Installation Instructions

48TC units for installation in the United States contain use of Carrier’s Staged Air Volume (SAV™) 2-speed indoor fan control system. This complies with the U.S. Department of Energy (DOE) efficiency standard of 2018.

48TC units for installation outside the United States may or may not contain use of the SAV 2-speed indoor fan control system as they are not required to comply with the U.S. Department of Energy (DOE) efficiency standard of 2018.

For specific details on operation of the Carrier SAV 2-speed indoor fan system refer to the Variable Frequency Drive (VFD) Factory-Installed Option 2-Speed Motor Control Installation, Setup, and Troubleshooting manual.

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

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SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.
Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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 death, serious personal injury and/or property damage.

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

**WARNING**

**ELECTRICAL SHOCK HAZARD**
Failure to follow this warning could cause personal injury or death.

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

**WARNING**

**UNIT OPERATION AND SAFETY HAZARD**
Failure to follow this warning could cause personal injury, death and/or equipment damage.

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

**WARNING**

**PERSONAL INJURY AND ENVIRONMENTAL HAZARD**
Failure to follow this warning could cause personal injury or death.

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

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

**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.

**WARNING**

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

Inlet pressure tap set screw must be tightened and 1/8-in. NPT pipe plug must be installed to prevent gas leaks.

**WARNING**

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

Manifold pressure tap set screw must be tightened and 1/8-in. NPT pipe plug must be installed to prevent gas leaks.

**WARNING**

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

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

Check that furnace vent (and air intake) terminal(s) are not obstructed in any way during all seasons.
These installation instructions cover the 48TC units with gas heat and electric cooling. Units are pre-wired and pre-charged with environmentally sound Puron® (R-410A) refrigerant at the factory. See Fig. 1 for model number nomenclature. See Fig. 2-13 for unit dimensions.

**Rated Indoor Airflow (cfm)**

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

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>FULL LOAD AIRFLOW (CFM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48TC*D/E17</td>
<td>4900</td>
</tr>
<tr>
<td>48TC*D/E20</td>
<td>6125</td>
</tr>
<tr>
<td>48TC*D/E24</td>
<td>8000</td>
</tr>
<tr>
<td>48TC*D/E28</td>
<td>8750</td>
</tr>
<tr>
<td>48TC*D30</td>
<td>9750</td>
</tr>
</tbody>
</table>
### Model Series - WeatherMaker®
TC - Standard Efficiency

#### Unit Heat Type
48 - Gas Heat Packaged Rooftop

#### Heat Options
- **D** = Low Gas Heat
- **E** = Medium Gas Heat
- **F** = High Gas Heat
- **S** = Low Heat with Stainless Steel Exchanger
- **R** = Medium Heat with Stainless Steel Exchanger
- **T** = High Heat with Stainless Steel Exchanger

#### Refrig. Systems Options
- **D** = Two stage cooling model with RTPF coils
- **E** = Two stage cooling models with Humidi-MiZer®

#### 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** = CO₂
- **F** = RA Smoke Detector and CO₂
- **G** = SA Smoke Detector and CO₂
- **H** = RA + SA Smoke Detector and CO₂
- **J** = Condensate Overflow Switch (electromechanical controls only)
- **K** = Condensate Overflow Switch and RA Smoke Detectors
- **L** = Condensate Overflow Switch and RA + SA Smoke Detectors

#### 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 – Hall 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 Hall Guard
- **N** = Precoat Al/Cu – Al/Cu – Louvered Hall Guard
- **P** = E-coat Al/Cu – Al/Cu – Louvered Hall Guard
- **Q** = E-coat Al/Cu – E-coat Al/Cu – Louvered Hall Guard
- **R** = Cu/Cu – Al/Cu – Louvered Hall Guard
- **S** = Cu/Cu – Cu/Cu – Louvered Hall Guard

#### Coil Options – Novation (Outdoor – Indoor – Hall 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-coat Al/Cu
- **T** = Al/Al – Al/Cu – Louvered Hall Guard
- **U** = Al/Al – Cu/Cu – Louvered Hall Guard
- **V** = Al/Al – E-coat Al/Cu – Louvered Hall Guard
- **W** = E-coat Al/Al – Al/Cu – Louvered Hall Guard
- **X** = E-coat Al/Al – E-coat Al/Cu – Louvered Hall Guard

#### Packaging
- **0** = Standard
- **A** = Non USA models - No (SAV) included
- **C** = Non-Fused Disconnect
- **G** = Standard USA models - (SAV) included
- **J** = 2 Speed Fan Controller (VFD) & Non-Fused Disconnect

#### Electrical Options
- **A** = Base Electro-mechanical Controls (can be used with W7212 EconoMi$er IV)
- **1** = PremierLink™ Controller (for 1-speed motors only)
- **2** = RTU Open Multi-Protocol Controller
- **6** = Electro-mechanical w/ 2-Speed Fan and W7220 Economizer Controller (can be used with W7220 EconoMi$er X)

#### 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/ 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

#### 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/ PE (cert) - Vertical Air Only
- **W** = Enthalpy Ultra Low Leak Economizer w/ Baro Relief

#### Base Unit Controls
- **0** = Base Electro-mechanical Controls (can be used with W7212 EconoMi$er IV)
- **1** = PremierLink™ Controller (for 1-speed motors only)
- **2** = RTU Open Multi-Protocol Controller
- **6** = Electro-mechanical w/ 2-Speed Fan and W7220 Economizer Controller (can be used with W7220 EconoMi$er X)

#### Design Revision
- **-** = Factory Design Revision

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

---

**Fig. 1 — 48TC**17-30 Model Number Nomenclature**
Fig. 2 — 48TC17, 20 Vertical Airflow

Dedicated Vertical Airflow Unit
17,20 Size
Fig. 3 — 48TC**17, 20 Back View and Condensate Drain Location
Fig. 4 — 48TC**17, 20 Corner Weights and Clearances

Notes:
1. CLEARANCE ABOVE THE UNIT FRAME."LEFT" 
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL

<table>
<thead>
<tr>
<th>FRONT</th>
<th>CONDUCTIVE BARRIER</th>
<th>NONCONDUCTIVE BARRIER</th>
<th>CLEARANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 (122 mm)</td>
<td>48 (122 mm)</td>
<td>18 (45 mm)</td>
<td></td>
</tr>
<tr>
<td>LEFT</td>
<td>48 (122 mm)</td>
<td>48 (122 mm)</td>
<td>18 (45 mm)</td>
</tr>
<tr>
<td>TOP</td>
<td>48 (122 mm)</td>
<td>48 (122 mm)</td>
<td>18 (45 mm)</td>
</tr>
</tbody>
</table>

*STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.*
Fig. 8 — 48TC**24-28 Corner Weights and Clearances

1. CLEARANCE ABOVE THE UNIT FOR H.V.
   2. FOR ALL VERTICAL CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

<table>
<thead>
<tr>
<th>SIDE</th>
<th>CONDUCTIVE BARRIER</th>
<th>NON-CONDUCTIVE BARRIER</th>
<th>CLEARANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONT</td>
<td>46 [117 mm]</td>
<td>66 [160 mm]</td>
<td>18 [45 mm]</td>
</tr>
<tr>
<td>LEFT</td>
<td>46 [117 mm]</td>
<td>66 [160 mm]</td>
<td>18 [45 mm]</td>
</tr>
<tr>
<td>TOP</td>
<td>46 [117 mm]</td>
<td>66 [160 mm]</td>
<td>18 [45 mm]</td>
</tr>
<tr>
<td>LEFT WITH HOOD</td>
<td>46 [117 mm]</td>
<td>66 [160 mm]</td>
<td>18 [45 mm]</td>
</tr>
<tr>
<td>FRONT</td>
<td>46 [117 mm]</td>
<td>66 [160 mm]</td>
<td>18 [45 mm]</td>
</tr>
</tbody>
</table>

NOTE:
1. CLEARANCE ABOVE THE UNIT FOR H.V.
2. FOR ALL VERTICAL CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

*WORK IN PROGRESS*
Fig. 10 — 48TC**30 Vertical Airflow
Fig. 11 — 48TC.30 Back View and Condensate Drain Location
Fig. 12 — 48TC-30 Corner Weights and Clearances

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORNER A</td>
<td>CORNER B</td>
</tr>
<tr>
<td>CORNER C</td>
<td>CORNER D</td>
</tr>
<tr>
<td>TOP</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. CLEARANCE ABOVE THE UNIT FLOOR IS 36".
2. FOR ALL MINIMUM CLEARANCES, LOCAL CODES OR INSTRUCTIONS MAY PREVAIL.

