Units
Fig. 2 - Unit Dimensional Drawing – 24 and 28 Size Units (cont.)
Fig. 3 - Unit Dimensional Drawing – 30 Size Units
Fig. 3 - Unit Dimensional Drawing – 30 Size Units (cont.)
INSTALLATION

Jobsite Survey

Complete the following checks before installation.
1. Consult local building codes or the U.S.A. National Electrical Code (Ref: ANSI/NFPA 70, [American National Standards Institute/National Fire Protection Association], latest revision) for special installation requirements
2. Determine unit location (from project plans) or select unit location.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 4.

NOTE: Consider also the effect of adjacent units.
Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents 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 10 — Install External Condensate Trap and Line – for required trap dimensions.

Roof Mount —

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

Table 1 – Operating Weights

<table>
<thead>
<tr>
<th>50TC–D</th>
<th>17</th>
<th>20</th>
<th>24</th>
<th>28</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Unit</td>
<td>820 (1808)</td>
<td>827 (1823)</td>
<td>895 (1973)</td>
<td>952 (2098)</td>
<td>998 (2196)</td>
</tr>
<tr>
<td>Economizer</td>
<td>111 (245)</td>
<td>111 (245)</td>
<td>111 (245)</td>
<td>111 (245)</td>
<td>111 (245)</td>
</tr>
<tr>
<td>Curb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>356 mm/14–in</td>
<td>95 (210)</td>
<td>95 (210)</td>
<td>112 (246)</td>
<td>112 (246)</td>
<td>123 (270)</td>
</tr>
<tr>
<td>610 mm/24–in</td>
<td>132 (290)</td>
<td>132 (290)</td>
<td>140 (308)</td>
<td>140 (308)</td>
<td>155 (342)</td>
</tr>
</tbody>
</table>

Fig. 4 - Service Clearance Dimensional Drawing
Fig. 5 - Roof Curb Details – 17 and 20 Size Units
Fig. 6 - Roof Curb Details – 24 and 28 Size Units
Fig. 7 - Roof Curb Details – 30 Size Unit
Step 2 — Plan for Sequence of Unit Installation

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

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

**Pad-mounted installation —**
- Prepare pad and unit supports
- Rig and place unit
- Remove duct covers and top skid
- Install Return Air smoke detector sensor tube
- Install field-fabricated ductwork at unit duct openings
- Install outside air hood
- Install condensate line trap and piping
- Make electrical connections
- Install other accessories

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

Step 3 — Inspect unit

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

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

Locate the carton containing the outside air hood parts; see Fig. 9 and 13. Do not remove carton until unit has been rigged and located in final position.

Step 4 — Provide Unit Support

**Roof Curb Mount —**
Accessory roof curb details and dimensions are shown in Figs. 5, 6 and 7. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

**NOTE:** The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Figs. 5, 6 and 7. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 8. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

![Fig. 8 - Unit Leveling Tolerances](image)

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

If electric and control wiring is to be routed through the basepan, remove knockouts in basepan located in control box area of access panel; see Figs. 1, 2 or 3 for basepan knockout locations. Attach the service connections to the basepans.

![Fig. 9 - Typical Access Panel and Compressor Locations](image)

**Slab Mount (Horizontal Units Only) —**
Provide a level concrete slab that extends a minimum of 152 mm (6-in.) beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

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

**Alternate Unit Support (In Lieu of Curb or Slab Mount) —**
A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 4 equally spaced 102 mm x 102 mm (4-in. x 4-in.) pads on each side. Locate pads so that they support the rails. Make sure to avoid the fork openings.
Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 87 Pa (0.5 in. wg) with economizer or 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 458 mm (18 in.) 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.

For Units with Accessory Electric Heaters —

Minimum clearance is not required around ductwork.

---

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERSONAL INJURY HAZARD</strong></td>
</tr>
<tr>
<td>Failure to follow this warning could cause personal injury.</td>
</tr>
</tbody>
</table>

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 not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 (on page 7) and Fig. 10 for additional information.

Lifting holes are provided in base rails as shown in Fig. 10. Refer to rigging instructions on unit.

---

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNIT DAMAGE HAZARD</strong></td>
</tr>
<tr>
<td>Failure to follow this caution may result in equipment damage.</td>
</tr>
</tbody>
</table>

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

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

**Positioning on Curb —**

Position unit on roof curb so that the following clearances are maintained: 6 mm (1/4 in.) clearance between the roof curb and the base rail inside the right and left, 12 mm (1/2 in.) clearance between the roof curb and the base rail inside the front and back. This will result in the distance between the roof curb and the base rail being approximately equal to Detail A and Detail B in Figs. 5, 6 and 7.

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

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

After unit is in position, remove rigging skids and shipping materials.
Step 7 — Horizontal Duct Connection

Refer to Figs. 1, 2 and 3 for locations and sizes of the horizontal duct connections. Note that there are two different return air duct connection locations – one for unit without an economizer (on back side of unit) and a different one for unit equipped with an economizer (on left end, under the economizer hood). The supply air duct connection is on the back side. See Fig. 11 for top view depicting typical horizontal duct arrangements.

Field-supplied 19 mm (3/4-in) flanges should be attached to horizontal duct openings (see Fig. 11) 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.

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

Fig. 10 - Rigging Details

Fig. 11 - Horizontal Duct Opening Dimensions
Step 8 — Install Outside Air Hood — Factory Option

The outside air hood for factory-option economizer and two-position damper is shipped in knock-down form and requires field assembly. The panel for the hood top is shipped on the end of the unit (see Fig. 12). The remaining parts for the hood assembly (including side panels, filters and tracks) are shipped in a carton that is secured to the rear of the blower assembly. Access the carton location through rear panel (see Fig. 13).

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

See Fig. 14 for identification of the various parts of the hood assembly.

To assemble the outside air hood:
1. Remove hood top panel from shipping position on unit end.
2. Install four angles to the upper end panel using the screws provided.
3. Apply seal strip to mating flanges on the side plates of the hood (see Fig. 14).
4. Secure side plates to panel using the screws provided.
5. Apply seal strip to mating flange of the hood (see Fig. 14).
6. Secure top flange using screws provided in kit.
7. Install outdoor air screens by sliding them into the channel formed by the four angles installed in step 2. Make sure that the screens extend across the entire length of the hood.
8. Install side filter supports using the screws provided.
9. Install side drip angles using the screws provided.
10. Run a continuous length of seal strip across the hood covering the engagement holes in the lower hood.
11. Install top diverter using the screws provided.
12. On units with barometric relief, remove screws at bottom of relief damper. Do not discard damper door.
Step 9 — Check Pulley Alignment and Belt Tension

Pulley Alignment —

The motor pulley is an adjustable-pitch type that allows implementation of changes in fan wheel speed to match as-installed ductwork systems. The pulley consists of a fixed flange side that faces the motor (secured to the motor shaft) and a movable flange side that can be rotated around the fixed flange side that increases or reduces the pitch diameter of this driver pulley. (See Fig. 16.)

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting.
3. Tighten fan pulley setscrews and motor mounting bolts to torque specifications.
4. Recheck belt tension.

Belt Tension —

Check belt tension by using a spring-force tool (such as Browning’s Part Number “Belt Tension Checker” or equivalent tool); tension should be between 2.3-4.5 kg (5-10 lbs) with 13.3 mm (5/8 in.) deflection when measured at the centerline of the belt span. This point is at the center of the belt when measuring the distance between the motor shaft and the blower shaft.

**NOTE:** Without the spring-tension tool, place a straight edge across the belt surface at the pulleys, then deflect the belt at mid-span using one finger to a 12.7 mm (1/2 in.) deflection.

Adjust the belt tension by loosening the four motor rail mounting nuts and bolts where the motor rails bolts to the blower rails. There are two jack bolts and nuts that are used to slide the motor rails to either increase or decrease belt tension. There are locking nuts on the jack bolts that need to be loosened at the motor rail. Turn the jack bolts clockwise or counter clockwise until the correct belt tension is achieved. Ensure the fan shaft and motor shaft are parallel prior to tightening motor plate nuts. (see Fig. 17.)
Step 10 — Install External Condensate Trap and Line

The unit has one 19 mm (3/4-in.) condensate drain connection on the end of the condensate pan (see Fig. 18). See Figs. 1, 2 and 3, item “E”, in the view labeled “BACK (HORIZONTAL DISCHARGE W/O ECON)” for the location of the condensate drain connection.

