48TC
Single Package Rooftop
Gas Heating/Electric Cooling
Vertical Air Flow Unit
with Puron® (R−410A) Refrigerant
15, 17.5, 20, 25, 27.5 Tons — (Sizes 17, 20, 24, 28, 30)

Carrier
turn to the experts

Installation Instructions

NOTE: Read the entire instruction manual before starting the installation

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SAFETY CONSIDERATIONS

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

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

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

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

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

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

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

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

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

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

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

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

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

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

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

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

Rated Indoor Airflow (cfm)

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

Model Number	Full Load Airflow (cfm)
48TC*D/E17	4900
48TC*D/E20	6125
48TC*D/E24	8000
48TC*D/E28	8750
48TC*D30	9750

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

Unit Heat Type
48 - Gas Heat Packaged Rooftop

Model Series - WeatherMaker™
TC - Standard Efficiency

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

Refrig. Systems Options
D = Two stage cooling model
E = Two stage cooling models with Humidi-MiZer (17-28 models with RTPF coils only)

Cooling Tons
17 = 15 tons
20 = 17.5 tons
24 = 20 tons
28 = 25 tons
30 = 27.5 tons

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

Indoor Fan Options & Air Flow Configuration
1 = Standard Static/Vertical Supply, Return Air Flow
2 = Medium Static/Vertical Supply, Return Air Flow
3 = High Static/Vertical Supply, Return Air Flow
B = Med Static High Efficiency Motor/Vertical Supply, Return Air Flow
C = High Static High Efficiency Motor/Vertical Supply, Return Air Flow

Coil Options – RTPF (Outdoor - Indoor - 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

Coil Options – Novation (Outdoor - Indoor - Hail Guard)
G = Al/Al - Al/Cu
H = Al/Al - Cu/Cu
J = Al/Al - E-coat Al/Cu
K = E-coat Al/Al - Al/Cu
L = E-coat Al/Al - E-coatAl/Cu
T = Al/Al - Al/Cu — Louvered Hail Guard
U = Al/Al - Cu/Cu — Louvered Hail Guard
V = Al/Al - E-coat Al/Cu — Louvered Hail Guard
W = E-coat Al/Al - Al/Cu — Louvered Hail Guard
X = E-coat Al/Al - E-coat Al/Cu — Louvered Hail Guard

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

Design Revision
- = Factory Design Revision

Base Unit Controls
0 = Base Electromechanical Controls
1 = PremierLink Controller
2 = RTU Open Multi-Protocol Controller
6 = Electro-mechanical w/ 2-Speed Fan and W7220 Economizer Controller

Intake / Exhaust Options
A = None
B = Temperature Economizer w/ Barometric Relief
F = Enthalpy Economizer w/ Barometric Relief
K = 2-Position Damper
U = Temp Ultra Low Leak Economizer w/ Baro Relief
V = Temp Ultra Low Leak Economizer w/ PE (cert) - Vertical Air Only
W = Enthalpy Ultra Low Leak Economizer w/ Baro Relief
X = Enthalpy Ultra Low Leak Economizer PE (cert) - Vertical Air Only

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

Electrical Options
A = None
C = Non-Fused Disconnect
G = 2-Speed Indoor Fan (VFD) Controller
J = 2 Speed Fan Controller (VFD) & Non-Fused Disconnect

Packaging & Seismic Complience
0 = Standard
3 = California seismic compliant

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Fig. 1 - 48TC MRT Vertical Airflow Units Model Number Nomenclature (Example)

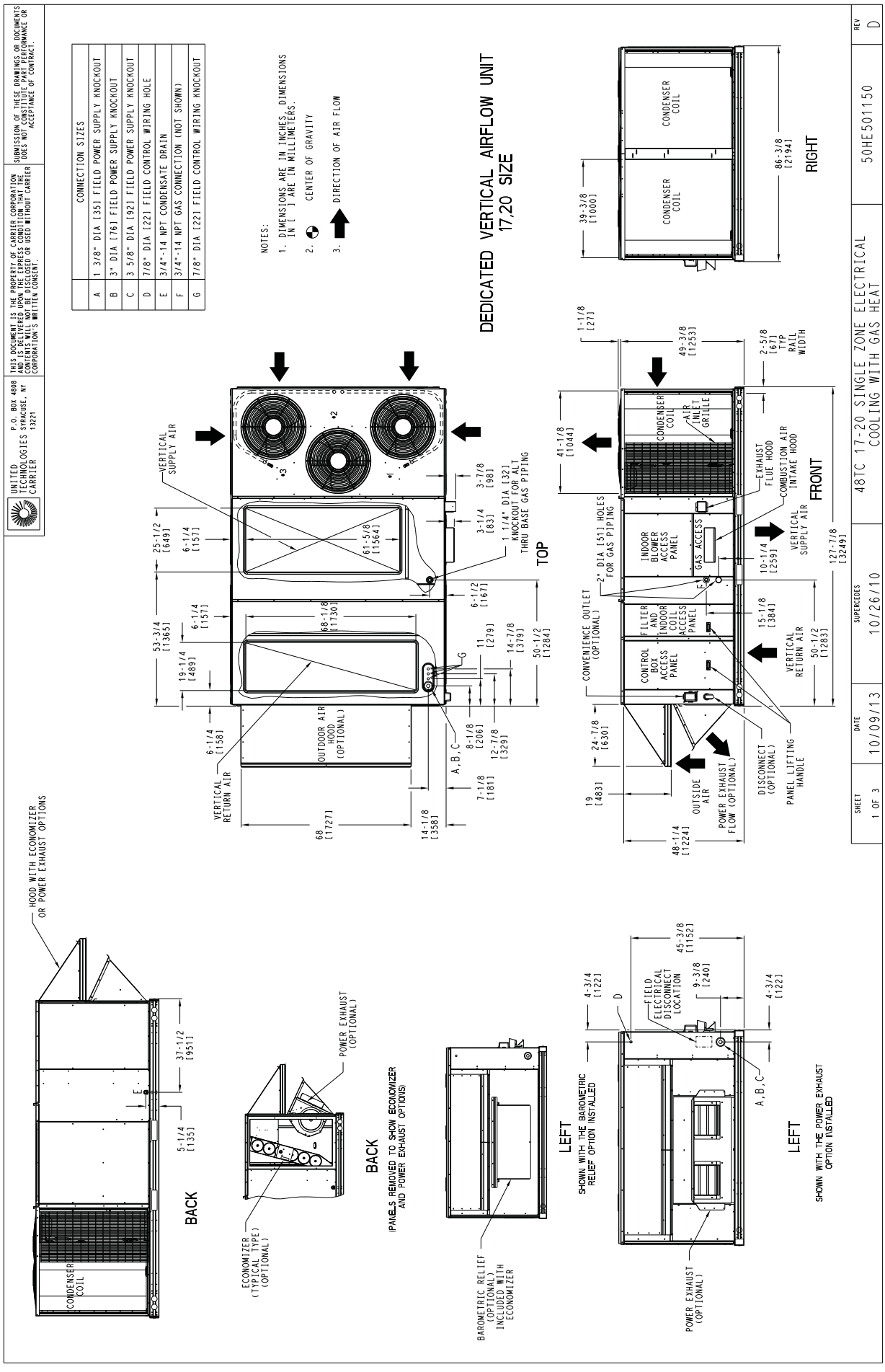

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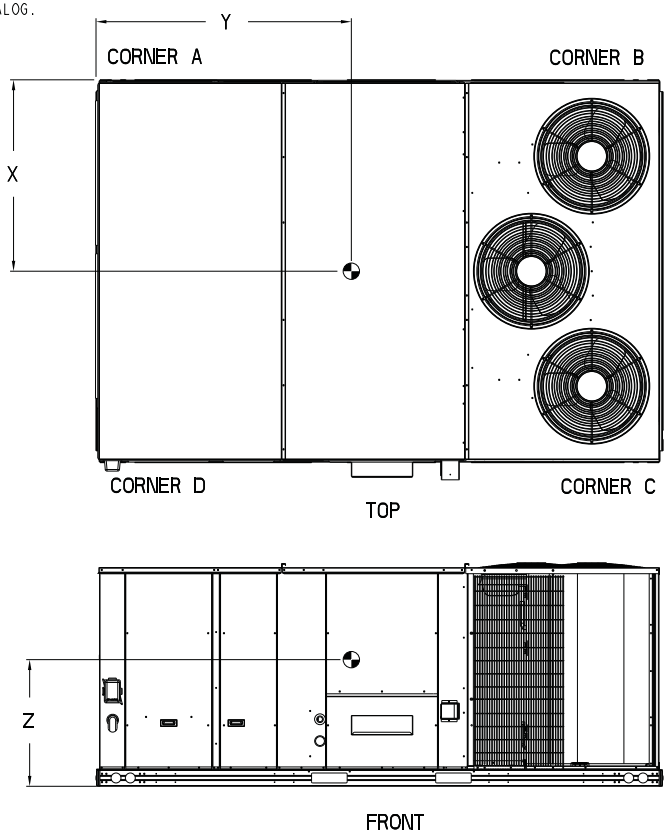
Fig. 2 - Unit Dimensional Drawing – 17 and 20 Size Unit

UNIT	OUTDOOR COIL TYPE	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC17	MCHX	1824	829	434	197	443	210	479	218	469	213	44 3/4 [1137]	64 3/4 [1645]	16 1/2 [419]
48TC20	MCHX	1839	836	437	199	447	203	483	219	472	215	44 3/4 [1137]	64 3/4 [1645]	16 1/2 [419]
48TC17	RTPF	1907	867	438	199	519	236	515	234	435	198	42 29/32 [1090]	69 1/4 [1759]	16 1/2 [419]
48TC18	RTPF	1892	860	401	182	449	204	565	257	505	230	48 [1219]	67 3/8 [1711]	16 1/2 [419]
48TC20	RTPF	1922	874	441	201	523	238	519	236	438	199	42 29/32 [1090]	69 1/4 [1759]	16 1/2 [419]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
MCHX - NOVATION (ALUM/ALUM)

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



SHEET	DATE	SUPERCEDES			REV
3 OF 3	10/09/13	10/26/10	48TC 17-20 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE501150	D

Fig. 2 - Unit Dimensional Drawing – 17 and 20 Size Unit (cont.)

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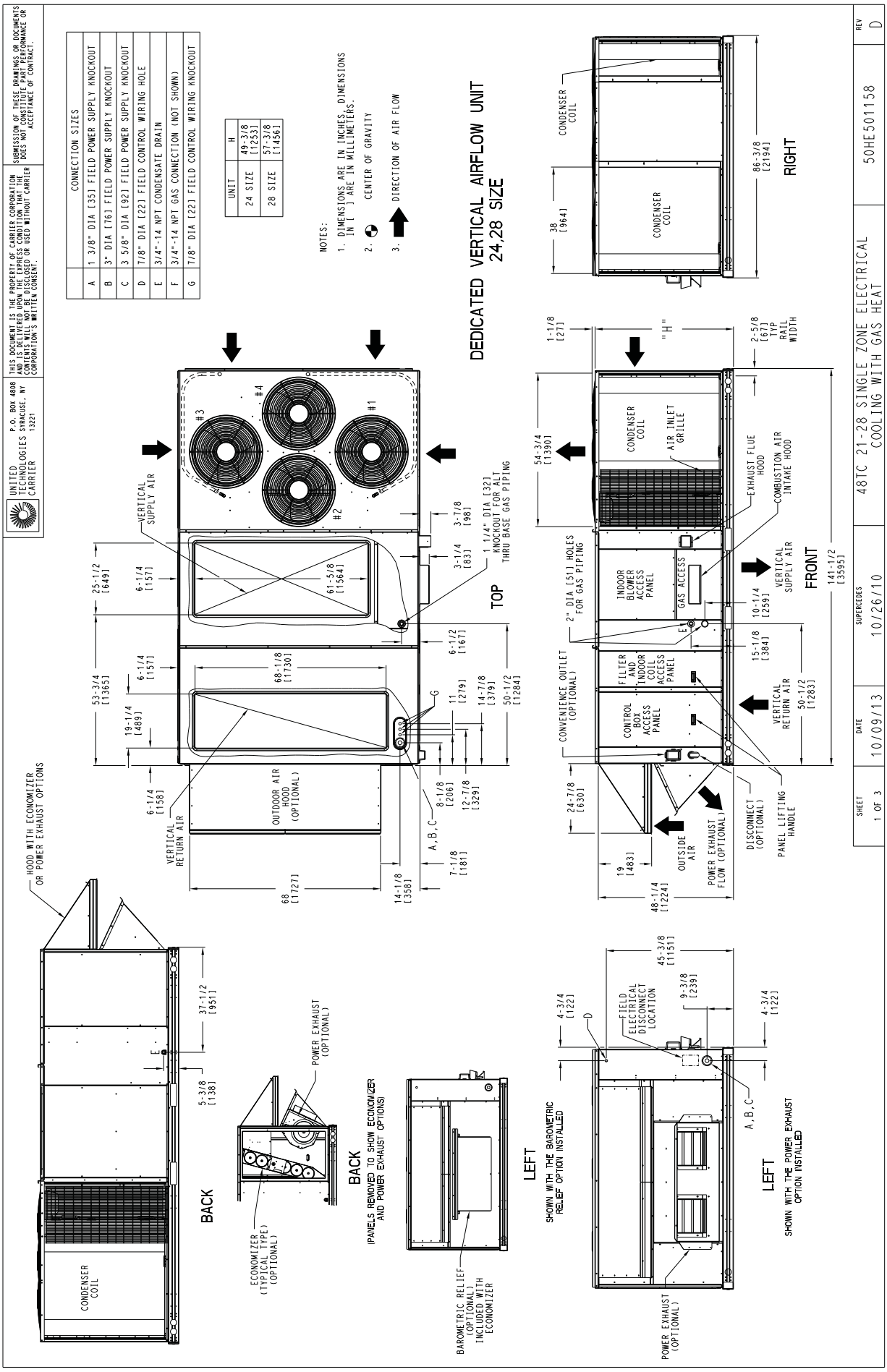
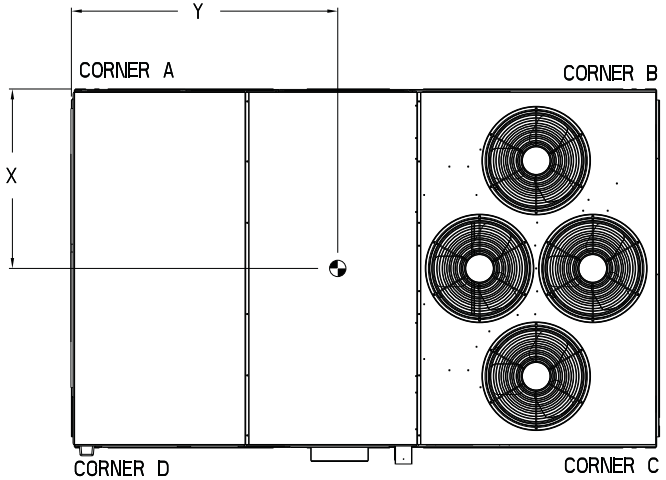


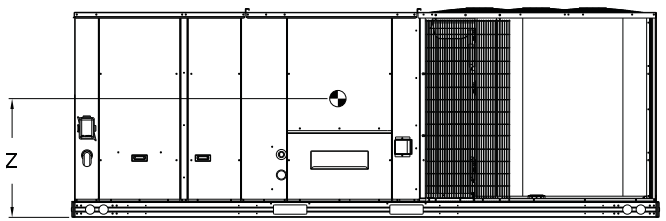
Fig. 3 - Unit Dimensional Drawing – 24 and 28 Size Units

UNIT	OUTDOOR COIL TYPE	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC24	MCHX	1989	904	383	174	540	245	623	283	442	201	46 1/8 [1172]	82 7/8 [2105]	16 1/2 [419]
48TC28	MCHX	2118	963	408	186	575	261	664	302	471	214	46 1/8 [1172]	82 7/8 [2105]	19 [483]
48TC21	RTPF	2102	956	474	215	390	177	593	269	582	265	47 1/2 [1207]	71 1/4 [1810]	16 1/2 [419]
48TC24	RTPF	2072	942	558	254	548	249	479	217	487	221	40 5/32 [1020]	70 [1778]	16 1/2 [419]
48TC25	RTPF	2247	1021	540	246	556	253	598	272	581	264	44 5/8 [1133]	71 5/8 [1819]	19 [483]
48TC28	RTPF	2197	999	571	259	564	256	528	240	534	243	41 21/32 [1058]	70 1/4 [1784]	19 [483]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
MCHX - NOVATION (ALUM/ALUM)

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





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

SHEET	DATE	SUPERCEDES			REV
3 OF 3	10/09/13	10/26/10	48TC 21-28 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE501158	D

Fig. 3 - Unit Dimensional Drawing – 24 and 28 Size Units (cont.)

C13735

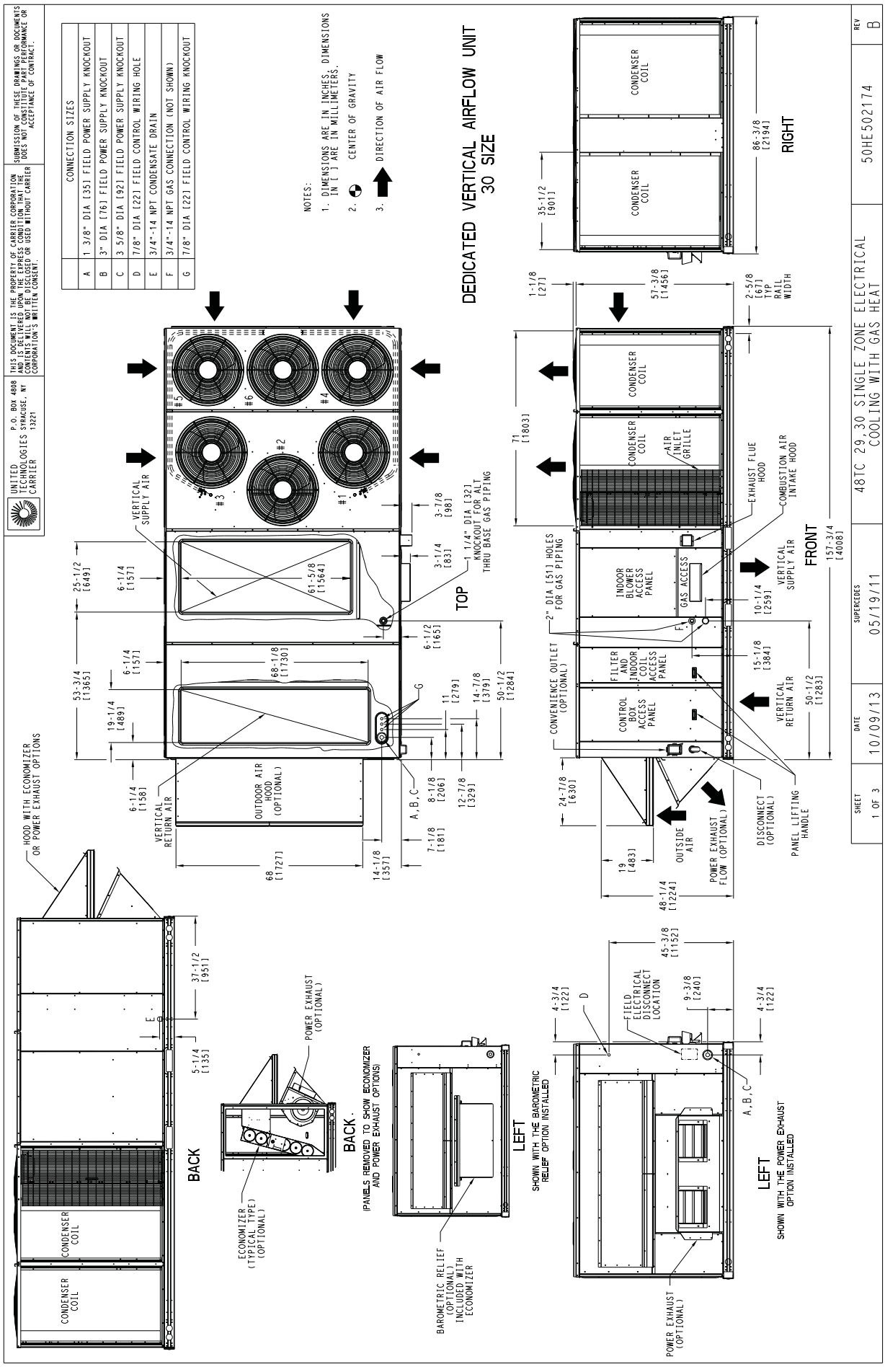


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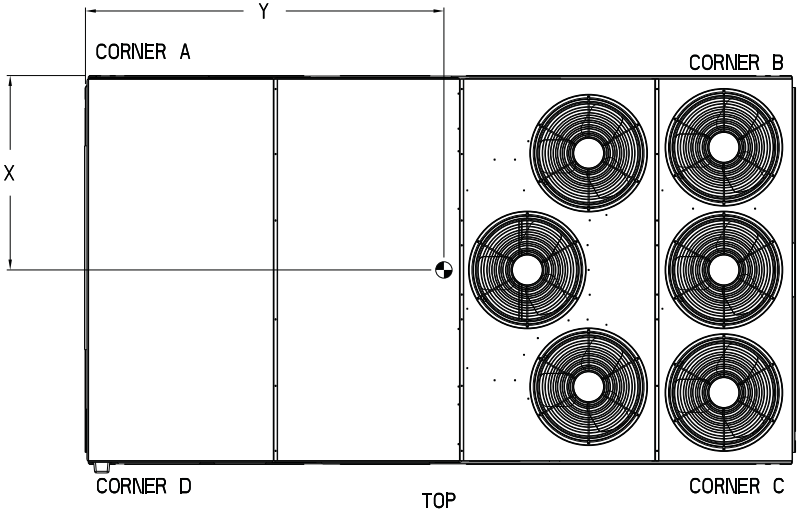
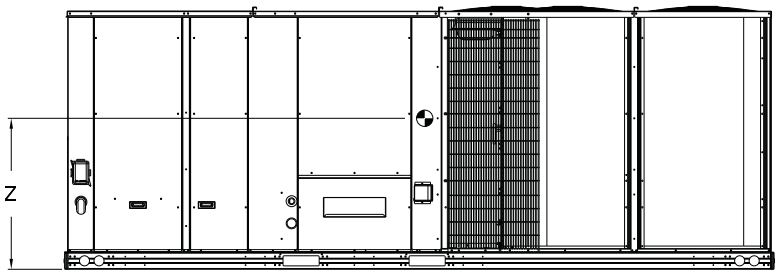
Fig. 4 - Unit Dimensional Drawing – 30 Size Units

UNIT	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC29	2292	1042	577	262	559	254	583	265	602	274	44 [1118]	77 1/2 [1969]	19 [483]
48TC30	2640	1200	697	317	595	270	621	282	728	331	44 [1118]	72 1/2 [1842]	19 [483]

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





SHEET	DATE	SUPERCEDES			REV
3 OF 3	10/09/13	05/19/11	48TC 29,30 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE502174	B

Fig. 4 - Unit Dimensional Drawing – 30 Size Units (cont.)