<table>
<thead>
<tr>
<th>Service Data</th>
<th>Service Data</th>
<th>Operating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>Conductive Barrier</td>
<td>Nonconductive Barrier</td>
</tr>
<tr>
<td>FRONT</td>
<td>48 (1270) mm</td>
<td>48 (1270) mm</td>
</tr>
<tr>
<td>LEFT</td>
<td>48 (1270) mm</td>
<td>48 (1270) mm</td>
</tr>
<tr>
<td>TOP</td>
<td>48 (1270) mm</td>
<td>48 (1270) mm</td>
</tr>
</tbody>
</table>

U.S. ENGINER  4038 5 07/11/19  10/09/15  UNIC 25-43 400V 3PH 120/208 3-PHASE ELECTRICAL  GMP05-14  C
INSTALLATION

Job-Site 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. 4, 8, and 12.

NOTE: Consider also the effect of adjacent units. Be sure that unit is installed such that snow will not block the combustion intake or flue 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-S4-S4-1. 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 2.

Step 2 — Plan for Sequence of Unit Installation

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

CURB-MOUNTED INSTALLATION

1. Install curb
2. Install field-fabricated ductwork inside curb
3. Install accessory thru-base service connection package (affects curb and unit) (refer to accessory installation instructions for details)
4. Rig and place unit
5. Remove top skid
6. Install outdoor air hood
7. Install smoke detector tube
8. Install combustion air hood
9. Install flue hood
10. Install gas piping
11. Install condensate line trap and piping
12. Make electrical connections
13. Install other accessories

PAD-MOUNTED INSTALLATION

1. Prepare pad and unit supports
2. Rig and place unit
3. Remove duct covers and top skid
4. Install smoke detector return air sensor tube
5. Install field-fabricated ductwork at unit duct openings
6. Install outdoor air hood
7. Install combustion air hood
8. Install flue hood
9. Install gas piping
10. Install condensate line trap and piping
11. Make electrical connections
12. 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 in the rear blower assembly. Do not remove carton until unit has been rigged and located in final position.

Step 4 — Provide Unit Support

ROOF CURB MOUNT

Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 14. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

Accessory roof curb details and dimensions are shown in Fig. 16-18.

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. 15 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, see Fig. 15. Depending on the unit size, see Fig. 2, 6, or 10 for the location of the knockouts. Attach the service connections to the basepan.
NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 16-18. Improperly applied gasket can also result in air leaks and poor unit performance.

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

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

MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

<table>
<thead>
<tr>
<th></th>
<th>A-B</th>
<th>B-C</th>
<th>A-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 — Operating Weights

<table>
<thead>
<tr>
<th>48TC</th>
<th>UNITS — lb (kg)</th>
<th>17</th>
<th>20</th>
<th>24</th>
<th>28</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14-in. (356 mm)</td>
<td>240</td>
<td>240</td>
<td>255</td>
<td>255</td>
<td>255</td>
</tr>
<tr>
<td></td>
<td>24-in. (610 mm)</td>
<td>340</td>
<td>340</td>
<td>355</td>
<td>355</td>
<td>355</td>
</tr>
<tr>
<td></td>
<td>1824 (829)</td>
<td>1839 (836)</td>
<td>1989 (904)</td>
<td>2118 (963)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Novation® Coil</td>
<td>1907 (867)</td>
<td>1922 (874)</td>
<td>2072 (942)</td>
<td>2197 (999)</td>
<td>2640 (1200)</td>
<td></td>
</tr>
<tr>
<td>RTPF Coil</td>
<td>246 (112)</td>
<td>246 (112)</td>
<td>246 (112)</td>
<td>246 (112)</td>
<td>246 (112)</td>
<td></td>
</tr>
<tr>
<td>Economizer</td>
<td>35 (16)</td>
<td>35 (16)</td>
<td>35 (16)</td>
<td>35 (16)</td>
<td>35 (16)</td>
<td></td>
</tr>
<tr>
<td>Powered Outlet</td>
<td>110 (50)</td>
<td>110 (50)</td>
<td>120 (54)</td>
<td>120 (54)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Humidi-MiZer® System</td>
<td>240 (109)</td>
<td>240 (109)</td>
<td>255 (116)</td>
<td>255 (116)</td>
<td>255 (116)</td>
<td></td>
</tr>
<tr>
<td>Curb</td>
<td>340 (154)</td>
<td>340 (154)</td>
<td>355 (161)</td>
<td>355 (161)</td>
<td>355 (161)</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 16 — Roof Curb Details — 17 and 20 Size Units
Fig. 17 — Roof Curb Details — 24 and 28 Size Units
Fig. 18 — Roof Curb Details — 30 Size Units
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.

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

POSITIONING ON CURB

Position unit on roof curb so that the following clearances are maintained: 1/4-in. (6 mm) clearance between the roof curb and the base rail inside the right and left, 1/2-in. (12 mm) clearance between the roof curb and the base rail inside the front and back. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately equal to Details A and B in Fig. 16-18.

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-in. (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.

![Fig. 19 — Rigging Details](image)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>MAX WEIGHT</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LB</td>
<td>KG</td>
</tr>
<tr>
<td>48TC**17</td>
<td>2355</td>
<td>1068</td>
</tr>
<tr>
<td>48TC**20</td>
<td>2370</td>
<td>1075</td>
</tr>
<tr>
<td>48TC**24</td>
<td>2516</td>
<td>1141</td>
</tr>
<tr>
<td>48TC**28</td>
<td>2652</td>
<td>1203</td>
</tr>
<tr>
<td>48TC**30</td>
<td>2976</td>
<td>1353</td>
</tr>
</tbody>
</table>

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 the unit.

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage. All panels must be in place when rigging. Unit is not designed for handling by fork truck when packaging is removed.

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

Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on the unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 2 and Fig. 19 for additional information.

Lifting holes are provided in base rails as shown in Fig. 19. Refer to rigging instructions on the unit.

![Fig. 19 — Rigging Details](image)
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. 20). 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. 21).

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.

To assemble the outside air hood (see Fig. 22 for hood component locations):
1. Remove hood top panel from shipping position on unit end.
2. Install filters supports (item #1) to the upper end panel using the screws provided.
3. Install each deflector (item #8) on to each filter support (item #1) using the screws provided.
4. Apply seal strip to mating flanges on side plates of hood (items #4 and #5).
5. Secure side panels (items #4 and #5) to upper panel using the screws provided.
6. Apply seal strip to mating flange of the hood (see Fig. 22).
7. Secure hood (item #3) to upper panel using the screws provided.
8. Secure side retainers (item #6) to side panels (items #4 and #5) using the screws provided, screwing from outside of the hood.
9. Secure each central retainer (item #2) to the hood (item #3). Then align central retainers to holes located on filter support (item #1), so central retainer is perpendicular to hood and each filter support. Secure using screws provided.
10. Apply seal strip to top diverters (item #7).
11. Secure top diverters (item #7) to hood (item #3).
12. Install outdoor air screens by sliding them into each of the four spaces created by the hood, filter support and central retainers. To do so, first insert the air screens into pocket created at the end of hood (item #3), then fully put the air screen into place, and then slide them back into pocket created in the filter support (item #1). Repeat this for each air screen (see Fig. 23). See Fig. 24 for completed hood assembly.
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. 25. 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. 25.

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 (NG) 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 (LP) 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. The input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 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 liquefied 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.

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, see Table 3. For LP gas application pressures, see Table 4.

<table>
<thead>
<tr>
<th>Table 3 — Natural Gas Supply Line Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT MODEL</td>
</tr>
<tr>
<td>48TC**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4 — LP Supply Line Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT MODEL</td>
</tr>
<tr>
<td>48TC**</td>
</tr>
</tbody>
</table>

Manifold pressure is factory-adjusted for NG fuel use. Adjust as required to obtain best flame characteristics. See Table 5 and 6 for ranges.
Table 5 — Natural Gas Manifold Pressure Ranges

<table>
<thead>
<tr>
<th>UNIT MODEL</th>
<th>UNIT SIZE</th>
<th>HIGH FIRE</th>
<th>LOW FIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>48TC**</td>
<td>17, 20, 24, 28, 30</td>
<td>3.0 in. wg (747 Pa)</td>
<td>2.0 in. wg (498 Pa)</td>
</tr>
</tbody>
</table>

Table 6 — LP Manifold Pressure Ranges

<table>
<thead>
<tr>
<th>UNIT MODEL</th>
<th>UNIT SIZE</th>
<th>HIGH FIRE</th>
<th>LOW FIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>48TC**</td>
<td>17, 20, 24, 28, 30</td>
<td>11.0 in. wg (2737 Pa)</td>
<td>7.3 in. wg (1816 Pa)</td>
</tr>
</tbody>
</table>

---

**CAUTION**

EQUIPMENT DAMAGE
Failure to follow this caution may result in equipment damage.
When connecting the gas line to the unit gas valve, the installer MUST use a backup wrench to prevent damage to the valve.