![Condensate Drain Pan Connection](C10729)

**Fig. 18 - Condensate Drain Pan Connection**

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

![Condensate Drain Piping Details](C11354)

**Fig. 19 - Condensate Drain Piping Details**

_All units must have an external trap for condensate drainage. Install a trap at least 102 mm (4-in.) deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 25 mm in 3 m (1-in. per 10 ft) of run. Do not use a pipe size smaller than the unit connection of 19 mm (3/4-in.)._

---

**Step 11 — Make Electrical Connections**

**WARNING**

**ELECTRICAL SHOCK HAZARD**

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

_Do not use gas piping as an electrical ground._ Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with local electrical codes or in absence of local codes, it is recommended that the U.S.A. standard ANSI/NFPA 70, National Electrical Code (NEC), be followed.

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

Field power wires are connected to the unit at line-side pressure lugs on the terminal block (see Fig. 20 or the wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch. Use copper conductors only.

![Location of TB1](C11181)

**Fig. 20 - Location of TB1**

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

The unit is factory wired for the voltage shown on the nameplate. Refer to unit label diagram for additional information.
**FIRE HAZARD**

Failure to follow this warning could result in intermittent operation or performance satisfaction.
Do not connect aluminum wire between disconnect switch and air conditioning unit. Use only copper wire. (See Fig. 21.)

---

**WARNING**

**COPPER WIRE ONLY**

**ELECTRIC DISCONNECT SWITCH**

---

**CAUTION**

**UNIT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage.
Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

---

**Units Without Factory-Installed Disconnect**

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

**Units with Factory-Installed Disconnect**

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

**All Units -**

All field wiring must comply with local codes. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 22 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is 7.0 mm² (2/0 AWG) per pole.

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

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

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

---

**Table 2 – American/European Wire Conversions**

<table>
<thead>
<tr>
<th>AMERICAN Standard Size</th>
<th>American Conversion Size (mm²)</th>
<th>AMERICAN Standard Size (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 AWG</td>
<td>0.52</td>
<td>50.0</td>
</tr>
<tr>
<td>18 AWG</td>
<td>0.82</td>
<td>1.0</td>
</tr>
<tr>
<td>16 AWG</td>
<td>1.30</td>
<td>1.5</td>
</tr>
<tr>
<td>14 AWG</td>
<td>2.08</td>
<td>2.5</td>
</tr>
<tr>
<td>12 AWG</td>
<td>3.30</td>
<td>4.0</td>
</tr>
<tr>
<td>10 AWG</td>
<td>5.25</td>
<td>6.0</td>
</tr>
<tr>
<td>8 AWG</td>
<td>6.36</td>
<td>10.0</td>
</tr>
<tr>
<td>6 AWG</td>
<td>13.29</td>
<td>16.0</td>
</tr>
<tr>
<td>4 AWG</td>
<td>21.14</td>
<td>25.0</td>
</tr>
<tr>
<td>3 AWG</td>
<td>26.65</td>
<td>—</td>
</tr>
<tr>
<td>2 AWG</td>
<td>33.61</td>
<td>35.0</td>
</tr>
<tr>
<td>1 AWG</td>
<td>42.39</td>
<td>50.0</td>
</tr>
<tr>
<td>1/0 AWG</td>
<td>53.49</td>
<td>—</td>
</tr>
<tr>
<td>2/0 AWG</td>
<td>67.42</td>
<td>70.0</td>
</tr>
<tr>
<td>3/0 AWG</td>
<td>85.00</td>
<td>95.0</td>
</tr>
<tr>
<td>4/0 AWG</td>
<td>107.9</td>
<td>120.0</td>
</tr>
</tbody>
</table>

---

**Fig. 21 - Disconnect Switch and Unit**

---

**Fig. 22 - Power Wiring Connections**
**Factory-Option Thru-Base Connections —**

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

The electrical entrance is located in the control box area can be accessed through the control box access panel. An embossed area is provided with three knock outs. High voltage is brought through the multi knock out by removing the appropriate size for the size of the fitting required. A 22 mm (7/8-in.) knock out is provided for low voltage. An additional 22 mm (7/8-in.) knock out is provided for a 115 volt line which is used when the unit is equipped with the non-unit powered convenience outlet option.

All required fittings are field supplied. Install fittings when access to both top and bottom of the base pan is available.

**Units without Thru-Base Connections —**

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 22.

**Field Control Wiring —**

The 50TC-D unit requires an external temperature control device. This device can be a thermostat (field-supplied) or a PremierLink controller (available as factory-installed option or as field-installed accessory, for use on a Carrier Comfort Network or as a stand alone control) or the RTU Open for Building Management Systems using non-CCN protocols (RTU Open is available as a factory-installed option only).

**Thermostat —**

Select a Carrier-approved accessory thermostat. When electric heat is installed in the 50TC 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.

Install the accessory thermostat according to installation instructions included with the accessory.

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 seven leads. If the thermostat does not require a 24-v source (no “C” connection required), use a thermostat cable or equivalent with minimum of six leads. Check the thermostat installation instructions for additional features which might require additional conductors in the cable.

For wire runs up to 15 m (50 ft.), use no. 18 AWG (American Wire Gage) insulated wire (35°C minimum). For 15 to 23 m (0 to 75 ft.), use no. 16 AWG insulated wire (35°C minimum). For over 23 m (75 ft.), 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.

![Typical Thermostat Corrections](image)

**CAUTION**

**UNIT DAMAGE HAZARD**

Failure to follow this caution may cause a short circuit.

Carefully check the connection of control conductor for indoor fan control at terminal G. Connecting the indoor fan lead to terminal C will cause a short circuit condition which can cause component damage inside the unit or at thermostat.

![Field Wiring](image)

**Configure for Electric Heat:** To configure the factory-approved thermostat, open the Advanced Setup menu, scroll down to ELECTRIC HEAT and change RANGE value from OFF to ON. Consult the thermostat installation instructions for full details.
Heat Anticipator Settings —

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

Fig. 24 - Field Control Wiring Raceway

Electric Heaters

50TC-D units may be equipped with field-installed accessory electric heaters. The heaters are modular in design. Heater modules are installed in the compartment below the indoor blower access panel. Access is through the electric heat access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. See Fig. 25, Fig. 26 and Fig. 27. Refer to the Electric Heater Kit Installation Instructions for complete details.

Fig. 25 - Typical Access Panel Location

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

Low-Voltage Control Connections —

Locate the plug assembly in the electric heater section of the main unit. Connect the plug with the mating low voltage plug located on the heater.

Fig. 28 - Accessory Electric Heater Control Connections
PremierLink™ (Factory-Option)

The PremierLink controller (see Fig. 29) is compatible with Carrier Comfort Network® (CCN) devices. This control is designed to allow users the access and ability to change factory-defined settings, thus expanding the function of the standard unit control board. CCN service access tools include System Pilot™, Touch Pilot™ and Service Tool. (Standard tier display tools Navigator™ and Scrolling Marquee are not suitable for use with latest PremierLink controller (Version 2.x).)

The PremierLink control is factory-mounted in the 50TC-D unit’s main control box to the right of the Control Terminal Board (CTB) (see Fig. 30). Factory wiring is completed through harnesses connected to the CTB thermostat. Field connections are made at a 16-pole terminal block (TB3) located at the top of the unit control box in front of the PremierLink controller. The factory-installed PremierLink control includes the supply-air temperature (SAT) sensor. The outdoor air temperature (OAT) sensor is included in the FIOP/accessory EconoMi$er™ 2 package.

The PremierLink controller requires the use of a Carrier electronic thermostat or a CCN connection for time broadcast to initiate its internal timeclock. This is necessary for broadcast of time of day functions (occupied/unoccupied).

NOTE: PremierLink controller is shipped in Sensor mode. To be used with a thermostat, the PremierLink controller must be configured to Thermostat mode. Refer to PremierLink Configuration instructions for Operating Mode.
Supply Air Temperature (SAT) Sensor —

On FIOP-equipped 50TC-D unit, the unit is supplied with a supply-air temperature (SAT) sensor (33ZCSENSAT). This sensor is a tubular probe type, approx 152 mm (6-inches) in length. It is a nominal 10-k ohm thermistor.

The SAT is factory-wired. The SAT probe is mounted in the fan deck (see Fig. 32). It can be removed or remounted per local codes. Drill or punch a 13 mm (1/2-in.) hole in the flange or duct. Use two field-supplied, self-drilling screws to secure the sensor probe in a horizontal orientation. Insure that the sensor wires do not contact the hot surface of the electric heaters.