C13741

INSTALLATION

Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

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

NOTE: Consider also the effect of adjacent units.

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

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

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

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

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

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

Step 2 — Plan for Sequence of Unit Installation

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

Curb-mounted installation —

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

Pad-mounted installation —

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

Frame-mounted installation —

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

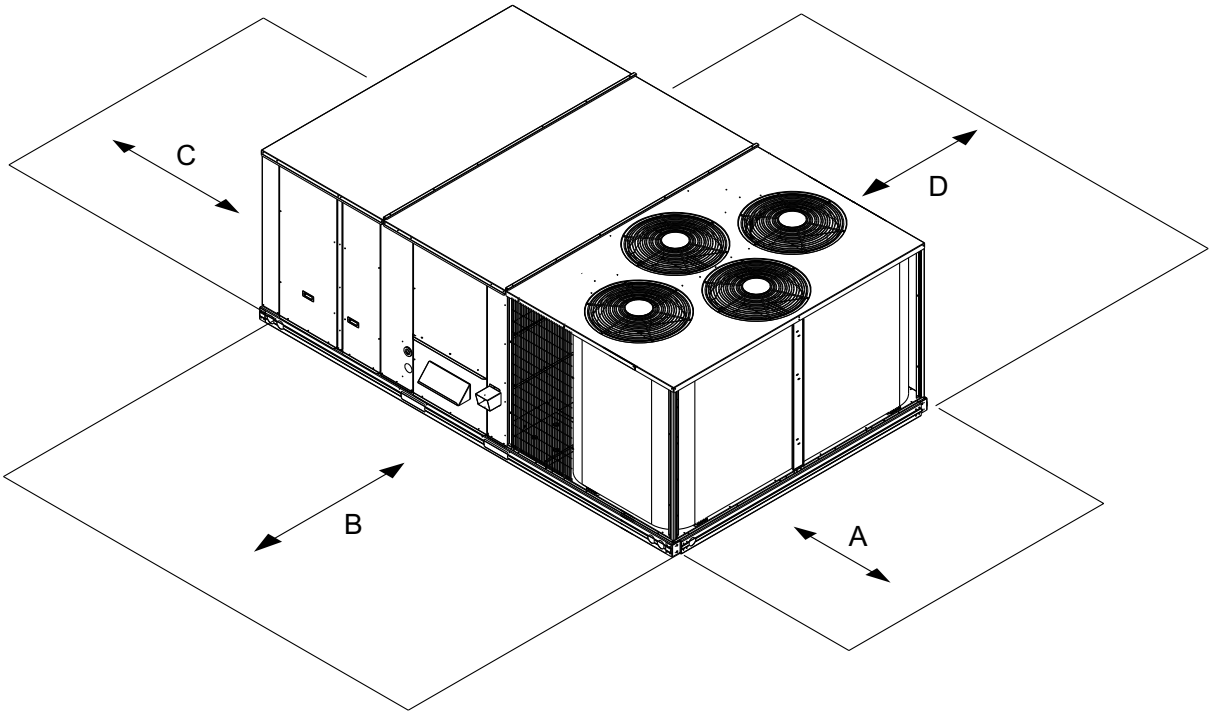
Step 3 — Inspect unit

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

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

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

Locate the carton containing the outside air hood parts; see Figs. 7 and 13. Do not remove carton until unit has been rigged and located in final position.



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

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

Fig. 5 - Service Clearance Dimensional Drawing

Table 1 – Operating Weights

48TC**	UNIT LB (KG)				
	17	20	24	28	30
Base Unit					
Novation™ Coil	1824 (829)	1839 (836)	1989 (904)	2118 (963)	N/A
RTPF Coil	1907 (867)	1922 (874)	2072 (942)	2197 (999)	2640 (1200)
Economizer	246 (112)	246 (112)	246 (112)	246 (112)	246 (112)
Powered Outlet	35 (16)	35 (16)	35 (16)	35 (16)	35 (16)
Humidi–MiZer® System	110 (50)	110 (50)	120 (54)	120 (54)	N/A
Curb					
14–in/356 mm	240 (109)	240 (109)	255 (116)	255 (116)	255 (116)
24–in/610 mm	340 (154)	340 (154)	355 (161)	355 (161)	355 (161)

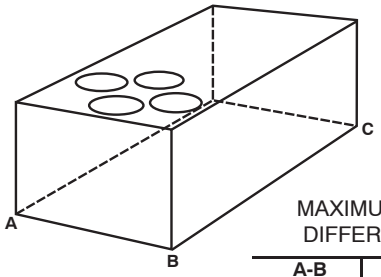
Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Figs. 8, 9 and 8. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Figs. 8, 9 and 10. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are show in Fig. 6. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

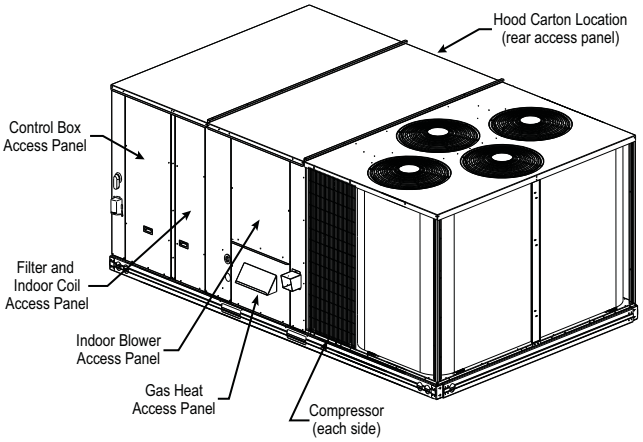
A-B	B-C	A-C
0.25” (6)	0.5” (12)	0.5” (12)

C10628

Fig. 6 - Unit Leveling Tolerances

Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb and not to the unit. Thru-the-base power connection must be installed before the unit is set on the roof curb.* If field-installed thru-the-roof curb gas connections are desired remove knockout in basepan located in the gas section, see Fig. 7 for location. Gas connections and power connections to the unit must be field installed after the unit is installed on the roof curb.

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



C11154

Fig. 7 - Typical Access Panel and Compressor Locations

Alternate Unit Support (In Lieu of Curb Mount) —

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

UNIT SIZE	"A"	ROOF CURB ACCESSORY
17,20	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB045A00 CRRFCURB046A00

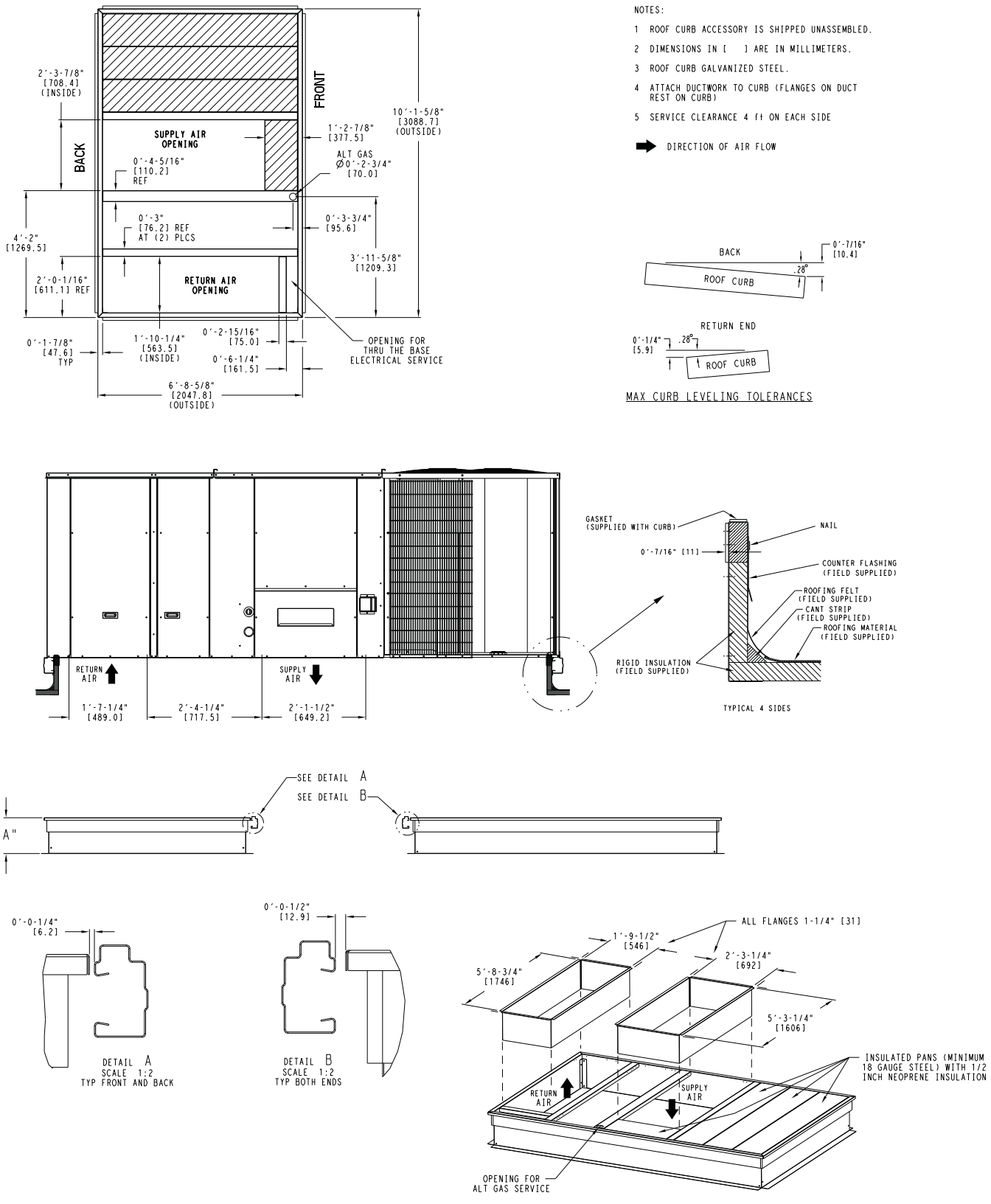
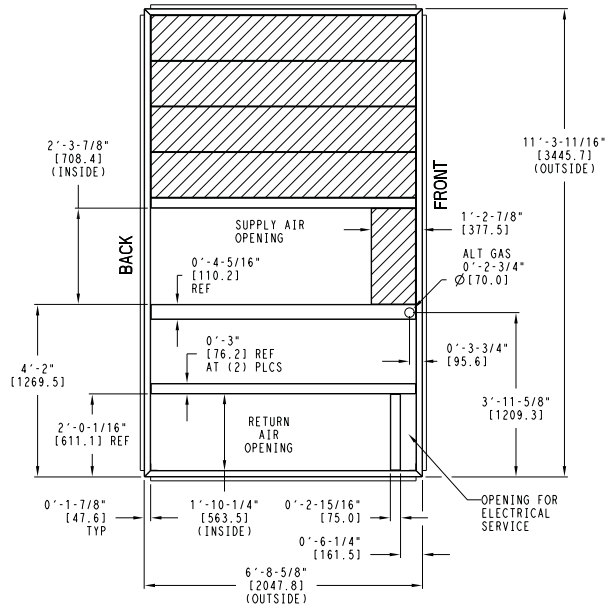


Fig. 8 - Roof Curb Details – 17 and 20 Size Units

UNIT SIZE	"A"	ROOF CURB ACCESSORY
24,28	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB047A00 CRRFCURB048A00



NOTES:

1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.

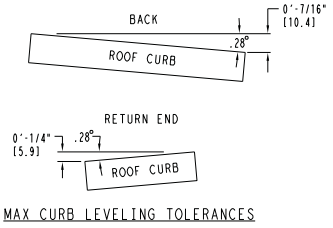
2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.

3 ROOF CURB GALVANIZED STEEL.

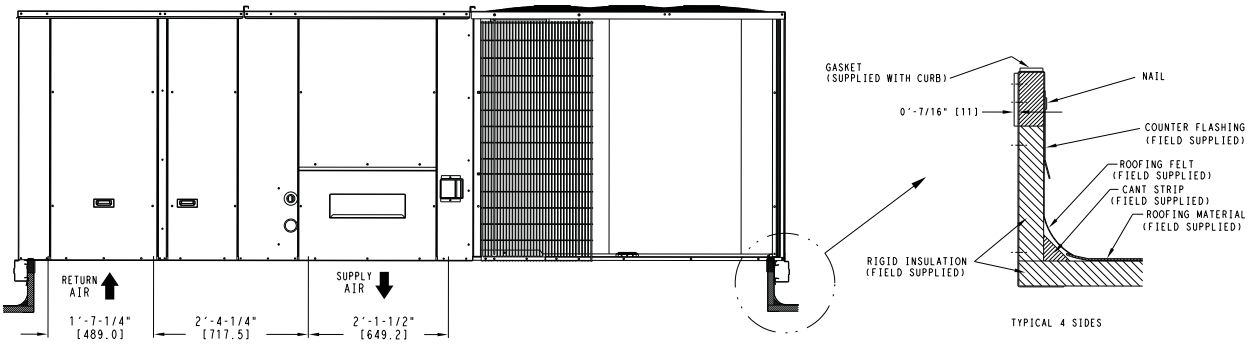
4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)

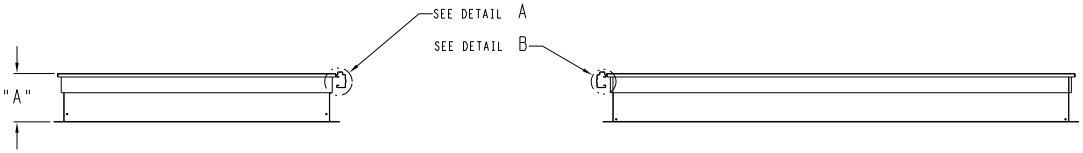
5 SERVICE CLEARANCE 4 ft ON EACH SIDE

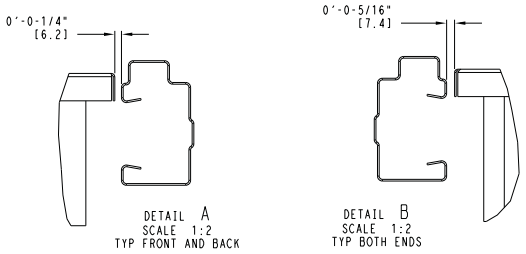
➡ DIRECTION OF AIR FLOW

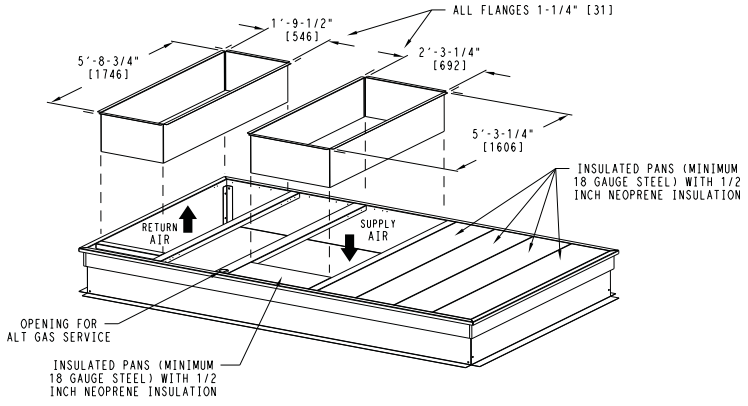


MAX CURB LEVELING TOLERANCES





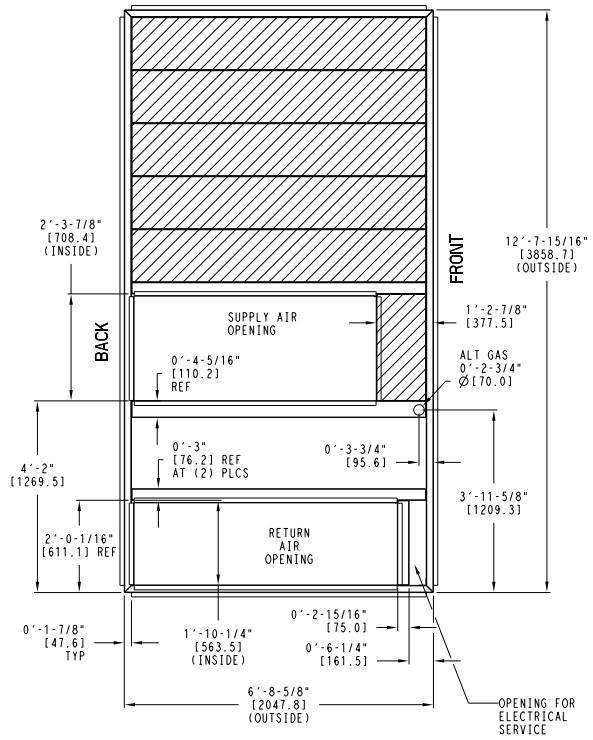




C09100

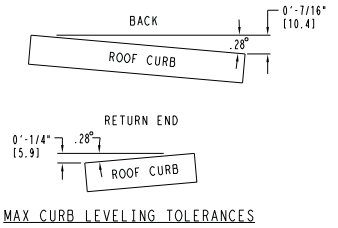
Fig. 9 - Roof Curb Details – 24 and 28 Size Units

UNIT SIZE	"A"	ROOF CURB ACCESSORY
30	1′-2" [356.0] 2′-0" [610.0]	CRRFCURB049A00 CRRFCURB050A00

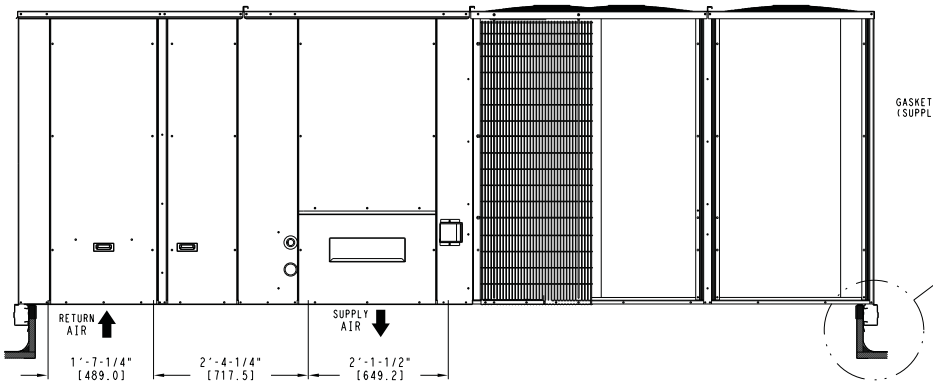


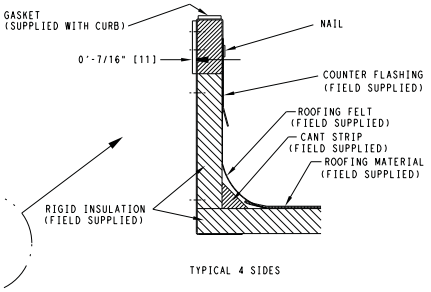
NOTES:
1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
2 BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
3 DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4 ROOF CURB GALVANIZED STEEL.
5 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
6 SERVICE CLEARANCE 4 ft ON EACH SIDE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

➡ DIRECTION OF AIR FLOW

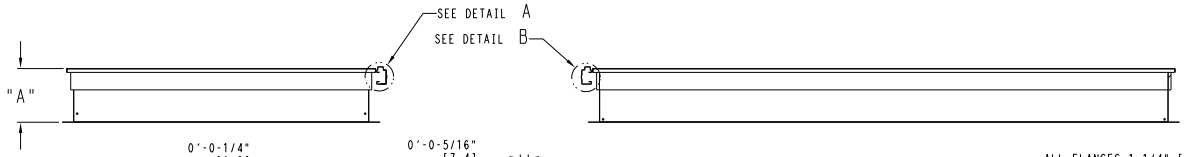


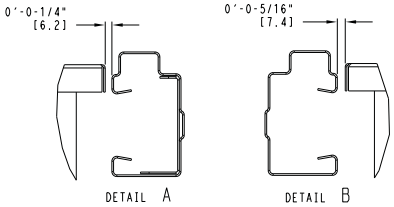
MAX CURB LEVELING TOLERANCES

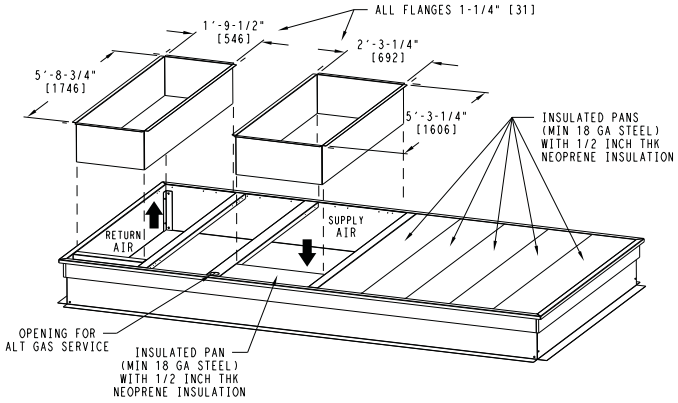




TYPICAL 4 SIDES







C11224

Fig. 10 - Roof Curb Details – 30 Size Unit

Step 5 — Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.5 in. wg (87 Pa) 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 18 in. (458 mm) of duct length from the unit basepan.

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

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

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

A minimum clearance is not required around ductwork.

⚠ CAUTION

PROPERTY DAMAGE HAZARD

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

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

Step 6 — Rig and Place Unit

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

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

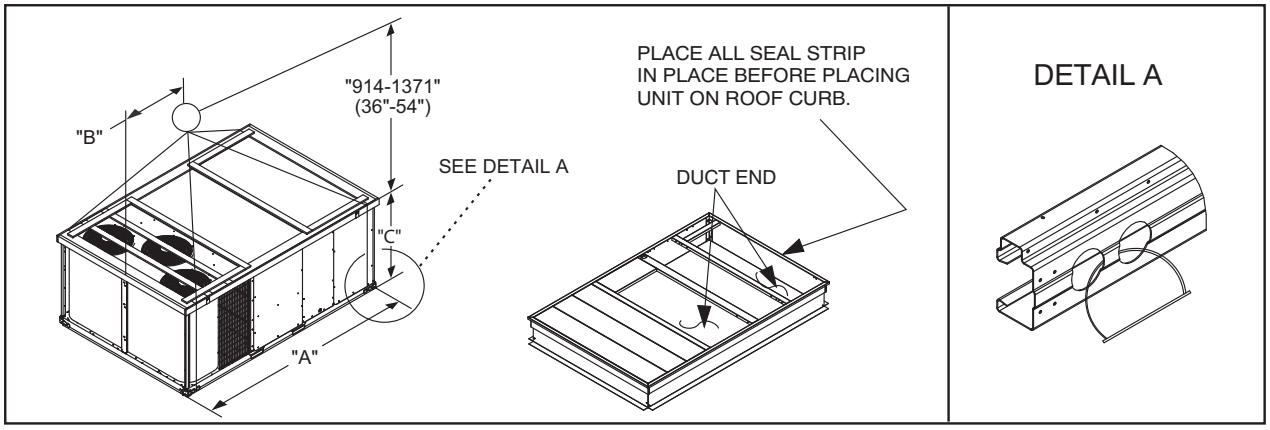
⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

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



C09107

UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
48TC**17	2355	1068	127.8	3249	58.7	1491	52.3	1328
48TC**20	2370	1075	127.8	3249	58.7	1491	52.3	1328
48TC**24	2516	1141	141.5	3595	71.5	1816	52.3	1328
48TC**28	2652	1203	141.5	3595	71.5	1816	60.3	1532
48TC**30	2976	1353	157.8	4007	80.3	2040	60.3	1532

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.
3. Use wooden top skid, when rigging, to prevent rigging straps from damaging unit.