Putting the gas pipe to the 90 degree elbow item 15 (see Table 7) through the hole in the unit basepan.

For typical 3/4-in. NPT field supplied fittings required for NON Thru-Base gas supply starting from the unit gas valve, omit items 14 and 15 from Table 7 and pipe gas supply into Tee. See Fig. 27.

Table 7 — Typical 3/4-in. NPT Field Supplied Piping Parts

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>90° Street Elbow</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5 in. Long Nipple</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Ground - Joint Union</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>3 in. Long Nipple</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>90° Elbow</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>12 in. Long Nipple</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>90° Elbow</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>3 in. Long Nipple</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Tee</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>4 in. Long Nipple (Sediment Trap)</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Cap</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>3 1/2 in. Long Nipple</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>NIBCO® Ball Valve (PN: GB30)</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>8 in. Long Nipple</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>90° Elbow</td>
</tr>
</tbody>
</table>

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. 28.
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. (22 mm) knockout and appropriate connector for low voltage wiring. If a non-unit powered convenience outlet is being utilized, remove the 7/8-in. (22 mm) knockout and utilize appropriate connector for 115 volt line. See “Step 11 — Make Electrical Connections” on page 27 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. 26 and Table 7. 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. 28 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).

LEGEND
*Field supplied.
NOTE: Follow all local codes.
NFGC – National Fuel Gas Code
STEEL PIPE
NOMINAL DIAMETER (in.) SPACING OF SUPPORTS X DIMENSION (ft)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Spacing of Supports X Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>6</td>
</tr>
<tr>
<td>3/4 or 1</td>
<td>8</td>
</tr>
<tr>
<td>11/4 or larger</td>
<td>10</td>
</tr>
</tbody>
</table>

Fig. 28 — Gas Piping Guide

Step 10 — Install External Condensate Trap and Line

The unit has one 3/4-in. condensate drain connection on the end of the condensate pan (see Fig. 30). See Fig. 3, 7, and 11 for the location of the condensate drain connection.
Fig. 30 — 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. 31.

Fig. 31 — 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

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. 32.

Fig. 32 — 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. See Fig. 33. NOTE: Make field power connections directly to line connection pressure lugs only.

WARNING

FIRE HAZARD

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

Do not connect aluminum wire between disconnect switch and unit. Use only copper wire.

Fig. 33 — Disconnect Switch and Unit
UNITS WITH 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. 34). 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 in.
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.

Fig. 34 — 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. 35 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. On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown below to determine the percent of voltage imbalance.

\[
\text{% Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}
\]
Example: Supply voltage is 230-3-60

\[
\begin{align*}
AB &= 224 \text{ v} \\
BC &= 231 \text{ v} \\
AC &= 226 \text{ v}
\end{align*}
\]

Average Voltage \(= \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227 \text{ v}\)

Determine maximum deviation from average voltage:

- \((AB) 227-224 = 3 \text{ v}\)
- \((BC) 231-227 = 4 \text{ v}\)
- \((AC) 227-226 = 1 \text{ v}\)

Maximum deviation is 4 v.

Determine percent of voltage imbalance:

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

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

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

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

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**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.

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**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-v 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. 36.

**Fig. 36 — 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. 37. 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.

**Non-powered type**

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

A unit-mounted transformer which is factory-installed to step-down the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit’s control box access panel. See Fig. 38.

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. 38. See Fig. 39 for convenience outlet utilization precautions.

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-energized is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

**FACTORY-OPTION THRU-BASE CONNECTIONS (ELECTRICAL 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. 35.

**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 ensure separation of the field.

---

**Fig. 38 — Powered Convenience Outlet Wiring**

**Fig. 39 — 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.
low voltage wire and the high voltage circuit. Route the low voltage wire to the central terminal board. See Fig. 40.

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

![Fig. 40 — Typical Low-Voltage Control Connections](image)

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 system is a factory installed option which is 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) (see Fig. 42) or a combination thermostat-humidistat control device such as Carrier’s EDGE® Pro Thermidistat (see Fig. 43) 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. 41) 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. 44.

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. 42) 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. The Thermidistat has dry contacts at terminals D1 and D2 for dehumidification operation (see Fig. 45). 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 for more information.

![Fig. 41 — Field Control Wiring Raceway](image)
Fig. 42 — Accessory Field-Installed Humidistat

Fig. 43 — Edge® Pro Thermidistat

Fig. 44 — Typical Humidi-MiZer® Adaptive Dehumidification System Humidistat Wiring
**EconoMi$er® X (Factory-Installed Option)**

**PRODUCT DESCRIPTION**

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

**SYSTEM COMPONENTS**

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

**Economizer Module**

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

**S-Bus Enthalpy Control Sensors**

The S-Bus enthalpy control sensors are a combination temperature and humidity sensor which is powered by and communicates on the S-Bus. Up to three sensors may be configured with the W7220 economizer module. See page 34 for details.

**CO₂ Sensor (optional)**

This sensor can be added for Demand Controlled Ventilation (DCV).

**SPECIFICATIONS**

**W7220 Economizer Module**

The module is designed for use with 2 to 10 Vdc or bus communicating actuator. The module includes terminals for CO₂ sensor, Mixed Air sensor, and an outdoor dry bulb sensor. Enthalpy and other options are available with bus sensors.

**User Interface**

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

**Electrical**

- Rated Voltage — 20 to 30 Vac RMS, 50/60 Hz
- Transformer — 100 va maximum system input
- Nominal Power Consumption (at 24 Vac, 60 Hz) — 11.5 VA without sensors or actuators
Relay Digital Output Rating at 30 Vac (maximum power from Class 2 input only) — 1.5A run:
3.5A inrush at 0.45PF (200,000 cycles) or
7.5A inrush at 0.45PF (100,000 cycles)
External Sensors Power Output — 21 Vdc ± 5% at 48mA

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

**Inputs**

**Sensors**

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

Dry Bulb Temperature (optional) and Mixed Air (required),
20k NTC
2-wire (18 to 22 AWG);
Temperature range –40°F to 150°F (–40°C to 65°C)
Temperature accuracy –0°F/+2°F

Temperature and Humidity, C7400S1000 (optional)
S-Bus; 2-wire (18 to 22 AWG)
Temperature: range –40°F to 150°F (–40°C to 65°C)
Temperature accuracy –0°F/+2°F
Humidity: range 0 to 100% RH with 5% accuracy.

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

4 Binary Inputs
1-wire 24 Vac + common GND (see “Economizer Module Wiring Details”). 24 Vac power supply: 20 to 30 Vac 50/60 Hz; 100 VA Class 2 transformer.

**Outputs**

**Actuator Signal:**
2-10 Vdc; minimum actuator impedance is 2k ohm; bus two-wire output for bus communicating actuators.

**Exhaust fan, Y1, Y2 and AUX1 O:**
All Relay Outputs (at 30 Vac):
Running: 1.5A maximum
Inrush: 7.5A maximum

**Environmental**

**Operating Temperature:**
–40°F to 150°F (–40°C to 65°C).
Exception of display operation down to –4°F (–20°C) with full recovery at –4°F (–20°C) from exposure to –40°F (–40°C)

**Storage Temperature:**
–40°F to 150°F (–40°C to 65°C)

**Shipping Temperature:**
–40°F to 150°F (–40°C to 65°C)

**Relative Humidity:**
5% to 95% RH non-condensing

**Economizer Module Wiring Details**

Use Fig. 47 and Tables 8 and 9 to locate the wiring terminals for the Economizer module.

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

**S-Bus Sensor Wiring**

The labels on the sensors and controller are color coded for ease of installation. Orange labeled sensors can only be wired to orange terminals on the controller. Brown labeled sensors can only be wired to S-bus (brown) terminals. Use Fig. 48 and Table 10 to locate the wiring terminals for each S-Bus sensor.

Use Fig. 48 and Table 11 to set the DIP switches for the desired use of the sensor.