NOTE: The sensor must be mounted in the discharge airstream downstream of the cooling coil and any heating devices. Be sure the probe tip does not come in contact with any of the unit’s heater surfaces.

Outdoor Air Temperature (OAT) Sensor —

The OAT is factory-mounted in the EconoMi$er2 (FIOP or accessory). It is a nominal 10k ohm thermistor attached to an eyelet mounting ring.

EconoMi$er2 —

The PremierLink control is used with EconoMi$er2 (option or accessory) for outdoor air management. The damper position is controlled directly by the PremierLink control; EconoMi$er2 has no internal logic device.

Outdoor air management functions can be enhanced with field-installation of these accessory control devices:

- Enthalpy control (outdoor air or differential sensors)
- Space CO₂ sensor
- Outdoor air CO₂ sensor

Refer to Table 3 for accessory part numbers.

Field Connections

Field connections for accessory sensor and input devices are made at the 16-pole terminal block (TB3, see Fig. 31) located on the control box top in front of the PremierLink control. Some input devices also require a 24-vac signal source; connect at CTB terminal R at “THERMOSTAT” connection strip for this signal source. See connections figures on following pages for field connection locations (and for continued connections at the PremierLink board inputs).

Table 4 provides a summary of field connections for units equipped with Space Sensor. Table 5 provides a summary of field connections for units equipped with Space Thermostat.

### Table 3 – PremierLink Sensor Usage

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>OUTDOOR AIR TEMPERATURE SENSOR</th>
<th>RETURN AIR TEMPERATURE SENSOR</th>
<th>OUTDOOR AIR ENTHALPY SENSOR</th>
<th>RETURN AIR ENTHALPY SENSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential Dry Bulb Temperature with PremierLink (PremierLink requires 4 – 20 mA Actuator)</td>
<td>Included – CRTEMPSN001A00</td>
<td>Required – 33ZCT55SPT or equivalent</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Single Enthalpy with PremierLink (PremierLink requires 4 – 20mA Actuator)</td>
<td>Included – Not Used</td>
<td>–</td>
<td>Requires – 33CSENTHSW</td>
<td>–</td>
</tr>
<tr>
<td>Differential Enthalpy with PremierLink (PremierLink requires 4 – 20mA Actuator)</td>
<td>Included – Not Used</td>
<td>–</td>
<td>Requires – 33CSENTHSW or equivalent</td>
<td>Requires – 33CSENTSEN or equivalent</td>
</tr>
</tbody>
</table>

**NOTES:**

CO₂ Sensors (Optional):

- 33ZCSENCO2 – Room sensor (adjustable). Aspirator box is required for duct mounting of the sensor.
- 33ZCASPCO2 – Aspirator box used for duct-mounted CO₂ room sensor.
- 33ZCT55CO2 – Space temperature and CO₂ room sensor with override.
- 33ZCT56CO2 – Space temperature and CO₂ room sensor with override and setpoint.
### Table 4 – Space Sensor Mode

<table>
<thead>
<tr>
<th>TB3 TERMINAL</th>
<th>FIELD CONNECTION</th>
<th>INPUT SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T55 – SEN/T56 – SEN</td>
<td>Analog (10k thermistor)</td>
</tr>
<tr>
<td>2</td>
<td>RMTOCC</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>3</td>
<td>T55 – SEN/T56 – SEN</td>
<td>Analog (10k thermistor)</td>
</tr>
<tr>
<td>4</td>
<td>CMPSAFE</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>5</td>
<td>T56 – SET</td>
<td>Analog (10k thermistor)</td>
</tr>
<tr>
<td>6</td>
<td>FSD</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>7</td>
<td>LOOP – PWR</td>
<td>Analog, 24VDC</td>
</tr>
<tr>
<td>8</td>
<td>SPS</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>9</td>
<td>IAQ – SEN</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>10</td>
<td>FILTER</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>11</td>
<td>IAQ – COM/OAQ – COM/RH – COM</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>12</td>
<td>CCN + (RED)</td>
<td>Digital, 5VDC</td>
</tr>
<tr>
<td>13</td>
<td>OAQ – SEN/RH – SEN</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>14</td>
<td>CCN Gnd (WHT)</td>
<td>Digital, 5VDC</td>
</tr>
<tr>
<td>15</td>
<td>AUX OUT (Power Exhaust)</td>
<td>(Output) Discrete 24VAC</td>
</tr>
<tr>
<td>16</td>
<td>CCN – (BLK)</td>
<td>Digital, 5VDC</td>
</tr>
</tbody>
</table>

**LEGEND:**
- T55 – Space Temperature Sensor
- T56 – Space Temperature Sensor
- CCN – Carrier Comfort Network (communication bus)
- CMPSAFE – Compressor Safety
- FILTER – Dirty Filter Switch
- FSD – Fire Shutdown
- IAQ – Indoor Air Quality (CO2)
- OAQ – Outdoor Air Quality (CO2)
- RH – Relative Humidity
- SFS – Supply Fan Status
- W1 – Thermostat Heat Stage 1
- W2 – Thermostat Heat Stage 2
- Y1 – Thermostat Cool Stage 1
- Y2 – Thermostat Cool Stage 2

### Table 5 – Thermostat Mode

<table>
<thead>
<tr>
<th>TB3 TERMINAL</th>
<th>FIELD CONNECTION</th>
<th>INPUT SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RAT SEN</td>
<td>Analog (10k thermistor)</td>
</tr>
<tr>
<td>2</td>
<td>G</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>3</td>
<td>RAT SEN</td>
<td>Analog (10k thermistor)</td>
</tr>
<tr>
<td>4</td>
<td>Y1</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Y2</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>7</td>
<td>LOOP – PWR</td>
<td>Analog, 24VDC</td>
</tr>
<tr>
<td>8</td>
<td>W1</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>9</td>
<td>IAQ – SEN</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>10</td>
<td>W2</td>
<td>Discrete, 24VAC</td>
</tr>
<tr>
<td>11</td>
<td>IAQ – COM/OAQ – COM/RH – COM</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>12</td>
<td>CCN + (RED)</td>
<td>Digital, 5VDC</td>
</tr>
<tr>
<td>13</td>
<td>OAQ – SEN/RH – SEN</td>
<td>Analog, 4 – 20mA</td>
</tr>
<tr>
<td>14</td>
<td>CCN Gnd (WHT)</td>
<td>Digital, 5VDC</td>
</tr>
<tr>
<td>15</td>
<td>AUX OUT (Power Exhaust)</td>
<td>(Output) Discrete 24VAC</td>
</tr>
<tr>
<td>16</td>
<td>CCN – (BLK)</td>
<td>Digital, 5VDC</td>
</tr>
</tbody>
</table>

**LEGEND:**
- CCN – Carrier Comfort Network (communication bus)
- G – Thermostat Fan
- IAQ – Indoor Air Quality (CO2)
- OAQ – Outdoor Air Quality (CO2)
- RAT – Return Air Temperature
- RH – Relative Humidity
- W1 – Thermostat Heat Stage 1
- W2 – Thermostat Heat Stage 2
- Y1 – Thermostat Cool Stage 1
- Y2 – Thermostat Cool Stage 2
Space Sensors —

The PremierLink controller is factory-shipped configured for Space Sensor Mode. A Carrier T-55 or T-56 space sensor must be used. T-55 space temperature sensor provides a signal of space temperature to the PremierLink control. T-56 provides same space temperature signal plus it allows for adjustment of space temperature setpoints from the face of the sensor by the occupants.

Connect T-55: See Fig. 33 for typical T-55 internal connections. Connect the T-55 SEN terminals to TB3 terminals 1 and 3 (see Fig. 34).

Connect T-56: See Fig. 35 for T-56 internal connections. Install a jumper between SEN and SET terminals as illustrated. Connect T-56 terminals to TB3 terminals 1, 3 and 5 (see Fig. 36).

Connect Thermostat —

A 7-wire thermostat connection requires a 24-v power source and a common connection. Use the R and C terminals on the CTB’s THERMOSTAT connection strip for these. Connect the thermostat’s Y1, Y2, W1, W2 and G terminals to PremierLink TB3 as shown in Fig. 37.

If the 50TC-D unit is equipped with factory-installed smoke detector(s), disconnect the factory BLU lead at TB3-6 (Y2) before connecting the thermostat. Identify the BLU lead originating at CTB-DDC-1; disconnect at TB3-6 and tape off. Confirm that the second BLU lead at TB3-6 remains connected to PremierLink J4-8.

