548J***D 17, 24
Single Package Rooftop Heat Pump with Puron (R-410A) Refrigerant

bryant®

Installation Instructions

548J units for installation in the United States contain use of Bryant's 2-speed indoor fan control system. This complies with the U.S. Department of Energy (DOE) efficiency standard of 2018.

548J units for installation outside the United States may or may not contain use of the 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 Bryant 2-speed indoor fan system refer to the Variable Frequency Drive (VFD) Factory-Installed Option 2-Speed Motor Control Installation, Setup and Troubleshooting manual.

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

CONTENTS

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

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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 local building codes and appropriate national electrical codes (in USA, ANSI/NFPA 70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements. 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.

⚠ DANGER

ELECTRICAL SHOCK HAZARD

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

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

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

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

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

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

Rated Indoor Airflow (cfm)

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

Table 1 — Rated Indoor Airflow (AHRI efficiency rating)

	FULL LOAD AIRFLOW (CFM)	
MODEL NUMBER	VERTICAL AIRFLOW UNITS	HORIZONTAL AIRFLOW UNITS
548J*D17**	5250	5250
548J*D24**	6500	6000

GENERAL

See Fig. 1 for model number nomenclature. See Fig. 2 and 3 for unit dimensions.

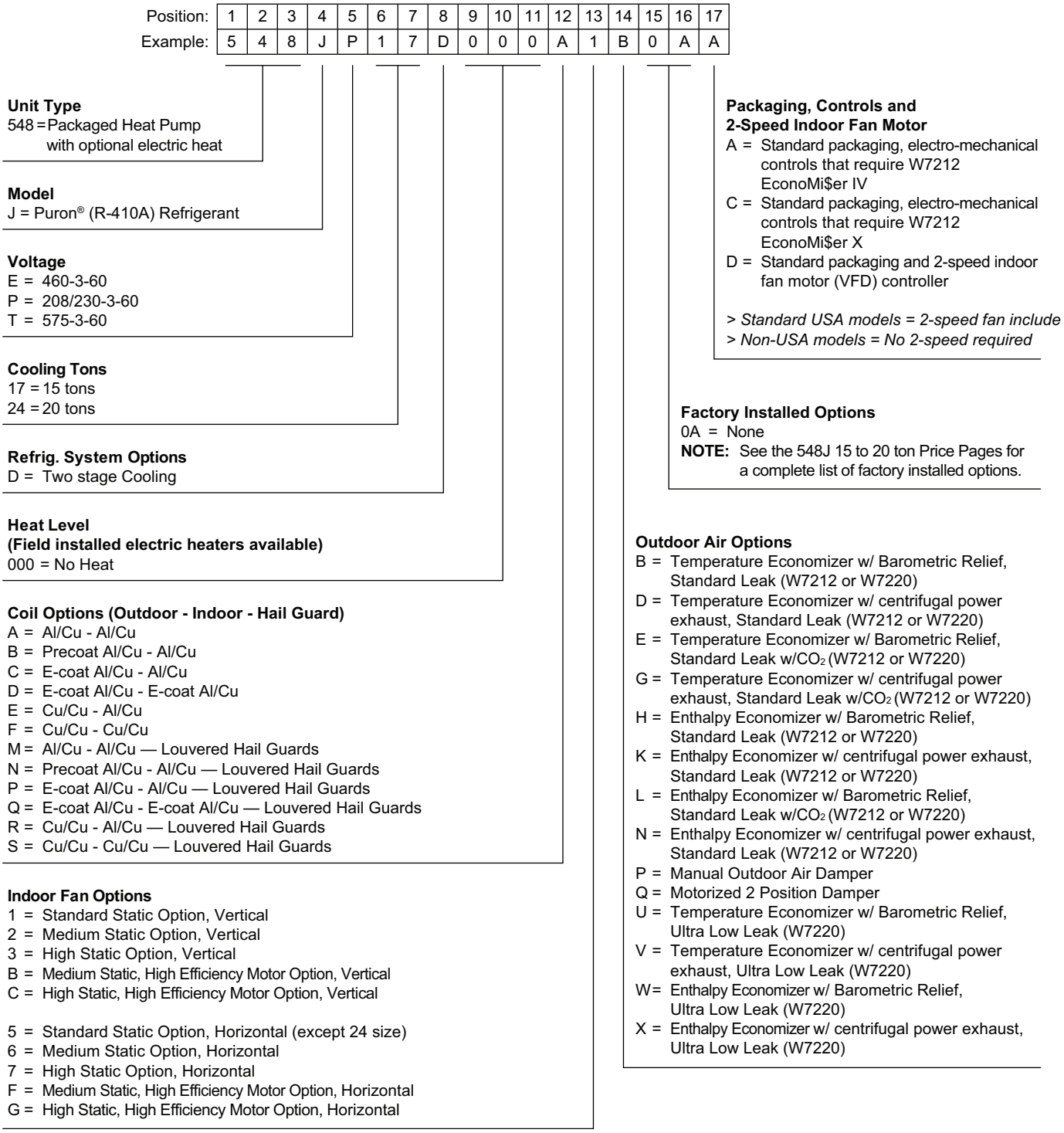


Fig. 1 — 548J*D 17-24 Model Number Nomenclature (Example)**

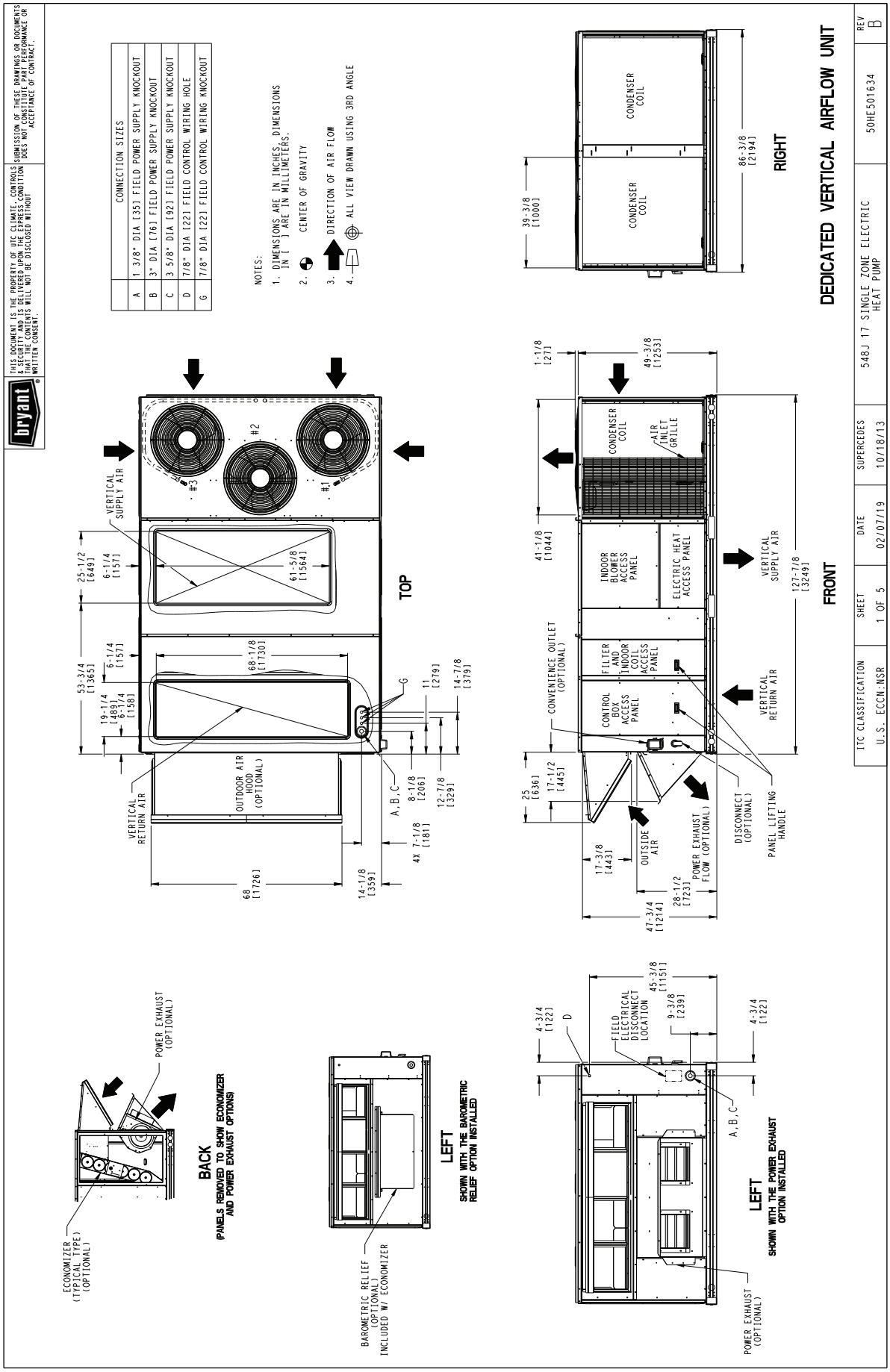


Fig. 2 — Unit Dimensional Drawing — Size 17 Units

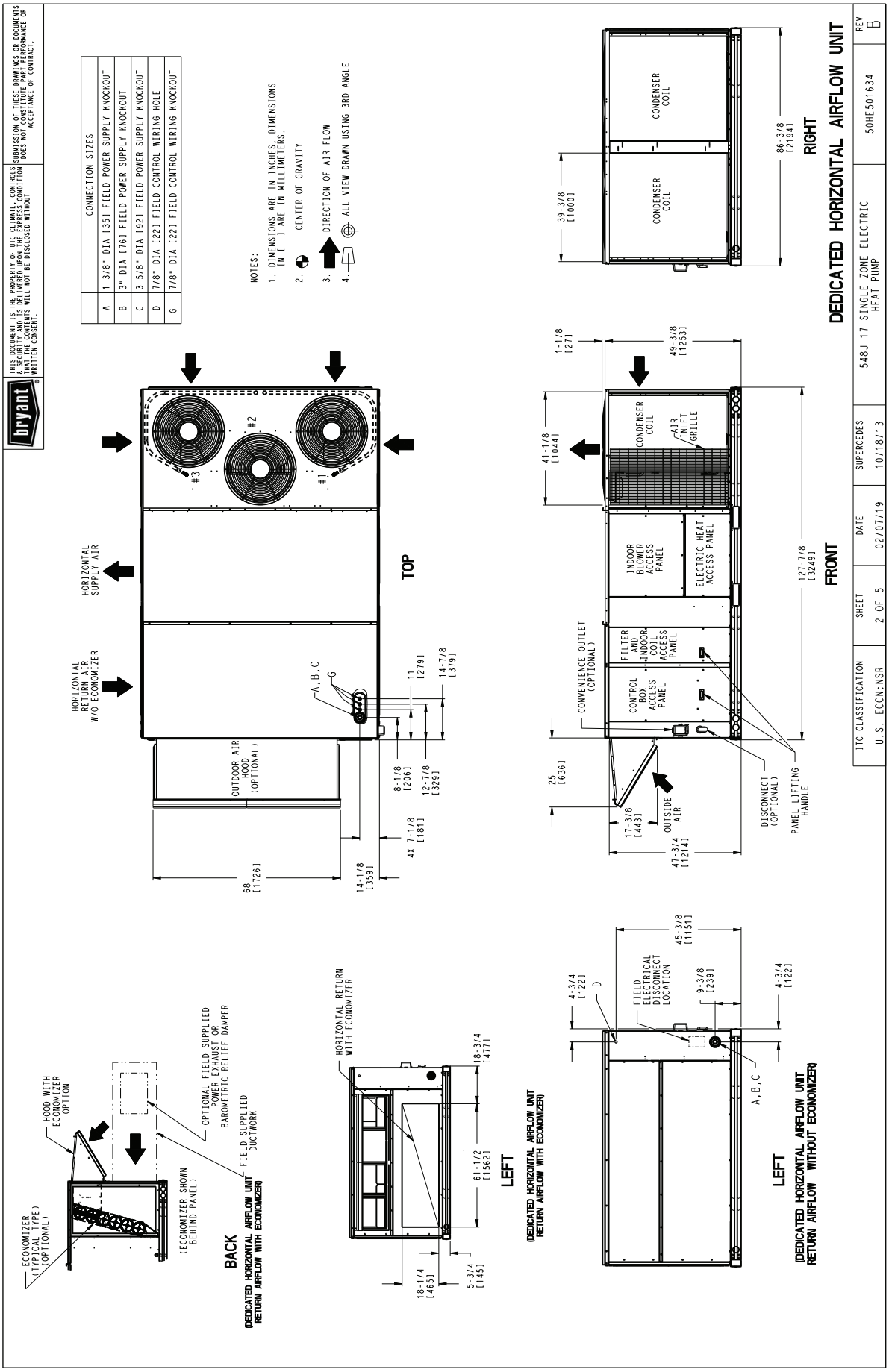


Fig. 2 — Unit Dimensional Drawing — Size 17 Units (cont)