**Table 8 — Economizer Module - Left Hand Terminal Blocks**

<table>
<thead>
<tr>
<th>LABEL</th>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 20k NTC and COM</td>
<td>Mixed Air Temperature Sensor (Polarity Insensitive Connection)</td>
<td></td>
</tr>
<tr>
<td>OAT 20k NTC and COM</td>
<td>Outdoor Air Temperature Sensor (Polarity Insensitive Connection)</td>
<td></td>
</tr>
<tr>
<td>S-BUS S-BUS (Sylk* Bus)</td>
<td>Enthalpy Control Sensor (Polarity Insensitive Connection)</td>
<td></td>
</tr>
</tbody>
</table>

*Sylk is a trademark of Honeywell International Inc.*
Table 9 — Economizer Module - Right Hand Terminal Blocks

<table>
<thead>
<tr>
<th>LABEL</th>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX2 I</td>
<td>24 vac IN</td>
<td>The first terminal is not used.</td>
</tr>
<tr>
<td>OCC</td>
<td>24 vac IN</td>
<td>Shut Down (SD) or HEAT (W) Conventional only and Heat Pump Changeover (O-B) in Heat Pump mode.</td>
</tr>
<tr>
<td>E-GND</td>
<td>E-GND</td>
<td>Occupied/Unoccupied Input</td>
</tr>
<tr>
<td>EXH1</td>
<td>24 vac OUT</td>
<td>Exhaust Fan 1 Output</td>
</tr>
<tr>
<td>AUX1 O</td>
<td>24 vac OUT</td>
<td>Programmable: Exhaust fan 2 output or ERV or System alarm output</td>
</tr>
</tbody>
</table>

Bottom Right Terminal Blocks

| Y2-I | 24 vac IN | Y2 in - Cooling Stage 2 Input from space thermostat |
| Y2-O | 24 vac OUT | Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling |
| Y1-I | 24 vac IN | Y1 in - Cooling Stage 2 Input from space thermostat |
| Y1-O | 24 vac OUT | Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling |
| C | COM | 24 vac Common |
| R | 24 vac | 24 vac Power (hot) |

Table 10 — HH57AC081 Sensor Wiring Terminations

<table>
<thead>
<tr>
<th>TERMINAL</th>
<th>NUMBER</th>
<th>LABEL</th>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S-BUS</td>
<td>S-BUS Communications (Enthalpy Control Sensor Bus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>S-BUS</td>
<td>S-BUS Communications (Enthalpy Control Sensor Bus)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use Fig. 48 and Table 10 to locate the wiring terminals for each enthalpy control sensor.

Table 11 — HH57AC081 Sensor DIP Switch

<table>
<thead>
<tr>
<th>USE</th>
<th>DIP SWITCH POSITIONS FOR SWITCHES 1, 2, AND 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA</td>
<td>OFF</td>
</tr>
<tr>
<td>RA</td>
<td>OFF</td>
</tr>
<tr>
<td>OA</td>
<td>OFF</td>
</tr>
</tbody>
</table>

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

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

CO2 SENSOR WIRING

When using a CO2 sensor, the black and brown common wires are internally connected and only one is connected to “IAQ COM” on the W7220. Use the power from the W7220 to power the CO2 sensor OR make sure the ground for the power supplies are common. See Fig. 49 for CO2 sensor wiring.

Fig. 49 — CO2 Sensor Wiring

POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

INTERFACE OVERVIEW

This section describes how to use the economizer’s user interface for:

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

USER INTERFACE

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

KEYPAD

The four navigation buttons (see Fig. 50) are used to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.
To use the keypad when working with menus:
- Press the ▲ (Up arrow) button to move to the previous menu.
- Press the ▼ (Down arrow) button to move to the next menu.
- Press the (Enter) button to display the first item in the currently displayed menu.
- Press the  (Menu Up/Exit) button to exit a menu’s item and return to the list of menus.

![Fig. 50 — W7220 Controller Menu Buttons](image)

**MENU STRUCTURE**

Table 12 illustrates the complete hierarchy of menus and parameters for the EconoMi$er® X system.

The Menus in display order are:
- STATUS
- SETPOINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

**NOTE:** Table 12 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration.

For example, if you do not have a DCV (CO₂) sensor, then none of the DCV parameters appear and only MIN POS will display. If you have a CO₂ sensor, the DCV MIN and DCV MAX will appear AND if you have 2 speed fan DCV MIN (high and low speed) and DCV MAX (high and low speed will appear).

**SETUP AND CONFIGURATION**

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

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

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

**TIME-OUT AND SCREENSAVER**

When no buttons have been pressed for 10 minutes, the LCD displays a screen saver, which cycles through the Status items. Each Status items displays in turn and cycles to the next item after 5 seconds.
## Table 12 — Menu Structure

<table>
<thead>
<tr>
<th>MENU</th>
<th>PARAMETER</th>
<th>PARAMETER DEFAULT VALUE</th>
<th>PARAMETER RANGE AND INCREMENT</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECONO AVAIL</td>
<td>NO</td>
<td>YES/NO</td>
<td></td>
<td>FIRST STAGE COOLING DEMAND (Y1–IN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES = economizing available; the system can use outside air for free cooling when required</td>
</tr>
<tr>
<td>ECONOMIZING</td>
<td>NO</td>
<td>YES/NO</td>
<td></td>
<td>FIRST STAGE COOLING RELAY OUTPUT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES = outside air being used for 1 stage cooling</td>
</tr>
<tr>
<td>OCCUPIED</td>
<td>NO</td>
<td>YES/NO</td>
<td></td>
<td>OCCUPIED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES = OCC signal received from space thermostat or unitary controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NO = 24 Vac on terminal OCC</td>
</tr>
<tr>
<td>HEAT PUMP</td>
<td>N/A</td>
<td>COOL HEAT</td>
<td></td>
<td>HEAT PUMP MODE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays COOL or HEAT when system is set to heat pump (Non-conventional)</td>
</tr>
<tr>
<td>COOL Y1–IN</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>0°F to 140°F (–18°C to 60°C)</td>
<td>FIRST STAGE COOLING DEMAND (Y1–IN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Y1–I signal from space thermostat or unitary controller for cooling stage 1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ON = 24 Vac on terminal Y1–I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OFF = 0 Vac on terminal Y1–I</td>
</tr>
<tr>
<td>COOL Y1–OUT</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>0°F to 140°F (–18°C to 60°C)</td>
<td>FIRST STAGE COOLING RELAY OUTPUT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cool stage 1 Relay Output to stage 1 mechanical cooling (Y1–OUT terminal)</td>
</tr>
<tr>
<td>COOL Y2–IN</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>0°F to 140°F (–18°C to 60°C)</td>
<td>SECOND STAGE COOLING DEMAND (Y2–IN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Y2–I signal from space thermostat or unitary controller for second stage cooling.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ON = 24 Vac on terminal Y2–I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OFF = 0 Vac on terminal Y2–I</td>
</tr>
<tr>
<td>COOL Y2–OUT</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>0°F to 140°F (–18°C to 60°C)</td>
<td>SECOND STAGE COOLING RELAY OUTPUT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cool Stage 2 Relay Output to mechanical cooling (Y2–OUT terminal)</td>
</tr>
<tr>
<td>MA TEMP</td>
<td>_ _ _ F</td>
<td></td>
<td>SUPPLY AIR TEMPERATURE, Cooling Mode</td>
<td>Displays value of measured mixed air from MAT sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ _ F if not connected, short or out-of-range.</td>
</tr>
<tr>
<td>DA TEMP</td>
<td>_ _ _ F</td>
<td></td>
<td>DISCHARGE AIR TEMPERATURE, after Heating section</td>
<td>Displays when Discharge Air sensor is connected and displays measured discharge temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ _ F if sensor sends invalid value, if not connected, short or out-of-range.</td>
</tr>
<tr>
<td>OA TEMP</td>
<td>_ _ _ F</td>
<td>–40°F to 140°F (-40°C to 60°C)</td>
<td>OUTSIDE AIR TEMPERATURE</td>
<td>Displays measured value of outdoor air temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ _ F if sensor sends invalid value, short or out-of-range.</td>
</tr>
<tr>
<td>OA HUM</td>
<td>_ _ %</td>
<td>0 to 100%</td>
<td>OUTSIDE AIR RELATIVE HUMIDITY</td>
<td>Displays measured value of outdoor humidity from OA sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ % if not connected, short, or out-of-range.</td>
</tr>
<tr>
<td>RA TEMP</td>
<td>_ _ _ F</td>
<td>0°F to 140°F (–18°C to 60°C)</td>
<td>RETURN AIR TEMPERATURE</td>
<td>Displays measured value of return air temperature from RAT sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ _ F if sensor sends invalid value, if not connected, short or out-of-range.</td>
</tr>
<tr>
<td>RA HUM</td>
<td>_ _ %</td>
<td>0 to 100%</td>
<td>RETURN AIR RELATIVE HUMIDITY</td>
<td>Displays measured value of return air humidity from RA sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Displays _ _ % if sensor sends invalid value, if not connected, short or out-of-range.</td>
</tr>
<tr>
<td>IN CO2</td>
<td>_ _ ppm</td>
<td>0 to 2000 ppm</td>
<td>SPACE/RETURN AIR CO2</td>
<td>Displays value of measured CO2 from CO2 sensor. Invalid if not connected, short or out-of-range.</td>
</tr>
<tr>
<td>DCV STATUS</td>
<td>N/A</td>
<td>ON/OFF</td>
<td>DEMAND CONTROLLED VENTILATION STATUS</td>
<td>Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO2 sensor is connected.</td>
</tr>
<tr>
<td>DAMPER OUT</td>
<td>2.0v</td>
<td>2.0 to 10.0v</td>
<td>Displays voltage output to the damper actuator.</td>
<td></td>
</tr>
<tr>
<td>ACT POS</td>
<td>N/A</td>
<td>0 to 100%</td>
<td>Displays actual position of outdoor air damper actuator.</td>
<td></td>
</tr>
<tr>
<td>ACT COUNT</td>
<td>N/A</td>
<td>1 to 65535</td>
<td>Displays number of times actuator has cycled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 cycles equals 180 deg. of actuator movement in any direction.</td>
<td></td>
</tr>
<tr>
<td>ACTUATOR</td>
<td>N/A</td>
<td>OK/Alarm (on Alarm menu)</td>
<td>Displays ERROR if voltage or torque is below actuator range.</td>
<td></td>
</tr>
<tr>
<td>EXH1 OUT</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>EXHAUST STAGE 1 RELAY OUTPUT</td>
<td>Output of EXH1 terminal: ON = relay closed OFF = relay open</td>
</tr>
</tbody>
</table>
### Table 12 — Menu Structure (cont)