Configure the Unit for Thermostat Mode —

Connect to the CCN bus using a CCN service tool and navigate to PremierLink Configuration screen for Operating Mode. Default setting is Sensor Mode (value 1). Change the value to 0 to reconfigure the controller for Thermostat Mode.

When the PremierLink is configured for Thermostat Mode, these functions are not available: Fire Shutdown (FSD), Remote Occupied (RMTOCC), Compressor Safety (CMPSAFE), Supply Fan Status (SFS), and Filter Pressure Switch (FILTER).
**Economizer Controls**

**Indoor Air Quality (CO₂) Sensor** —

The indoor air quality sensor accessory monitors space carbon dioxide (CO₂) levels. This information is used to monitor IAQ levels. Several types of sensors are available, for wall mounting in the space or in return duct, with and without LCD display, and in combination with space temperature sensors. Sensors use infrared technology to measure the levels of CO₂ present in the space air.

The CO₂ sensors are all factory set for a range of 0 to 2000 ppm and a linear mA output of 4 to 20. Refer to the instructions supplied with the CO₂ sensor for electrical requirements and terminal locations. See Fig. 38 for typical CO₂ sensor wiring schematic.

To accurately monitor the quality of the air in the conditioned air space, locate the sensor near a return-air grille (if present) so it senses the concentration of CO₂ leaving the space. The sensor should be mounted in a location to avoid direct breath contact.

Do not mount the IAQ sensor in drafty areas such as near supply ducts, open windows, fans, or over heat sources. Allow at least 0.9 m (3 ft) between the sensor and any corner. Avoid mounting the sensor where it is influenced by the supply air; the sensor gives inaccurate readings if the supply air is blown directly onto the sensor or if the supply air does not have a chance to mix with the room air before it is drawn into the return airstream.

**Wiring the Indoor Air Quality Sensor**: For each sensor, use two 2-conductor 18 AWG (American Wire Gage) twisted-pair cables (unshielded) to connect the separate isolated 24 vac power source to the sensor and to connect the sensor to the control board terminals.

**Outdoor Air Quality Sensor** (PNO 33ZCSENCO2 plus weatherproof enclosure) —

The outdoor air CO₂ sensor is designed to monitor carbon dioxide (CO₂) levels in the outside ventilation air and interface with the ventilation damper in an HVAC system. The OAQ sensor is packaged with an outdoor cover. See Fig. 40. The outdoor air CO₂ sensor must be located in the economizer outside air hood.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the sensor. See Fig. 38. Connect the 4-20 mA terminal to terminal TB3-9 and connect the SIG COM terminal to terminal TB3-11. See Fig. 39.

**Fig. 39 - Indoor CO₂ Sensor (33ZCSENCO2) Connections**

Refer to Form 33CS-68SI, PremierLink Installation, Start-up, and Configuration Instructions, for detailed configuration information.

**Outdoor Air Quality Sensor**

To wire the Outdoor Air CO₂ Sensor: A dedicated power supply is required for this sensor. A two-wire cable is required to wire the dedicated power supply for the sensor. The two wires should be connected to the power supply and terminals 1 and 2.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the OAQ sensor. See Fig. 38. Connect the 4 to 20 mA terminal to the TB3-13 terminal of the 50TC-D. Connect the SIG COM terminal to the TB3-11 terminal of the 50TC-D. See Fig. 41.

**Fig. 40 - Outdoor Air Quality Sensor Cover**

Wiring the Outdoor Air CO₂ Sensor: A dedicated power supply is required for this sensor. A two-wire cable is required to wire the dedicated power supply for the sensor. The two wires should be connected to the power supply and terminals 1 and 2.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the OAQ sensor. See Fig. 38. Connect the 4 to 20 mA terminal to the TB3-13 terminal of the 50TC-D. Connect the SIG COM terminal to the TB3-11 terminal of the 50TC-D. See Fig. 41.
Smoke Detector/Fire Shutdown (FSD) —

This function is available only when PremierLink is configured for (Space) Sensor Mode. The unit is factory-wired for PremierLink FSD operation when PremierLink is factory-installed.

On 50TC-D units equipped with factory-installed Smoke Detector(s), the smoke detector controller implements the unit shutdown through its NC contact set connected to the unit’s CTB input. The FSD function is initiated via the smoke detector’s Alarm NO contact set. The PremierLink communicates the smoke detector’s tripped status to the CCN building control. See Fig. 31, The PremierLink wiring schematic.

Filter Status Switch —

This function is available only when PremierLink is configured for (Space) Sensor Mode.

PremierLink control can monitor return filter status in two ways: By monitoring a field-supplied/installed filter pressure switch or via supply fan runtime hours.

Using switch input: Install the dirty filter pressure switch according to switch manufacturer’s instructions, to measure pressure drop across the unit’s return filters. Connect one side of the switch’s NO contact set to CTB’s THERMOSTAT-R terminal. Connect the other side of the NO contact set to TB3-10. Setpoint for Dirty Filter is set at the switch. See Fig. 42.

Remote Occupied Switch —

The PremierLink control permits a remote timeclock to override the control’s on-board occupancy schedule and place the unit into Occupied mode. This function may also provide a “Door Switch” time delay function that will terminate cooling and heating functions after a 2-20 minute delay.

Connect one side of the NO contact set on the timeclock to CTB’s THERMOSTAT-R terminal. Connect the other side of the NO contact set to TB3-8. Setpoint for Dirty Filter is set at the switch. See Fig. 44.

Power Exhaust (output) —

Connect the accessory Power Exhaust contactor coils(s) per Fig. 45.
Space Relative Humidity Sensor —

The RH sensor is not used with 50Hz 50TC-D models at this time.

CCN Communication Bus —

The PremierLink controller connects to the bus in a daisy chain arrangement. Negative pins on each component must be connected to respective negative pins, and likewise, positive pins on each component must be connected to respective positive pins. The controller signal pins must be wired to the signal ground pins. Wiring connections for CCN must be made at the 3-pin plug.

At any baud (9600, 19200, 38400 baud), the number of controllers is limited to 239 devices maximum. Bus length may not exceed 4000 ft (1219 m), with no more than 60 total devices on any 1000-ft (305 m) section. Optically isolated RS-485 repeaters are required every 1000 ft (305 m).

NOTE: Carrier device default is 9600 baud.

Communications Bus Wire Specifications: The CCN Communication Bus wiring is field-supplied and field-installed. It consists of shielded 3-conductor cable with drain (ground) wire. The cable selected must be identical to the CCN Communication Bus wire used for the entire network.

See Table 6 for recommended cable.

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>CABLE PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>2413 or 5463</td>
</tr>
<tr>
<td>American</td>
<td>A22503</td>
</tr>
<tr>
<td>Belden</td>
<td>8772</td>
</tr>
<tr>
<td>Columbia</td>
<td>02525</td>
</tr>
</tbody>
</table>

NOTE: Conductors and drain wire must be at least 20 AWG (American Wire Gage), stranded, and tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of -20°C to 60°C (4°F to 140°F) is required. Do not run communication wire in the same conduit as or next to any AC voltage wiring.

The communication bus shields must be tied together at each system element. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. If the communication bus cable exits from one building and enters another building, the shields must be connected to the grounds at a lightning suppressor in each building (one point only).

Connecting CCN bus:

NOTE: When connecting the communication bus cable, a color code system for the entire network is recommended to simplify installation and checkout. See Table 7 for the recommended color code.

Table 7 – Color Code Recommendations

<table>
<thead>
<tr>
<th>SIGNAL TYPE</th>
<th>CCN BUS WIRE COLOR</th>
<th>CCN PLUG PIN NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Red</td>
<td>1</td>
</tr>
<tr>
<td>Ground</td>
<td>White</td>
<td>2</td>
</tr>
<tr>
<td>–</td>
<td>Black</td>
<td>3</td>
</tr>
</tbody>
</table>

Connect the CCN (+) lead (typically RED) to the unit’s TB3-12 terminal. Connect the CCN (ground) lead (typically WHT) to the unit’s TB3-14 terminal. Connect the CCN (-) lead (typically BLK) to the unit’s TB3-16 terminal. See Fig. 46.

Fig. 46 - PremierLink CCN Bus Connections
The RTU Open control is factory-mounted in the 50DC*D unit’s main control box, to the right of the CTB. See Fig. 30. Factory wiring is completed through harnesses connected to the CTB. Field connections for RTU Open sensors will be made at the Phoenix connectors on the RTU Open board. The factory-installed RTU Open control includes the supply-air temperature (SAT) sensor. The outdoor air temperature (OAT) sensor is included in the FIOP/accessory EconoMi$er2 package.