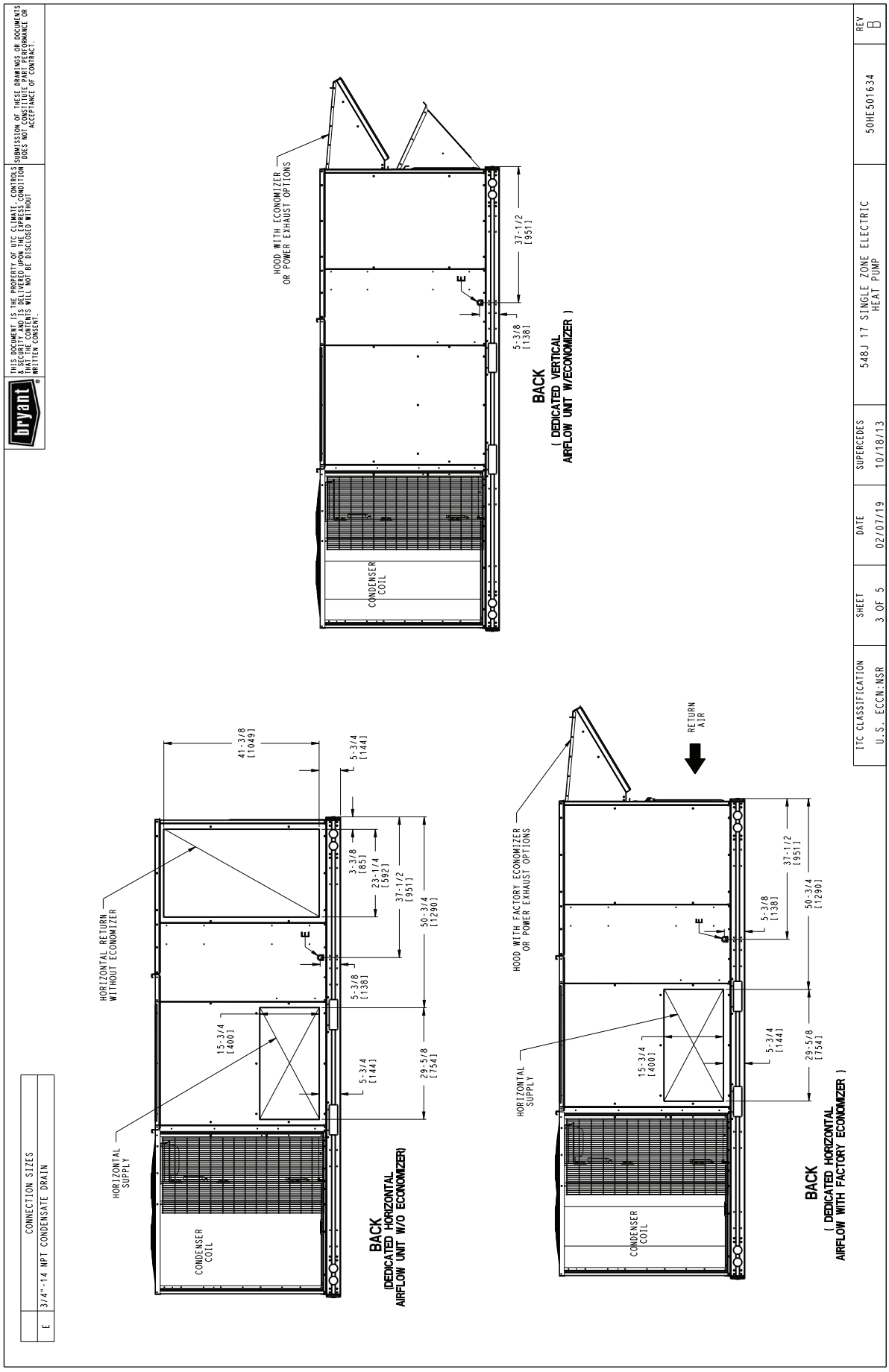


Fig. 2 — Unit Dimensional Drawing — Size 17 Units (cont)

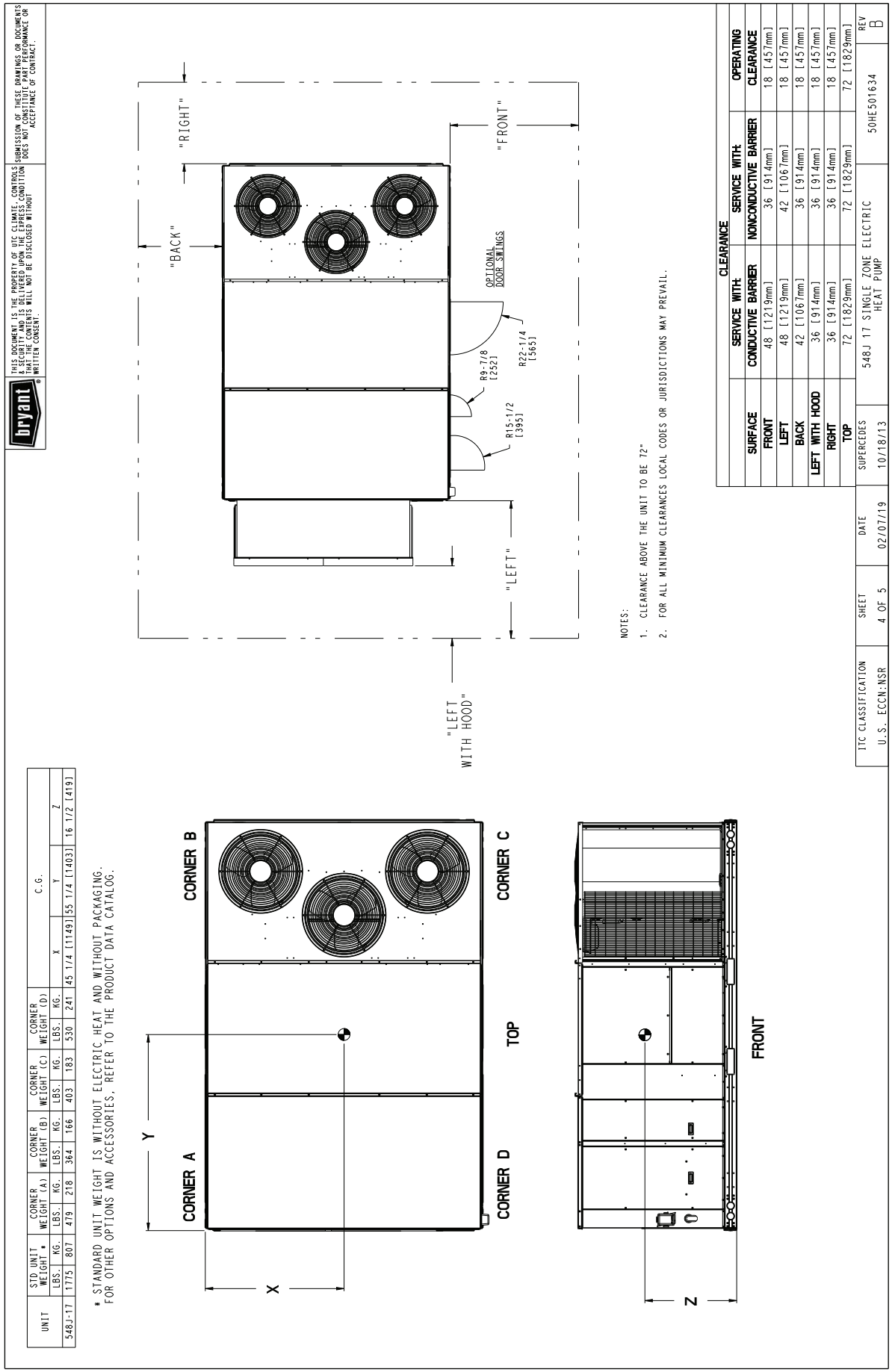


Fig. 2 — Unit Dimensional Drawing — Size 17 Units (cont)

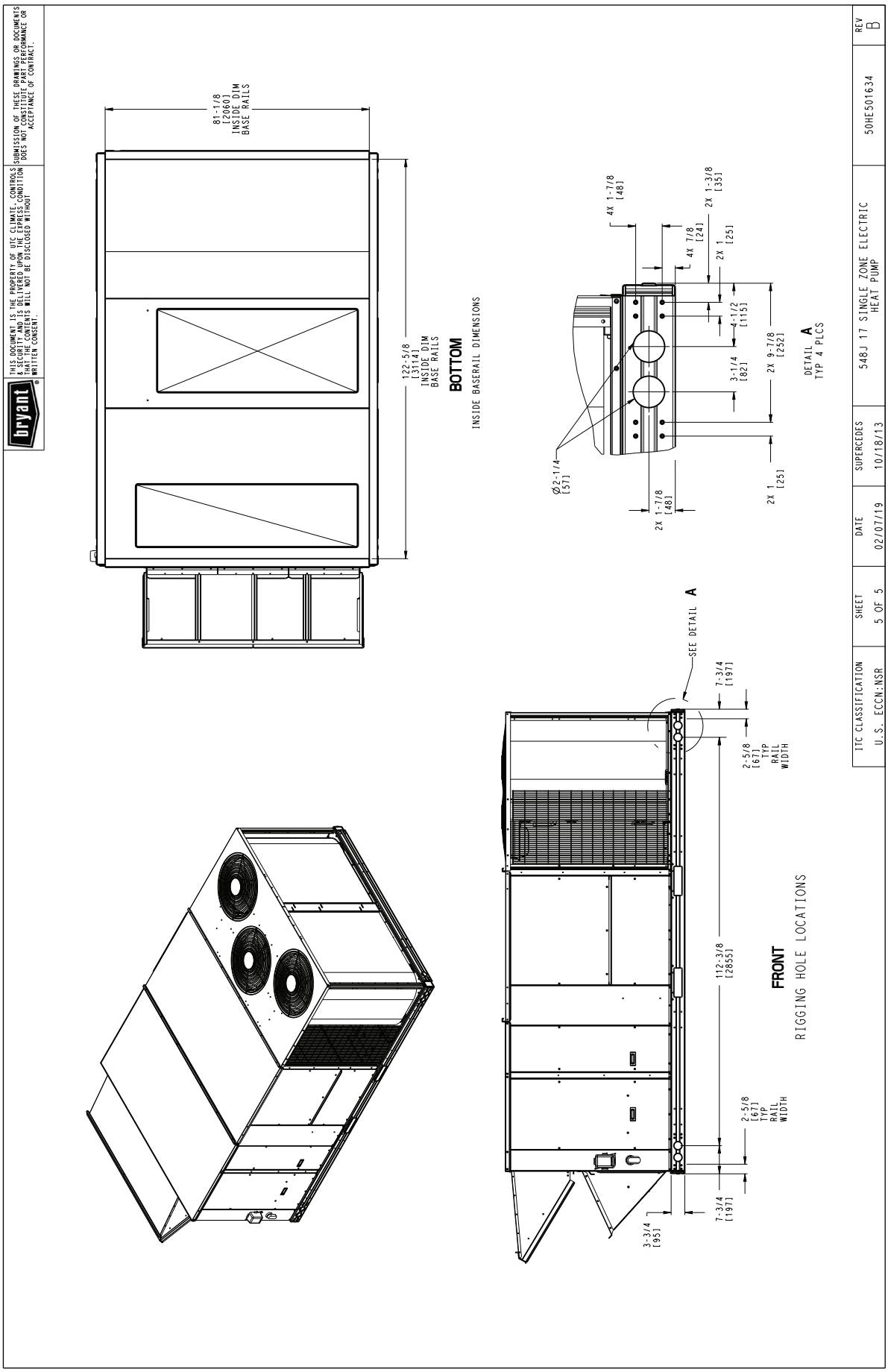


Fig. 2 — Unit Dimensional Drawing — Size 17 Units (cont)