Fig. 11 - Rigging Details

Positioning on Curb —

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

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

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

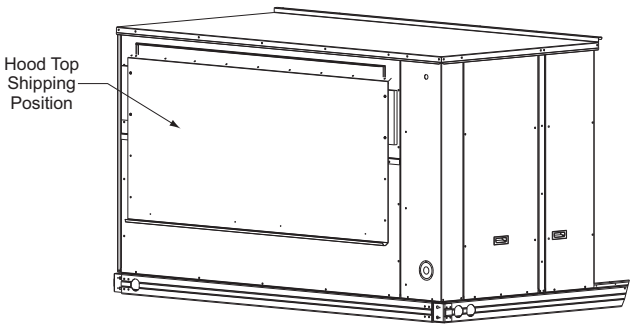
Flue vent discharge must have a minimum horizontal clearance of 48 in. (1220 mm) from electric and gas meters, gas regulators, and gas relief equipment. Minimum distance between unit and other electrically live parts is 48 inches (1220 mm).

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

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

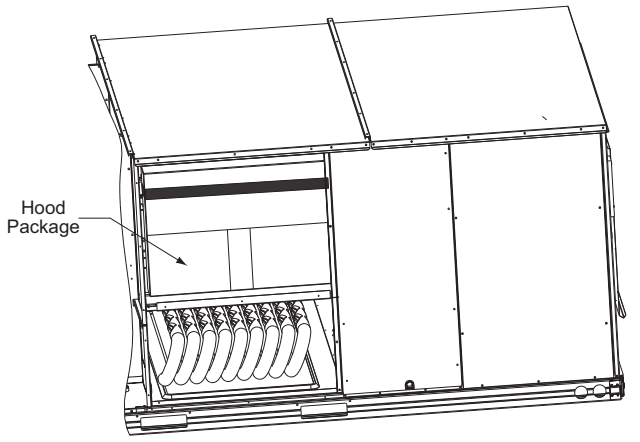
Step 7 — Install Outside Air Hood — Factory Option

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).



C09134

Fig. 12 - Hood Top – Shipping Position



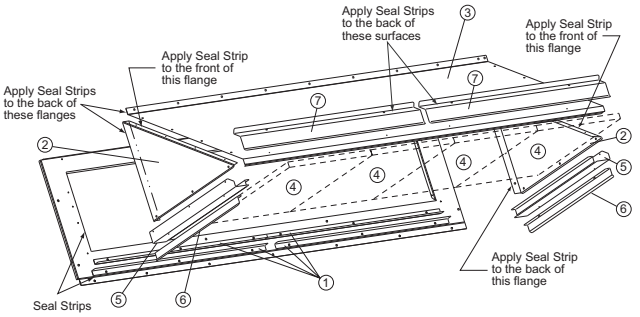
C09133

Fig. 13 - Hood Package – Shipping Location

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.



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

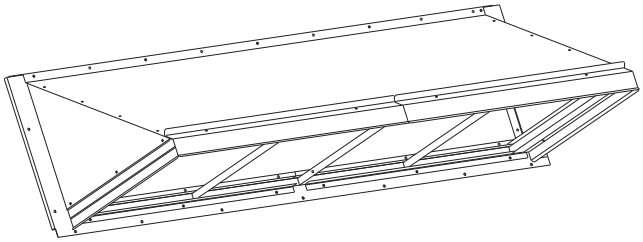
C09079

Fig. 14 - Hood Part Identification and Seal Strip Application Areas

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**.



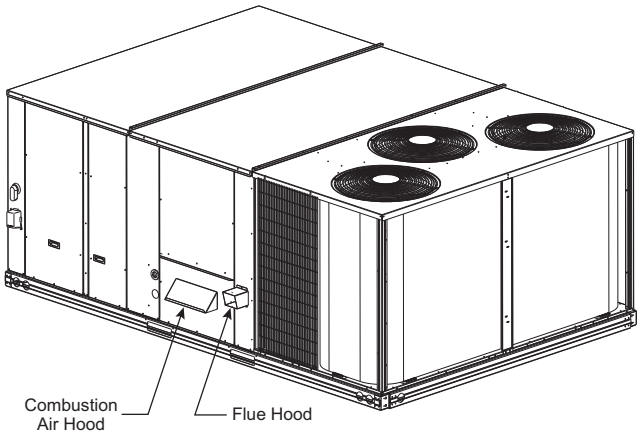
C09090

Fig. 15 - Hood Assembly – Completed

Step 8 — Install Flue Hood and Combustion Air Hood

The flue hood is shipped screwed to the fan deck inside the burner compartment. Remove the burner access panel and then remove the flue hood from its shipping location. Using the screws provided, install flue hood in the location shown in Fig. 16.

The combustion air hood is attached to the back of the burner access panel. Remove the two screws securing the hood to the back of the burner access panel. Using the two screws, re-attach the hood to the front of the burner access panel as shown in Fig. 16.



C10744

Fig. 16 - Flue Hood and Combustion Air Hood Details

Step 9 — Install Gas Piping

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

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

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

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

Gas Supply Line —

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

Table 4 lists typical $^3/_4$ inch NPT (National Pipe Thread) field supplied pipe fittings required for Thru-Base gas supply, starting from the unit gas valve (see Fig. 17).

Pipe gas supply into 90 degree elbow item 15 (see Table 4) through the hole in the unit basepan.

For typical $^3/_4$ inch NPT field supplied fittings required for NON Thru-Base gas supply starting from the unit gas valve, omit items 14 and 15 from Table 4 and pipe gas supply into TEE. See Fig. 18.

Table 2 – Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN	MAX
48TC**	17, 20, 24, 28, 30	5.0 in. wg (1246 Pa)	13.0 in. wg (3240 Pa)

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

Table 3 – Natural Gas Manifold Pressure Ranges

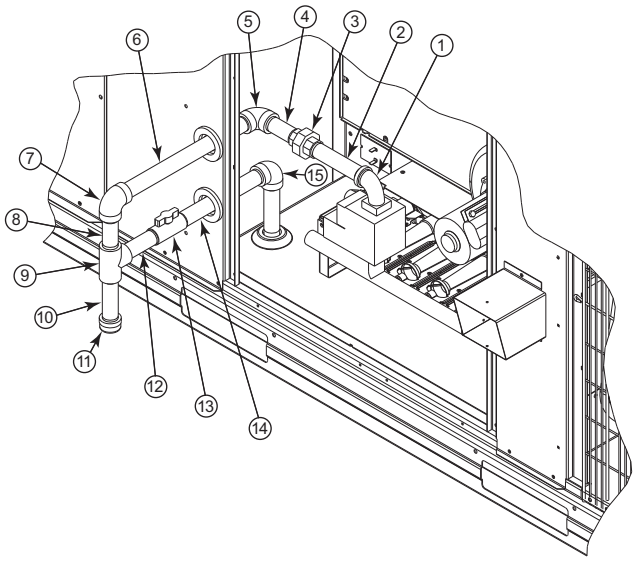
UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48TC**	17, 20, 24, 28, 30	3.0 in. wg (747 Pa)	2.0 in. Wg (498 Pa)

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

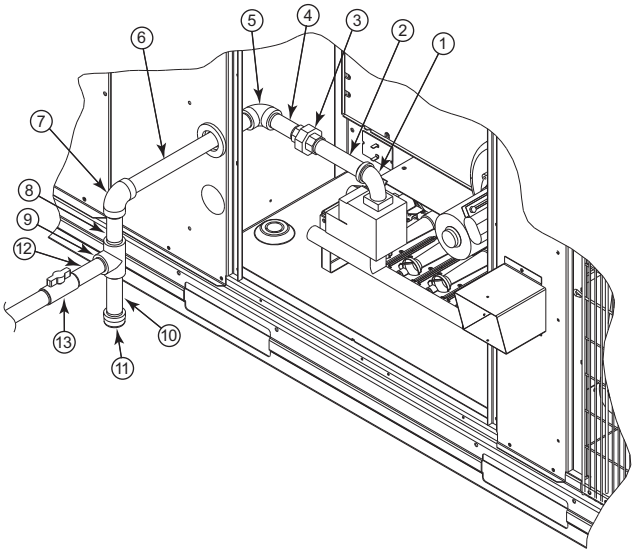
Failure to follow this caution may result in damage to equipment.

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



C10999

Fig. 17 - Gas Supply Line Piping with Thru-Base



C101006

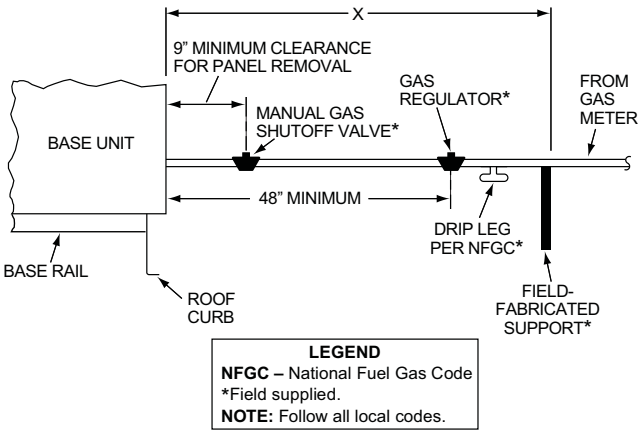
Fig. 18 - Gas Supply Line Piping

Table 4 – Typical $^{3}/_{4}$-in NPT Field Supplied Piping Parts

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

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

The gas supply line can approach the unit in two ways: horizontally from outside the unit (across the roof), or through unit basepan. Observe clearance to gas line components per Fig. 19.



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

C11121

Fig. 19 - Gas Piping Guide

Factory-Option Thru-Base Connections —

Electrical Connections: Knockouts are located in the control box area. Remove the appropriate size knockout for high voltage connection. Use the field supplied connector depending on wiring or conduit being utilized. Remove the $^{7}/_{8}$-in (22mm) knockout and appropriate connector for low voltage wiring. If non-unit powered convenience outlet is being utilized, remove the $^{7}/_{8}$-in (22mm) knockout and utilize appropriate connector for 115 volt line. See "Step 11 — Making Electrical Connections" for details.

Gas Connections: Remove the knockout in the base pan and route $^{3}/_{4}$-in. gas line up through the opening. Install an elbow and route gas line through opening in panel after first removing plastic bushing. Install a gas shut off followed by a drip leg and ground-joint union. Route gas line into gas section through the grommet (Part #: KA56SL112) at the gas inlet and into the gas valve. See Fig. 17 and Table 4. If a regulator is installed, it must be located 4 feet (1.22 meters) from the flue outlet.

Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 18 for typical piping arrangements for gas piping that has been routed through the sidewall of the base pan.

When installing the gas supply line, observe local codes pertaining to gas pipe installations. Refer to the NFPA 54/ANSI Z223.1 NFGC latest edition (in Canada, CAN/CSA B149.1). In the absence of local building codes, adhere to the following pertinent recommendations:

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

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

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

⚠ WARNING

FIRE OR EXPLOSION HAZARD

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

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

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

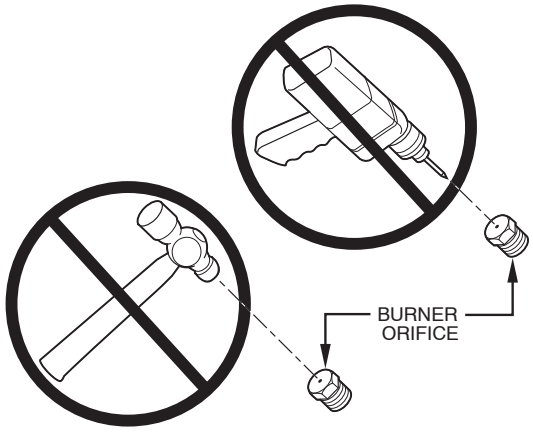
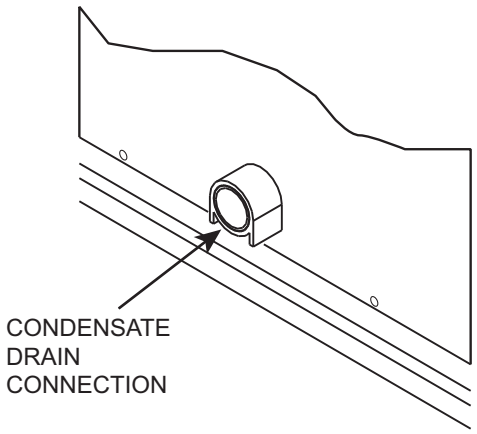


Fig. 20 - Orifice Hole

Step 10 — Install External Condensate Trap & Line

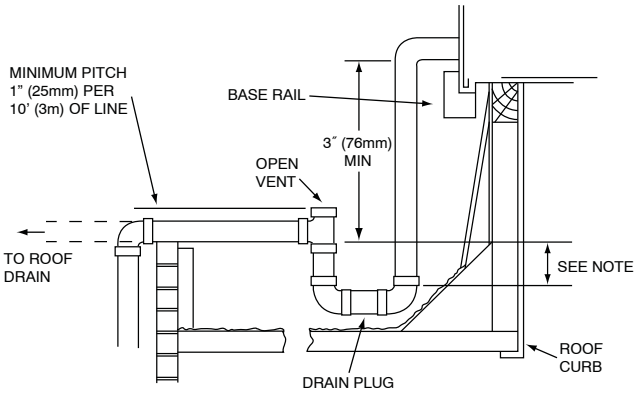
The unit has one $^3/_4$-in. condensate drain connection on the end of the condensate pan (see Fig. 21). See Figs. 2, 3 and 4, item "E", in the view labeled "BACK" for the location of the condensate drain connection.



C10729

Fig. 21 - 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. 22.



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

C11291

Fig. 22 - Condensate Drain Piping Details

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

Step 11 — Make Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

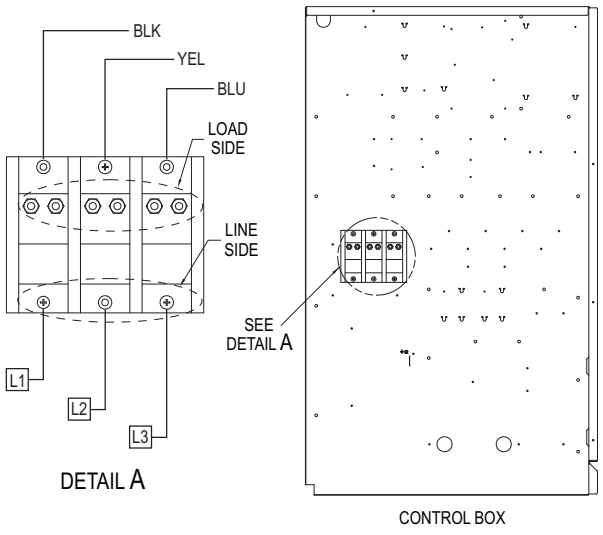
Failure to follow this warning could result in personal injury or death.

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 NEC (National Electrical Code); ANSI/NFPA 70, latest edition (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1), and local electrical codes.

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

Field Power Supply —

If equipped with optional Powered Convenience Outlet: The power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of the unit-mounted disconnect. (Check with local codes to ensure this method is acceptable in your area.) If a de-energize via unit disconnect switch operation of the convenience outlet is desired, connect the source leads to the load side of the unit disconnect. On a unit without a unit-mounted disconnect, connect the source leads to the line side with unit field power leads. See Fig. 23.



C11181

Fig. 23 - Location of TB1

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

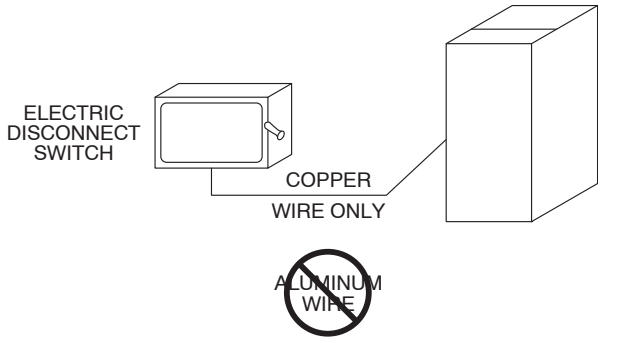
NOTE: Make field power connections directly to line connection pressure lugs only.

⚠ WARNING

FIRE HAZARD

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

Do not connect aluminum wire between disconnect switch and air conditioning unit. Use only copper wire. (See Fig. 24.)



A93033

Fig. 24 - Disconnect Switch and Unit

Units Without Factory-Installed Non- Fused Disconnect —

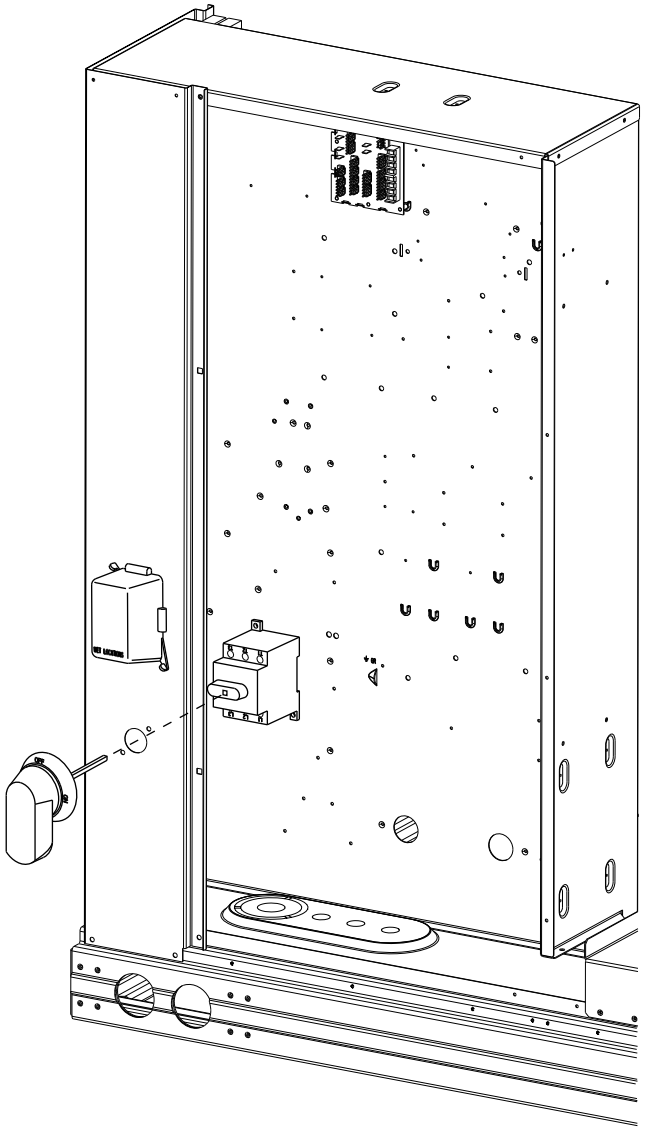
When installing units, provide a disconnect switch per NEC (National Electrical Code) of adequate size. Disconnect sizing data is provided on the unit informative plate. Locate on unit cabinet or within sight of the unit per national or local codes. Do not cover unit informative plate if mounting the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

Units With Factory-Installed Non-Fused Disconnect —

The factory-installed option non-fused disconnect switch (NFD) is located in the main control box. The manual switch handle and shaft are shipped in the control box and must be mounted on the corner post adjacent to the control box (see Fig. 25). Note that the tape covering the hole for the shaft in the corner post must be removed prior to handle and shaft installation.

To field install the NFD shaft and handle:

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



C12385

Fig. 25 - Handle and Shaft Assembly for NFD

All Units -

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

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 26 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is 2/0 AWG per pole.

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.

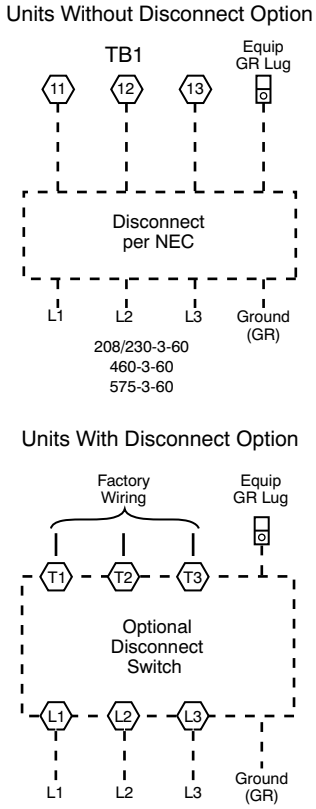
Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate. See Table 14. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in the legend for Tables 12-14 (see Note 2 on page 49) to determine the percent of voltage imbalance.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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



C13662

Fig. 26 - Power Wiring Connections

Convenience Outlets —

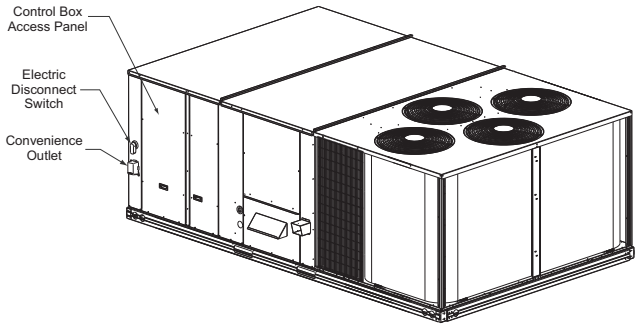
⚠ WARNING

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 48TC models: Non-unit powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. See Fig. 27.



C10641

Fig. 27 - 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.

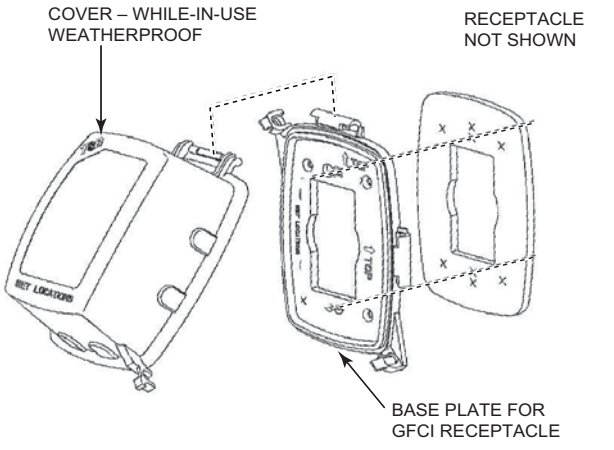
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

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. 28. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.