The RTU Open controller is an integrated component of the Carrier rooftop unit. Its internal application programming provides optimum performance and energy efficiency. RTU Open enables the unit to run in 100% stand-alone control mode, Carrier’s I-Vu Open network, or a Third Party Building Automation System (BAS). On-board DIP switches allow you to select your protocol (and baud rate) of choice among the four most popular protocols in use today: BACnet, Modbus, Johnson N2 and LonWorks. (See Fig. 47.)

Refer to Table 8, RTU Open Controller Inputs and Outputs for locations of all connections to the RTU Open board.

Fig. 47 - RTU Open Multi-Protocol Control Board
Fig. 48 - RTU Open System Control Wiring Diagram
### Table 8 – RTU Open Controller Inputs and Outputs

<table>
<thead>
<tr>
<th>POINT NAME</th>
<th>BACnet OBJECT NAME</th>
<th>TYPE OF I/O</th>
<th>CONNECTION PIN NUMBER(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEDICATED INPUTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space Temp / Zone Temp</td>
<td>zone_temp</td>
<td>AI (10K Thermistor)</td>
<td>J20 – 1, 2</td>
</tr>
<tr>
<td>Supply Air Temperature</td>
<td>sa_temp</td>
<td>AI (10K Thermistor)</td>
<td>J2 – 1, 2</td>
</tr>
<tr>
<td>Outdoor Air Temperature</td>
<td>oa_temp</td>
<td>AI (10K Thermistor)</td>
<td>J2 – 3, 4</td>
</tr>
<tr>
<td>Space Temperature Offset Pot</td>
<td>stpt_adj_offset</td>
<td>AI (100K Potentiometer)</td>
<td>J20 – 3</td>
</tr>
<tr>
<td>Safety Chain Feedback</td>
<td>safety_status</td>
<td>DI (24 VAC)</td>
<td>J1 – 9</td>
</tr>
<tr>
<td>Compressor Safety Status</td>
<td>comp_status</td>
<td>DI (24 VAC)</td>
<td>J1 – 2</td>
</tr>
<tr>
<td>Fire Shutdown Status</td>
<td>firedown_status</td>
<td>DI (24 VAC)</td>
<td>J1 – 10</td>
</tr>
<tr>
<td>Enthalpy Status</td>
<td>enthalpy_status</td>
<td>DI (24 VAC)</td>
<td>J2 – 6</td>
</tr>
<tr>
<td>Humidistat Input Status</td>
<td>humstat_status</td>
<td>DI (24 VAC)</td>
<td>J5 – 7</td>
</tr>
<tr>
<td><strong>CONFIGURABLE INPUTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Air CO2</td>
<td>iaq</td>
<td>AI (4 – 20 ma)</td>
<td>J4 – 2 or J4 – 5</td>
</tr>
<tr>
<td>Outdoor Air CO2</td>
<td>oaq</td>
<td>AI (4 – 20 ma)</td>
<td></td>
</tr>
<tr>
<td>Space Relative Humidity</td>
<td>space_rh</td>
<td>AI (4 – 20 ma)</td>
<td></td>
</tr>
<tr>
<td>Supply Fan Status*</td>
<td>sfan_status</td>
<td>DI (24 VAC)</td>
<td></td>
</tr>
<tr>
<td>Filter Status*</td>
<td>filter_status</td>
<td>DI (24 VAC)</td>
<td></td>
</tr>
<tr>
<td>Door Contact Input*</td>
<td>door_contact_status</td>
<td>DI (24 VAC)</td>
<td>J5 – 1 or J5 – 3 or J5 – 5 or J5 – 7</td>
</tr>
<tr>
<td>Occupancy Contact*</td>
<td>occ_contact_status</td>
<td>DI (24 VAC)</td>
<td></td>
</tr>
<tr>
<td><strong>OUTPUTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economizer Output</td>
<td>econ_output</td>
<td>AO (4 – 20ma)</td>
<td>J2 – 5</td>
</tr>
<tr>
<td>Supply Fan Relay State</td>
<td>sfan</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J1 – 4</td>
</tr>
<tr>
<td>Compressor 1 Relay State</td>
<td>comp_1</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J1 – 8</td>
</tr>
<tr>
<td>Compressor 2 Relay State</td>
<td>comp_2</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J1 – 7</td>
</tr>
<tr>
<td>Heat Stage 1 Relay State</td>
<td>heat_1</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J1 – 6</td>
</tr>
<tr>
<td>Heat Stage 2 Relay State</td>
<td>heat_2</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J1 – 5</td>
</tr>
<tr>
<td>Power Exhaust Relay State</td>
<td>pexh</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J11 – 3</td>
</tr>
<tr>
<td>Dehumidification Relay State</td>
<td>dehum</td>
<td>DO Relay (24VAC, 1A)</td>
<td>J11 – 7, 8</td>
</tr>
</tbody>
</table>

**LEGEND**

AI – Analog Input
AO – Analog Output
DI – Discrete Input
DO – Discrete Output

* These inputs (if installed) take the place of the default input on the specific channel according to schematic.

Parallel pins J5 – 1 = J2 – 6, J5 – 3 = J1 – 10, J5 – 5 = J1 – 2 are used for field-installation.

The RTU Open controller requires the use of a Carrier space sensor. A standard thermostat cannot be used with the RTU Open system.

**Supply Air Temperature (SAT) Sensor** —

On FIOP-equipped 50TC-D unit, the unit is supplied with a supply-air temperature (SAT) sensor (33ZCSENSAT). This sensor is a tubular probe type, approx 152 mm (6-in.) in length. It is a nominal 10-k ohm thermistor.

The SAT is factory-wired. The SAT probe is wire-tied to the supply-air opening (on the horizontal opening end) in its shipping position. Remove the sensor for installation. Re-position the sensor in the flange of the supply-air opening or in the supply air duct (as required by local codes). Drill or punch a 13 mm (1/2-in.) hole in the flange or duct. Use two field-supplied, self-drilling screws to secure the sensor probe in a horizontal orientation. See Fig. 32.

**Outdoor Air Temperature (OAT) Sensor** —

The OAT is factory-mounted in the EconoMi$er2 (FIOP or accessory). It is a nominal 10k ohm thermistor attached to an eyelet mounting ring.

**EconoMi$er2** —

The RTU Open control is used with EconoMi$er2 (option or accessory) for outdoor air management. The damper position is controlled directly by the RTU Open control; EconoMi$er2 has no internal logic device.

Outdoor air management functions can be enhanced with field-installation of these accessory control devices:

- Enthalpy control (outdoor air or differential sensors)
- Space CO₂ sensor
- Outdoor air CO₂ sensor
Field Connections

Field connections for accessory sensors and input devices are made to the RTU Open, at plugs J1, J2, J4, J5, J11 and J20. All field control wiring that connects to the RTU Open must be routed through the raceway built into the corner post as shown in Fig. 24. The raceway provides the UL required clearance between high- and low-voltage wiring. Pass the control wires through the hole provided in the corner post, then feed the wires thorough the raceway to the RTU Open. Connect to the wires to the removable Phoenix connectors and then reconnect the connectors to the board.

Space Temperature (SPT) Sensors —

There are two types of SPT sensors available from Carrier, resistive input non-communicating (T55, T56, and T59) and Rnet communicating (SPS, SPPL, SPP, and SPPF) sensors. Each type has a variety of options consisting of: timed override button, set point adjustment, a LCD screen, and communication tie in. Space temperature can be also be written to from a building network or zoning system. However, it is still recommended that return air duct sensor be installed to allow stand-alone operation for back-up. Refer to the configuration section for details on controller configurations associated with space sensors.

- 33ZCT55SPT, space temperature sensor with override button (T-55)
- 33ZCT56SPT, space temperature sensor with override button and setpoint adjustment (T-56)
- 33ZCT59SPT, space temperature sensor with LCD (liquid crystal display) screen, override button, and setpoint adjustment (T-59)

Use 20 gauge wire to connect the sensor to the controller. The wire is suitable for distances of up to 152 m (500 ft.) Use a three-conductor shielded cable for the sensor and setpoint adjustment connections. If the setpoint adjustment (slidebar) is not required, then an unshielded, 18 or 20 gauge, two-conductor, twisted pair cable may be used.

Connect T-55: See Fig. 33 for typical T-55 internal connections. Connect the T-55 SEN terminals to RTU Open J20-1 and J20-2. See Fig. 49.