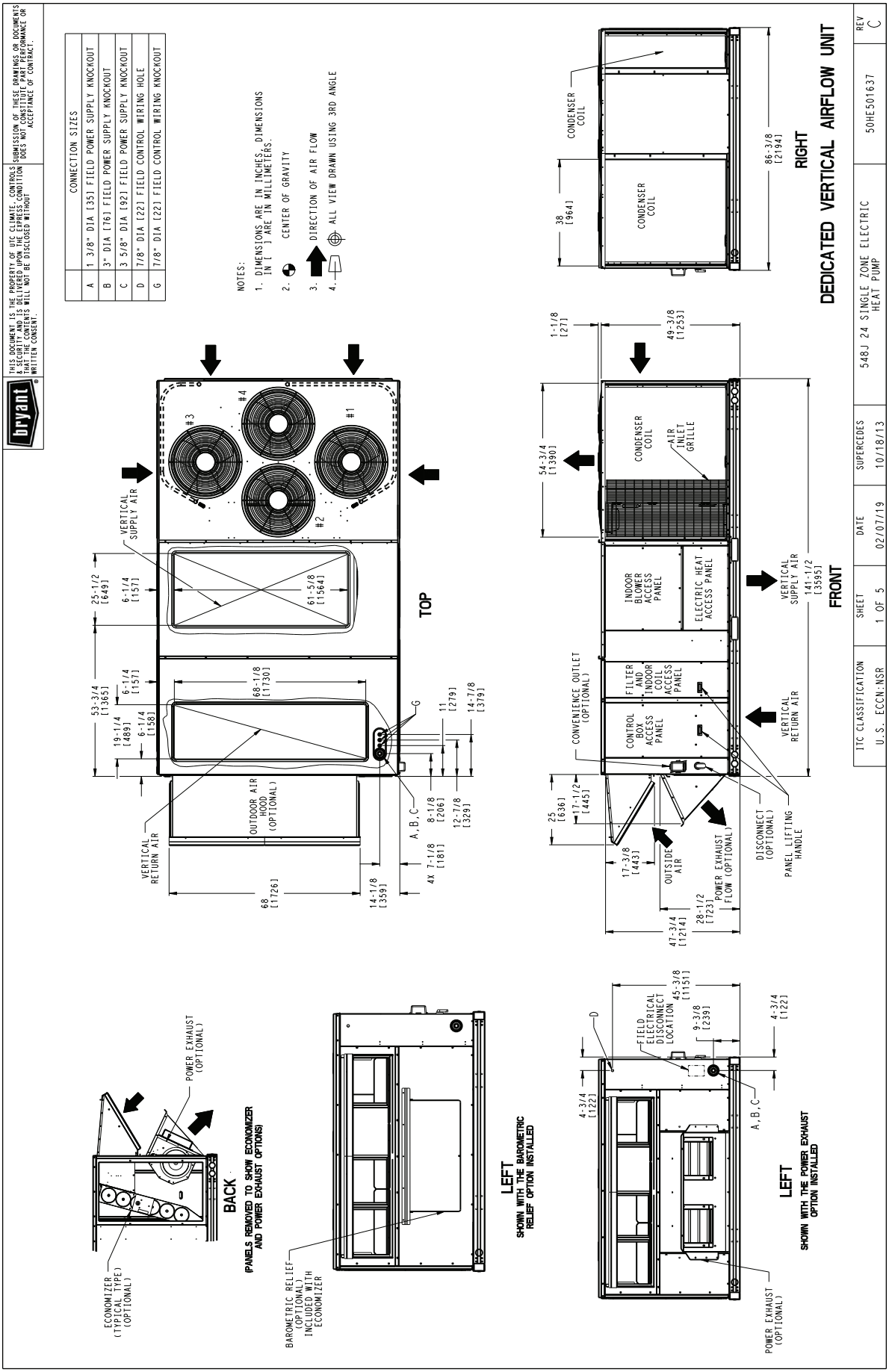


Fig. 3 — Unit Dimensional Drawing — Size 24 Units

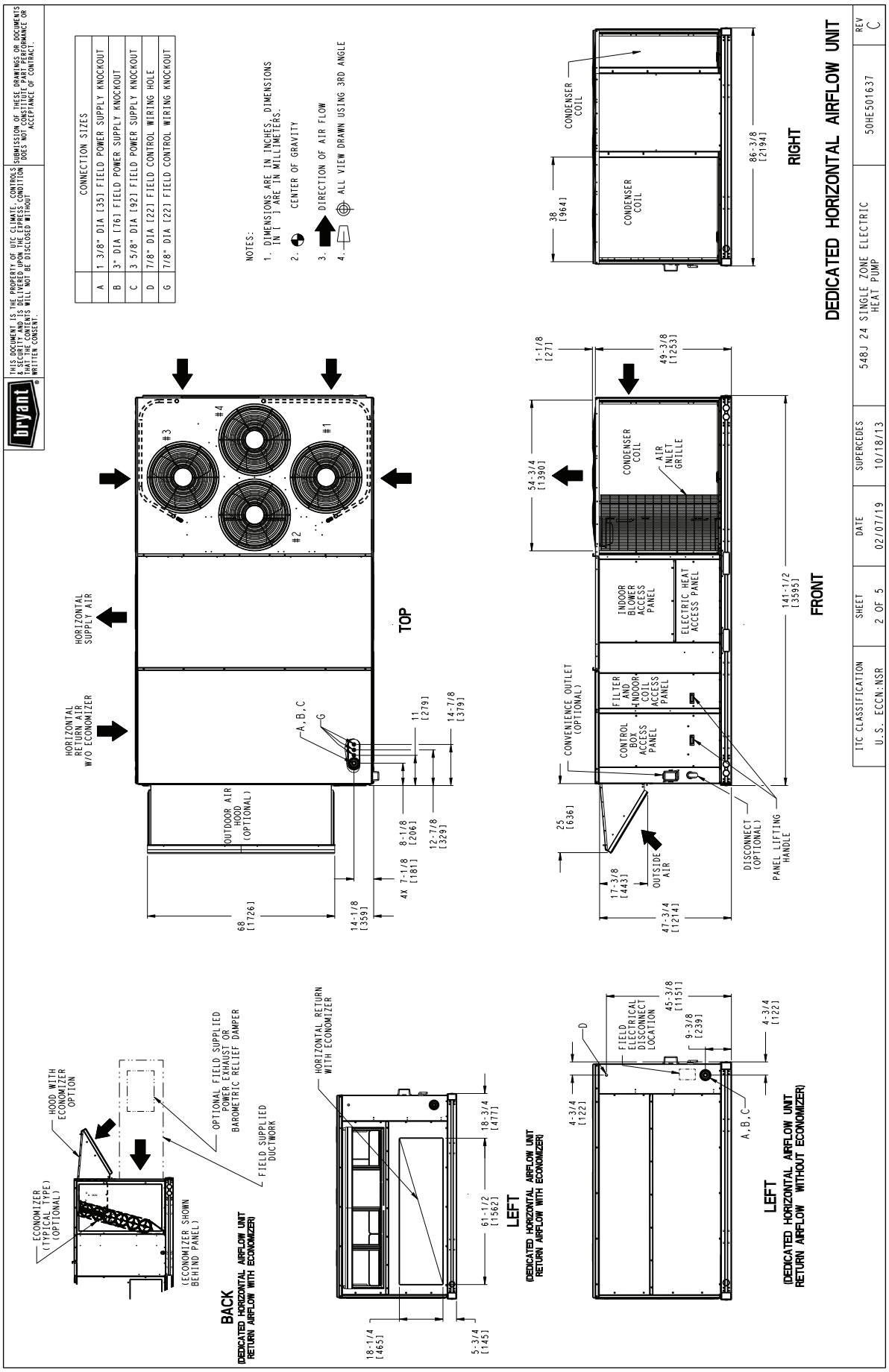


Fig. 3 — Unit Dimensional Drawing — Size 24 Units (cont)

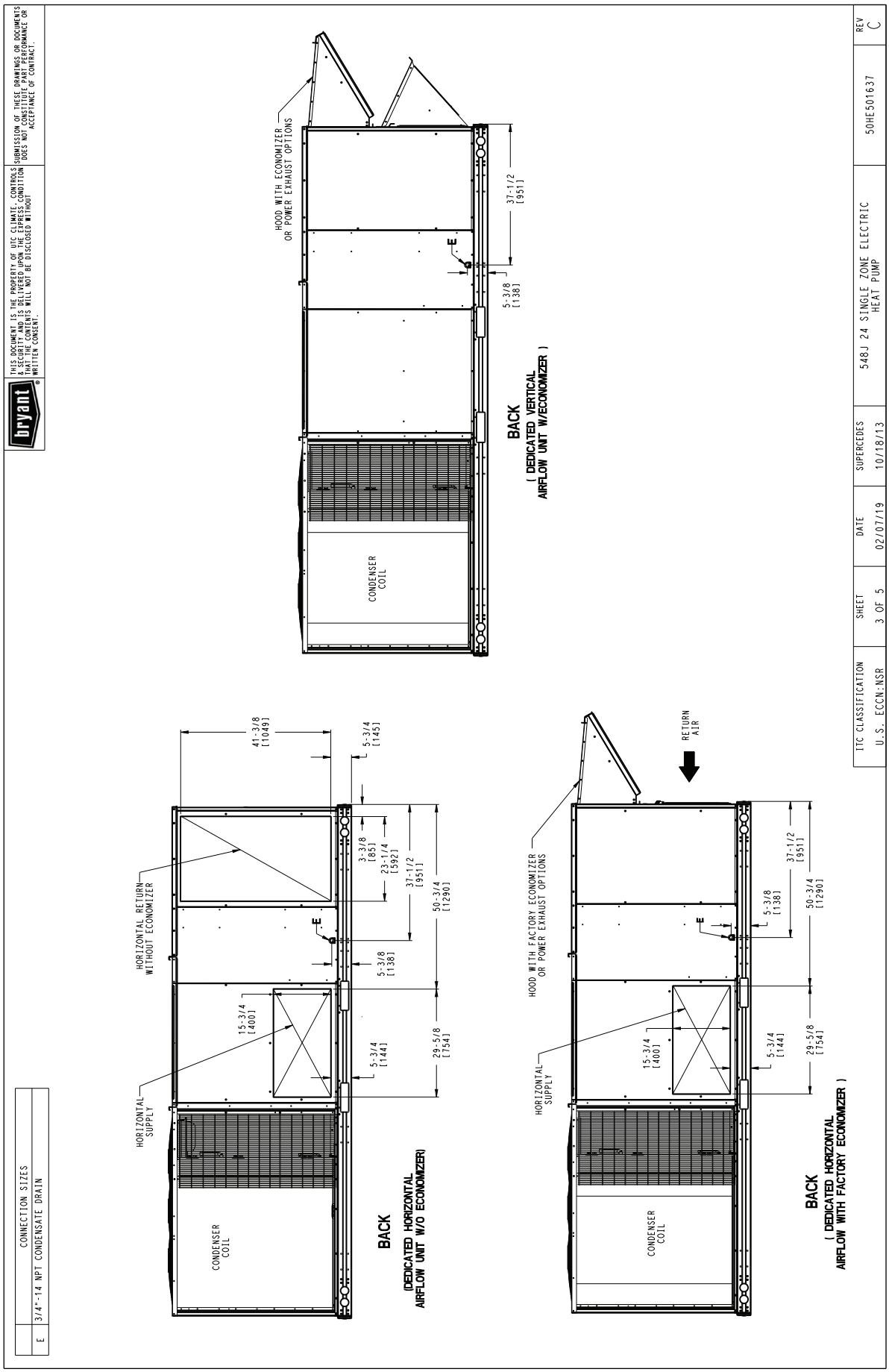
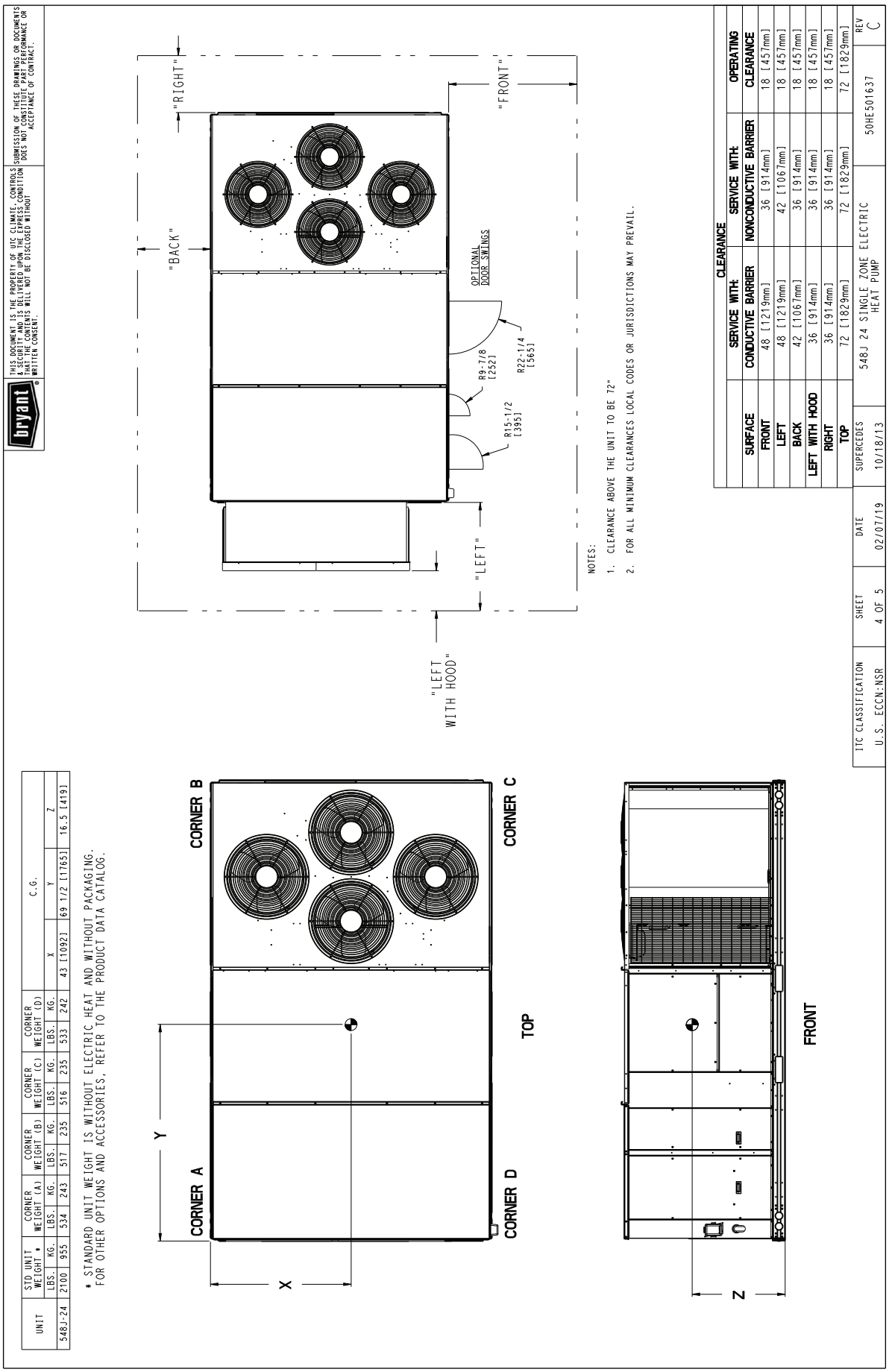