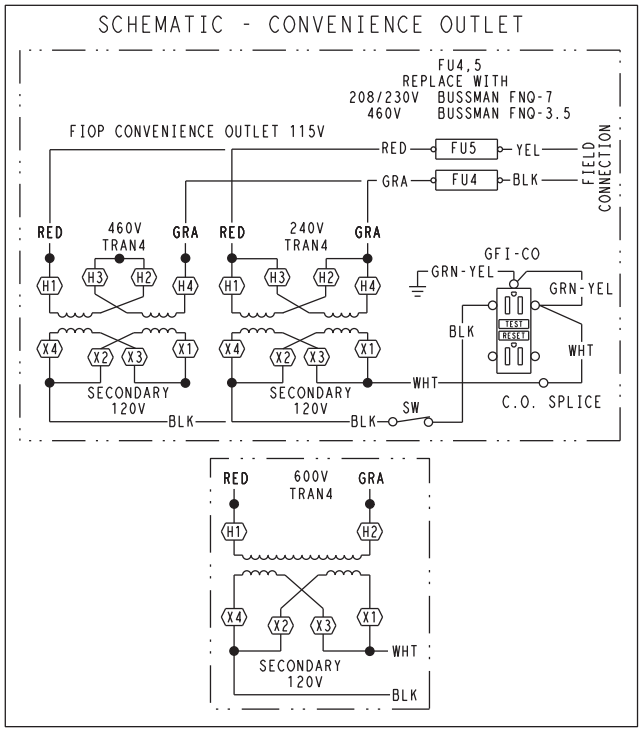
C09022

Fig. 28 - Weatherproof Cover Installation

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

Unit-powered type: A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a control box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 27.

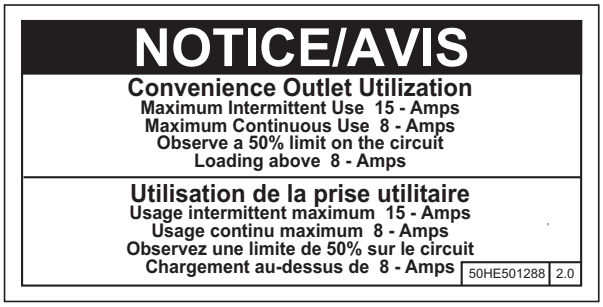
The primary leads to the convenience outlet transformer are not factory-connected. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect switch; this will provide service power to the unit when the unit disconnect switch is open. See Fig. 29.



C10730

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

Fig. 29 - Powered Convenience Outlet Wiring



C10077

Fig. 30 - Convenience Outlet Utilization Notice

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

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

Factory-Option Thru-Base Connections —

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

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

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

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

Units Without Thru-Base Connections —

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 26.

Field Control Wiring —

The 48TC 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 —

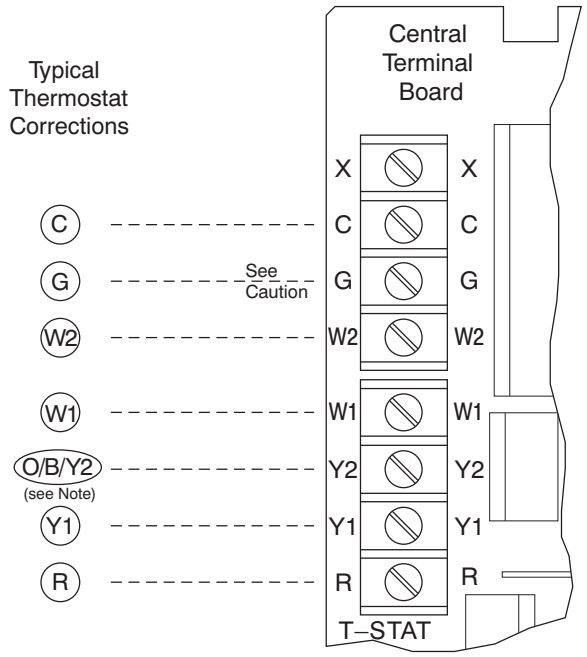
Install a Carrier-approved accessory 2-stage thermostat according to installation instructions included with the accessory. Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

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 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.

Unit Without Thru-Base Connection Kit —

Correctly rated low voltage wire can be routed through the rubber grommet located on the corner post adjacent to the control box access panel. Route wire through the grommet and then route the wire behind the corner post utilizing the factory provided wire ties secured to the control box. This will insure separation of the field low voltage wire and the high voltage circuit. Route the low voltage wire to the central terminal board. See Fig. 31.



Note: Typical multi-function marking. Follow manufacturer's configuration instructions to select Y2.

– – – Field Wiring

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may cause a short circuit.

Carefully check the connection of control coductor 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.

C10731

Fig. 31 - Typical Low-Voltage Control Connections

NOTE: If utilizing the through the base connections, route the low voltage wire through the wire ties to the central terminal board.

Heat Anticipator Settings —

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

Transformer Connection for 208-v Power Supply —

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. *If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the $^1/_4$-in. female spade connector from the 230-v connection and moving it to the 208-v $^1/_4$-in. male terminal on the primary side of the transformer.* Refer to unit label diagram for additional information.

Humidi-MiZer® Control Connections

Humidi-MiZer – Space RH Controller —

NOTE: The Humidi-MiZer is a factory installed option which is only available for size 17, 20, 24 and 28 units equipped with RTPF condenser coils.

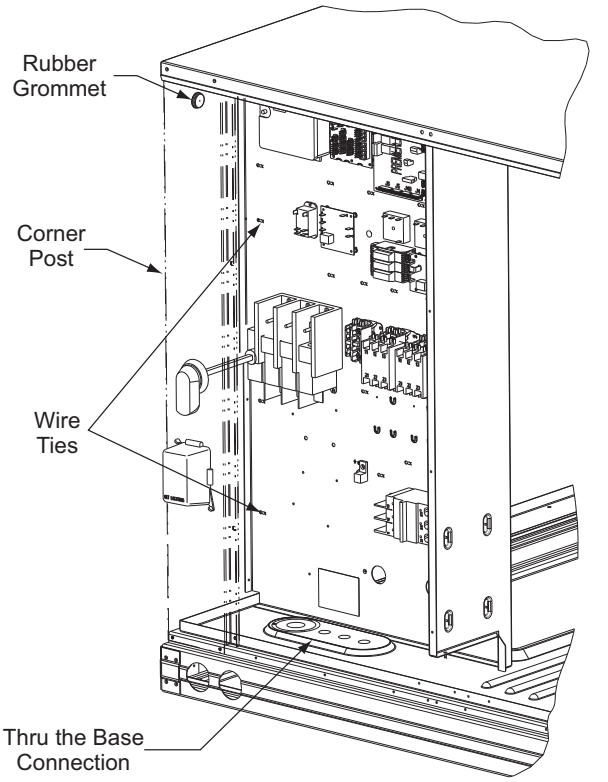
The Humidi-MiZer dehumidification system requires a field-supplied and -installed space relative humidity control device. This device may be a separate humidistat control (contact closes on rise in space RH above control setpoint) or a combination thermostat-humidistat control device such as Carrier's EDGE® Pro Thermidistat with isolated contact set for dehumidification control. The humidistat is normally used in applications where a temperature control is already provided (units with PremierLink™ control).

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. 32) 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 two PINK leads in the low–voltage wiring as shown in Fig. 35.

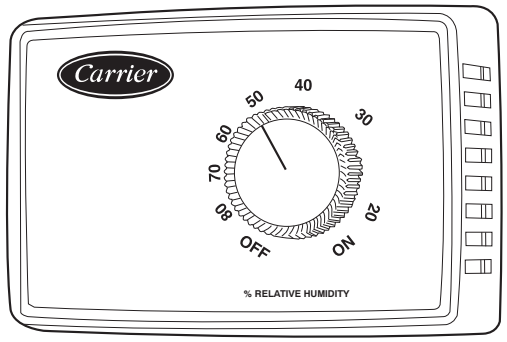
To connect the Thermidistat device (33CS2PPRH-01):

1. Route the Thermidistat multi-conductor thermostat 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. 32) to the 24-v barrier located on the left side of the control box. The raceway provides the ETL-required clearance between high-voltage and low-voltage wiring.
3. The Thermidistat has dry contacts at terminals D1 and D2 for dehumidification operation (see Fig. 36). The dry contacts must be wired between CTB terminal R and the PINK lead to the LTLO switch with field-supplied wire nuts. Refer to the installation instructions included with the Carrier Edge Thermidistat device (Form 33CS-65SI or latest) for more information.



C10734

Fig. 32 - Field Control Wiring Raceway

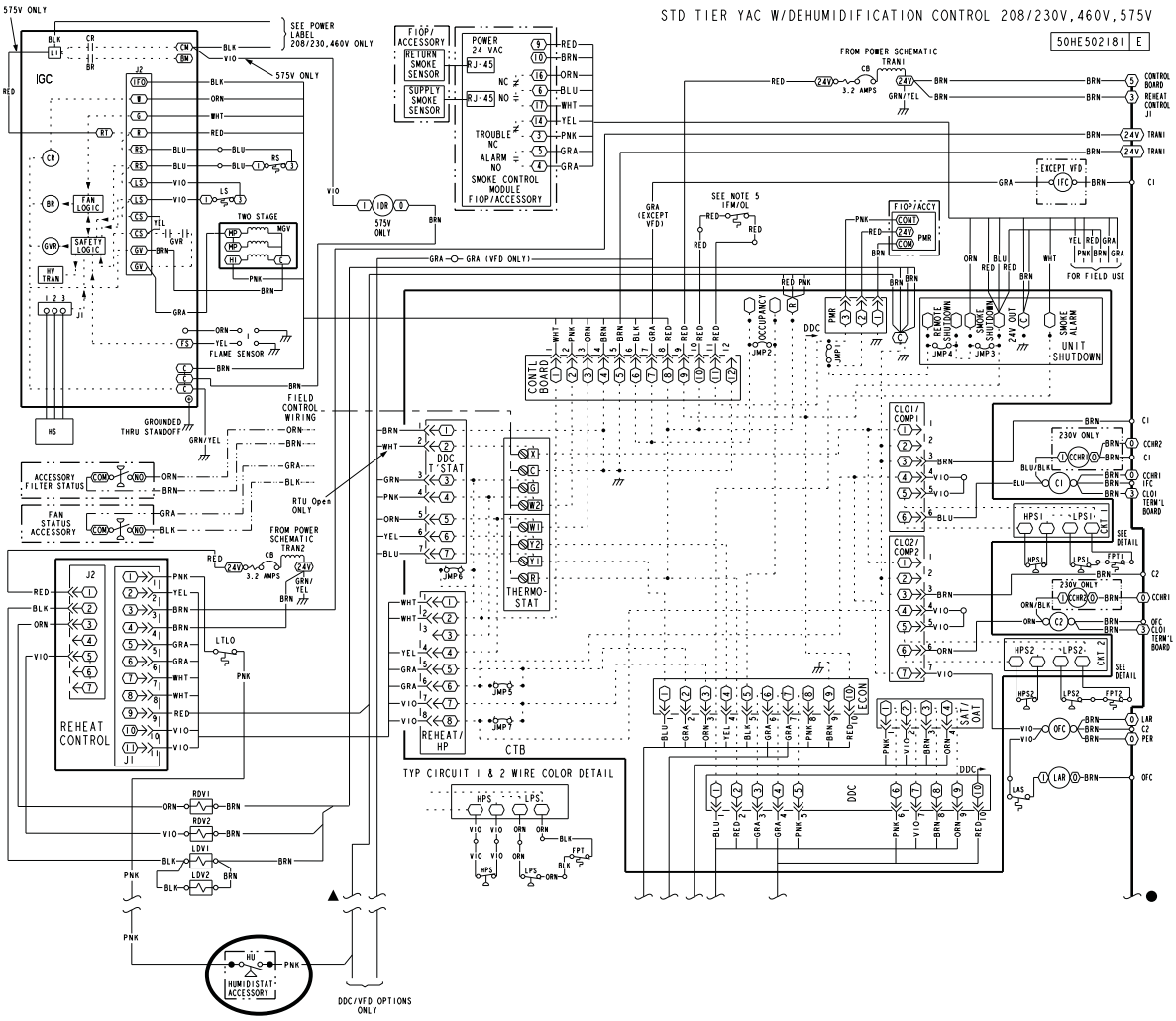


C09295

Fig. 33 - Accessory Field-Installed Humidistat

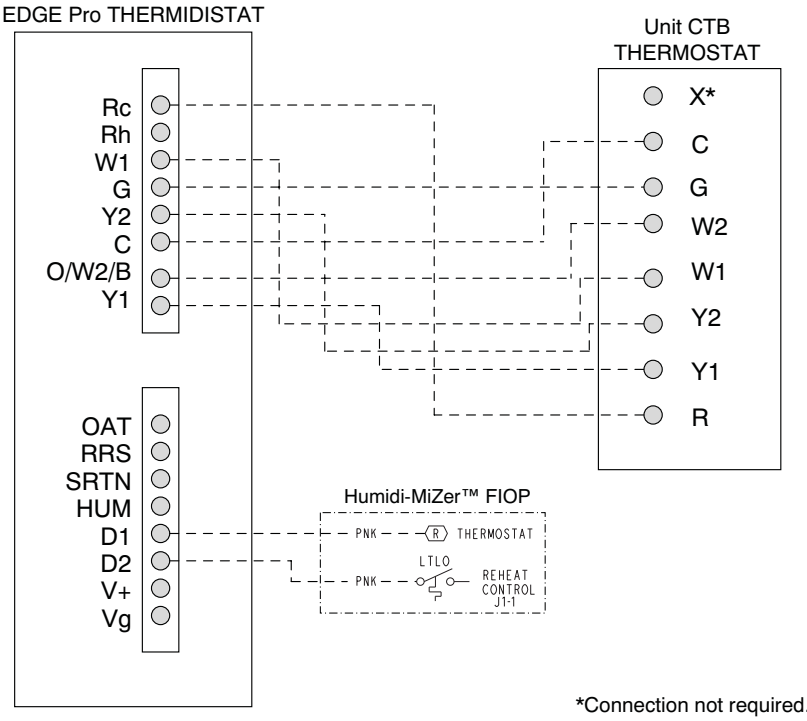
C09296

Fig. 34 - EDGE Pro Thermidistat



C13764

Fig. 35 - Typical Humidi-MiZer® Adaptive Dehumidification System Humidistat Wiring



C09298

Fig. 36 - Typical Rooftop Unit with Humidi-MiZer Adaptive Dehumidification System with EDGE Pro Thermidistat Device

Staged Air Volume (SAV™) with Variable Frequency Drive (Factory Option)

For details on operating 48TC 2 stage cooling units equipped with the factory installed Staged Air Volume option, refer to the *Variable Frequency Drive (VFD) Installation, Setup & Troubleshooting Supplement* (Catalog No. VFD-02SI, or later).

EconoMi$er X - Ultra Low Leak Economizer (Factory Option)

For details on operating 48TC 2 stage cooling units equipped with a factory installed EconoMi$er X, refer to the *EconoMi$er X Installation, Setup & Troubleshooting Supplement* (Catalog No. LLECON-02SI, or later).

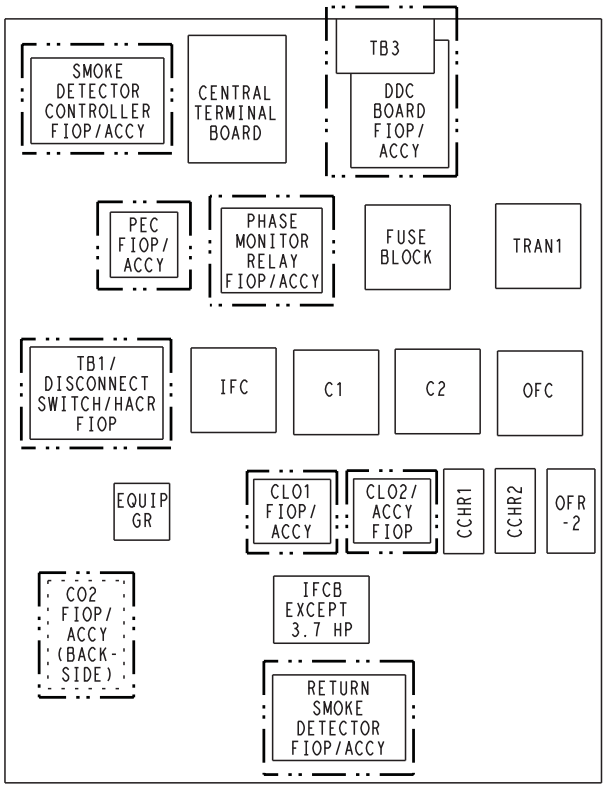
PremierLink™ (Factory-Option)

The PremierLink controller (see Fig. 38) 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 48TC unit's main control box to the right of the Central Terminal Board (CTB) (see Fig. 37). 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. (See page 47 for accessory enthalpy controls.)

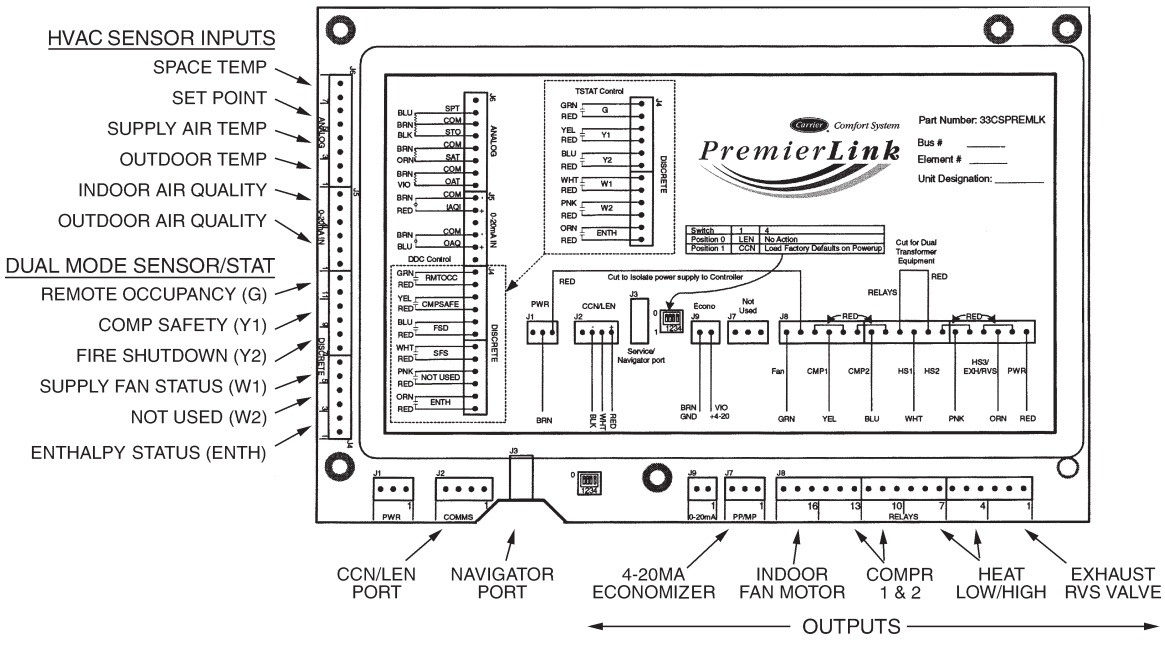
The PremierLink controller requires the use of a Carrier electronic thermostat or a CCN connection for time broadcast to initiate its internal timeclock. This is necessary for broadcast of time of day functions (occupied/unoccupied).

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.