**Fig. 49 - RTU Open T-55 Sensor Connections**

Connect T-56: See Fig. 35 for T-56 internal connections. Install a jumper between SEN and SET terminals as illustrated. Connect T-56 terminals to RTU Open J20-1, J20-2 and J20-3 per Fig. 50.

**Fig. 50 - RTU Open T-56 Sensor Connections**

Connect T-59: The T-59 space sensor requires a separate, isolated power supply of 24 VAC. See Fig. 51 for internal connections at the T-59. Connect the SEN terminal (BLU) to RTU Open J20-1. Connect the COM terminal (BRN) to J20-2. Connect the SET terminal (STO or BLK) to J20-3.

**Fig. 51 - Space Temperature Sensor Typical Wiring (33ZCT59SPT)**

Indoor Air Quality (CO₂) Sensor —

The indoor air quality sensor accessory monitors space carbon dioxide (CO₂) levels. This information is used to monitor IAQ levels. Several types of sensors are available, for wall mounting in the space or in return duct, with and without LCD display, and in combination with space temperature sensors. Sensors use infrared technology to measure the levels of CO₂ present in the space air.

The CO₂ sensors are all factory set for a range of 0 to 2000 ppm and a linear mA output of 4 to 20. Refer to the instructions supplied with the CO₂ sensor for electrical requirements and terminal locations. See Fig. 38 for typical CO₂ sensor wiring schematic.

To accurately monitor the quality of the air in the conditioned air space, locate the sensor near a return-air grille (if present) so it senses the concentration of CO₂ leaving the space. The sensor should be mounted in a location to avoid direct breath contact.
Do not mount the IAQ sensor in drafty areas such as near supply ducts, open windows, fans, or over heat sources. Allow at least 0.9 m (3 ft) between the sensor and any corner. Avoid mounting the sensor where it is influenced by the supply air; the sensor gives inaccurate readings if the supply air is blown directly onto the sensor or if the supply air does not have a chance to mix with the room air before it is drawn into the return airstream.

**Wiring the Indoor Air Quality Sensor:** For each sensor, use two 2-conductor 18 AWG (American Wire Gage) twisted-pair cables (unshielded) to connect the separate isolated 24 vac power source to the sensor and to connect the sensor to the RTU Open control board terminals.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the sensor. See Fig. 38. Connect the 4-20 mA terminal to RTU Open J4-2 and connect the SIG COM terminal to RTU Open J4-3. See Fig. 52.

**IAQ Sensor**

![IAQ Sensor Diagram](image1)

**Outdoor Air Quality Sensor (PNO 33ZCSENCO2 plus weatherproof enclosure)** —

The outdoor air CO₂ sensor is designed to monitor carbon dioxide (CO₂) levels in the outside ventilation air and interface with the ventilation damper in an HVAC system. The OAQ sensor is packaged with an outdoor cover. See Fig. 40. The outdoor air CO₂ sensor must be located in the economizer outside air hood.

**Wiring the Outdoor Air CO₂ Sensor:** A dedicated power supply is required for this sensor. A two-wire cable is required to wire the dedicated power supply for the sensor. The two wires should be connected to the power supply and terminals 1 and 2.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the OAQ sensor. See Fig. 38. Connect the 4-20 mA terminal to RTU Open J4-5. Connect the SIG COM terminal to RTU Open J4-6. See Fig. 53.

**OAQ Sensor/RH Sensor**

![OAQ Sensor Diagram](image2)

On 50TC-D units equipped with factory-installed Smoke Detector(s), the smoke detector controller implements the unit shutdown through its NC contact set connected to the unit’s CTB input. The FSD function is initiated via the smoke detector’s Alarm NO contact set. The RTU Open controller communicates the smoke detector’s tripped status to the BAS building control. See Fig. 48, the RTU Open System Control Wiring diagram.

The Fire Shutdown Switch configuration, **MENU → Config → Inputs → input 5**, identifies the normally open status of this input when there is no fire alarm.

**Connecting Discrete Inputs —**

**Filter Status:** The filter status accessory is a field-installed accessory. This accessory detects plugged filters. When installing this accessory, the unit must be configured for filter status by setting **MENU → Config → Inputs → input 3, 5, 8, or 9** to Filter Status and normally open (N/O) or normally closed (N/C). Input 8 or 9 is recommended for easy of installation. Refer to Fig. 47 and Fig. 48 for wire terminations at J5.

**Fan Status:** The fan status accessory is a field-installed accessory. This accessory detects when the indoor fan is blowing air. When installing this accessory, the unit must be configured for fan status by setting **MENU → Config → Inputs → input 3, 5, 8, or 9** to Fan Status and normally open (N/O) or normally closed (N/C). Input 8 or 9 is recommended for easy of installation. Refer to Fig. 47 and Fig. 48 for wire terminations at J5.

**Remote Occupancy:** The remote occupancy accessory is a field-installed accessory. This accessory overrides the unoccupied mode and puts the unit in occupied mode. When installing this accessory, the unit must be configured for remote occupancy by setting **MENU → Config → Inputs → input 3, 5, 8, or 9** to Remote Occupancy and normally open (N/O) or normally closed (N/C). Also set **MENU → Schedules → occupancy source** to DI on/off. Input 8 or 9 is recommended for easy of installation. Refer to Fig. 47 and Table 8 for wire terminations at J5.

**Power Exhaust (output):** The relay used by the RTU Open board to control power exhaust is a dry contact which means it does not have 24vac. This 24vac must be connected to the relay to allow it to operate the power exhaust relay in the PE accessory. A 24vac source must be provided to J11-2 on the RTU Open control board. This can be provided by the unit’s transformer from various sources. The “R” terminal on the unit’s low voltage terminal board (LVTB) is a logical source. Refer to Fig. 47 and Fig. 48 for wire terminations at J11.

**Space Relative Humidity Sensor:** The RH sensor is not used with 50Hz 50TC-D models at this time.
Communication Wiring - Protocols

General —

Protocols are the communication languages spoken by control devices. The main purpose of a protocol is to communicate information in the most efficient method possible. Different protocols exist to provide different kinds of information for different applications. In the BAS application, many different protocols are used, depending on manufacturer. Protocols do not change the function of a controller; just make the front end user different.

The RTU Open can be set to communicate on four different protocols: BACnet, Modbus, N2, and LonWorks. Switch 3 (SW3) on the board is used to set protocol and baud rate. Switches 1 and 2 (SW1 and SW2) are used to set the board’s network address. See Fig. 54 and 55 for protocol switch settings and address switches. The 3rd party connection to the RTU Open is through plug J19. See Fig. 56 for wiring.

NOTE: Power must be cycled after changing the SW1-3 switch settings.

Refer to the RTU Open Controller Integration Guide (Catalog No. 11-808-428-01) for more detailed information on protocols, 3rd party wiring, and networking.

### SW3 Protocol Selection

<table>
<thead>
<tr>
<th>PROTOCOL</th>
<th>DS8</th>
<th>DS7</th>
<th>DS6</th>
<th>DS5</th>
<th>DS4</th>
<th>DS3</th>
<th>DS2</th>
<th>DS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACnet MS/TP (Master)</td>
<td>Unused</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>Select Baud</td>
<td>Select Baud</td>
</tr>
<tr>
<td>Modbus (Slave)</td>
<td>Unused</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>Select Baud</td>
<td>Select Baud</td>
</tr>
<tr>
<td>N2 (Slave)</td>
<td>Unused</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>LonWorks</td>
<td>Unused</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

NOTE: DS = Dip Switch
BACnet MS/TP SW3 example shown

### Baud Rate Selections

<table>
<thead>
<tr>
<th>BAUD RATE</th>
<th>DS2</th>
<th>DS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>19,200</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>38,400</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>76,800</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

### Fig. 54 - RTU Open SW3 Dip Switch Settings

![Fig. 54 - RTU Open SW3 Dip Switch Settings](C10815)

### Fig. 55 - RTU Open Address Switches

![Fig. 55 - RTU Open Address Switches](C10915)

### Fig. 56 - Network Wiring

![Fig. 56 - Network Wiring](C10816)
Local Access —

**BACview® Handheld:** The BACview® is a keypad/display interface used to connect to the RTU Open to access the control information, read sensor values, and test the RTU, see Fig. 57. This is an accessory interface that does not come with the RTU Open controller and can only be used at the unit. Connect the BACview® to the RTU Open J12 local access port. There are two password protected levels in the display (User and Admin). The user password is defaulted to 0000 but can be changed. The Admin password is 1111 and cannot be changed. There is a 10 minute auto logout if a screen is idle. See Form 48-50HCTQ-01T, Appendix A for navigation and screen content.