<table>
<thead>
<tr>
<th>MENU</th>
<th>PARAMETER</th>
<th>PARAMETER DEFAULT VALUE</th>
<th>PARAMETER RANGE AND INCREMENT</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS (cont)</td>
<td>EXH2 OUT</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>EXHAUST STAGE 2 RELAY OUTPUT Output of AUX terminal; displays only if AUX = EXH2</td>
</tr>
<tr>
<td></td>
<td>ERV</td>
<td>OFF</td>
<td>ON/OFF</td>
<td>ENERGY RECOVERY VENTILATOR Output of AUX terminal; displays only if AUX = ERV</td>
</tr>
<tr>
<td></td>
<td>MECH COOL ON or HEAT STAGES ON</td>
<td>0</td>
<td>0, 1, or 2</td>
<td>Displays stage of mechanical cooling that is active. Displays the stage of heat pump heating that is active.</td>
</tr>
<tr>
<td></td>
<td>FAN SPEED</td>
<td>N/A</td>
<td>LOW or HIGH</td>
<td>SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.</td>
</tr>
<tr>
<td></td>
<td>W (HEAT ON)</td>
<td>N/A</td>
<td>ON/OFF</td>
<td>HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.</td>
</tr>
<tr>
<td></td>
<td>MAT SET</td>
<td>53F</td>
<td>38°F to 65°F (3°C to 18°C); increment by 1°F</td>
<td>SUPPLY AIR SETPOINT Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.</td>
</tr>
<tr>
<td></td>
<td>LOW T LOCK</td>
<td>32F</td>
<td>–45°F to 80°F (~43°C to 27°C); increment by 1°F</td>
<td>COMPRESSOR LOW TEMPERATURE LOCKOUT Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout.</td>
</tr>
<tr>
<td></td>
<td>DRYBLB SET</td>
<td>63F</td>
<td>48°F to 80°F (9°C to 27°C); increment by 1°F</td>
<td>OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63°F unit will economize at 62°F and below and not economize at 64°F and above. There is a 2°F deadband.</td>
</tr>
<tr>
<td></td>
<td>ENTH CURVE</td>
<td>ES3</td>
<td>ES1, ES2, ES3, ES4, or ES5</td>
<td>ENTHALPY CHANGEOVER CURVE Enthalpy boundary “curves” for economizing using single enthalpy.</td>
</tr>
<tr>
<td></td>
<td>DCV SET</td>
<td>1100ppm</td>
<td>500 to 2000ppm; increment by 100</td>
<td>DEMAND CONTROLLED VENTILATION Displays only if CO2 sensor is connected. Setpoint for Demand Controlled Ventilation of space. Above the setpoint, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the setpoint.</td>
</tr>
<tr>
<td></td>
<td>MIN POS</td>
<td>2.8 V</td>
<td>2 to 10 Vdc</td>
<td>VENTILATION MINIMUM POSITION Displays ONLY if a CO2 sensor is NOT connected.</td>
</tr>
<tr>
<td></td>
<td>VENTMAX</td>
<td>2.8 V</td>
<td>2 to 10 Vdc</td>
<td>DCV MAXIMUM DAMPER POSITION Displays only if a CO2 sensor is connected. Used for Vbz (ventilation max cfm) setpoint. Displays 2 to 10 V if &lt;3 sensors (RA, OA, and MA). In AUTO mode dampers controlled by CFM.</td>
</tr>
<tr>
<td></td>
<td>VENTMIN</td>
<td>2.25 V</td>
<td>2 to 10 Vdc or 100 to 9990 cfm; increment by 10</td>
<td>DCV MINIMUM DAMPER POSITION Displays only if a CO2 sensor is connected. Used for Ba (ventilation min cfm) setpoint. Displays 2 to 10 V if &lt;3 sensors (RA, OA, and MA). Va is only set if DCV is used. This is the ventilation for less than maximum occupancy of the space. In AUTO mode dampers controlled by CFM.</td>
</tr>
<tr>
<td></td>
<td>ERV OAT SP</td>
<td>32°F</td>
<td>0°F to 50°F (~18°C to 10°C); increment by 1°F</td>
<td>ENERGY RECOVERY VENTILATOR UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only when AUX1 O = ERV</td>
</tr>
<tr>
<td></td>
<td>EXH1 SET</td>
<td>50%</td>
<td>0 to 100%; increment by 1</td>
<td>EXHAUST FAN STAGE 1 SETPOINT Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. With 2-speed fan units Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required. Default for Exh1 L is 65% and Exh1 H is 50%</td>
</tr>
<tr>
<td></td>
<td>EXH2 SET</td>
<td>75%</td>
<td>0 to 100%; increment by 1</td>
<td>EXHAUST FAN STAGE 2 SETPOINT Setpoint for OA damper position when exhaust fan 2 is powered by the economizer. Only used when AUX1 O is set to EH2. With 2-speed fan units Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required. Default for Exh2 L is 80% and Exh2 H is 75%</td>
</tr>
<tr>
<td>MENU</td>
<td>PARAMETER</td>
<td>PARAMETER DEFAULT VALUE</td>
<td>PARAMETER RANGE AND INCREMENT</td>
<td>NOTES</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>-------------------------</td>
<td>------------------------------</td>
<td>-------</td>
</tr>
</tbody>
</table>
| SYSTEM SETUP | INSTALL | 01/01/10 | N/A | Display order = MM/DD/YY  
Setting order = DD, MM, then YY. |
|  | UNITS DEG | F | F or C | Sets economizer controller in degrees Fahrenheit or Celsius |
|  | EQUIPMENT CONV | Conventional or HP | CONV = conventional;  
HP O/B = Enable Heat Pump mode. Use AUX2 I for Heat Pump input from thermostat or controller.  
See Menu Note 4. |
|  | AUX2 IN | W | SD/W or HP(O)/HP(B) | In CONV mode:  
SD + Enables configuration of shutdown (default);  
W = Informs controller that system is in heating mode.  
NOTE: If using 2-speed fan mode, you must program CONV mode for W. Shutdown is not available in 2-speed fan mode.  
See Menu Note 4.  
In HP O/B mode:  
HP(O) = energize heat pump on Cool (default);  
HP(B) = energize heat pump on heat. |
|  | FAN SPEED | 2 speed | 1 speed/2 speed | Sets the economizer controller for operation of 1 speed or 2 speed supply fan.  
NOTE: 2-speed fan option also needs Heat (W1) programmed in AUX2 IN.  
See Menu Note 4. |
|  | FAN CFM | 5000cfm | 100 to 15000 cfm; increment by 100 | UNIT DESIGN AIRFLOW (CFM)  
Enter only if using DCVAL ENA = AUTO  
The value is found on the nameplate label for the specific unit. |
|  | AUX1 OUT | NONE | NONE | Select OUTPUT for AUX1 O relay  
• NONE = not configured (output is not used)  
• ERV = Energy Recovery Ventilator  
• EXH2 = second damper position relay closure for second exhaust fan  
• SYS = use output as an alarm signal |
|  | OCC | INPUT | INPUT or ALWAYS | OCCUPIED MODE BY EXTERNAL SIGNAL  
When using a setback thermostat with occupancy out (24 vac),  
the 24 vac is input “INPUT” to the OCC terminal. If no occupancy output from the thermostat then change program to “ALWAYS” OR add a jumper from terminal R to OCC terminal. |
|  | FACTORY DEFAULT | NO | NO or YES | Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to the factory default values.  
NOTE: RECHECK AUX2 IN and FANTYPE for required 2-speed values. |
| ADVANCED SETUP | MALO SET | 45 F | 35°F to 55°F (2°F to 13°F); incremented by 10°F | SUPPLY AIR TEMPERATURE LOW LIMIT  
Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value). |
|  | FREEZE POS | CLO | CLO or MIN | FREEZE PROTECTION DAMPER POSITION  
Damper position when freeze protection is active (closed or MIN POS). |
|  | CO2 ZERO | 0ppm | 0 to 500 ppm; Increment by 10 | CO2 ppm level to match CO2 sensor start level. |
|  | CO2 SPAN | 2000ppm | 1000 to 3000 ppm; Increment by 10 | CO2 ppm span to match CO2 sensor. |
|  | STG3 DLY | 2.0h | 0 min, 5 min, 15 min, then 15 min intervals. Up to 4 hrs or OFF | COOLING STAGE 3 DELAY  
Delay after stage 2 cool has been active. Turns on second stage of cooling when economizer is first stage and mechanical cooling is second stage. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling |
|  | SD DMPR POS | CLO | CLO or OPN | Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 Vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., fans, etc. will shut off. |
|  | DA LO ALM | 45 F (7 C) | 35°F to 65°F; (2°C to 18°C) Incremented by 5°F | Used for alarm when the DA air temperature is too low. Set lower range of alarm, Below this temperature the alarm will show on the display. |
|  | DA HI ALM | 80 F (27 C) | 70°F to 180°F; (21°C to 82°C) Incremented by 5°F | Used for alarm when the DA air temperature is too high. Set higher range of alarm, Above this temperature the alarm will show on the display. |
|  | DCVCAL ENA | MAN | MAN (manual) AUTO | Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA, and MA sensor conditions. Requires all 3 RA, OA, and MA sensors. |
### ADVANCED SETUP (cont)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>DEFAULT VALUE</th>
<th>RANGE AND INCREMENT</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT T CAL</td>
<td>0.0°F</td>
<td>±2.5°F</td>
<td>SUPPLY AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.</td>
</tr>
<tr>
<td>OAS T CAL</td>
<td>0.0°F</td>
<td>±2.5°F</td>
<td>OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.</td>
</tr>
<tr>
<td>OA H CAL</td>
<td>0% RH</td>
<td>±10% RH</td>
<td>OUTSIDE AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.</td>
</tr>
<tr>
<td>RA T CAL</td>
<td>0.0°F</td>
<td>±2.5°F</td>
<td>RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.</td>
</tr>
<tr>
<td>RA H CAL</td>
<td>0% RH</td>
<td>±10% RH</td>
<td>RETURN AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.</td>
</tr>
<tr>
<td>DA T CAL</td>
<td>0.0°F</td>
<td>±2.5°F</td>
<td>DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.</td>
</tr>
<tr>
<td>2SP FAN DELAY</td>
<td>5 Minutes</td>
<td>0 to 20 minutes in 1 minute increments</td>
<td>TIME DELAY ON SECOND STAGE ECONOMIZING When in economizing mode this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.</td>
</tr>
<tr>
<td>DAMPER MINIMUM POSITION</td>
<td>N/A</td>
<td>N/A</td>
<td>The checkout for the damper minimum position is based on the system. See Table 13.</td>
</tr>
<tr>
<td>DAMPER OPEN</td>
<td>N/A</td>
<td>N/A</td>
<td>Position damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure you pause in the mode to allow exhaust contacts to energize due to the delay in the system.</td>
</tr>
<tr>
<td>DAMPER CLOSE</td>
<td>N/A</td>
<td>N/A</td>
<td>Positions damper to the fully closed position</td>
</tr>
<tr>
<td>CONNECT Y1–O</td>
<td>N/A</td>
<td>N/A</td>
<td>Closes the Y1–O relay (Y1–O)</td>
</tr>
<tr>
<td>CONNECT Y2–O</td>
<td>N/A</td>
<td>N/A</td>
<td>Closes the Y2–O relay (Y2–O)</td>
</tr>
</tbody>
</table>
| CONNECT AUX1–O | N/A | N/A | Energizes the AUX output. If Aux setting is:  
  • NONE — not action taken  
  • ERV — 24 Vac out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation.  
  • SYS — 24 Vac out. Issues a system alarm |
| CONNECT EXH1 | N/A | N/A | Closes the power exhaust fan 2 relay (EXH1) |