C10643

Fig. 37 - 48TC Control Box Component Locations



C08199

Fig. 38 - PremierLink Controller

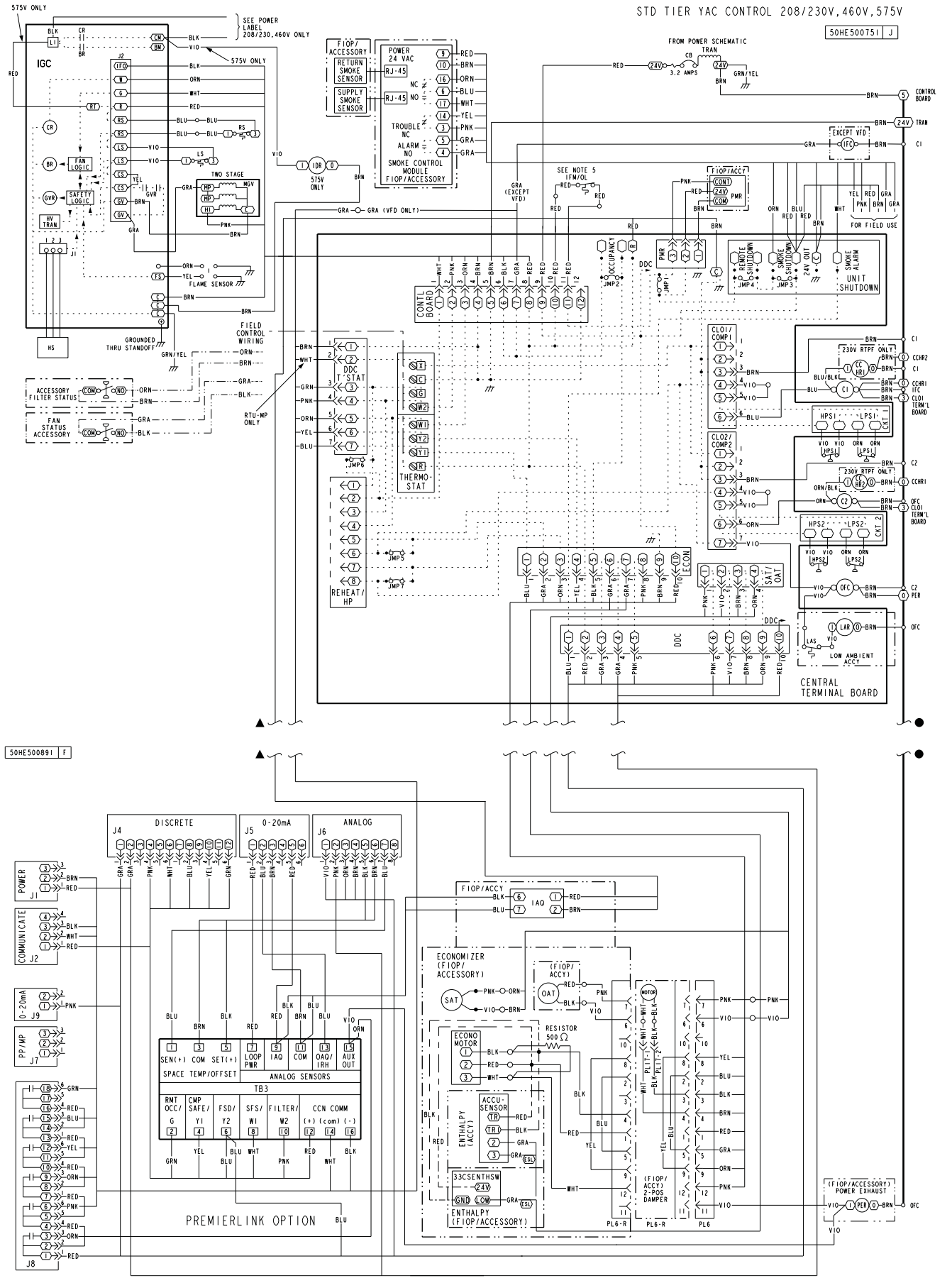


Fig. 39 - PremierLink Wiring Diagram

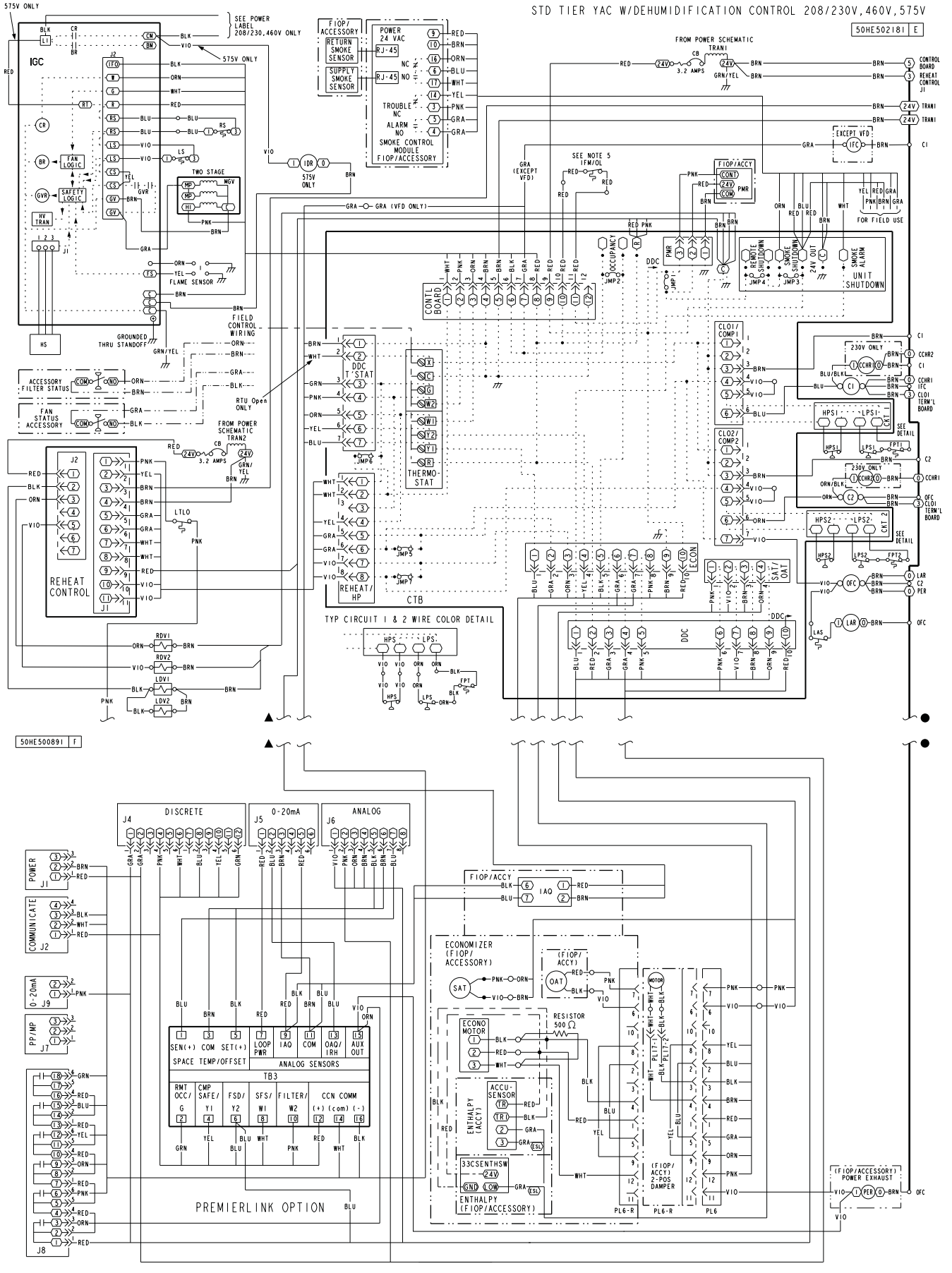


Fig. 40 - PremierLink Wiring Diagram with Humidi-MiZer®

Supply Air Temperature (SAT) Sensor —

On FIOP-equipped 48TC unit, the unit is supplied with a supply-air temperature (SAT) sensor (33ZCSENSAT). This sensor is a tubular probe type, approx 6-inches (152 mm) 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. 41). It can be removed or remounted per local codes.. Drill or punch a 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 heat exchanger.

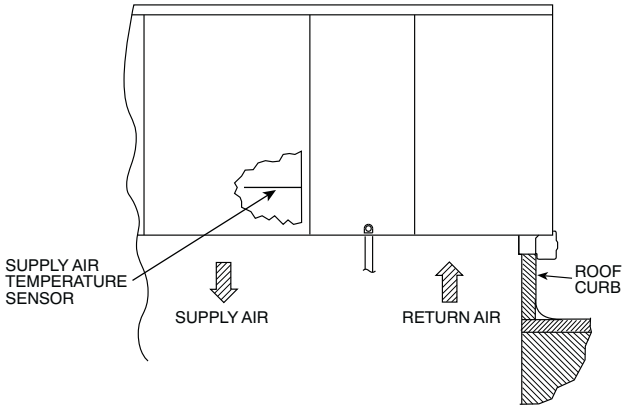


Fig. 41 - Mounting Location for Supply Air Temperature (SAT) Sensor on 48TC Units

NOTE: Refer to Form 33CS-68SI for complete PremierLink configuration, operating sequences and troubleshooting information. Have a copy of this manual available at unit start-up.

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 CO_2 sensor
Outdoor air CO_2 sensor

Refer to Table 5 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. 39 and Fig. 40) located on the control box top shelf 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 6 provides a summary of field connections for units equipped with Space Sensor. Table 7 provides a summary of field connections for units equipped with Space Thermostat.

Table 5 – PremierLink Sensor Usage

APPLICATION	OUTDOOR AIR TEMPERATURE SENSOR	RETURN AIR TEMPERATURE SENSOR	OUTDOOR AIR ENTHALPY SENSOR	RETURN AIR ENTHALPY SENSOR
Differential Dry Bulb Temperature with PremierLink (PremierLink requires 4–20 mA Actuator)	Included – CRTEMPSN001A00	Required – 33ZCT55SPT or equivalent	–	–
Single Enthalpy with PremierLink (PremierLink requires 4–20mA Actuator)	Included – Not Used	–	Requires – 33CSENTHSW	–
Differential Enthalpy with PremierLink (PremierLink requires 4–20mA Actuator)	Included – Not Used	–	Requires – 33CSENTHSW or equivalent	Requires – 33CSENTSEN or equivalent

NOTES:
CO_2 Sensors (Optional):
33ZCSENCO2 – Room sensor (adjustable). Aspirator box is required for duct mounting of the sensor.
33ZCASPCO2 – Aspirator box used for duct–mounted CO_2 room sensor.
33ZCT55CO2 – Space temperature and CO_2 room sensor with override.
33ZCT56CO2 – Space temperature and CO_2 room sensor with override and setpoint.

Table 6 – Space Sensor Mode

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

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 (CO_2)
OAQ – Outdoor Air Quality (CO_2)
RH – Relative Humidity
SFS – Supply Fan Status

Table 7 – Thermostat Mode

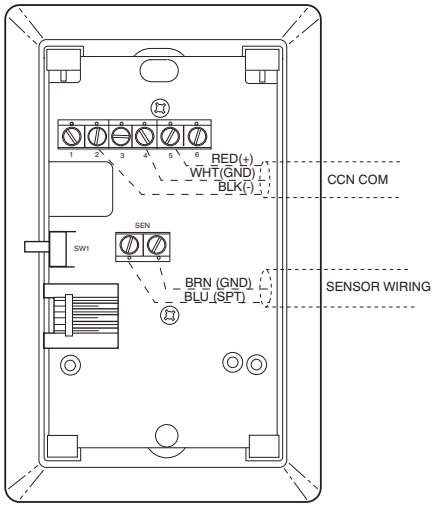
TB3 TERMINAL	FIELD CONNECTION	INPUT SIGNAL
1	RAT SEN	Analog (10k thermistor)
2	G	Discrete, 24VAC
3	RAT SEN	Analog (10k thermistor)
4	Y1	Discrete, 24VAC
5		
6	Y2	Discrete, 24VAC
7	LOOP–PWR	Analog, 24VDC
8	W1	Discrete, 24VAC
9	IAQ–SEN	Analog, 4–20mA
10	W2	Discrete, 24VAC
11	IAQ–COM/OAQ–COM/RH–COM	Analog,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

LEGEND:

CCN – Carrier Comfort Network (communication bus)
G – Thermostat Fan
IAQ – Indoor Air Quality (CO_2)
OAQ – Outdoor Air Quality (CO_2)
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 —

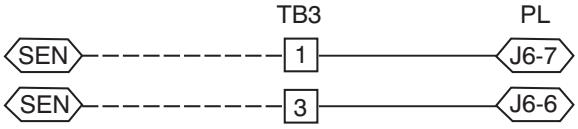
The PremierLink controller is factory-shipped configured for Space Sensor Mode. A Carrier T-55 or T-56 space sensor must be used. T-55 space temperature sensor provides a signal of space temperature to the PremierLink control. T-56 provides same space temperature signal plus it allows for adjustment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



C08201

Fig. 42 - T-55 Space Temperature Sensor Wiring

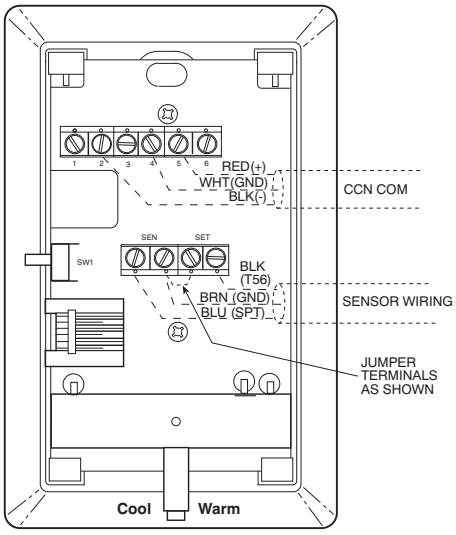
Connect T-55: See Fig. 42 for typical T-55 internal connections. Connect the T-55 SEN terminals to TB3 terminals 1 and 3 (see Fig. 43).



C10023

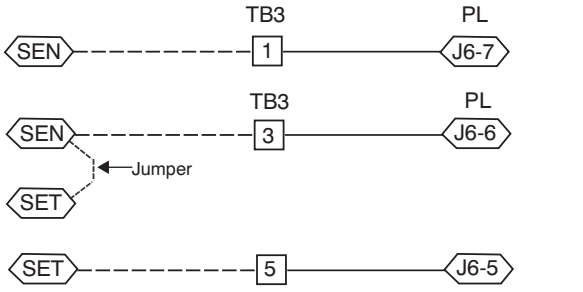
Fig. 43 - PremierLink T-55 Sensor

Connect T-56: See Fig. 44 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. 45).



C08202

Fig. 44 - T-56 Internal Connections



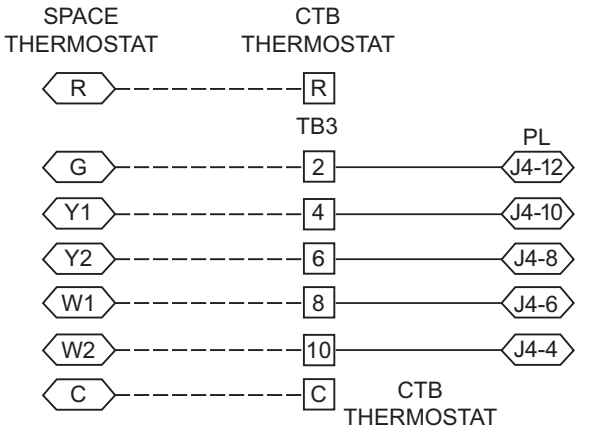
C10022

Fig. 45 - PremierLink T-56 Sensor

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. 46.

If the 48TC 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.



C10283

Fig. 46 - Space Thermostat Connections

If the 48TC unit has an economizer system and free-cooling operation is required, a sensor representing Return Air Temperature must also be connected (field-supplied and installed). This sensor may be a T-55 Space Sensor (see Fig. 42) installed in the space or in the return duct, or it may be sensor PNO 33ZCSENSAT, installed in the return duct. Connect this sensor to TB3-1 and TB3-3 per Fig. 43.

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.

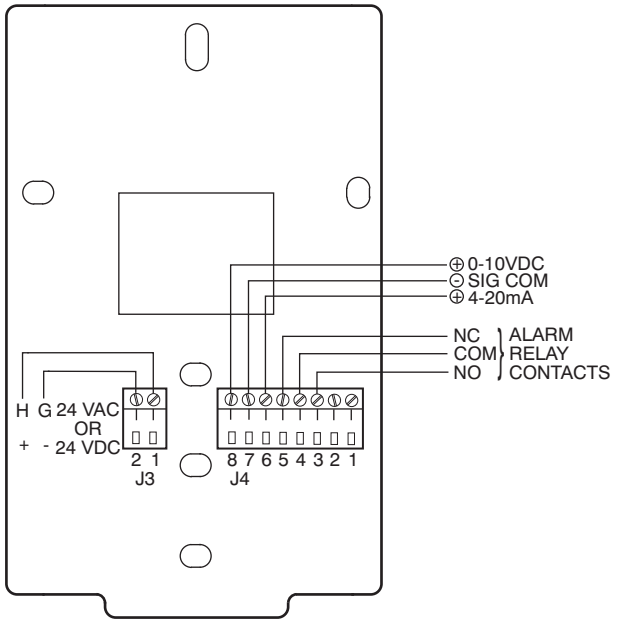
When the PremierLink is configured for Thermostat Mode, these functions are not available: Fire Shutdown (FSD), Remote Occupied (RMTOCC), Compressor Safety (CMPSAFE), Supply Fan Status (SFS), and Filter Pressure Switch (FILTER).

Economizer Controls

Indoor Air Quality (CO_2) Sensor —

The indoor air quality sensor accessory monitors space carbon dioxide (CO_2) 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 CO_2 present in the space air.

The CO_2 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 CO_2 sensor for electrical requirements and terminal locations. See Fig. 47 for typical CO_2 sensor wiring schematic.



C08635

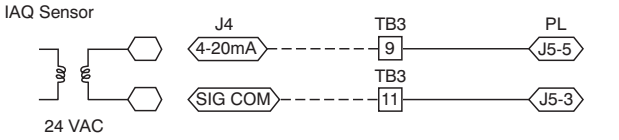
Fig. 47 - Indoor/Outdoor Air Quality (CO_2) Sensor (33ZCSENCO2) - Typical Wiring Diagram

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 CO_2 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 3 ft (0.9 m) 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.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the sensor. See Fig. 47. Connect the 4-20 mA terminal to terminal TB3-9 and connect the SIG COM terminal to terminal TB3-11. See Fig. 48.



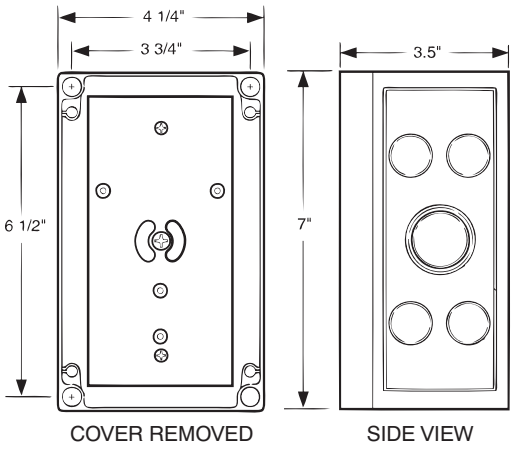
C11156

Fig. 48 - Indoor CO_2 Sensor (33ZCSENCO2) Connections

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

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

The outdoor air CO_2 sensor is designed to monitor carbon dioxide (CO_2) 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. 49. The outdoor air CO_2 sensor must be located in the economizer outside air hood.

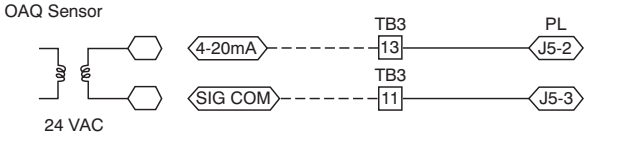


C07135

Fig. 49 - Outdoor Air Quality Sensor Cover

Wiring the Outdoor Air CO_2 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. 47. Connect the 4 to 20 mA terminal to the TB3-13 terminal of the 48TC . Connect the SIG COM terminal to the TB3-11 terminal of the 48TC. See Fig. 50.



C11157

Fig. 50 - Outdoor CO_2 Sensor Connections

Space Relative Humidity Sensor or Humidistat Connections —

NOTE: The accessory space relative humidity sensor and humidistat do not apply to Size 30 units.

Space Relative Humidity Sensor connections: The accessory space relative humidity sensor (33ZCSENSRH-01) is installed on an interior wall to measure the relative humidity of the air within the occupied space.

The use of a standard 2 X 4 inch electrical box to accommodate the wiring is recommended for installation. The sensor can be mounted directly on the wall, if acceptable by local codes.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in permanent damage to the sensor.

DO NOT clean or touch the sensing element with chemical solvents as they can permanently damage the sensor.

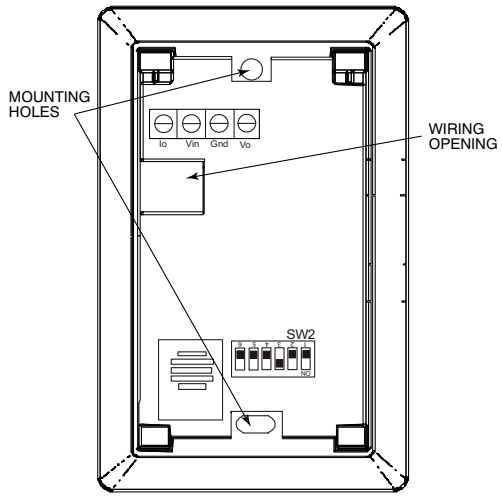
⚠ CAUTION

UNIT PERFORMANCE HAZARD

Failure to follow this caution will result in inaccurate sensor readings.

DO NOT mount the sensor in drafty areas such as near heating or air-conditioning ducts, open windows, fans, or over heat sources such as baseboard heaters, radiators, or wall-mounted dimmers. Sensors mounted in those areas will produce inaccurate readings.

If the sensor is installed directly on a wall service, install the humidity sensor using 2 screws and 2 hollow wall anchors (field supplied). Do not over tighten screws. See Fig. 51.



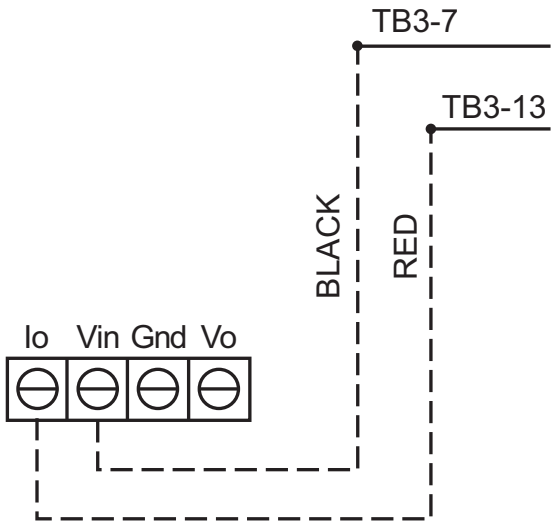
C11084

Fig. 51 - Space Relative Humidity Sensor Installation

The sensor must be mounted vertically on the wall. The Carrier logo should be orientated correctly when the sensor is properly mounted.

Avoid corner locations. Allow at least 4 ft between the sensor and any corner. Airflow near corners tends to be reduced, resulting in erratic sensor readings. The sensor should be vertically mounted approximately 5 ft up from the floor, beside the space temperature sensor.

For wiring distances up to 500 feet, use a 3-conductor, 18 or 20 AWG cable. ACCN communication cable can be used, although the shield is not required. The shield must be removed from the sensor end of the cable if this cable is used. See Fig. 52 for wiring details.



C11085

Fig. 52 - Space Relative Humidity Sensor Connection

The power for the sensor is provided by the PremierLink control on terminal J5-4 (+33 to +35vdc).

To wire the sensor:

1. At the sensor, remove 4 inches of the jacket from the cable. Strip $^1/_4$ inch of insulation from each conductor. Route the cable through the wire clearance opening in the center of the sensor. See Fig. 51.
2. Connect a field-supplied BLACK wire to the sensor screw terminal marked Vin.
3. Connect a field-supplied RED wire into the sensor screw terminal marked Io.
4. Connect the field-supplied RED wire from the sensor to TB3-13.
5. Connect the field-supplied BLACK wire from the sensor to TB3-7.

Humidistat connections: A humidistat can not be directly connected to the PremierLink controller. Follow the instructions on pages 26 & 27 to connect a humidistat or a thermostat as an electromechanical device.

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 48TC 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 Figs. 39 and 40, the PremierLink wiring schematics.

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. 53.

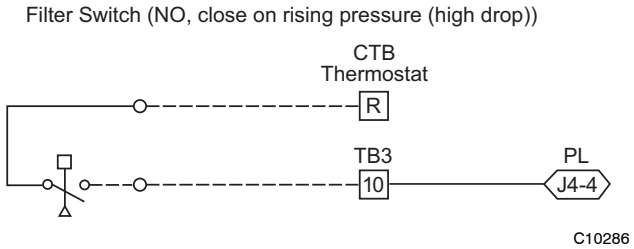


Fig. 53 - PremierLink Filter Switch Connection

When the filter switch's NO contact set closes as filter pressure drop increases (indicating dirt-laden filters), the input signal to PremierLink causes the filter status point to read "DIRTY".

Using Filter Timer Hours: Refer to Form 33CS-68SI for instructions on using the PremierLink Configuration screens and on unit alarm sequence.

Supply Fan Status Switch —

The PremierLink control can monitor supply fan operation through a field-supplied/installed differential pressure switch. This sequence will prevent (or interrupt) operation of unit cooling, heating and economizer functions until the pressure switch contacts are closed indicating proper supply fan operation.