Fig. 3 — Unit Dimensional Drawing — Size 24 Units (cont)



UNIT	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.			
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X		Y	Z
548J-24	2100	955	534	243	517	235	516	235	533	242	43 [10921]		69 1/2 [1765]	16.5 [419]

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

Fig. 3 — Unit Dimensional Drawing — Size 24 Units (cont)

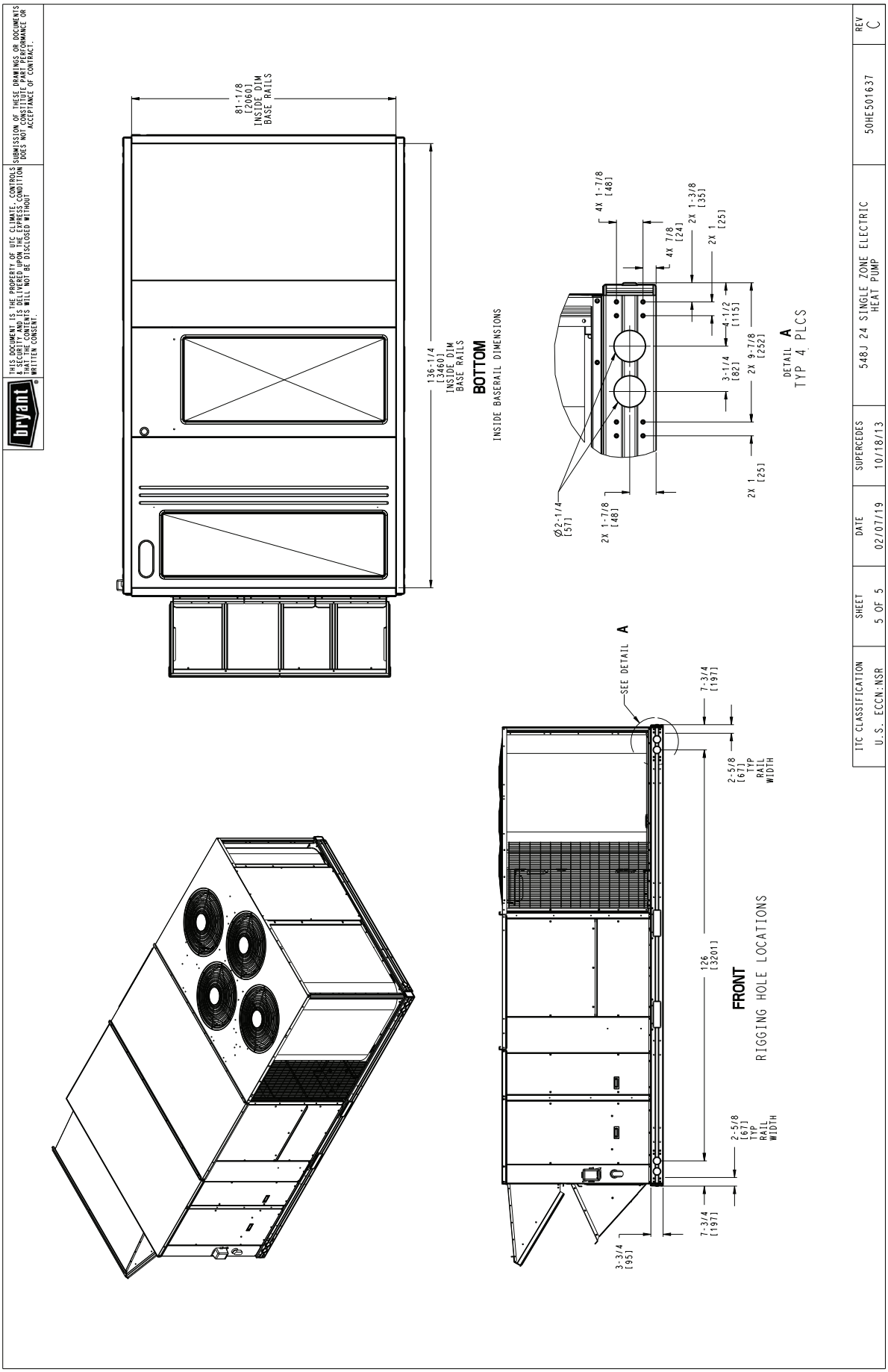


Fig. 3 — Unit Dimensional Drawing — Size 24 Units (cont)

REFRIGERATION SYSTEM COMPONENTS

Each heat pump refrigeration system includes a compressor, accumulator, reversing valve, dual-function outdoor coil with vapor header check valve, cooling liquid line with a filter drier and a check valve, dual-function indoor coil with a vapor header check valve, and heating liquid line with a check valve and a strainer. Size 17 and 24 units have two compressor-circuits. See Fig. 4 for typical unit piping schematic (4-row indoor coil with two compressor-circuits is shown).

Dual-function outdoor and indoor coils are designed to provide parallel coil circuits during evaporator-function operation and converging coil circuits during the condenser-function operation.

REVERSING VALVE AND CHECK VALVE POSITION

See Fig. 4 and Tables 2-4.

TROUBLESHOOTING REFRIGERANT PRESSURE PROBLEMS AND CHECK VALVES

Refer to Fig. 4 and the Cooling Mode and Heating Mode tables (Tables 2 and 3).

REFRIGERANT SYSTEM PRESSURE ACCESS PORTS

There are two access ports in each circuit - on the suction tube and the discharge tube near the compressor. These are brass fittings with black plastic caps. The hose connection fittings are standard 1/4-in. SAE male flare couplings.

The brass fittings are two-piece High Flow valves, with a receptacle base brazed to the tubing and an integral spring-closed check valve core screwed into the base (see Fig. 5). This check valve is permanently assembled into this core body and cannot be serviced separately. Replace the entire core body if necessary. Service tools are available from RCD that allow the replacement of the check valve core without having to recover the entire system refrigerant charge. Apply compressor refrigerant oil to the check valve core's bottom O-ring. Install the fitting body and torque to 96 ± 10 in.-lbs (10.9 ± 1 Nm). Do not exceed 106 in.-lbs (11.9 Nm) when tightening.

Table 2 — Cooling Mode (Each Circuit)

COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Closed
Check Valve D	Open

Table 3 — Heating Mode (Each Circuit)

COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	Open
Check Valve B	Closed
Check Valve C	Open
Check Valve D	Closed

Table 4 — Defrost Mode

COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Closed
Check Valve D	Open

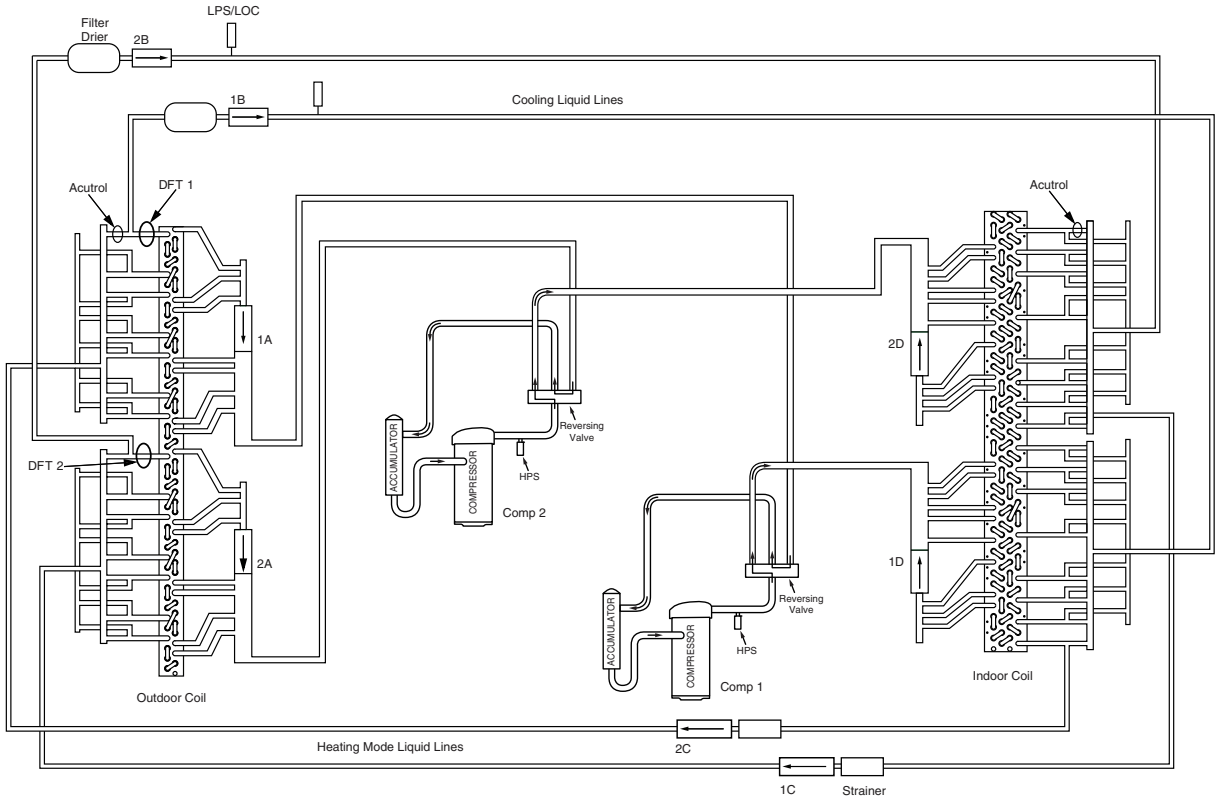


Fig. 4 — Typical Unit Piping Schematic

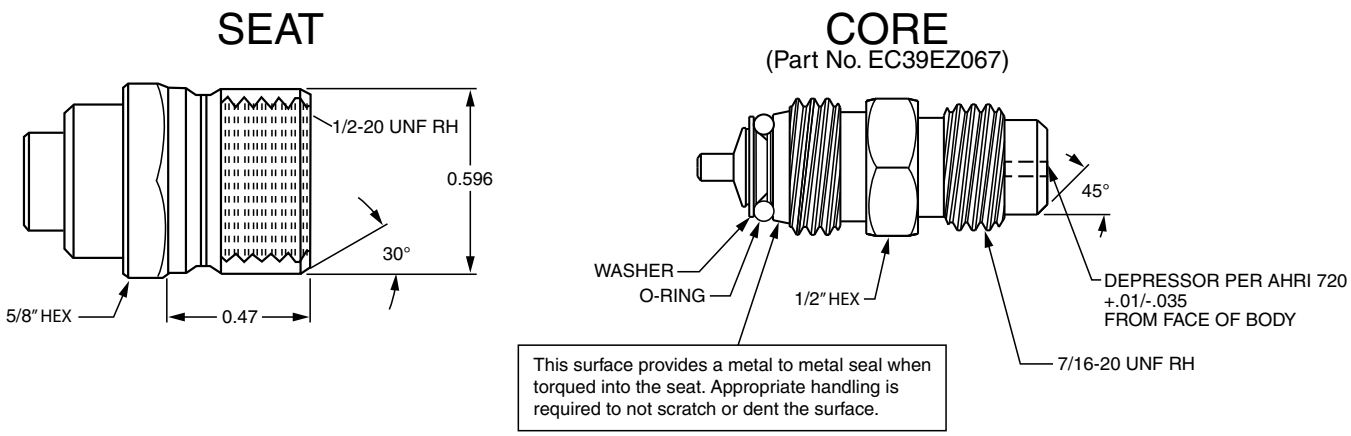


Fig. 5 — CoreMax[1] Access Port Assembly

INSTALLATION

548J size 17 and 24 units are shipped with dedicated air flow configuration, vertical or horizontal, and cannot be field converted.

Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings (see Fig. 2 and 3).

NOTE: Consider also the effect of adjacent units.

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

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 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 5.

Table 5 — Operating Weights

548J***D	UNITS LB (KG)	
	17	24
Base Unit	1775 (807)	2100 (955)
Economizer	246 (112)	246 (112)
Powered Outlet	35 (16)	35 (16)
Curb 14-in/356mm and 24-in/610mm	240 (109) 340 (154)	255 (116) 355 (161)

1.CoreMax is a registered trademark of Fastest, Inc.

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 thru-base service connection fittings (affects curb and unit)
4. Rig and place unit
5. Remove top skid
6. Install condensate line trap and piping
7. Make electrical connections
8. 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 field-fabricated ductwork at unit duct openings
5. Install condensate line trap and piping
6. Make electrical connections
7. 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.