### CHECKOUT

Alarms display only when they are active. The menu title “ALARMS(#)” includes the number of active alarms in parenthesis ( ). When using SYLK bus sensors, “SYLK” will appear on the screen, and when using 20k OA temperature sensors, “SENS T” will appear on the screen.

<table>
<thead>
<tr>
<th>ALARMS</th>
<th>DEFAULT VALUE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT SENS ERR</td>
<td>N/A</td>
<td>SUPPLY AIR TEMPERATURE SENSOR ERROR Mixed air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>CO2 SENS ERR</td>
<td>N/A</td>
<td>CO2 SENSOR ERROR CO2 sensor has failed, gone out of range or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>OA SYLK T ERR</td>
<td>N/A</td>
<td>OUTSIDE AIR S-BUS SENSOR ERROR Outdoor air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>OA SYLK H ERR</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>RA SYLK T ERR</td>
<td>N/A</td>
<td>RETURN AIR S-BUS SENSOR ERROR Return air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>RA SYLK H ERR</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>DA SYLK T ERR</td>
<td>N/A</td>
<td>DISCHARGE AIR S-BUS SENSOR ERROR Discharge air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>OA SENS T ERR</td>
<td>N/A</td>
<td>OUTSIDE AIR TEMPERATURE SENSOR ERROR Outdoor air temperature sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.</td>
</tr>
<tr>
<td>ACT ERROR</td>
<td>N/A</td>
<td>ACTUATOR ERROR Actuator has failed or become disconnected - check for stall, over voltage, under voltage and actuator count. Replace actuator if damper is movable and supply voltage is between 21.6 V and 26.4 V. Check actuator count on STATUS menu.</td>
</tr>
<tr>
<td>FREEZE ALARM</td>
<td>N/A</td>
<td>Check if outdoor temperature is below the LOW Temp Lockout on setpoint menu. Check if Mixed air temperature on STATUS menu is below the Lo Setpoint on Advanced menu. When conditions are back in normal range then the alarm will go away.</td>
</tr>
</tbody>
</table>
LEGEND

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

* Table 12 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration. For example if you do not have a DCV (CO2) sensor, then none of the DCV parameters appear.
† When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.
** N/A = Not Applicable.
†† ERV Operation: When in cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode, the ERV terminal will be energized when the OA is below the ERV OAT setpoint in the setpoint menu.

NOTES:

1. STATUS —> OCCUPIED — The factory-standard Occupancy signal originates with a thermostat or other controller call for indoor fan operation at CTB terminal G. This signal passes through the Central Terminal Board's OCCUPIED jumper JMP1 to the ECONO connector and to the W7220's OCC input terminal. An external timeclock or relay is required to implement an Occupancy schedule on the economizer damper position.
2. STATUS —> MA TEMP, SETPOINTS —> MAT SET — The W7220 menu parameters and labels include designations MA, MAT and Mixed Air for the economizer cooling control sensor. On these rooftop units, the economizer control sensor is located downstream of the evaporator/indoor coil in the supply fan section where this sensor is designated as Supply Air Temperature (SAT) sensor.
3. SETPOINTS —> DRYBLB SET — This point is not displayed if a Return Air (differential) temperature sensor or an Outdoor Air enthalpy sensor is connected.
4. SYSTEM SETUP parameters must be configured as noted for 2-Speed unit operation:
   EQUIPMENT = CONV
   AUX2 I = W
   FAN TYPE = 2SPEED

For damper minimum position settings and readings on the checkout menus, see Table 13. For 1 speed fan dry bulb and enthalpy operation (with and without DCV), see Tables 14-17. For 2 speed fan dry bulb and enthalpy operation (with and without DCV), see Tables 18-21.