Install the differential pressure switch in the supply fan section according to switch manufacturer's instructions. Arrange the switch contact to be open on no flow and to close as pressure rises indicating fan operation.

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 TB3-8. Setpoint for Supply Fan Status is set at the switch. See Fig. 54.

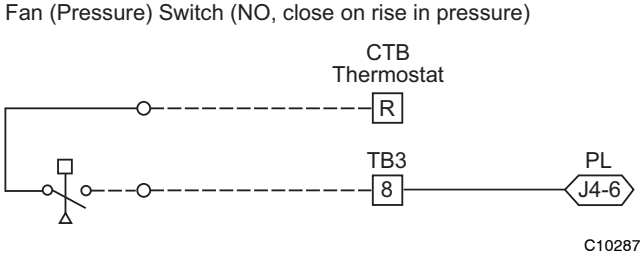


Fig. 54 - PremierLink Wiring Fan Pressure Switch Connection

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 timeclock contact to the unit's TB3-2 terminal.

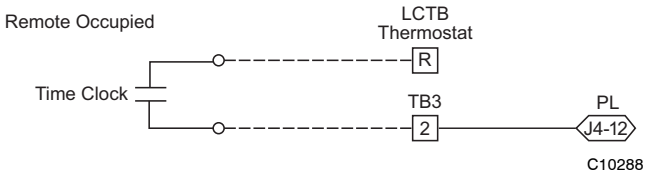


Fig. 55 - PremierLink Wiring Remote Occupied

Refer to Form 33CS-68SI for additional information on configuring the PremierLink control for Door Switch timer function.

Power Exhaust (output) —

Connect the accessory Power Exhaust contactor coils(s) per Fig. 56.

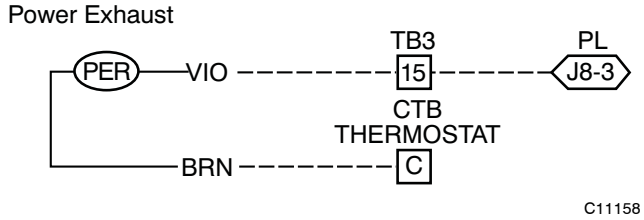


Fig. 56 - PremierLink Power Exhaust Output Connection

NOTE: The Power Exhaust and Humidi-MiZer® options can not be used with PremierLink at the same time as both options require connection at TB3-15 (AUX OUT).

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 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 8 for recommended cable.

Table 8 – Recommended Cables

MANUFACTURER	CABLE PART NO.
Alpha	2413 or 5463
American	A22503
Belden	8772
Columbia	02525

NOTE: Conductors and drain wire must be at least 20 AWG, 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 (-4°F) to 60°C (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 9 for the recommended color code.

Table 9 – Color Code Recommendations

SIGNAL TYPE	CCN BUS WIRE COLOR	CCN PLUG PIN NUMBER
+	Red	1
Ground	White	2
–	Black	3

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. 57.

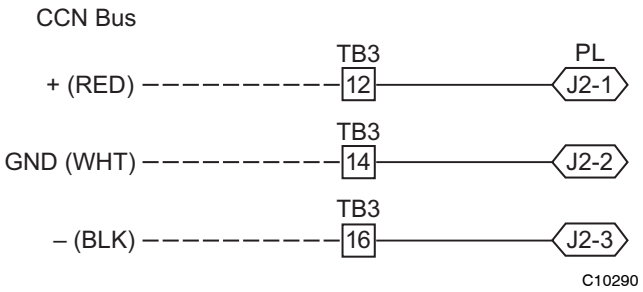


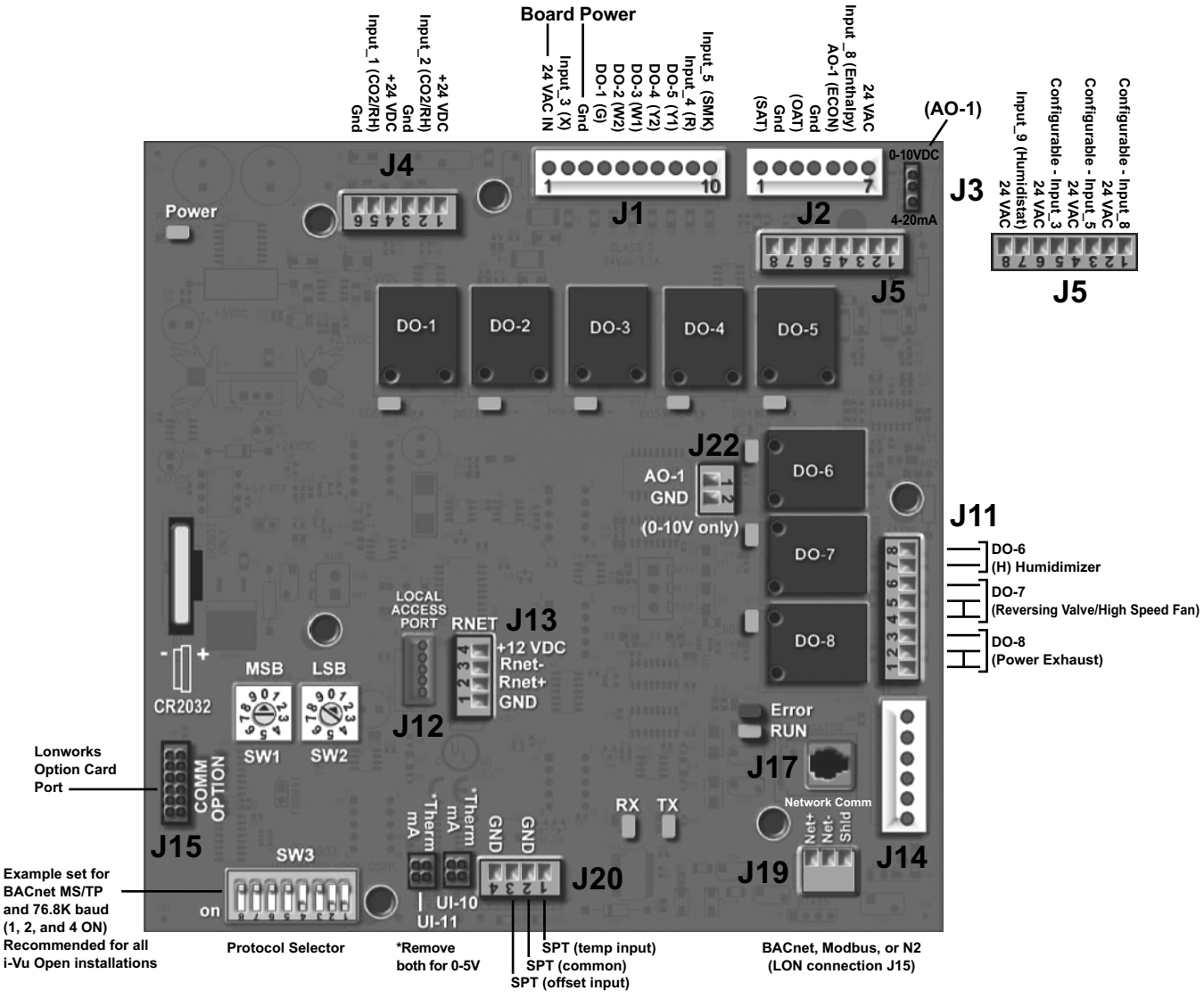
Fig. 57 - PremierLink CCN Bus Connections

RTU Open Control System

The RTU Open control is factory-mounted in the 48TC unit's main control box, to the right of the CTB. See Fig. 37. 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. 58.)

Refer to Table 10, RTU Open Controller Inputs and Outputs for locations of all connections to the RTU Open board.



C12751

Fig. 58 - RTU Open Multi-Protocol Control Board

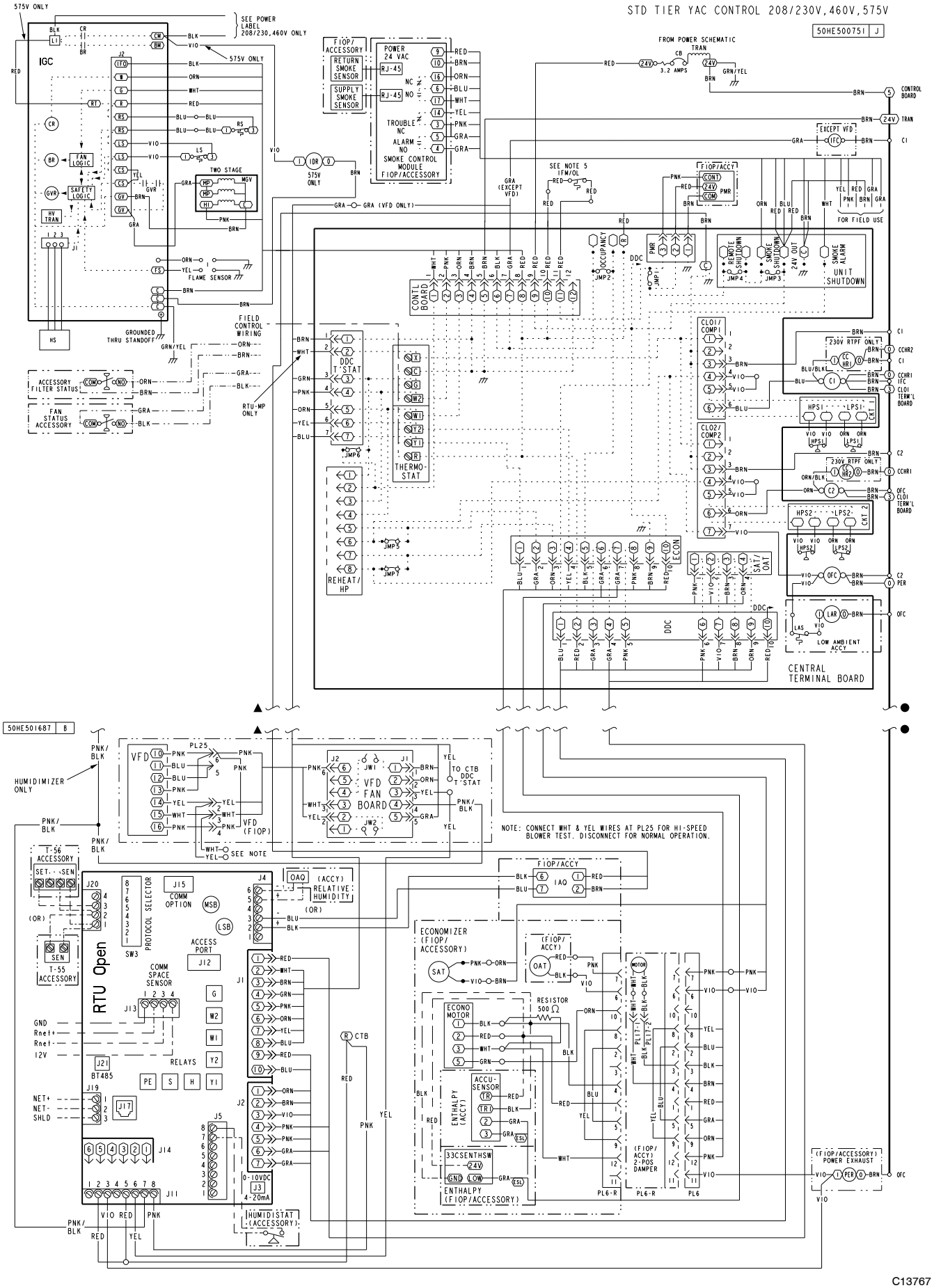


Fig. 59 - RTU Open System Control Wiring Diagram

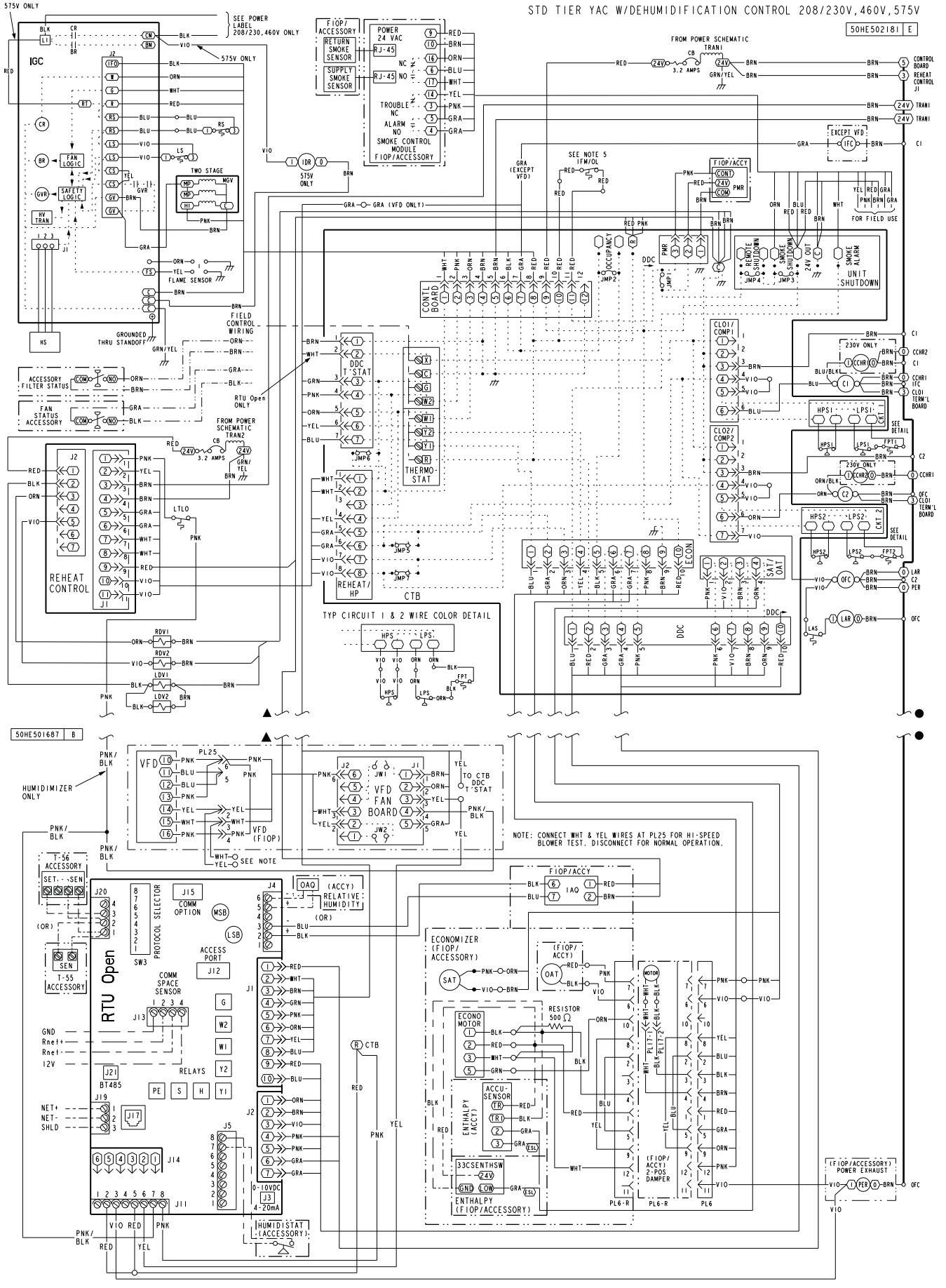


Fig. 60 - RTU Open System Control Wiring Diagram with Humidi-MiZer®

Table 10 – RTU Open Controller Inputs and Outputs

POINT NAME04	BACnet OBJECT NAME	TYPE OF I/O	CONNECTION PIN NUMBER(S)
DEDICATED INPUTS			
Space Temp / Zone Temp	zone_temp	AI (10K Thermistor)	J20–1 & 2
Supply Air Temperature	sa_temp	AI (10K Thermistor)	J2–1 & 2
Outdoor Air Temperature	oa_temp	AI (10K Thermistor)	J2–3 & 4
Space Temperature Offset Pot	stpt_adj_offset	AI (100K Potentiometer)	J20–3 & 4
Safety Chain Feedback	safety_status	DI (24 VAC)	J1–9
Compressor Safety Status	comp_status	DI (24 VAC)	J1–2
Fire Shutdown Status	firedown_status	DI (24 VAC)	J1–10
Enthalpy Status	enthalpy_status	DI (24 VAC)	J2–6 & 7
Humidistat Input Status	humstat_status	DI (24 VAC)	J5–7 & 8
Zone Temperature	n/a	n/a	J13–1, 2, 3, 4
CONFIGURABLE INPUTS			
Indoor Air CO2	iaq	AI (4–20 ma)	J4–2 & 3 or J4–5 & 6
Outdoor Air CO2	oaq	AI (4–20 ma)	
Space Relative Humidity	space_rh	AI (4–20 ma)	
Supply Fan Status*	sfan_status	DI (24 VAC)	J5–1 or J5–3 or J5–5
Filter Status*	filter_status	DI (24 VAC)	
Door Contact Input*	door_contact_status	DI (24 VAC)	
Occupancy Contact*	occ_contact_status	DI (24 VAC)	
OUTPUTS			
Economizer Output	econ_output	AO (4–20ma)	J2–5
Supply Fan Relay State	sfan	DO Relay (24VAC , 1A)	J1–4
Compressor 1 Relay State	comp_1	DO Relay (24VAC , 1A)	J1–8
Compressor 2 Relay State	comp_2	DO Relay (24VAC , 1A)	J1–7
Heat Stage 1 Relay State	heat_1	DO Relay (24VAC , 1A)	J1–6
Heat Stage 2 Relay State	heat_2	DO Relay (24VAC , 1A)	J1–5
Power Exhaust Relay State	pexh	DO Relay (24VAC , 1A)	J11–1 & 3
Humidimizer Relay State	dehum	DO Relay (24VAC, 1A)	J11–7, 8

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 48TC unit, the unit is supplied with a supply-air temperature (SAT) sensor (33ZCSENSAT). This sensor is a tubular probe type, approx 6-inches (152 mm) 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 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 $^1/_2$-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. 41 on page 31 .

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 CO_2 sensor
Outdoor air CO_2 sensor

Field Connections

Field connections for accessory sensors and input devices are made 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. 32. 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.

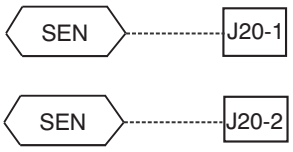
Space Temperature (SPT) Sensors —

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 500 ft. (152 m). 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.

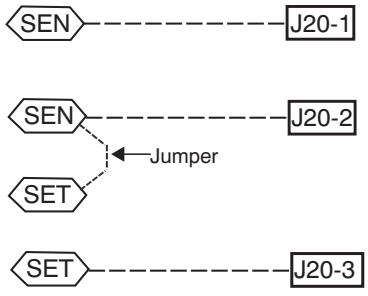
Connect T-55: See Fig. 42 for typical T-55 internal connections. Connect the T-55 SEN terminals to RTU Open J20-1 and J20-2. See Fig. 61.



C08460

Fig. 61 - RTU Open T-55 Sensor Connections

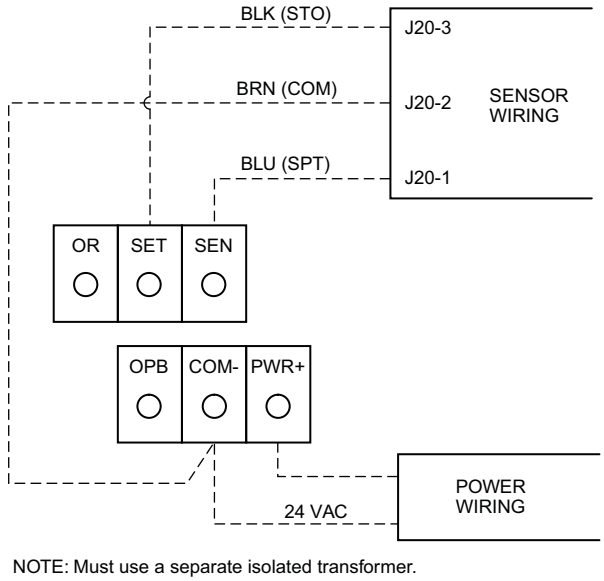
Connect T-56: See Fig. 44 for T-56 internal connections. Install a jumper between SEN and SET terminals as illustrated. Connect T-56 terminals to RTU Open J20-1, J20-2 and J20-3 per Fig. 62.



C08461

Fig. 62 - 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. 63 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.



C10291

Fig. 63 - Space Temperature Sensor Typical Wiring (33ZCT59SPT)

Indoor Air Quality (CO_2) Sensor —

The indoor air quality sensor accessory monitors space carbon dioxide (CO_2) 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 CO_2 present in the space air.

The CO_2 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 CO_2 sensor for electrical requirements and terminal locations. See Fig. 47 for typical CO_2 sensor wiring schematic.

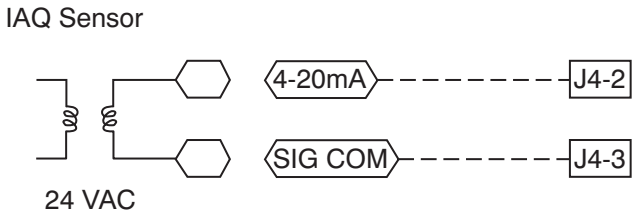
To accurately monitor the quality of the air in the conditioned air space, locate the sensor near a return-air grille (if present) so it senses the concentration of CO_2 leaving the space. The sensor should be mounted in a location to avoid direct breath contact.

Do not mount the IAQ sensor in drafty areas such as near supply ducts, open windows, fans, or over heat sources. Allow at least 3 ft (0.9 m) 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.

To connect the sensor to the control, identify the positive (4 to 20 mA) and ground (SIG COM) terminals on the sensor. See Fig. 47. Connect the 4-20 mA terminal to RTU Open terminal J4-2 and connect the SIG COM terminal to RTU Open terminal J4-3. See Fig. 64.



C10738

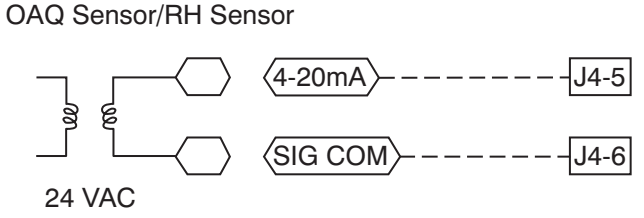
Fig. 64 - RTU Open / Indoor CO_2 Sensor (33ZCSENCO2) Connections

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

The outdoor air CO_2 sensor is designed to monitor carbon dioxide (CO_2) 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. 49. The outdoor air CO_2 sensor must be located in the economizer outside air hood.

Wiring the Outdoor Air CO_2 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. 47. Connect the 4 to 20 mA terminal to RTU Open terminal J4-5. Connect the SIG COM terminal to RTU Open terminal J4-6. See Fig. 65.