**Virtual BACview:** Virtual BACview is a freeware computer program that functions as the BACview® Handheld. The USB Link interface (USB-L) is required to connect a computer to the RTU Open board. The link cable connects a USB port to the J12 local access port. This program functions and operates identical to the handheld.

**RTU Open Troubleshooting —**

**Communication LEDs:** The LEDs indicate if the controller is speaking to the devices on the network. The LEDs should reflect communication traffic based on the baud rate set. The higher the baud rate the more solid the LEDs will appear. See Table 9.

---

Fig. 57 - BACview® Handheld Connections
Table 9 – LEDs

The LEDs on the RTU Open Control Board (see Fig. 47) show the status of certain functions:

<table>
<thead>
<tr>
<th>If this LED is on...</th>
<th>Status is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>RTU Open has power</td>
</tr>
<tr>
<td>Rx</td>
<td>RTU Open is receiving data from the network segment</td>
</tr>
<tr>
<td>Tx</td>
<td>RTU Open is transmitting data over the network segment</td>
</tr>
<tr>
<td>DO#</td>
<td>The digital output is active</td>
</tr>
</tbody>
</table>

The Run and Error LEDs indicate control module and network status

<table>
<thead>
<tr>
<th>If Run LED shows...</th>
<th>And Error LED shows...</th>
<th>Status is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 flashes per second</td>
<td>Off</td>
<td>Normal</td>
</tr>
<tr>
<td>2 flashes per second</td>
<td>2 flashes, alternating with Run LED</td>
<td>Five minute auto – restart delay after system error</td>
</tr>
<tr>
<td>2 flashes per second</td>
<td>3 flashes, then off</td>
<td>Control module has just been formatted</td>
</tr>
<tr>
<td>2 flashes per second</td>
<td>4 flashes, then pause</td>
<td>Two or more devices on this network have the same ARC156 network address</td>
</tr>
<tr>
<td>2 flashes per second</td>
<td>On</td>
<td>Exec halted after frequent system errors or control programs halted</td>
</tr>
<tr>
<td>5 flashes per second</td>
<td>On</td>
<td>Exec start-up aborted, Boot is running</td>
</tr>
<tr>
<td>5 flashes per second</td>
<td>Off</td>
<td>Firmware transfer in progress, Boot is running</td>
</tr>
<tr>
<td>7 flashes per second</td>
<td>7 flashes per second, alternating with Run LED</td>
<td>Ten second recovery period after brownout</td>
</tr>
<tr>
<td>14 flashes per second</td>
<td>14 flashes per second, alternating with Run LED</td>
<td>Brownout</td>
</tr>
</tbody>
</table>
| On                  | On                     | Failure. Try the following solutions:  
• Turn RTU Open off, then on.  
• Format RTU Open.  
• Download memory to RTU Open.  
• Replace RTU Open. |

NOTE: Refer to Catalog No. 48-50HCTQ-01T for complete configuration of RTU Open, operating sequences and troubleshooting information. Refer to RTU Open Controller Integration Guide (Catalog No. 11-808-428-01) for details on configuration and troubleshooting of connected networks. Have a copy of these manuals available at unit start-up.

Outdoor Air Enthalpy Control (PNO 33CSEHTHSW) -

The enthalpy control (33CSEHTHSW) is available as a field-installed accessory to be used with the EconoMi$er2 damper system. The outdoor air enthalpy sensor is part of the enthalpy control. (The separate field-installed accessory return air enthalpy sensor (33CSENTSEN) is required for differential enthalpy control. See Fig. 58.)

Locate the enthalpy control in the economizer next to the Actuator Motor. Locate two GRA leads in the factory harness and connect the gray lead labeled “ESL” to the terminal labeled “LOW”. See Fig. 58. Connect the enthalpy control power input terminals to economizer actuator power leads RED (connect to 24V) and BLK (connect to GND).

Differential Enthalpy Control —

The outdoor enthalpy changeover setpoint is set at the enthalpy controller.
To wire the return air enthalpy sensor, perform the following:

1. Use a 2-conductor, 18 or 20 AWG, twisted pair cable to connect the return air enthalpy sensor to the enthalpy controller.
2. Connect the field-supplied RED wire to (+) spade connector on the return air enthalpy sensor and the (+) terminal on the enthalpy controller. Connect the BLK wire to (-) spade connector on the return air enthalpy sensor and the (-) terminal on the enthalpy controller.

Smoke Detectors

Smoke detectors are available as factory-installed options on 50TC-D models. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. Return Air smoke detectors are arranged for vertical return configurations only. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

Return Air Sensor Tube Installation –

The return air sampling tube is shipped in the unit’s supply fan section, attached to the blower housing (see Fig. 60). Its operating location is in the return air section of the unit (see Fig. 61, unit without economizer, or Fig. 62, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.
To install the return air sensor sampling tube:

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

Return Air Sensor Exhaust Tube Installation —

The exhaust tube is shipped in a bag located in the control box. The exhaust tube is 152 mm (6 inches) long with a base coupling and a gasket. Slip the gasket over the coupling end, then insert the connector into the rear opening in the sensor module until the tube snaps into location.

NOTE: The shipping bag contains a tube plug or cap. This part is not used in this installation and may be discarded. Do NOT insert the plug into the exhaust tube.

Test/Reset Magnet —

The shipping bag also contains a magnet for testing and resetting smoke detectors. Do not discard this magnet.

Additional Application Data —

Refer to Catalog No. HKRNKA-1XA for discussions on additional control features of these smoke detectors including multiple unit coordination.
### Table 10 – Unit Wire/Fuse or HACR Breaker Sizing Data