Step 4 — Provide Unit Support

ROOF CURB MOUNT

Accessory roof curb details and dimensions are shown in Fig. 6 (size 17) and Fig. 7 (size 24). Assemble and install accessory

roof curb in accordance with instructions shipped with the curb.

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

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

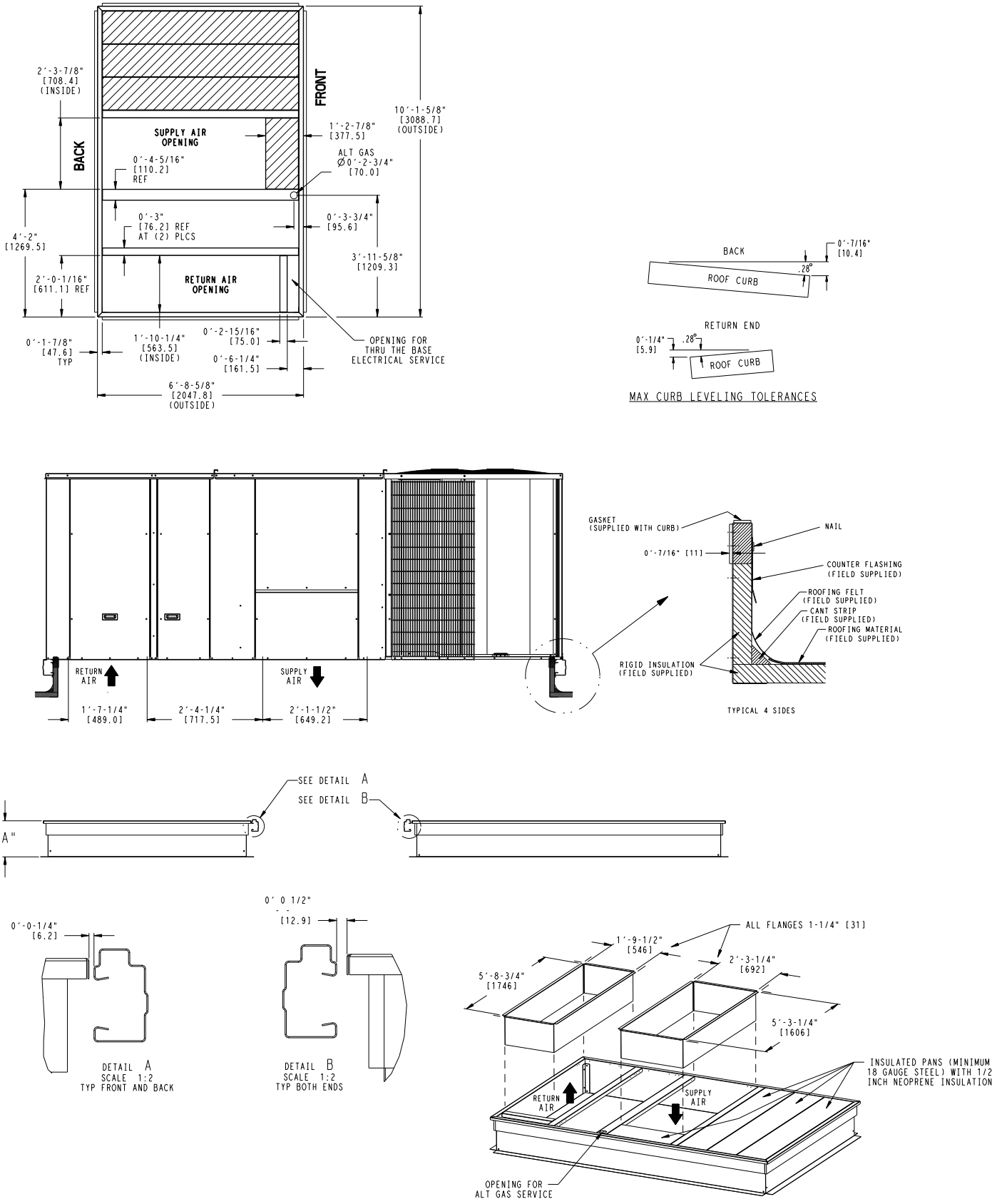


Fig. 6 — Roof Curb Details — Size 17 Units

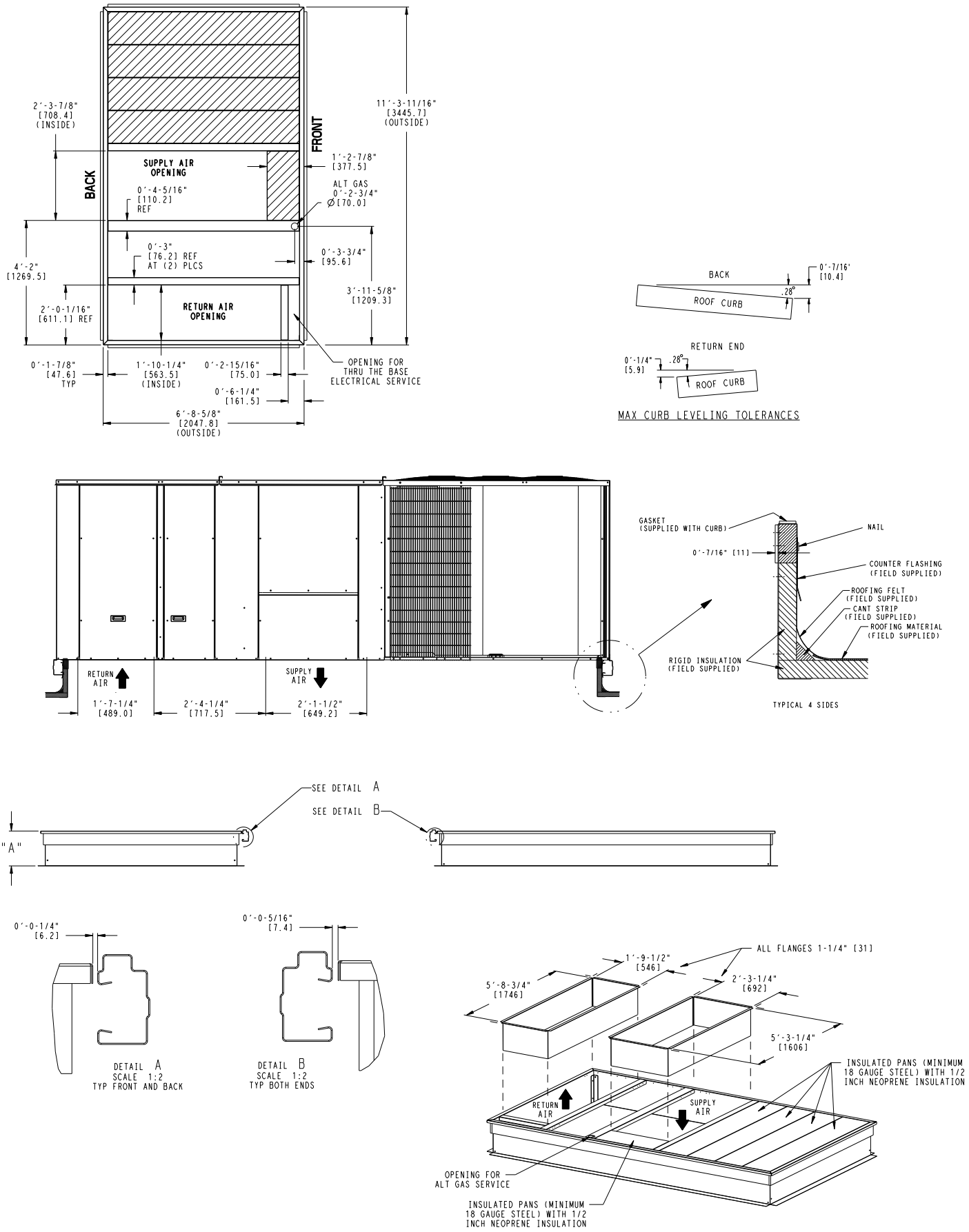
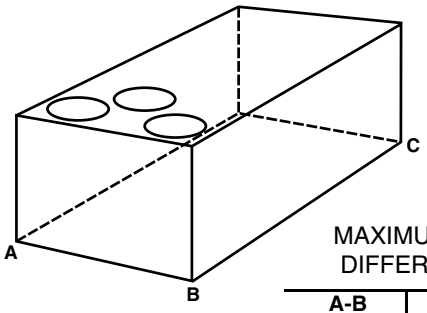


Fig. 7 — Roof Curb Details — Size 24 Units



MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

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

Fig. 8 — Unit Leveling Tolerances

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

If electric and control wiring is to be routed through the basepan remove knockouts in basepan located in control box area, see Fig. 9 for location. Attach the service connections to the basepans.

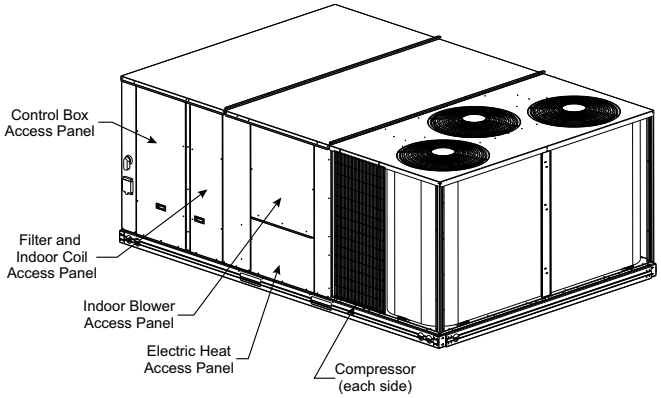


Fig. 9 — Typical Access Panel and Compressor Locations

SLAB MOUNT (HORIZONTAL UNITS ONLY)

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

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

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

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

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.*

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

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

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

For units with accessory electric heaters, minimum clearance is not required around ductwork. One inch (25 mm) clearance to combustible materials must be maintained for the first 48 inches (1220 mm) of ductwork exiting the unit. This applies to horizontal and vertical applications.

Outlet grilles must not lie directly below unit discharge.

NOTE: A 90-degree elbow must be provided in the ductwork to comply with UL (Underwriters Laboratories) code for use with electric heat.

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could cause personal injury.

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

Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 5 and Fig. 10 for additional information.

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

⚠ CAUTION

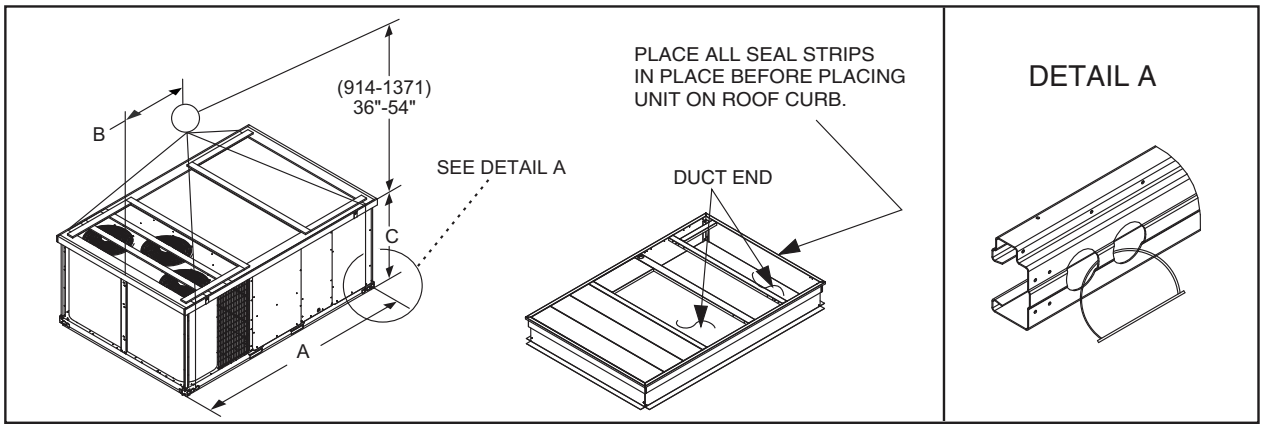
UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

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.

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



UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	LB	KG	IN.	MM	IN.	MM	IN.	MM
548J*D17**	2070	940	127.8	3249	58.7	1491	52.3	1328
548J*D24**	2358	1071	141.5	3595	58.7	1491	52.3	1328

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

Fig. 10 — Rigging Details

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 Detail A in Fig. 6 and 7.

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

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

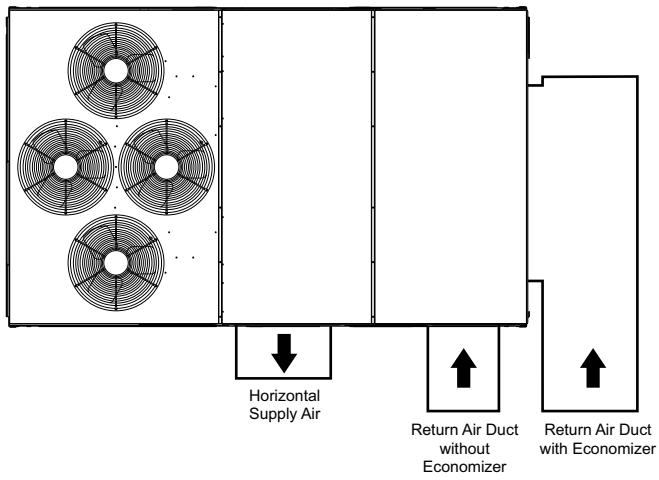
After unit is in position, remove rigging skids and shipping materials.