C10739

Fig. 65 - RTU Open / Outdoor CO_2 Sensor (33ZCSENCO2) Connections

Space Relative Humidity Sensor or Humidistat —

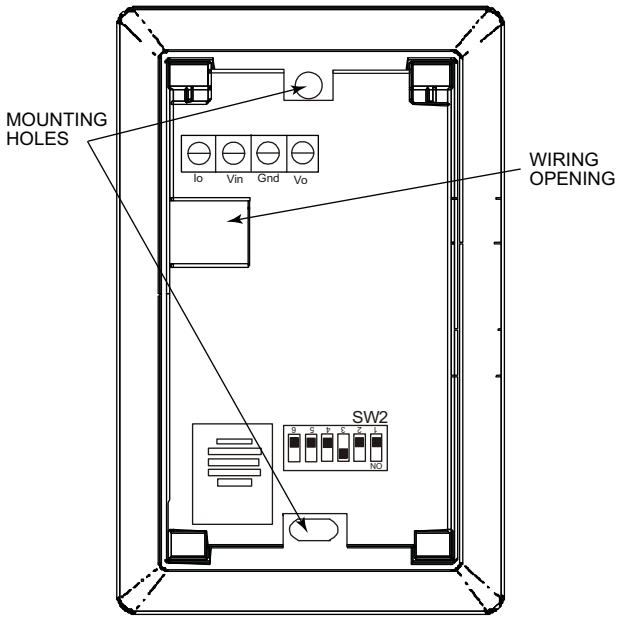
NOTE: The accessory space relative humidity sensor and humidistat do not apply to Size 30 units.

Humidi-MiZer® Control Wiring: In units equipped with the Humidi-MiZer option there are two pink (PNK) wires loose in the control box used to control the dehumidification function of the unit. These pink wires are meant to be tied to a space humidistat or thermidistat on an electromechanical unit. On RTU Open equipped units these pink wires must be connected to J11-7 & 8 to allow the Open board to operate the dehumidification function for the unit. Disconnect the J11 Phoenix style connector from the board and use the plug screws to secure the pink wires in pins 7 and 8, reconnect the plug to the board at J11.

Relative Humidity Sensors (Space or Duct Mounted): The accessory space humidity sensor (33ZCSENSRH-01) or duct humidity sensor (33ZCSENDRH-01) is used to measure the relative humidity of air within the space or return air duct. The RH reading is used to control the Humidi-MiZer option of the rooftop unit. For wiring distances up to 500 ft (152 m), use a 3-conductor, 18 or 20 AWG shielded cable. The shield must be removed from the sensor end of the cable and grounded at the unit end. The current loop power for sensor is provided by the RTU Open controller as 24vdc. Refer to the instructions supplied with the RH sensor for the electrical requirements and terminal locations. RTU Open configurations must be changed after adding an RH sensor. See Fig. 66 and 67 for typical RH sensor wiring.

- J4-1 or J4-4 = 24vdc loop power
- J4-2 or J4-5 = 4-20mA signal input

NOTE: The factory default for dehumidification control is normally open humidistat.



C11087

Fig. 66 - Space Relative Humidity Sensor Typical Wiring

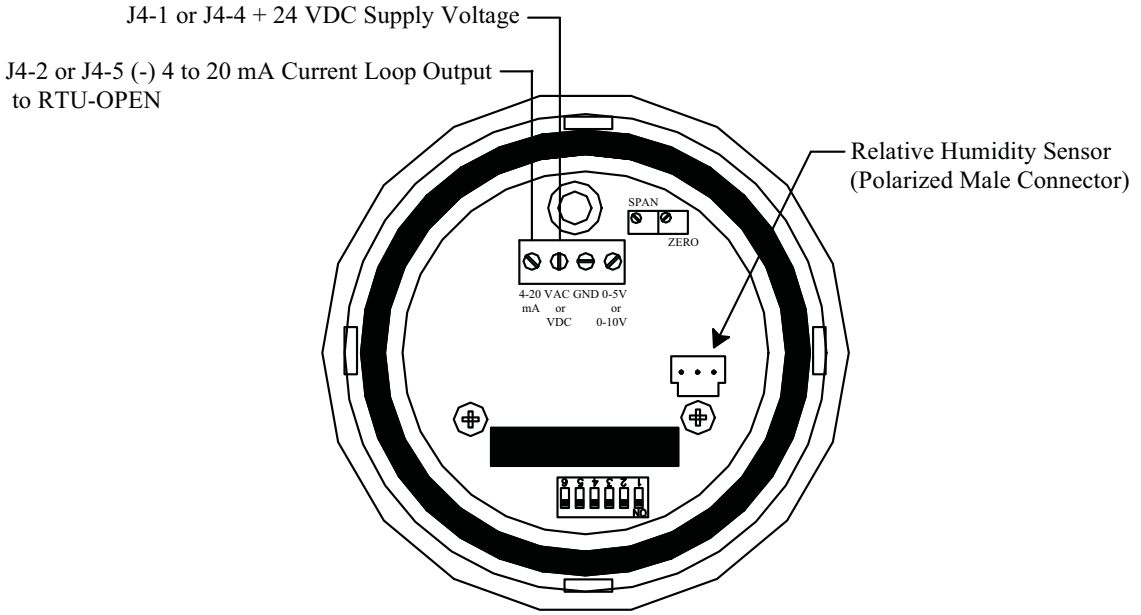


Fig. 67 - Duct Relative Humidity Sensor Typical Wiring

Humidistat: The accessory humidistat provides the RTU Open insight to the relative humidity in the space. The humidistat reads the RH level in the space and compares it to its setpoint to operate a dry contact. The humidistat is a dedicated input on the configurable input 9 and tells the RTU Open when the RH level is HIGH or LOW. The normal condition for humidity is LOW. A normally open humidistat is the factory default control for the Humidi-MiZer® option.

To wire in the field:

- J5-8 = 24 VAC source for dry contact
- J5-7 = Signal input

Smoke Detector/Fire Shutdown (FSD) —

On 48TC 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. 59 and Fig. 60, the RTU Open wiring schematics.

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. 58 and Figs. 59 or 60 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. 58 and Figs. 59 or 60 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. 58 and Table 10 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. 58 and Figs. 59 or 60 for wire terminations at J11.

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. 68 and 69 for protocol switch settings and address switches. The 3rd party connection to the RTU Open is through plug J19. See Fig. 70 for wiring.

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

Refer to the *RTU Open v2 Integration Guide* for more detailed information on protocols, 3rd party wiring, and networking.

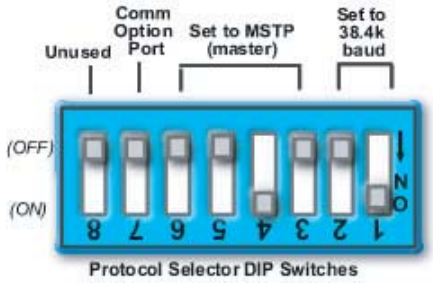
SW3 Protocol Selection

PROTOCOL	DS8	DS7	DS6	DS5	DS4	DS3	DS2	DS1
BACnet MS/TP (Master)	Unused	OFF	OFF	OFF	ON	OFF	Select Baud	Select Baud
Modbus (Slave)	Unused	OFF	OFF	ON	ON	OFF	Select Baud	Select Baud
N2 (Slave)	Unused	OFF	OFF	OFF	ON	ON	OFF	OFF
LonWorks	Unused	ON	ON	OFF	ON	OFF	OFF	OFF

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

Baud Rate Selections

BAUD RATE	DS2	DS1
9600	OFF	OFF
19,200	ON	OFF
38,400	OFF	ON
76,800	ON	ON

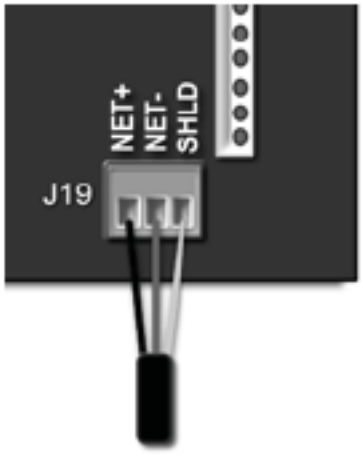


C07166

Fig. 68 - RTU Open SW3 Dip Switch Settings

C10815

Fig. 69 - RTU Open Address Switches



C10816

Fig. 70 - Network Wiring

Local Access —

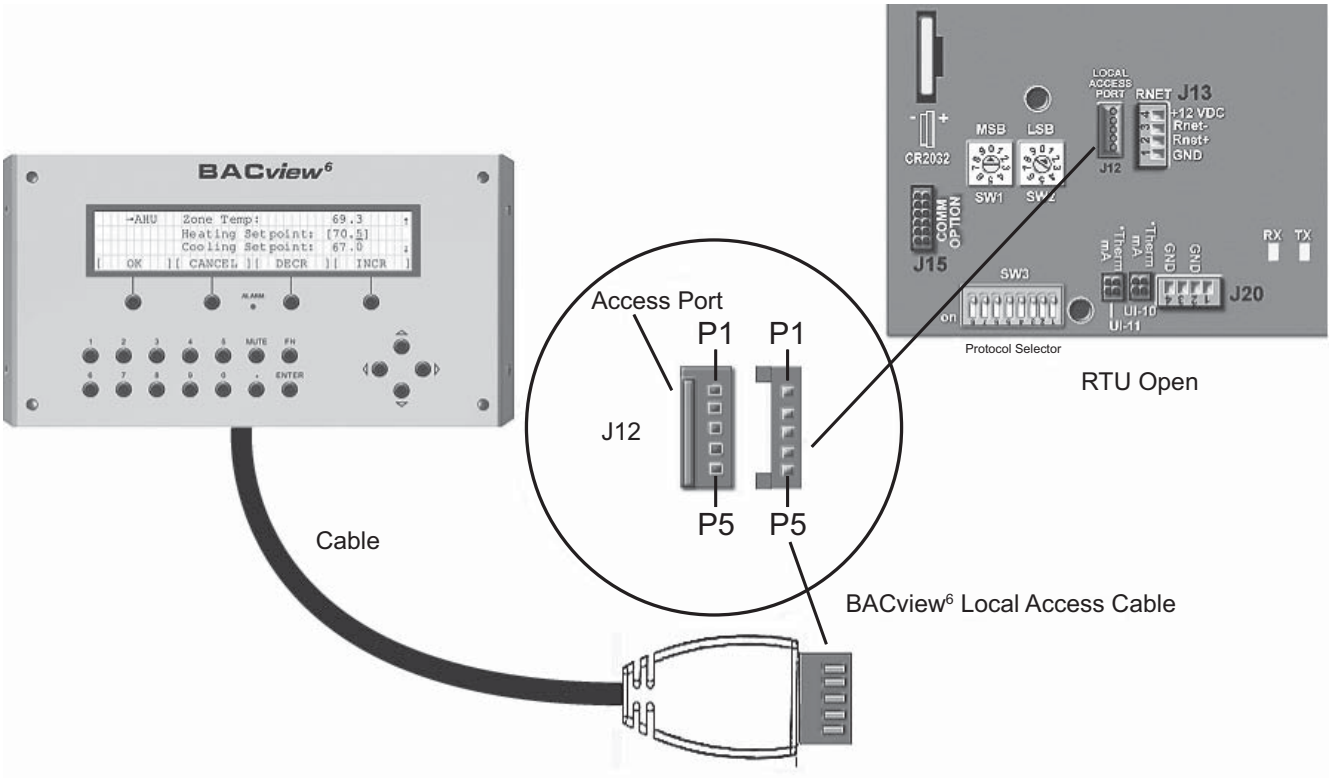
BACview[6] Handheld: The BACview[6] is a keypad/display interface used to connect to the RTU Open to access the control information, read sensor values, and test the RTU, see Fig. 71. This is an accessory interface that does not come with the RTU Open controller and can only be used at the unit. Connect the BACview[6] 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 Appendix A of 48-50HCTQ-02T (or later), for navigation and screen content.

Virtual BACview: Virtual BACview is a freeware computer program that functions as the BACview[6] 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 11.

NOTE: Refer to Catalog No. 48-50HCTQ-02T (or later) for complete configuration of RTU Open, operating sequences and troubleshooting information. Refer to *RTU Open v2 Integration Guide* for details on configuration and troubleshooting of connected networks. Have a copy of these manuals available at unit start-up.



C10812

Fig. 71 - BACview[6] Handheld Connections

Table 11 – LEDs

The LED's on the RTU Open show the status of certain functions

If this LED is on...	Status is...
Power	The RTU Open has power
Rx	The RTU Open is receiving data from the network segment
Tx	The RTU Open is transmitting data over the network segment
DO#	The digital output is active

The **Run** and **Error** LED's indicate control module and network status

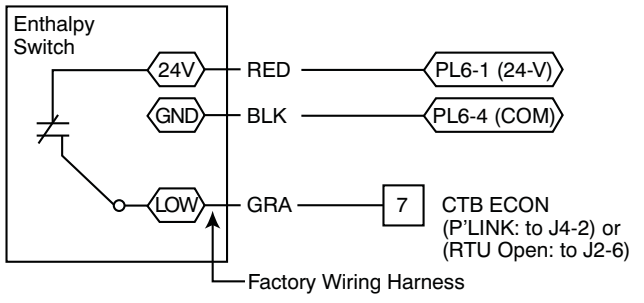
If Run LED shows...	And Error LED shows...	Status is...
2 flashes per second	Off	Normal
2 flashes per second	2 flashes, alternating with **Run** LED	Five minute auto–restart delay after system error
2 flashes per second	3 flashes, then off	Control module has just been formatted
2 flashes per second	4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

Outdoor Air Enthalpy Control (PNO 33CSENTHSW)

The enthalpy control (33CSENTHSW) 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. 72.)

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. 72. Connect the enthalpy control power input terminals to economizer actuator power leads RED (connect to 24V) and BLK (connect to GND).

The outdoor enthalpy changeover setpoint is set at the enthalpy controller.

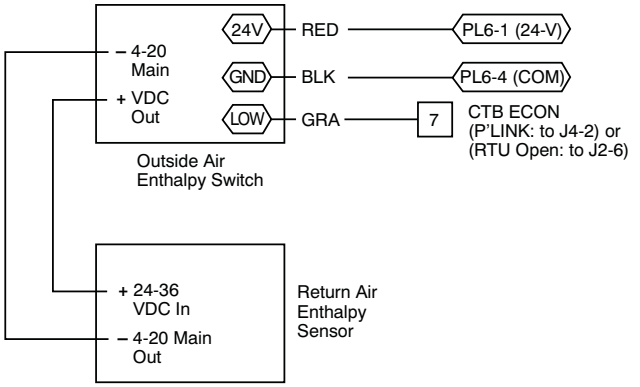


C11160

Fig. 72 - Enthalpy Switch (33CSENTHSW) Connections

Differential Enthalpy Control —

Differential enthalpy control is provided by sensing and comparing the outside air and return air enthalpy conditions. Install the outdoor air enthalpy control as described above. Add and install a return air enthalpy sensor (see Fig. 73).



C11161

Fig. 73 - Outside & Return Air Enthalpy Sensor Wiring

To wire the return air enthalpy sensor, perform the following:

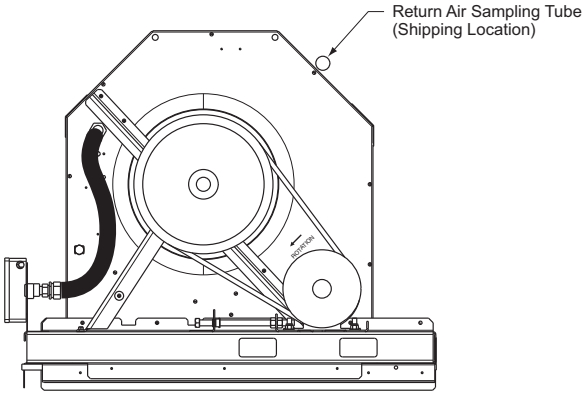
1. Use a 2-conductor, 18 or 20 AWG, twisted pair cable to connect the return air enthalpy sensor to the enthalpy controller.
2. Connect the field-supplied RED wire to (+) spade connector on the return air enthalpy sensor and the (+) terminal on the enthalpy controller. Connect the BLK wire to (-) spade 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 48TC models. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

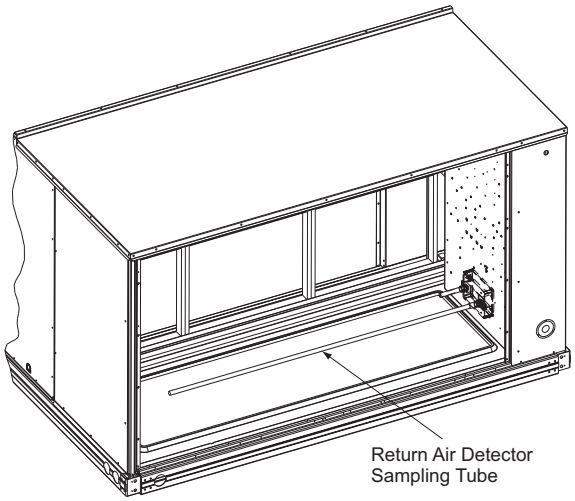
Return Air Sensor Tube Installation —

The return air sampling tube is shipped in the unit's supply fan section, attached to the blower housing (see Fig. 74). Its operating location is in the return air section of the unit (see Fig. 75, unit without economizer, or Fig. 76, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.



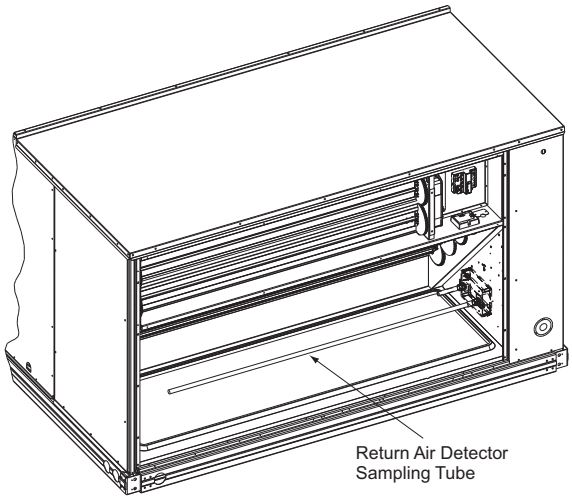
C09102

Fig. 74 - Typical Supply Air Smoke Detector Sensor Location



C09135

Fig. 75 - Return Air Sampling Tube Location in Unit without Economizer



C09136

Fig. 76 - Return Air Sampling Tube Location in Unit with Economizer

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. Position the sampling holes on the bottom of the tube, facing into the bottom return duct opening.
4. Insert the sampling tube into the return air sensor module until the tube snaps into position.
5. Replace end panel or outside air hood.

Smoke Detector Test Magnet —

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

Additional Application Data —

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

ELECTRICAL DATA FOR UNITS PRODUCED ON OR AFTER JULY 30, 2012

NOTE: Check the serial number of unit to verify production date.

To confirm the date of manufacture, locate the unit nameplate and check the first four digits of the Serial Number. If the number listed in the first 4 digits of the Serial Number is 3112 or higher, the unit was produced on or after July 30, 2012.

Position:	1	2	3	4	5	6	7	8	9	10
Example:	3	1	1	2	U	1	2	3	4	5

Week of manufacture (fiscal calendar)

Year of manufacture ("12" = 2012)

Manufacturing location

Sequence number

C12562A

Legend and Notes for Tables 12 - 14

LEGEND:

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

NOTES:

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

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

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= 227$$

Determine maximum deviation from average voltage.
(AB) 227 – 224 = 3 v
(BC) 231 – 227 = 4 v
(AC) 227 – 226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

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

$$= 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 12 – Unit Wire/Fuse or HACR Breaker Sizing Data

UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
48TC**17	208/230–3–60	STD	80.0/79.9	100/100	83/83	501	91.8/91.7	100/100	97/97	521	84.8/84.7	100/100	89/89	506	96.6/96.5	125/125	102/102	526
		MED	82.2	100	86	515	94.0	110	99	535	87.0	100	91	520	98.8	125	105	540
		HIGH	85.2/84.3	100/100	89/88	517	97.0/96.1	125/125	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	125/125	108/107	542
	460–3–60	STD	42.5	50	44	251	48.7	60	51	263	44.7	60	47	253	50.9	60	54	265
		MED	43.6	60	45	258	49.8	60	52	270	45.8	60	48	260	52.0	60	55	272
		HIGH	44.7	60	47	259	50.9	60	54	271	46.9	60	49	261	53.1	60	56	273
	575–3–60	STD	32.1	40	33	188	36.9	45	39	196	33.8	45	35	190	38.6	50	41	198
		MED	32.1	40	33	188	36.9	45	39	196	33.8	45	35	190	38.6	50	41	198
		HIGH	34.9	45	37	202	39.7	50	42	210	36.6	45	39	204	41.4	50	44	212
48TC**20	208/230–3–60	STD	82.2	100	86	515	94.0	110	99	535	87.0	100	91	520	98.8	125	105	540
		MED	85.2/84.3	100/100	89/88	517	97.0/96.1	125/125	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	125/125	108/107	542
		HIGH	88.7	100	93	513	100.5	125	107	533	93.5	110	99	518	105.3	125	112	538
	460–3–60	STD	43.6	60	45	258	49.8	60	52	270	45.8	60	48	260	52.0	60	55	272
		MED	44.7	60	47	259	50.9	60	54	271	46.9	60	49	261	53.1	60	56	273
		HIGH	46.9	60	49	257	53.1	60	56	269	49.1	60	52	259	55.3	60	59	271
	575–3–60	STD	32.1	40	33	188	36.9	45	39	196	33.8	45	35	190	38.6	50	41	198
		MED	34.9	45	37	202	39.7	50	42	210	36.6	45	39	204	41.4	50	44	212
		HIGH	36.9	45	39	200	41.7	50	44	208	38.6	50	41	202	43.4	50	46	210
48TC**24	208/230–3–60	STD	109.2/108.3	150/150	112/111	540	121.0/120.1	150/150	125/124	560	114.0/113.1	150/150	117/116	545	125.8/124.9	150/150	131/130	565
		MED	112.7	150	116	536	124.5	150	129	556	117.5	150	121	541	129.3	175	135	561
		HIGH	124.1	150	129	615	135.9	175	142	635	128.9	175	134	620	140.7	175	148	640
	460–3–60	STD	48.0	60	50	272	54.2	60	57	284	50.2	60	52	274	56.4	70	59	286
		MED	50.2	60	52	270	56.4	70	59	282	52.4	60	55	272	58.6	70	62	284
		HIGH	55.9	70	59	310	62.1	80	66	322	58.1	70	61	312	64.3	80	69	324
	575–3–60	STD	38.6	50	40	224	43.4	50	46	232	40.3	50	42	226	45.1	50	48	234
		MED	40.6	50	42	222	45.4	60	48	230	42.3	50	44	224	47.1	60	50	232
		HIGH	42.5	50	45	249	47.3	60	50	257	44.2	50	47	251	49	60	52	259

See: “Legend and Notes for Tables 12 – 14” on page 49.