Table 12 — Menu Structure (cont)

<table>
<thead>
<tr>
<th>MENU</th>
<th>PARAMETER</th>
<th>PARAMETER DEFAULT VALUE</th>
<th>PARAMETER RANGE AND INCREMENT</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SHUTDOWN ACTIVE</td>
<td>N/A</td>
<td>N/A</td>
<td>AUX2 IN is programmed for SHUTDOWN and 24 V has been applied to AUX 2IN terminal.</td>
</tr>
<tr>
<td></td>
<td>DMP CAL RUNNING</td>
<td>N/A</td>
<td>N/A</td>
<td>DAMPER CALIBRATION ROUTINE RUNNING If DCV Auto enable has been programmed, when the W7220 is completing a calibration on the dampers, this alarm will display. Wait until the calibration is completed and the alarm will go away. Must have OA, MA and RA sensors for DCV calibration; set up in the Advanced setup menu.</td>
</tr>
<tr>
<td></td>
<td>DA SENS ALM</td>
<td>N/A</td>
<td>N/A</td>
<td>DISCHARGE AIR TEMPERATURE SENSOR ALARM Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.</td>
</tr>
<tr>
<td></td>
<td>SYS ALARM</td>
<td>N/A</td>
<td>N/A</td>
<td>When AUX1-O is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX-1-O terminal has 24 Vac out.</td>
</tr>
<tr>
<td></td>
<td>ACT UNDER V</td>
<td>N/A</td>
<td>N/A</td>
<td>ACTUATOR VOLTAGE LOW Voltage received by actuator is above expected range.</td>
</tr>
<tr>
<td></td>
<td>ACT OVER V</td>
<td>N/A</td>
<td>N/A</td>
<td>ACTUATOR VOLTAGE HIGH Voltage received by actuator is below expected range.</td>
</tr>
<tr>
<td></td>
<td>ACT STALLED</td>
<td>N/A</td>
<td>N/A</td>
<td>ACTUATOR STALLED Actuator stopped before achieving commanded position.</td>
</tr>
</tbody>
</table>

Table 13 — Damper Minimum Position Settings and Readings on Checkout Menu

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (CO2 SENSOR)</th>
<th>FAN SPEED</th>
<th>SETPOINTS</th>
<th>CHECKOUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>MIN POS</td>
<td>VMAX–HS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>MIN POS H</td>
<td>VMAX–HS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MIN POS L</td>
<td>VMAX–LS</td>
</tr>
<tr>
<td>YES</td>
<td>1</td>
<td>VENT MIN</td>
<td>VMAX–HS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VENT MAX</td>
<td>VMAX–HS</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>VENT MIN H</td>
<td>VMAX–HS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VENT MAX H</td>
<td>VMAX–LS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VENT MIN L</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VENT MAX L</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**Table 14 — Dry Bulb Operation No DCV (CO₂ Sensor) — 1 Speed Fan**

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>NO</td>
<td>OFF</td>
<td>OFF</td>
<td>HIGH</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>OFF</td>
<td>HIGH</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>24v/On</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
</tbody>
</table>

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

**Table 15 — Dry Bulb Operation with DCV (CO₂ Sensor) — 1 Speed Fan**

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below CO₂ Set</td>
<td>No</td>
<td>OFF</td>
<td>OFF</td>
<td>HIGH</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>OFF</td>
<td>HIGH</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>VENTMIN</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>24v/On</td>
<td>VENTMIN</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>OFF</td>
<td>OFF</td>
<td>HIGH</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
<td></td>
</tr>
</tbody>
</table>

| Above CO₂ Set                       | No                            | OFF  | OFF  | HIGH      | 0v/Off | 0v/Off | VENTMIN to VENTMAX | Closed     |
|                                     | ON                            | OFF  | HIGH | 24v/On   | 0v/Off | VENTMIN to VENTMAX | Closed   |            |
|                                     | ON                            | ON   | HIGH | 24v/On   | 24v/On | VENTMIN to VENTMAX | Closed   |            |
|                                     | Yes                           | OFF  | OFF  | HIGH      | 0v/Off | 0v/Off | VENTMIN to Full-Open | Closed to Full-Open |
|                                     | ON                            | ON   | HIGH | 24v/On   | 0v/Off*| VENTMIN to Full-Open | Closed to Full-Open |

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

**Table 16 — Enthalpy Operation without DCV (CO₂ Sensor) — 1 Speed Fan**

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>NO</td>
<td>OFF</td>
<td>OFF</td>
<td>HIGH</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>OFF</td>
<td>HIGH</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>24v/On</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
</tbody>
</table>

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.
### Table 17 — Enthalpy Operation with DCV (CO₂ Sensor) — 1 Speed Fan

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below CO₂ Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>OFF OFF HIGH 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>Yes</td>
<td>OFF OFF HIGH 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>Above CO₂ Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>OFF OFF HIGH 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>Yes</td>
<td>OFF OFF HIGH 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
</tbody>
</table>

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

### Table 18 — Dry Bulb Operation without DCV (CO₂ Sensor) — 2 Speed Fan

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td>ON OFF LOW 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td>ON ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
</tr>
<tr>
<td>NONE</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS to Full Open</td>
<td>Closed to Full-Open</td>
<td></td>
</tr>
<tr>
<td>ON OFF LOW 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS to Full Open</td>
<td>Closed to Full-Open</td>
<td></td>
</tr>
<tr>
<td>ON ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MIN POS to Full Open</td>
<td>Closed to Full-Open</td>
<td></td>
</tr>
</tbody>
</table>

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

### Table 19 — Dry Bulb Operation with DCV (CO₂ Sensor) — 2 Speed Fan

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below CO₂ Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN</td>
<td>Closed</td>
</tr>
<tr>
<td>Yes</td>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>Above CO₂ Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to VENTMAX</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to VENTMAX</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to VENTMAX</td>
<td>Closed</td>
</tr>
<tr>
<td>Yes</td>
<td>OFF OFF LOW 0v/Off 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>OFF HIGH 24v/On 0v/Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
<tr>
<td>ON</td>
<td>ON HIGH 24v/On 24v/On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
</tr>
</tbody>
</table>

*With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2-O after the delay if the call for Y1-I and Y2-I have not been satisfied.
### Table 20 — Enthalpy Operation without DCV (CO₂ Sensor) — 2 Speed Fan

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO CO₂ SENSOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td>OFF</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>LOW</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>24v/On</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>OFF</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td>Closed</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>MIN POS</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>MIN POS to Full Open</td>
<td>Closed to Full-Open</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

### Table 21 — Enthalpy Operation with DCV (CO₂ Sensor) — 2 Speed Fan

<table>
<thead>
<tr>
<th>DEMAND CONTROLLED VENTILATION (DCV)</th>
<th>OUTSIDE AIR GOOD TO ECONOMIZE</th>
<th>Y1-I</th>
<th>Y2-I</th>
<th>FAN SPEED</th>
<th>Y1-O</th>
<th>Y2-O</th>
<th>OCCUPIED</th>
<th>UNOCUPIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below CO₂ Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>OFF</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>VENTMIN</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>LOW</td>
<td>24v/On</td>
<td>0v/Off</td>
<td>VENTMIN</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>HIGH</td>
<td>24v/On</td>
<td>24v/On</td>
<td>VENTMIN</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>OFF</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>LOW</td>
<td>0v/Off</td>
<td>0v/Off</td>
<td>VENTMIN to Full-Open</td>
<td>Closed to Full-Open</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Above CO₂ Set                      |                                |      |      |           |      |      |          |           |
| No                                 | OFF                            | OFF  | LOW  | 0v/Off   | VENTMIN to VENTMAX| Closed |
| ON                                 | OFF                            | LOW  | 24v/On| 0v/Off   | VENTMIN to VENTMAX| Closed |
| ON                                 | ON                             | HIGH | 24v/On| 24v/On   | VENTMIN to VENTMAX| Closed |
| Yes                                | OFF                            | OFF  | LOW  | 0v/Off   | VENTMIN to VENTMAX| Closed |
| ON                                 | OFF                            | LOW  | 0v/Off| 0v/Off   | VENTMIN to Full-Open| Closed to Full-Open |
| ON                                 | ON                             | HIGH | 24v/On| 0v/Off   | VENTMIN to Full-Open| Closed to Full-Open |

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

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

Refer to Table 22 for ENTH CURVE setpoint values.

The W7220 calculates the enthalpy and dew point using the OA temperature and humidity input from the OA enthalpy sensor. When the OA temperature, OA humidity and OA dew point are all below the selected boundary, the economizer sets the economizing mode to YES, economizing is available.

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

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

Table 22 provides the values for each boundary limit.

TWO-SPEED FAN OPERATION

The W7220 controller has the capability to work with a system using a 2-speed supply fan. The W7220 does not control the supply directly but uses the following input status to determine the speed of the supply fan and controls the OA damper to the required position, see Table 23.