Step 7 — Horizontal Duct Connection

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

Field-supplied (3/4-in.) flanges should be attached to horizontal duct openings (see Fig. 11) and all ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof or building openings with counter flashing and mastic in accordance with applicable codes.

NOTE: 548J size 17 to 24 units are factory assembled as either dedicated horizontal or vertical units. These units cannot be field converted.



UNIT	LOCATION	SUPPLY	RETURN WITHOUT ECONOMIZER	RETURN WITH ECONOMIZER
		Back	Back	Left End
548J*17**	Height – in. (mm)	15-7/8 (402)	41-3/8 (1051)	18-3/8 (467)
	Width – in. (mm)	29-3/4 (756)	23-3/8 (593)	61-5/8 (1564)
548J*24**	Height – In. (mm)	15-7/8 (402)	49-3/8 (1253)	18-3/8 (467)
	Width – in. (mm)	29-3/4 (756)	23-3/8 (593)	61-5/8 (1564)

Fig. 11 — Horizontal Duct Opening Dimensions

Step 8 — Install Outside Air Hood (Factory Option)

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

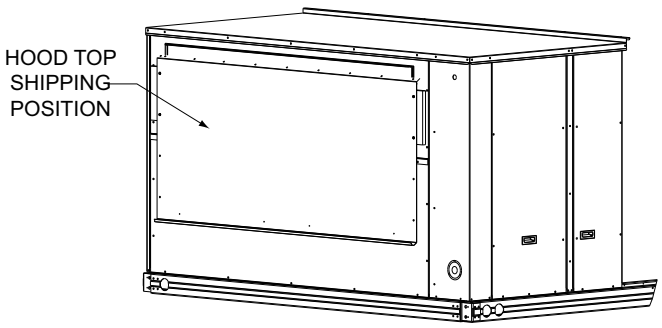


Fig. 12 — Hood Top -Shipping Position

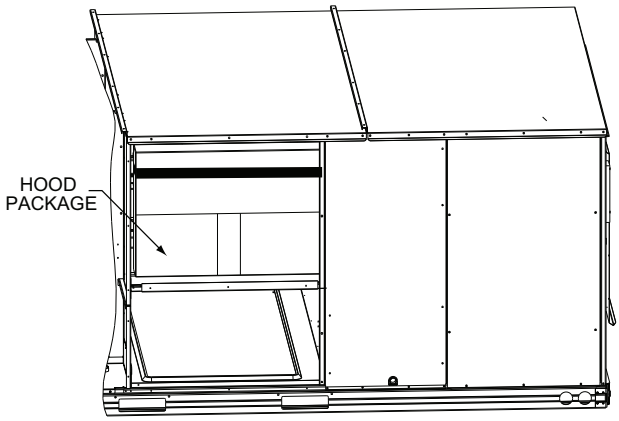
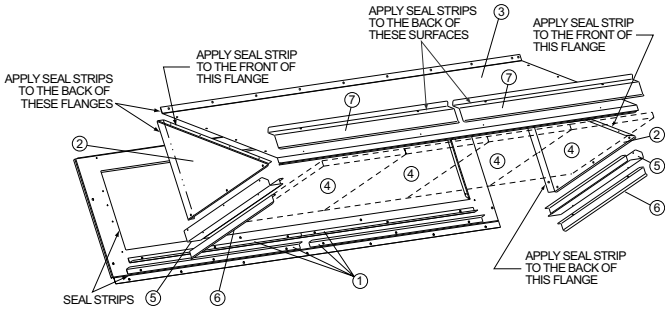


Fig. 13 — Hood Package - Shipping Locations

To remove the hood parts package:

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

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



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

Fig. 14 — Hood Part Identification and Seal Strip

To assemble the outside air hood (see Fig. 15):

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

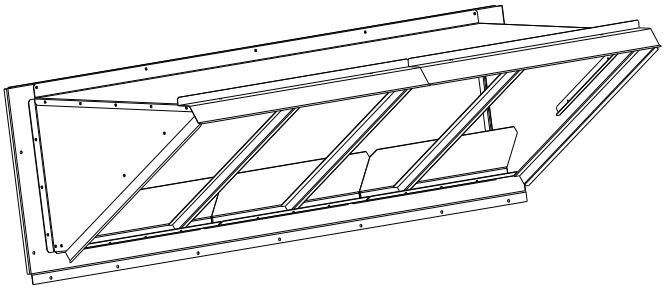


Fig. 15 — Hood Assembly- Completed

Step 9 — Assemble Barometric Hood

The barometric hood can be assembled in vertical or horizontal configuration. Figure 16 illustrates the barometric hood parts.

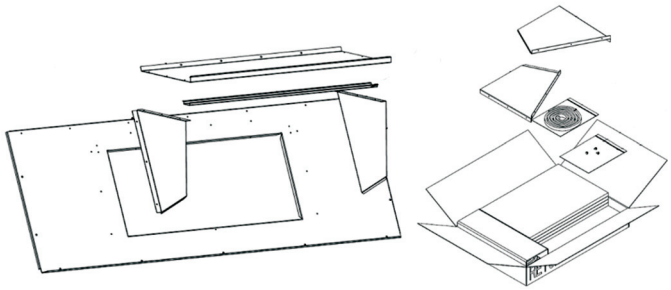


Fig. 16 — Barometric Hood Parts

BAROMETRIC HOOD (VERTICAL CONFIGURATION)

1. Remove the hood top panel from its shipping position on the unit end (see Fig. 17).

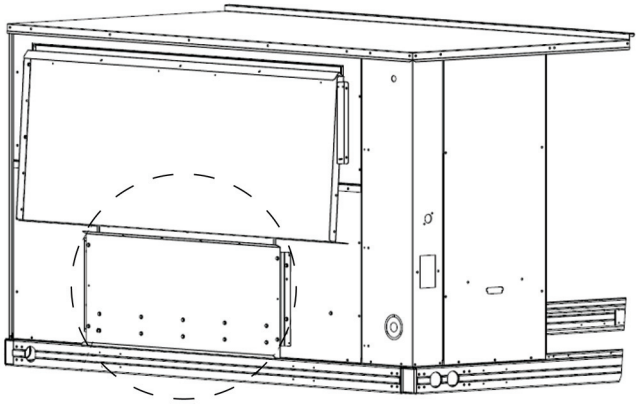


Fig. 17 — Shipping Location, Vertical Units

2. Remove the side panels located in the hood parts box (see Fig. 18).

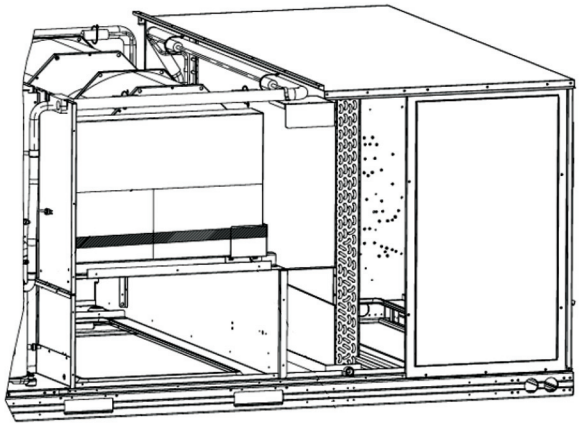


Fig. 18 — Barometric Hood Box Parts Location

3. Install parts as shown in the following exploded view (Fig. 19) using the seal strip and screws provided in the parts box.

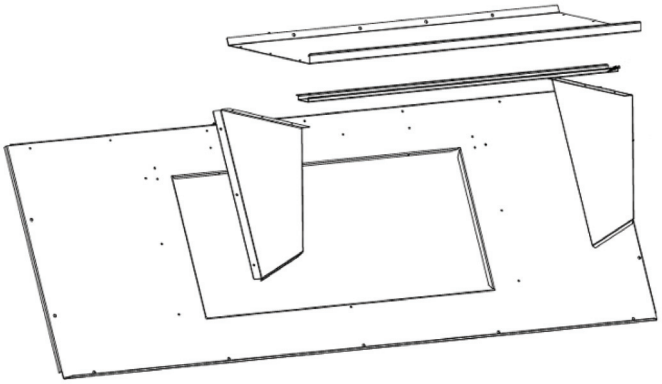


Fig. 19 — Barometric Hood Exploded View

Figure 20 illustrates the installed barometric hood parts.

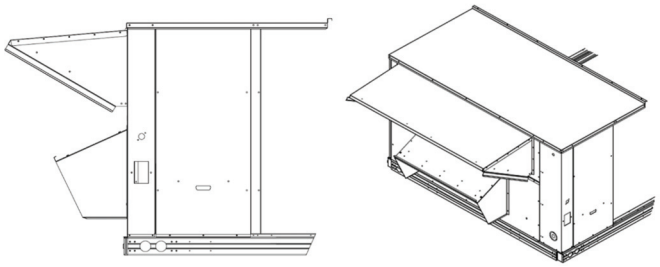


Fig. 20 — Installed Barometric Hood Side View and Isometric View

BAROMETRIC HOOD (HORIZONTAL CONFIGURATION)

For horizontal return and field installed economizer, install the economizer as follows:

1. Install the field provided horizontal ductwork onto the unit. Duct height must be at least 19-1/2 in. high, however the duct can be no taller than the top of the relief opening in the bottom panel, or airflow into the outside air hood will be restricted. See Fig. 21.

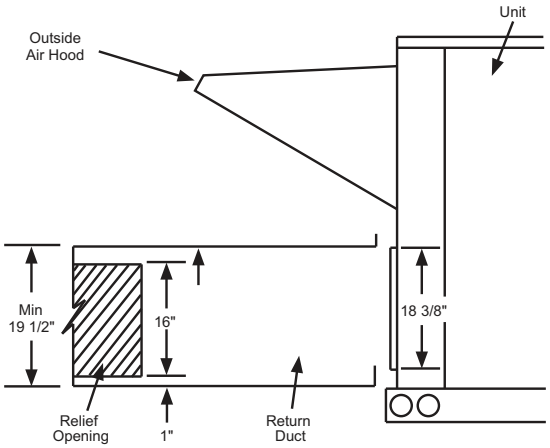


Fig. 21 — Relief Damper

2. Cut a 16 in. x 36 in. opening in the return duct for the relief damper (see Fig. 21).
3. On the field installed economizer (CRECOMZR0**A00), a birdscreen or hardware cloth is shipped attached to the bottom panel used for vertical applications.

NOTE: This panel is not used for horizontal return applications. Remove the screen from the provided panel and install it over the relief opening cut in return duct.

4. Using the blade brackets, install the relief damper onto the side of the return duct (see Fig. 22). The two brackets and relief damper are provided with the economizer.

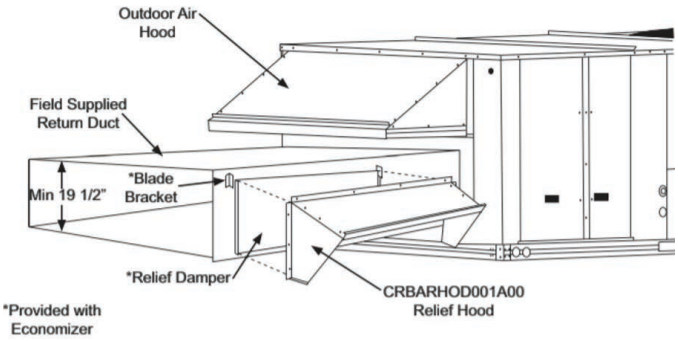


Fig. 22 — Installing CRBARHOD001A00 Over Relief Damper

5. Using the provided hardware, screw the CRBARHOD001A00 hood sides and top together (see Fig. 23).

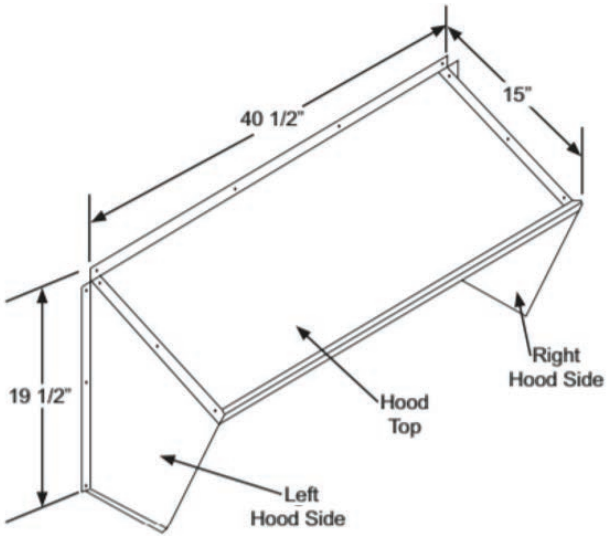


Fig. 23 — CRBARHOD001A00 Hood Sides and Top

Caulk the backside of the mating flanges to ensure a watertight seal. Install the CRBARHOD001A00 over the relief damper and screw to the return duct, as illustrated in Fig. 22.