<table>
<thead>
<tr>
<th>UNIT</th>
<th>VER.</th>
<th>HORIZ.</th>
<th>CRHEATER***A00</th>
<th>CR PESS</th>
<th>ELEC. HTR†</th>
<th>PE.</th>
<th>NO P.</th>
<th>w/ P.</th>
<th>MCA</th>
<th>FLA</th>
<th>LRA</th>
<th>FLA</th>
<th>LRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>50TC-D17</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>41.4</td>
<td>40</td>
<td>50</td>
<td>240</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>66.9</td>
<td>70</td>
<td>62</td>
<td>240</td>
<td>74.6</td>
<td>80</td>
<td>69</td>
<td>252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>79.5</td>
<td>90</td>
<td>90</td>
<td>240</td>
<td>87.2</td>
<td>90</td>
<td>98</td>
<td>252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>68.1</td>
<td>70</td>
<td>63</td>
<td>249</td>
<td>75.9</td>
<td>80</td>
<td>70</td>
<td>261</td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>80.7</td>
<td>90</td>
<td>92</td>
<td>249</td>
<td>88.5</td>
<td>100</td>
<td>99</td>
<td>261</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D20</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>42.4</td>
<td>40</td>
<td>50</td>
<td>249</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>68.1</td>
<td>70</td>
<td>63</td>
<td>249</td>
<td>75.9</td>
<td>80</td>
<td>70</td>
<td>261</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>80.7</td>
<td>90</td>
<td>92</td>
<td>249</td>
<td>88.5</td>
<td>100</td>
<td>99</td>
<td>261</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D24</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>45.6</td>
<td>40</td>
<td>60</td>
<td>253</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>72.1</td>
<td>80</td>
<td>66</td>
<td>253</td>
<td>79.9</td>
<td>80</td>
<td>73</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>84.7</td>
<td>100</td>
<td>95</td>
<td>253</td>
<td>92.5</td>
<td>100</td>
<td>102</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D28</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>48.2</td>
<td>40</td>
<td>60</td>
<td>253</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>72.1</td>
<td>80</td>
<td>66</td>
<td>253</td>
<td>79.9</td>
<td>80</td>
<td>73</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>88.0</td>
<td>100</td>
<td>98</td>
<td>253</td>
<td>95.7</td>
<td>100</td>
<td>105</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D32</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>51.4</td>
<td>40</td>
<td>60</td>
<td>262</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>75.4</td>
<td>80</td>
<td>69</td>
<td>262</td>
<td>83.1</td>
<td>90</td>
<td>76</td>
<td>274</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>88.0</td>
<td>100</td>
<td>98</td>
<td>262</td>
<td>95.7</td>
<td>100</td>
<td>105</td>
<td>274</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D36</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>58.0</td>
<td>40</td>
<td>70</td>
<td>303</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>83.6</td>
<td>90</td>
<td>77</td>
<td>303</td>
<td>91.4</td>
<td>100</td>
<td>84</td>
<td>315</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>96.2</td>
<td>110</td>
<td>106</td>
<td>303</td>
<td>104.0</td>
<td>110</td>
<td>113</td>
<td>315</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D40</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>52.7</td>
<td>40</td>
<td>60</td>
<td>285</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>72.1</td>
<td>80</td>
<td>66</td>
<td>285</td>
<td>79.9</td>
<td>80</td>
<td>73</td>
<td>297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>84.7</td>
<td>100</td>
<td>95</td>
<td>285</td>
<td>92.5</td>
<td>100</td>
<td>102</td>
<td>297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D44</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>55.3</td>
<td>40</td>
<td>60</td>
<td>285</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>75.4</td>
<td>80</td>
<td>69</td>
<td>285</td>
<td>83.1</td>
<td>90</td>
<td>76</td>
<td>297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>88.0</td>
<td>100</td>
<td>98</td>
<td>285</td>
<td>95.7</td>
<td>100</td>
<td>105</td>
<td>297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50TC-D48</td>
<td>400-3-50</td>
<td>STD</td>
<td>NONE</td>
<td>-</td>
<td>273A00</td>
<td>17.4</td>
<td>50</td>
<td>251</td>
<td>3.1</td>
<td>61.9</td>
<td>40</td>
<td>60</td>
<td>326</td>
</tr>
<tr>
<td>282A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>83.6</td>
<td>90</td>
<td>77</td>
<td>326</td>
<td>91.4</td>
<td>100</td>
<td>84</td>
<td>338</td>
<td></td>
<td></td>
</tr>
<tr>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>96.2</td>
<td>110</td>
<td>106</td>
<td>326</td>
<td>104.0</td>
<td>110</td>
<td>113</td>
<td>338</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** See page 41 for table legend and notes.
Table 10 – Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>NOM. V.−PH−HZ I/F M TYPE</th>
<th>ELEC. HTR †</th>
<th>PE.</th>
<th>NO PE.</th>
<th>w/ PE. (pwrd fr/unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CRHEATER***A00</td>
<td>Nom (kW)</td>
<td>FLA</td>
<td>MCA</td>
<td>FUSE or HACR BRKR DISC. SIZE</td>
</tr>
<tr>
<td></td>
<td>VERTICAL</td>
<td>HORIZONTAL</td>
<td>FLA</td>
<td>MCA</td>
<td>FUSE or HACR BRKR DISC. SIZE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FLA</td>
<td>MCA</td>
<td>FLA</td>
</tr>
<tr>
<td>STD</td>
<td>NONE</td>
<td>NONE</td>
<td>−</td>
<td>−</td>
<td>64.1</td>
</tr>
<tr>
<td></td>
<td>282A00</td>
<td>273A00</td>
<td>17.4</td>
<td>25.1</td>
<td>64.1</td>
</tr>
<tr>
<td></td>
<td>283A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>75.4</td>
</tr>
<tr>
<td></td>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>88.0</td>
</tr>
<tr>
<td>MED</td>
<td>NONE</td>
<td>NONE</td>
<td>−</td>
<td>−</td>
<td>70.7</td>
</tr>
<tr>
<td></td>
<td>282A00</td>
<td>273A00</td>
<td>17.4</td>
<td>25.1</td>
<td>70.7</td>
</tr>
<tr>
<td></td>
<td>283A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>83.6</td>
</tr>
<tr>
<td></td>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>96.2</td>
</tr>
<tr>
<td>HIGH</td>
<td>NONE</td>
<td>NONE</td>
<td>−</td>
<td>−</td>
<td>71.1</td>
</tr>
<tr>
<td></td>
<td>282A00</td>
<td>273A00</td>
<td>17.4</td>
<td>25.1</td>
<td>71.1</td>
</tr>
<tr>
<td></td>
<td>283A00</td>
<td>274A00</td>
<td>34.7</td>
<td>50.1</td>
<td>84.1</td>
</tr>
<tr>
<td></td>
<td>284A00</td>
<td>275A00</td>
<td>52.1</td>
<td>75.2</td>
<td>96.7</td>
</tr>
</tbody>
</table>

Legend and Notes for Table 10

LEGEND:
BRKR – Circuit breaker
DISC – Disconnect
FLA – Full load amps
IFM – Indoor fan motor
LRA – Locked rotor amps
MCA – Minimum circuit amps
PE – Power exhaust

† Heater capacity (kW) is based on heater voltage of 400 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

NOTES:
1. In compliance with NEC requirements (U.S.A. Standard) for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.
2. MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA).
Step 12 — Adjust Factory-Installed Options

EconoMi$er IV Occupancy Switch —

Refer to Fig. 63 for general EconoMi$er IV wiring. External occupancy control is managed through a connection on the Central Terminal Board.

If external occupancy control is desired, connect a time clock or remotely controlled switch (closed for Occupied, open for Unoccupied sequence) at terminals marked OCCUPANCY on CTB. Remove or cut jumper JMP 2 to complete the installation.

Step 13 — Install Accessories

Available accessories include:

- Roof Curb
- Thru-base connection kit (must be installed before unit is set on curb)
- Manual outside air damper
- Two-Position motorized outside air damper
- EconoMi$er IV (with control and integrated barometric relief)

EconoMi$er2 (without control/for external signal and integrated barometric relief)
- Power Exhaust
- Differential dry-bulb sensor (EconoMi$er IV)
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Electric Heaters
- Single Point kits
- Thermostat / Sensors
- CO₂ sensor
- DDC interface (PremierLink)
- Louvered hail guard
- Phase monitor control

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

Pre-Start and Start-Up

This completes the mechanical installation of the unit. Refer to the unit’s Service and Maintenance manual for detailed Pre-Start and Start-up instructions.
START-UP CHECKLIST
(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO.: ________________________ SERIAL NO.: ________________________
DATE: ________________________ TECHNICIAN: ________________________

II. PRE-START-UP (insert checkmark in box as each item is completed)

☐ VERIFY THAT JOBSITE VOLTAGE AGREES WITH VOLTAGE LISTED ON RATING PLATE
☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT
☐ REMOVE ALL SHIPPING HOLD DOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS
☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
☐ CHECK REFRIGERANT PIPING FOR INDICATIONS OF LEAKS; INVESTIGATE AND REPAIR IF NECESSARY
☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
☐ CHECK THAT RETURN (INDOOR) AIR FILTERS ARE CLEAN AND IN PLACE
☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
☐ CHECK FAN WHEELS AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
☐ CHECK TO ENSURE THAT ELECTRICAL WIRING IS NOT IN CONTACT WITH REFRIGERANT LINES OR SHARP METAL EDGES
☐ CHECK PULLEY ALIGNMENT AND BELT TENSION PER INSTALLATION INSTRUCTIONS

III. START-UP (REFER TO UNIT SERVICE/MAINTENANCE MANUAL FOR START-UP INSTRUCTIONS)

ELECTRICAL

SUPPLY VOLTAGE

\[ \begin{array}{ccc}
\text{CIRCUIT 1 COMPRESSOR AMPS} & \text{L1} & \text{L2} & \text{L3} \\
\text{CIRCUIT 2 COMPRESSOR AMPS} & \text{L1} & \text{L2} & \text{L3} \\
\text{INDOOR-FAN AMPS} & & & \\
\end{array} \]

TEMPERATURES

\[ \begin{array}{cc}
\text{OUTDOOR-AIR TEMPERATURE} & \text{DB} & \text{WB} \\
\text{RETURN-AIR TEMPERATURE} & \text{DB} & \text{WB} \\
\text{COOLING SUPPLY AIR} & \text{DB} & \text{WB} \\
\end{array} \]

PRESSURES (Cooling Mode)

\[ \begin{array}{cccc}
\text{REFRIGERANT SUCTION, CIRCUIT 1} & \text{kPa} & \text{PSIG} & \text{°C} & \text{°F} \\
\text{REFRIGERANT SUCTION, CIRCUIT 2} & \text{kPa} & \text{PSIG} & \text{°C} & \text{°F} \\
\text{REFRIGERANT DISCHARGE, CIRCUIT 1} & \text{kPa} & \text{PSIG} & \text{°C} & \text{°F} \\
\text{REFRIGERANT DISCHARGE, CIRCUIT 2} & \text{kPa} & \text{PSIG} & \text{°C} & \text{°F} \\
\end{array} \]

☐ VERIFY THAT 3-PHASE FAN MOTOR AND BLOWER ARE ROTATING IN CORRECT DIRECTION.
☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION
☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

GENERAL

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