CHECKOUT

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

NOTE: See “Interface Overview” on page 35 for information about menu navigation and use of the keypad.
**Power Up**
After the W7220 module is mounted and wired, apply power.

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

**Power Loss (Outage or Brownout)**
All setpoints and advanced settings are restored after any power loss or interruption.

**Status**
Use the Status menu (see Table 12) to check the parameter values for the various devices and sensors configured.

**Checkout Tests**
Use the Checkout menu (in Table 12) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

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

To clear an alarm, perform the following:
1. Navigate to the desired alarm.
2. Press the  button.
3. ERASE? displays.
4. Press the  button.
5. ALARM ERASED displays.
6. Press the (Menu up/Exit) button to complete the action and return to the previous menu.

**PremierLink™ Control**
For details on operating units equipped with the factory-installed PremierLink controller option, refer to the PremierLink Retrofit Rooftop Controller Version 3.x Installation, Start-Up, and Configuration Instructions manual.

For wiring the PremierLink controller, see Fig. 52. For wiring the controller to a unit equipped with a Humidi-MiZer® system, see Fig. 53.

**RTU Open Control System**
For details on operating units equipped with the factory-installed RTU Open controller, refer to the “Factory-Installed RTU Open Multi-Protocol Controller Control, Start-Up, Operation and Troubleshooting” manual.

For typical RTU Open controller wiring, see Fig. 54. For wiring the controller to a unit equipped with a Humidi-MiZer® system, see Fig. 55.

**Wiring Diagrams**
See Fig. 56-63 for unit wiring diagrams.

---

**WARNING**

**ELECTRICAL SHOCK HAZARD**
Failure to follow this warning could result in personal injury, property damage, 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. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

If any wiring changes are required, first be sure to remove power from the economizer module before starting work. Pay particular attention to verifying the power connection (24 vac).
Fig. 53 — PremierLink Wiring Diagram with Humidi-MiZer® System
Fig. 54 — Typical RTU Open System Control Wiring Diagram
Fig. 55 — Typical RTU Open System Control Wiring Diagram with Humidi-MiZer® System
Fig. 56 — 48TC**17-30 Control Wiring Diagram
Fig. 57 — 48TC**17-30 Power Wiring Diagram, 208/230-3-60
Fig. 58 — 48TC**17-30 Power Wiring Diagram, 460-3-60
Fig. 59 — 48TC**17-30 Power Wiring Diagram, 575-3-60
Fig. 60 — 48TC**17-30 Control Wiring Diagram with Humidi-MiZer® System
Fig. 61 — 48TC**17-30 Power Wiring Diagram with Humidi-MiZer® System (208/230-3-60)
Fig. 62 — 48TC**17-30 Power Wiring Diagram with Humidi-Mizer® System (460-3-60)
Fig. 63 — 48TC**17-30 Power Wiring Diagram with Humidi-MiZer® System (575-3-60)
Smoke Detectors
Smoke detectors are available as factory-installed options on 48TC models. Smoke detectors may be specified for supply air only, for return air without or with economizer, or in combination of supply air and return air. 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. 64). Its operating location is in the return air section of the unit (see Fig. 65, unit without economizer, or Fig. 66, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.

To install the return air sensor sampling tube:
1. Remove the tube from its shipping location.
2. Open the unit end to access the return air sensor (located on right-hand partition).
3. Orient the tube’s sampling holes into the return air flow direction. 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 the application data sheet titled “Factory-Installed Smoke Detector, for Small and Medium Rooftop Units 2 to 25 Tons” for discussions on additional control features of these smoke detectors including multiple unit coordination.
Step 12 — Adjust Factory-Installed Options

**ECONOMISER IV OCCUPANCY SWITCH**

Refer to Fig. 67 for general EconoMi$er IV wiring. External occupancy control is managed through a connection on the Controls Connections 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:

- Rooft curb
- Thru-base connection kit (must be installed before unit is set on curb)
- LP conversion kit
- Manual outside air damper
- High altitude gas kit
- Flue discharge deflector
- Low ambient controls
- Thermostat/sensor
- 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
- CO₂ sensor
- DDC interface (PremierLink)
- Louvered hail guard
- Phase monitor control
- Winter start kit

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

Step 14 — Check Belt Tension

Measure the belt span length as shown in Fig. 68. Calculate the required deflection by multiplying the belt span length by \(1/64\). For example, if the belt span length is 32 inches:

\[ 32 \times \frac{1}{64} = \frac{1}{2} \text{ inch deflection}. \]

**BELT FORCE — DEFLECTION METHOD**

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

1. Place a straightedge along the belt between the two pulleys. Measure the distance between the motor shaft and the blower shaft.
2. Set the tension gage to the desired tension (see Table 1 in Fig. 68). Place the large O-ring at that point.
3. Press the tension checker downward on the belt until the large O-ring is at the bottom of the straightedge.
4. Adjust the belt tension as needed.

Adjust belt tension by loosening the motor mounting plate front bolts and rear bolt (see Fig. 69) and slide the plate towards the fan (to reduce tension) or away from the fan (to increase tension). Ensure the blower shaft and motor shaft are parallel to each other (pulleys aligned). Tighten all bolts securely when finished.

**BELT TENSION METHOD**

Requires belt tension gage that measures tension in belt in units of lbs force (see Fig. 68).

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**Fig. 67 — EconoMi$er IV Wiring**
This completes the mechanical installation of the unit. Refer to the unit’s Service Manual for detailed Pre-Start and Start-Up instructions. Download the latest versions from HVAC Partners (www.hvacpartners.com).
START-UP CHECKLIST — 48TC 17-30 SINGLE PACKAGE ROOFTOP WITH HEAT/ELECTRIC COOLING WITH PURON® (R-410A) REFRIGERANT

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

I. PRELIMINARY INFORMATION
MODEL NO. ___________________________
JOB NAME ___________________________
SERIAL NO. ___________________________
ADDRESS ___________________________
START-UP DATE _______________________
TECHNICIAN NAME ____________________
ADDITIONAL ACCESSORIES _____________

II. PRE-START-UP
Verify that job site voltage agrees with voltage listed on rating plate (Y/N) ______
Verify that all packaging materials have been removed from unit (Y/N) ______
Remove all shipping hold down bolts and brackets per installation instructions (Y/N) ______
Verify that condensate connection is installed per installation instructions (Y/N) ______
Verify that flue hood is installed (Y/N) ______
Check refrigerant piping for indications of leaks; investigate and repair if necessary (Y/N) ______
Check gas piping for leaks (Y/N) ______
Check all electrical connections and terminals for tightness (Y/N) ______
Check that return (indoor) air filters are clean and in place (Y/N) ______
Verify that unit installation is level (Y/N) ______
Check fan wheels and propeller for location in housing/orifice and setscrew tightness (Y/N) ______
Check to ensure that electrical wiring is not in contact with refrigerant lines or sharp metal edges (Y/N) ______
Check pulley alignment and belt tension per installation instructions (Y/N) ______

II. START-UP (Refer to Unit Service/Maintenance Manual for Start-Up Instructions)

ELECTRICAL
Supply Voltage L1-L2 ______ L2-L3 ______ L3-L1 ______
Compressor Amps 1 L1 ______ L2 ______ L3 ______
Compressor Amps 2 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 ______ °F DB (Dry Bulb) ______ °F WB (Wet Bulb)
Return-air Temperature ______ °F DB ______ °F WB
Cooling Supply Air Temperature ______ °F DB ______ °F WB
Gas Heat Supply Air ______ °F DB ______ °F WB

PRESSURES (HEATING MODE)
GAS INLET PRESSURE ______ IN. WG
GAS MANIFOLD PRESSURE ______ IN. WG (Low Fire) ______ IN. WG (High Fire)
PRESSURES (COOLING MODE)

REFRIGERANT SUCTION
- Circuit 1: ____________ PSIG, ____________ °F
- Circuit 2: ____________ PSIG, ____________ °F

REFRIGERANT DISCHARGE
- Circuit 1: ____________ PSIG, ____________ °F
- Circuit 2: ____________ PSIG, ____________ °F

Verify that 3-phase fan motor and blower are rotating in correct direction (Y/N) _____
Verify that 3-phase scroll compressor is rotating in the correct direction (Y/N) _____
VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS (Y/N) _____

GENERAL
Economizer minimum vent and changeover settings to job requirements (if equipped) (Y/N) _____
Verify smoke detector unit shutdown by utilizing magnet test (Y/N) _____

III. HUMIDI-MIZER® START-UP

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

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

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

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

REPEAT PROCESS FOR 2 COMPRESSOR SYSTEMS