Step 10 — Install External Condensate Trap/Line

The unit has one 3/4-in. condensate drain connection on the end of the condensate pan (see Fig. 24). For the location of the condensate drain connection, see Fig. 22 (or Fig. 3).

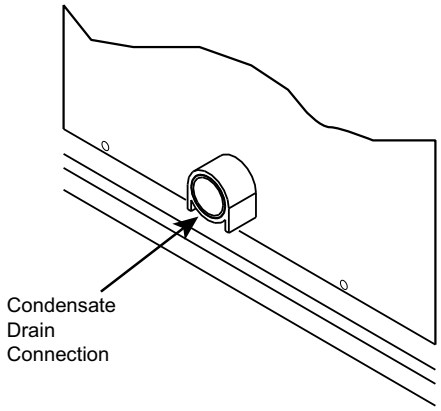
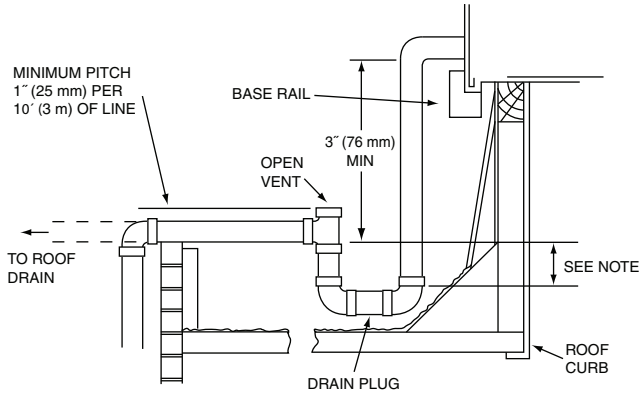


Fig. 24 — Condensate Drain Pan Connection

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



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

Fig. 25 — Condensate Drain Piping Details

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

Step 11 — Make Electrical Connections

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

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

NOTE: Check all factory and field electrical connections for tightness. Field-supplied wiring shall conform with the limitations of 63°F (33°C) rise.

CONTROL AND POWER WIRING DIAGRAMS

See Fig. 27-28 for examples of typical unit wiring diagrams. For details pertaining to a specific unit, see the control and power wiring diagram labels on the unit.

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 terminal block with unit field power leads.

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. 26).

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.

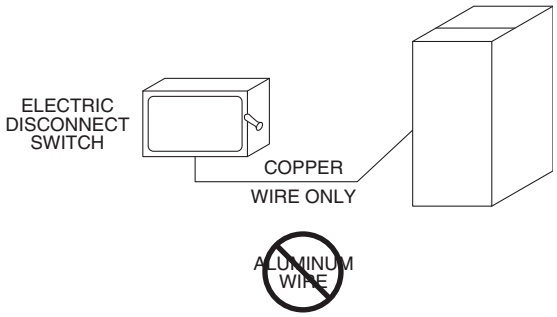
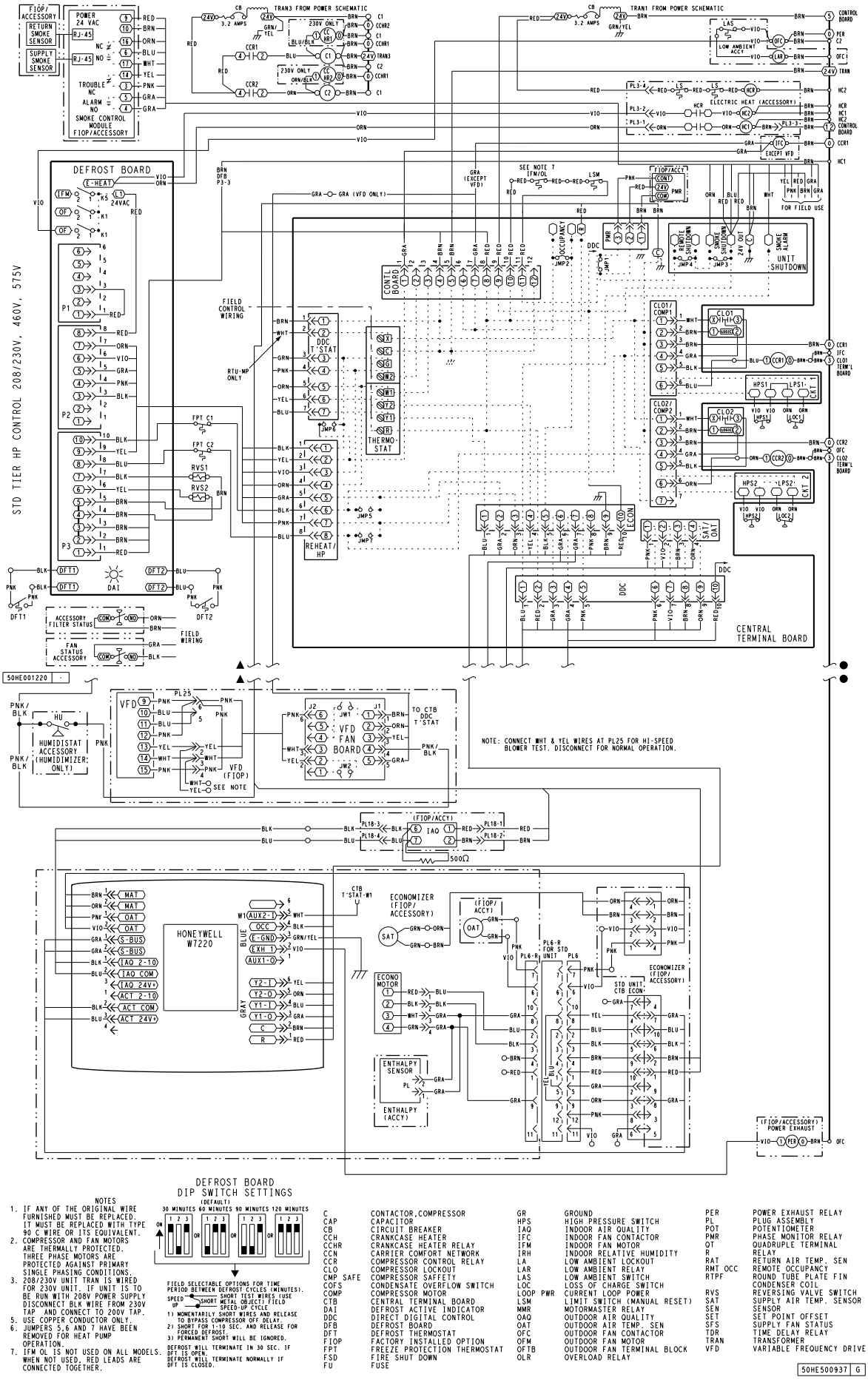


Fig. 26 — Disconnect Switch and Unit



NOTES

1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.
5. USE COPPER CONDUCTOR ONLY.
6. JUMPERS 5,6 AND 7 HAVE BEEN REMOVED FOR HEAT PUMP OPERATION.
7. IFM OL IS NOT USED ON ALL MODELS. WHEN NOT USED, RED LEADS ARE CONNECTED TOGETHER.

FIELD SELECTABLE OPTIONS FOR TIME PERIOD BETWEEN DEFROST CYCLES (MINUTES).
SPEED UP (SHORT METAL OBJECT) FIELD SPEED-UP CYCLE

1) MOMENTARILY SHORT WIRES AND RELEASE TO BYPASS COMPRESSOR OFF DELAY.
2) SHORT FOR 1-10 SEC. AND RELEASE FOR FORCED DEFROST.
3) PERMANENT SHORT WILL BE IGNORED.

DEFROST WILL TERMINATE IN 30 SEC. IF DFT IS OPEN.
DEFROST WILL TERMINATE NORMALLY IF DFT IS CLOSED.

C	CONTACTOR,COMPRESSOR	GR	GROUND	PER	POWER EXHAUST RELAY
CAP	CAPACITOR	HPS	HIGH PRESSURE SWITCH	PL	PLUG ASSEMBLY
CB	CIRCUIT BREAKER	IAQ	INDOOR AIR QUALITY	POT	POTENTIOMETER
CCH	CRANKCASE HEATER	IFC	INDOOR FAN CONTACTOR	PMR	PHASE MONITOR RELAY
CCHR	CRANKCASE HEATER RELAY	IFM	INDOOR FAN MOTOR	QT	QUADRUPLE TERMINAL
CCN	CARRIER COMFORT NETWORK	IRH	INDOOR RELATIVE HUMIDITY	R	RELAY
CCR	COMPRESSOR CONTROL RELAY	LA	LOW AMBIENT LOCKOUT	RAT	RETURN AIR TEMP. SEN
CLO	COMPRESSOR LOCKOUT	LAR	LOW AMBIENT RELAY	RMT OCC	REMOTE OCCUPANCY
CMP SAFE	COMPRESSOR SAFFETY	LAS	LOW AMBIENT SWITCH	RTPF	ROUND TUBE PLATE FIN
COFS	CONDENSATE OVERFLOW SWITCH	LOC	LOSS OF CHARGE SWITCH		CONDENSER COIL
COMP	COMPRESSOR MOTOR	LOOP PWR	CURRENT LOOP POWER	RVS	REVERSING VALVE SWITCH
CTB	CENTRAL TERMINAL BOARD	LSM	LIMIT SWITCH (MANUAL RESET)	SAT	SUPPLY AIR TEMP. SENSOR
DAI	DEFROST ACTIVE INDICATOR	MMR	MOTORMASTER RELAY	SEN	SENSOR
DDC	DIRECT DIGITAL CONTROL	OAQ	OUTDOOR AIR QUALITY	SET	SET POINT OFFSET
DFB	DEFROST BOARD	OAT	OUTDOOR AIR TEMP. SEN	SFS	SUPPLY FAN STATUS
DFT	DEFROST THERMOSTAT	OFC	OUTDOOR FAN CONTACTOR	TDR	TIME DELAY RELAY
FIOP	FACTORY INSTALLED OPTION	OFM	OUTDOOR FAN MOTOR	TRAN	TRANSFORMER
FPT	FREEZE PROTECTION THERMOSTAT	OFTB	OUTDOOR FAN TERMINAL BLOCK	VFD	VARIABLE FREQUENCY DRIVE
FSD	FIRE SHUT DOWN	OLR	OVERLOAD RELAY		
FU	FUSE				

Fig. 27 — 548J 17-24 Control Wiring Diagram with VFD Option

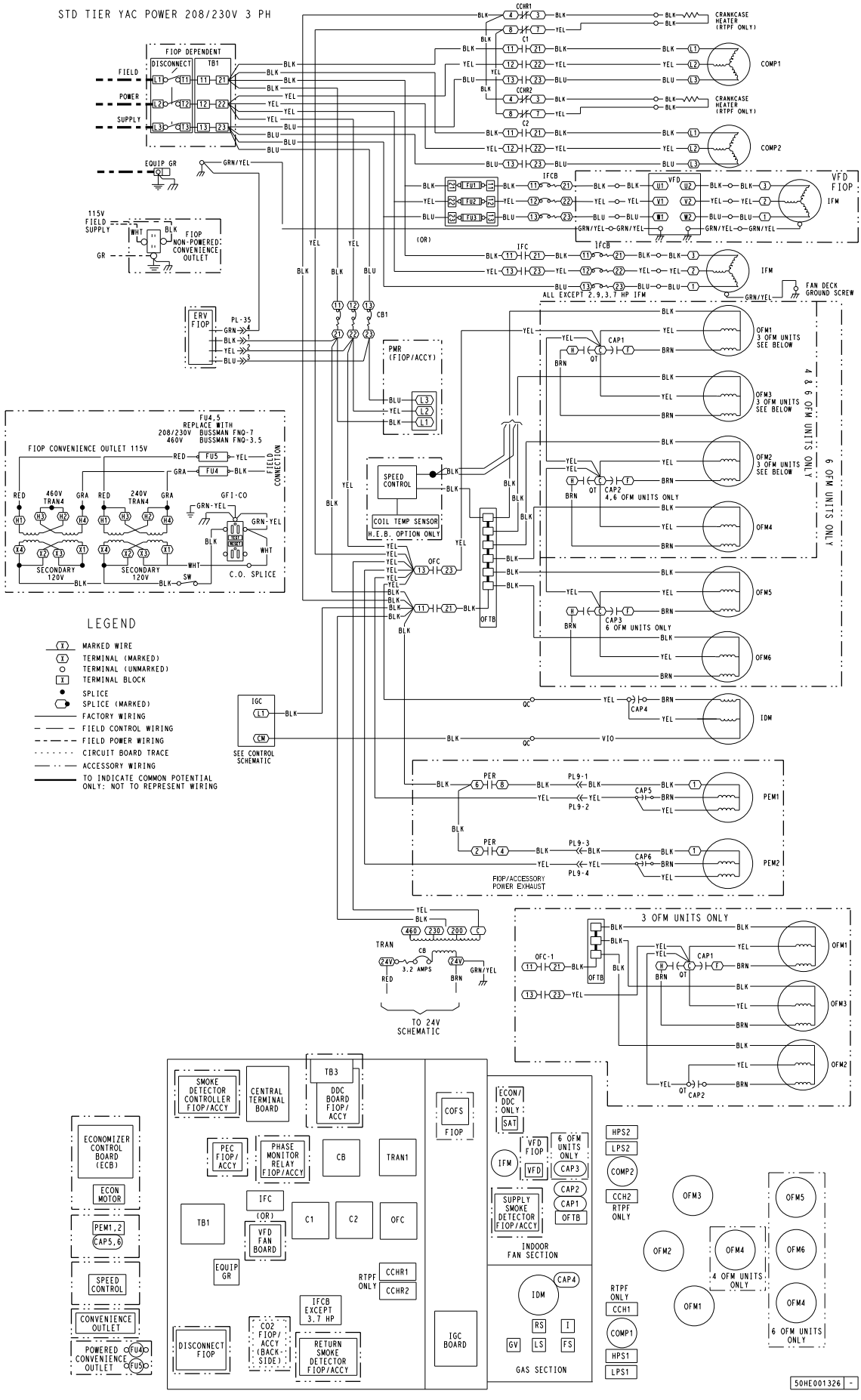


Fig. 28 — Typical 548J 17-24 Power Wiring Diagram (208/230V 3 Phase 60Hz unit shown)

UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT

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

UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT

The factory-installed option non-fused disconnect switch (NFD) is located in the main control box. The manual switch handle and shaft are shipped in the control box and must be mounted on the corner post adjacent to the control box (See Fig. 29). Note that the tape covering the hole for the shaft in the corner post must be removed prior to handle and shaft installation.