Table 12 - Unit Wire/Fuse or HACR Breaker Sizing Data (cont)

UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
48TC**28	208/230–3–60	STD	127.8/126.9	175/175	133/132	590	139.6/138.7	175/175	147/146	610	132.6/131.7	175/175	139/138	595	144.4/143.5	175/175	152/151	615
		MED	131.3	175	137	586	143.1	175	151	606	136.1	175	143	591	147.9	175	156	611
		HIGH	142.7	175	150	665	154.5	200	164	685	147.5	175	156	670	159.3	200	169	690
	460–3–60	STD	51.9	60	54	302	58.1	70	61	314	54.1	60	57	304	60.3	70	64	316
		MED	54.1	60	57	300	60.3	70	64	312	56.3	70	59	302	62.5	80	66	314
		HIGH	59.8	70	63	340	66.0	80	70	352	62.0	80	66	342	68.2	80	73	354
	575–3–60	STD	41.1	50	43	244	45.9	60	49	252	42.8	50	45	246	47.6	60	50	254
		MED	43.1	50	45	242	47.9	60	51	250	44.8	50	47	244	49.6	60	53	252
		HIGH	45.0	50	47	269	49.8	60	53	277	46.7	60	49	271	51.5	60	55	279
48TC**30	208/230–3–60	STD	141.5	175	148	702	153.3	200	162	722	146.3	175	154	707	158.1	200	167	727
		MED	152.9	200	161	781	164.7	200	175	801	157.7	200	167	786	169.5	200	180	806
		HIGH	154.8	200	163	812	166.6	200	177	832	159.6	200	169	817	171.4	200	182	837
	460–3–60	STD	66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368
		MED	71.7	90	76	394	77.9	100	83	406	73.9	90	78	396	80.1	100	85	408
		HIGH	72.6	90	77	409	78.8	100	84	421	74.8	90	79	411	81.0	100	86	423
	575–3–60	STD	56.0	70	59	264	60.8	80	64	272	57.7	70	61	266	62.5	80	66	274
		MED	57.9	70	61	291	62.7	80	66	299	59.6	70	63	293	64.4	80	68	301
		HIGH	60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312

See: ""Legend and Notes for Tables 12 – 14" on page 49.

Table 13 – Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option

UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
48TC**17	208/230–3–60	STD	80.2/79.4	100/100	84/83	482	92.0/91.2	100/100	97/96	502	85.0/84.2	100/100	89/88	487	96.8/96.0	125/125	103/102	507
		MED	82.4/81.4	100/100	86/85	506	94.2/93.2	110/110	100/99	526	87.2/86.2	100/100	92/91	511	99.0/98.0	125/125	105/104	531
		HIGH	85.2/84.3	100/100	89/88	517	97.0/96.1	125/125	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	125/125	108/107	542
	460–3–60	STD	42.1	50	44	242	48.3	60	51	254	44.3	60	46	244	50.5	60	53	256
		MED	43.2	50	45	254	49.4	60	52	266	45.4	60	47	256	51.6	60	55	268
		HIGH	44.7	60	47	259	50.9	60	54	271	46.9	60	49	261	53.1	60	56	273
	575–3–60	STD	33.8	45	35	188	38.6	50	41	196	35.5	45	37	190	40.3	50	43	198
		MED	33.8	45	35	188	38.6	50	41	196	35.5	45	37	190	40.3	50	43	198
		HIGH	35.5	45	37	202	40.3	50	43	210	37.2	45	39	204	42	50	45	212
48TC**20	208/230–3–60	STD	82.4/81.4	100/100	86/85	506	94.2/93.2	110/110	100/99	526	87.2/86.2	100/100	92/91	511	99.0/98.0	125/125	105/104	531
		MED	85.2/84.3	100/100	89/88	517	97.0/96.1	125/125	103/102	537	90.0/89.1	100/100	95/94	522	101.8/100.9	125/125	108/107	542
		HIGH	88.7	100	93	513	100.5	125	107	533	93.5	110	99	518	105.3	125	112	538
	460–3–60	STD	43.2	50	45	254	49.4	60	52	266	45.4	60	47	256	51.6	60	55	268
		MED	44.7	60	47	259	50.9	60	54	271	46.9	60	49	261	53.1	60	56	273
		HIGH	46.9	60	49	257	53.1	60	56	269	49.1	60	52	259	55.3	60	59	271
	575–3–60	STD	33.8	45	35	188	38.6	50	41	196	35.5	45	37	190	40.3	50	43	198
		MED	35.5	45	37	202	40.3	50	43	210	37.2	45	39	204	42.0	50	45	212
		HIGH	36.9	45	39	200	41.7	50	44	208	38.6	50	41	202	43.4	50	46	210
48TC**24	208/230–3–60	STD	109.2/108.3	150/150	112/111	540	121.0/120.1	150/150	125/124	560	114.0/113.1	150/150	117/116	545	125.8/124.9	150/150	131/130	565
		MED	112.7	150	116	536	124.5	150	129	556	117.5	150	121	541	129.3	175	135	561
		HIGH	124.1	150	129	615	135.9	175	142	635	128.9	175	134	620	140.7	175	148	640
	460–3–60	STD	48.0	60	50	272	54.2	60	57	284	50.2	60	52	274	56.4	70	59	286
		MED	50.2	60	52	270	56.4	70	59	282	52.4	60	55	272	58.6	70	62	284
		HIGH	55.9	70	59	310	62.1	80	66	322	58.1	70	61	312	64.3	80	69	324
	575–3–60	STD	39.2	50	41	224	44.0	50	46	232	40.9	50	43	226	45.7	60	48	234
		MED	40.6	50	42	222	45.4	60	48	230	42.3	50	44	224	47.1	60	50	232
		HIGH	42.5	50	45	249	47.3	60	50	257	44.2	50	47	251	49	60	52	259

See: “Legend and Notes for Tables 12 – 14” on page 49.

Table 13 - Unit Wire/Fuse or HACR Breaker Sizing Data with Factory Installed 2 Speed Indoor Fan Option (cont)

UNIT	NOM. V–Ph–Hz	IFM TYPE	NO C.O. or UNPWR C.O.								w/ PWRD C.O.							
			NO P.E.				w/ P.E. (pwrd fr/ unit)				NO P.E.				w/ P.E. (pwrd fr/ unit)			
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
					FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA
48TC**28	208/230–3–60	STD	127.8/126.9	175/175	133/132	590	139.6/138.7	175/175	147/146	610	132.6/131.7	175/175	139/138	595	144.4/143.5	175/175	152/151	615
		MED	131.3	175	137	586	143.1	175	151	606	136.1	175	143	591	147.9	175	156	611
		HIGH	142.7	175	150	665	154.5	200	164	685	147.5	175	156	670	159.3	200	169	690
	460–3–60	STD	51.9	60	54	302	58.1	70	61	314	54.1	60	57	304	60.3	70	64	316
		MED	54.1	60	57	300	60.3	70	64	312	56.3	70	59	302	62.5	80	66	314
		HIGH	59.8	70	63	340	66.0	80	70	352	62.0	80	66	342	68.2	80	73	354
	575–3–60	STD	41.7	50	44	244	46.5	60	49	252	43.4	50	46	246	48.2	60	51	254
		MED	43.1	50	45	242	47.9	60	51	250	44.8	50	47	244	49.6	60	53	252
		HIGH	45	50	47	269	49.8	60	53	277	46.7	60	49	271	51.5	60	55	279
48TC**30	208/230–3–60	STD	141.5	175	148	702	153.3	200	162	722	146.3	175	154	707	158.1	200	167	727
		MED	152.9	200	161	781	164.7	200	175	801	157.7	200	167	786	169.5	200	180	806
		HIGH	154.8	200	163	812	166.6	200	177	832	159.6	200	169	817	171.4	200	182	837
	460–3–60	STD	66.0	80	69	354	72.2	90	76	366	68.2	90	72	356	74.4	90	79	368
		MED	71.7	90	76	394	77.9	100	83	406	73.9	90	78	396	80.1	100	85	408
		HIGH	72.6	90	77	409	78.8	100	84	421	74.8	90	79	411	81.0	100	86	423
	575–3–60	STD	56.0	70	59	264	60.8	80	64	272	57.7	70	61	266	62.5	80	66	274
		MED	57.9	70	61	291	62.7	80	66	299	59.6	70	63	293	64.4	80	68	301
		HIGH	60.8	80	64	302	65.6	80	70	310	62.5	80	66	304	67.3	80	72	312

See: “Legend and Notes for Tables 12 – 14” on page 49.

ELECTRICAL DATA FOR UNITS PRODUCED PRIOR TO JULY 30, 2012

NOTE: Check the serial number of unit to verify production date.

To confirm the date of manufacture, locate the unit nameplate and check the first four digits of the Serial Number. If the number listed in the first 4 digits of the Serial Number is 3012 or lower, the unit was produced prior to July 30, 2012.

Position:	1	2	3	4	5	6	7	8	9	10
Example:	3	0	1	2	U	1	2	3	4	5

Week of manufacture (fiscal calendar)

Year of manufacture ("12" = 2012)

Manufacturing location

Sequence number

C13784

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

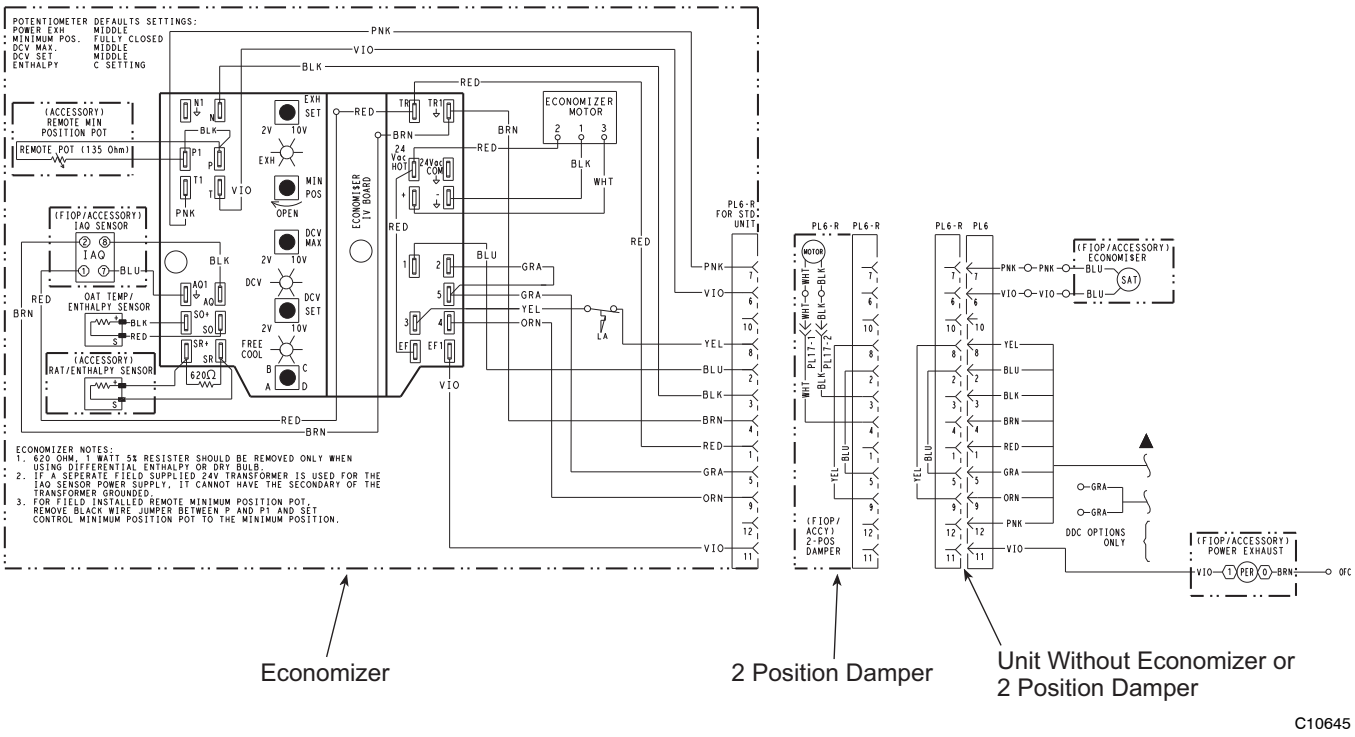
UNIT	NOM. V–Ph–Hz	IFM TYPE	COMBUSTION FAN MOTOR	POWER EXHAUST	NO C.O. or UNPWR C.O.							
					NO P.E.				w/ P.E. (pwrd fr/ unit)			
			FLA	FLA	MCA	FUSE or HACR BRKR	DISC. SIZE		MCA	FUSE or HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
48TC**17	208/230–3–60	STD	0.52	5.9	79.1	100.0	82	485	90.9	100.0	96	505
		MED			81.8	100.0	85	502	93.6	110.0	99	522
		HIGH			86.6	100.0	91	511	98.4	125.0	105	531
	460–3–60	STD	0.3	3.1	41.7	50.0	43	243	47.9	60.0	50	255
		MED			43.1	50.0	45	252	49.3	60.0	52	264
		HIGH			45.7	60.0	48	256	51.9	60.0	55	268
	575–3–60	STD	0.24	2.4	32.1	40.0	33	188	36.9	45.0	39	196
		MED			32.1	40.0	33	188	36.9	45.0	39	196
		HIGH			34.9	45.0	37	202	39.7	50.0	42	210
48TC**20	208/230–3–60	STD	0.52	5.9	81.8	100.0	85	502	93.6	110.0	99	522
		MED			86.6	100.0	91	511	98.4	125.0	105	531
		HIGH			92.0	100.0	97	521	103.8	125.0	111	541
	460–3–60	STD	0.3	3.1	43.1	50.0	45	252	49.3	60.0	52	264
		MED			45.7	60.0	48	256	51.9	60.0	55	268
		HIGH			48.5	60.0	51	261	54.7	60.0	58	273
	575–3–60	STD	0.24	2.4	32.1	40.0	33	188	36.9	45.0	39	196
		MED			34.9	45.0	37	202	39.7	50.0	42	210
		HIGH			38.3	50.0	40	200	43.1	50.0	46	208
48TC**24	208/230–3–60	STD	0.52	5.9	110.6	150.0	113	534	122.4	150.0	127	554
		MED			116.0	150.0	120	544	127.8	175.0	133	564
		HIGH			128.7	175.0	134	618	140.5	175.0	148	638
	460–3–60	STD	0.3	3.1	49.0	60.0	51	269	55.2	60.0	58	281
		MED			51.8	60.0	54	274	58.0	70.0	61	286
		HIGH			57.8	70.0	61	311	64.0	80.0	68	323
	575–3–60	STD	0.24	2.4	38.6	50.0	40	224	43.4	50.0	46	232
		MED			42.0	50.0	44	222	46.8	60.0	50	230
		HIGH			42.5	50.0	45	249	47.3	60.0	50	257
48TC**28	208/230–3–60	STD	0.52	5.9	129.2	175.0	135	584	141.0	175.0	148	604
		MED			134.6	175.0	141	594	146.4	175.0	155	614
		HIGH			147.3	175.0	156	668	159.1	200.0	169	688
	460–3–60	STD	0.3	3.1	52.9	60.0	55	299	59.1	70.0	63	311
		MED			55.7	70.0	59	304	61.9	80.0	66	316
		HIGH			61.7	80.0	66	341	67.9	80.0	73	353
	575–3–60	STD	0.24	2.4	41.1	50.0	43	244	45.9	60.0	49	252
		MED			44.5	50.0	47	242	49.3	60.0	52	250
		HIGH			45.0	50.0	47	269	49.8	60.0	53	277
48TC**30	208/230–3–60	STD	0.52	5.9	137.2	175.0	143	702	149.0	200.0	157	722
		MED			157.5	200.0	166	784	169.3	200.0	180	804
		HIGH			160.1	200.0	169	824	171.9	200.0	183	844
	460–3–60	STD	0.3	3.1	63.8	80.0	67	354	70.0	90.0	74	366
		MED			73.6	90.0	78	395	79.8	100.0	85	407
		HIGH			74.7	90.0	79	415	80.9	100.0	86	427
	575–3–60	STD	0.24	2.4	53.5	60.0	56	255	58.3	70.0	61	263
		MED			57.9	70.0	61	291	62.7	80.0	66	299
		HIGH			62.9	80.0	67	302	67.7	80.0	72	310

See: “Legend and Notes for Tables 12 – 14” on page 49.

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

UNIT	NOM. V–Ph–Hz	IFM TYPE	COMBUSTION FAN MOTOR	POWER EXHAUST	w/ PWRD C.O.							
					NO P.E.				w/ P.E. (pwrd fr/ unit)			
			FLA	FLA	MCA	FUSE or HACR BRKR	DISC. SIZE		MCA	FUSE or HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
48TC**17	208/230–3–60	STD	0.52	5.9	83.9	100.0	88	490	95.7	125.0	101	510
		MED			86.6	100.0	91	507	98.4	125.0	105	527
		HIGH			91.4	100.0	96	516	103.2	125.0	110	536
	460–3–60	STD	0.3	3.1	43.9	60.0	46	245	50.1	60.0	53	257
		MED			45.3	60.0	47	254	51.5	60.0	54	266
		HIGH			47.9	60.0	50	258	54.1	60.0	57	270
	575–3–60	STD	0.24	2.4	33.8	45.0	35	190	38.6	50.0	41	198
		MED			33.8	45.0	35	190	38.6	50.0	41	198
		HIGH			36.6	45.0	39	204	41.4	50.0	44	212
48TC**20	208/230–3–60	STD	0.52	5.9	86.6	100.0	91	507	98.4	125.0	105	527
		MED			91.4	100.0	96	516	103.2	125.0	110	536
		HIGH			96.8	125.0	103	526	108.6	125.0	116	546
	460–3–60	STD	0.3	3.1	45.3	60.0	47	254	51.5	60.0	54	266
		MED			47.9	60.0	50	258	54.1	60.0	57	270
		HIGH			50.7	60.0	53	263	56.9	70.0	61	275
	575–3–60	STD	0.24	2.4	33.8	45.0	35	190	38.6	50.0	41	198
		MED			36.6	45.0	39	204	41.4	50.0	44	212
		HIGH			40.0	50.0	42	202	44.8	50.0	48	210
48TC**24	208/230–3–60	STD	0.52	5.9	115.4	150.0	119	539	127.2	175.0	132	559
		MED			120.8	150.0	125	549	132.6	175.0	139	569
		HIGH			133.5	175.0	140	623	145.3	175.0	153	643
	460–3–60	STD	0.3	3.1	51.2	60.0	53	271	57.4	70.0	61	283
		MED			54.0	60.0	57	276	60.2	70.0	64	288
		HIGH			60.0	70.0	64	313	66.2	80.0	71	325
	575–3–60	STD	0.24	2.4	40.3	50.0	42	226	45.1	50.0	48	234
		MED			43.7	50.0	46	224	48.5	60.0	52	232
		HIGH			44.2	50.0	47	251	49.0	60.0	52	259
48TC**28	208/230–3–60	STD	0.52	5.9	134.0	175.0	140	589	145.8	175.0	154	609
		MED			139.4	175.0	147	599	151.2	175.0	160	619
		HIGH			152.1	200.0	161	673	163.9	200.0	175	693
	460–3–60	STD	0.3	3.1	55.1	60.0	58	301	61.3	70.0	65	313
		MED			57.9	70.0	61	306	64.1	80.0	68	318
		HIGH			63.9	80.0	68	343	70.1	80.0	75	355
	575–3–60	STD	0.24	2.4	42.8	50.0	45	246	47.6	60.0	50	254
		MED			46.2	60.0	49	244	51.0	60.0	54	252
		HIGH			46.7	60.0	49	271	51.5	60.0	55	279
48TC**30	208/230–3–60	STD	0.52	5.9	142.0	175.0	149	707	153.8	200.0	162	727
		MED			162.3	200.0	172	789	174.1	225.0	185	809
		HIGH			164.9	200.0	175	829	176.7	225.0	188	849
	460–3–60	STD	0.3	3.1	66.0	80.0	69	356	72.2	90.0	76	368
		MED			75.8	90.0	81	397	82.0	100.0	88	409
		HIGH			76.9	90.0	82	417	83.1	100.0	89	429
	575–3–60	STD	0.24	2.4	55.2	70.0	58	257	60.0	70.0	63	265
		MED			59.6	70.0	63	293	64.4	80.0	68	291
		HIGH			64.6	80.0	69	304	69.4	80.0	74	306

See: “Legend and Notes for Tables 12 – 14” on page 49.



C10645

Fig. 77 - EconoMi$er™ IV Wiring

Step 12 — Adjust Factory-Installed Options

EconoMi$er IV Occupancy Switch —

Refer to Fig. 77 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)

LP conversion kit

Manual outside air damper

High Altitude Gas kits

Flue Discharge Deflector

Low Ambient Controls

Thermostat / Sensors

Two-Position motorized outside air damper

EconoMi$er2 (without control/for external signal and integrated barometric relief)

EconoMi$er IV (with control and integrated barometric relief)

Power Exhaust

Differential dry-bulb sensor (EconoMi$er IV)

Outdoor enthalpy sensor

Differential enthalpy sensor

CO_2 sensor

DDC interface (PremierLink)

Louvered hail guard

Phase monitor control

Winter Start kit

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.

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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

☐ VERIFY THAT FLUE HOOD IS INSTALLED

☐ CHECK REFRIGERANT PIPING FOR INDICATIONS OF LEAKS; INVESTIGATE AND REPAIR IF NECESSARY

☐ CHECK GAS PIPING FOR LEAKS

☐ 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	L1-L2	_____	L2-L3	_____	L3-L1 _____
CIRCUIT 1 COMPRESSOR AMPS	L1	_____	L2	_____	L3 _____
CIRCUIT 2 COMPRESSOR AMPS	L1	_____	L2	_____	L3 _____
INDOOR-FAN AMPS	L1	_____	L2	_____	L3 _____
OUTDOOR-FAN AMPS	NO. 1	_____	NO. 2	_____	NO. 3 _____
	NO. 4	_____	NO. 5	_____	NO. 6 _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	_____ DB	_____ WB
RETURN-AIR TEMPERATURE	_____ DB	_____ WB
COOLING SUPPLY AIR	_____ DB	_____ WB
GAS HEAT SUPPLY AIR	_____ DB	_____ WB

PRESSURES (Heating Mode)

GAS INLET PRESSURE	_____ IN. WG	
GAS MANIFOLD PRESSURE	_____ IN. WG (LOW FIRE)	_____ IN. WG (HI FIRE)

PRESSURES (Cooling Mode)

REFRIGERANT SUCTION, CIRCUIT 1	_____ PSIG	_____ F
REFRIGERANT SUCTION, CIRCUIT 2	_____ PSIG	_____ F
REFRIGERANT DISCHARGE, CIRCUIT 1	_____ PSIG	_____ F
REFRIGERANT DISCHARGE, CIRCUIT 2	_____ PSIG	_____ F

☐ 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)

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