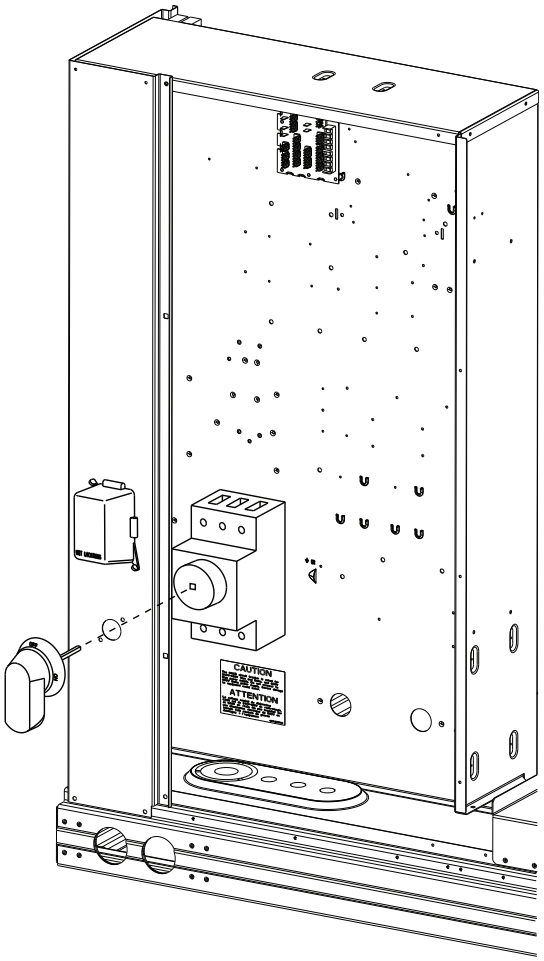


Fig. 29 — Handle and Shaft Assembly for NFD

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 inch.
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.

ALL UNITS

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

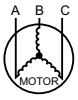
Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 30 for power wiring connections to the unit power terminal block and equipment ground.

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 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



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

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

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

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

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.

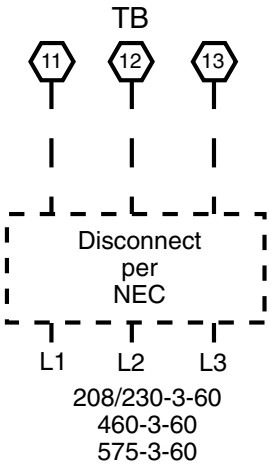
⚠ CAUTION

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 Bryant warranty.

Units Without Disconnect Option



Units With Disconnect Option

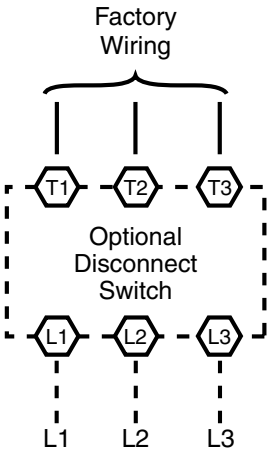


Fig. 30 — Power Wiring Connections

CONVENIENCE OUTLETS

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

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

Two types of convenience outlets are offered on 548J models: non-powered and unit-powered. Both types provide a 125-volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. (See Fig. 31.)

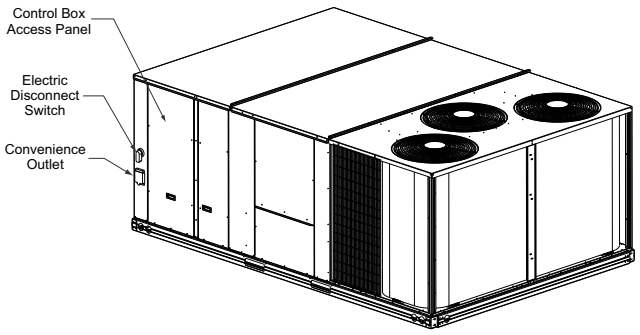


Fig. 31 — Convenience Outlet Location

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 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.

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

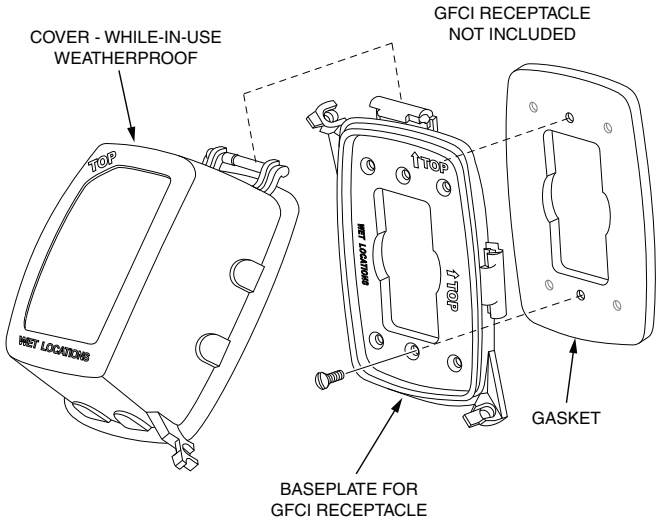


Fig. 32 — Weatherproof Cover Installation

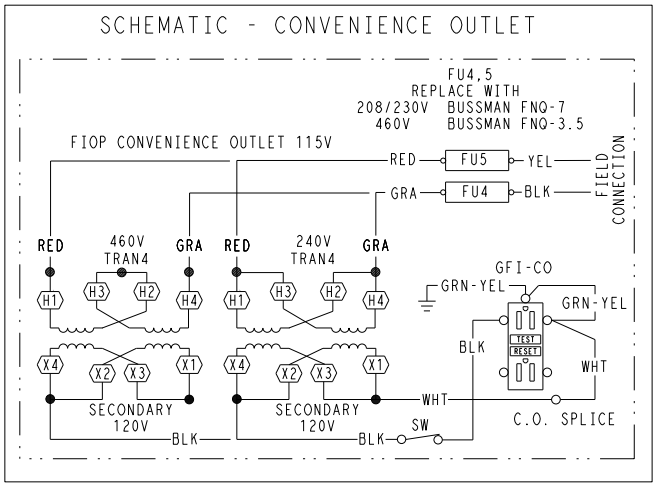
Non-powered type

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

Unit-powered type

A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel (see Fig. 31).

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. 33).



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

Fig. 33 — Powered Convenience Outlet Wiring

Duty Cycle

The unit-powered convenience outlet has a duty cycle limitation. The transformer is intended to provide power on an intermittent basis for service tools, lamps, etc; it is not intended to provide 15-amps loading for continuous duty loads (such as electric heaters for overnight use). Observe a 50% limit on circuit loading above 8-amps (i.e., limit loads exceeding 8-amps to 30 minutes of operation every hour).

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.

Fuse on power type: The factory fuse is a Bussman FNQ-7 dual element time delay fuse.

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

FACTORY-OPTION THRU-BASE CONNECTIONS

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

The electrical entrance is located in the control box area can be accessed through the control box access panel. An embossed area is provided with three knock outs. High voltage is brought through the multi knock out by removing the appropriate size for the size of the fitting required. A 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-powered convenience outlet option.

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

UNITS WITHOUT THRU-BASE CONNECTIONS

1. Install conduit, liquid tight, 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. 33.

FIELD CONTROL WIRING

The 548J unit requires an external temperature control device. This device can be a thermostat (field-supplied) or RTU Open Multi-Protocol Controller (RTU Open is available as a factory-installed option only).

THERMOSTAT

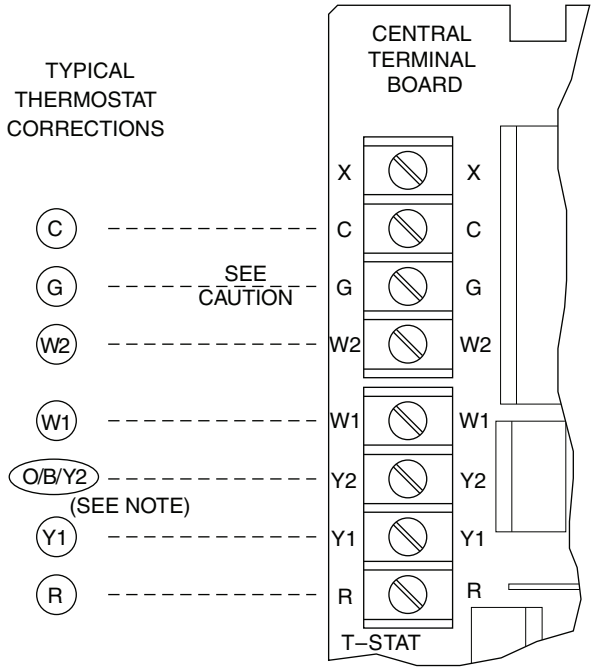
Select a Bryant-approved accessory thermostat. The 548J models do not require a thermostat with an O function to control the reversing valve operation. When electric heat is installed in the 548J unit, the thermostat must be capable of energizing the G terminal (to energize the Indoor Fan Contactor) whenever there is a space call for heat (energizing the W1 terminal). The accessory thermostats listed on the unit price pages can provide this signal but they are not configured to enable this signal as shipped.

Install the accessory thermostat according to installation instructions included with the accessory (see Fig. 34).

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



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

– – – Field Wiring

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may cause a short circuit.

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

Fig. 34 — Typical Low-Voltage Control Connections

CENTRAL TERMINAL BOARD

The Central Terminal Board (CTB) is a pass through connection point. The CTB provides the capability to add factory-installed options and field-installed accessories to the units by cutting jumper wires without having to change or reroute wires through the structure of the unit. The CTB does not provide any microprocessor control; it is simply a basic multifunction wiring terminal configuration.

COMMERCIAL DEFROST CONTROL

The Commercial Defrost Control Board (DFB) coordinates thermostat demands for supply fan control, 1 or 2 stage cooling, 2 stage heating, emergency heating and defrost control with unit operating sequences. The DFB also provides an indoor fan off delay feature (user selectable). See Fig. 35 for board arrangement.

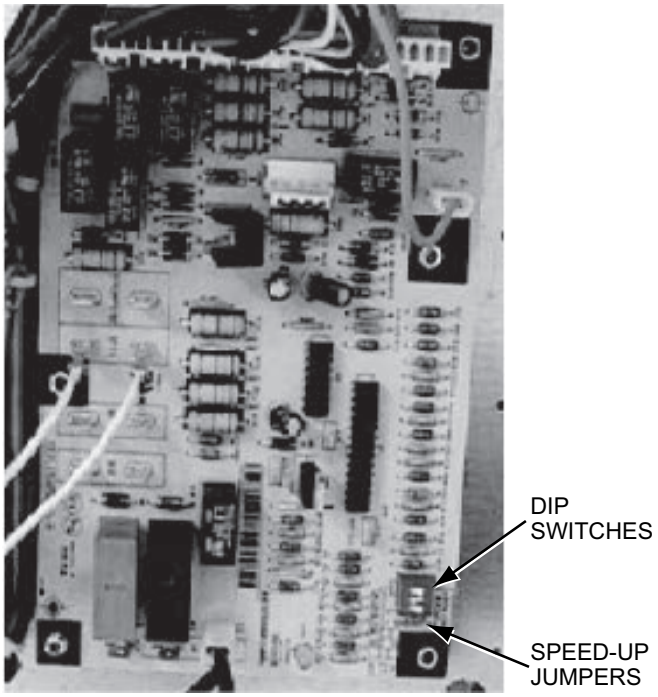


Fig. 35 — Defrost Control Board Arrangement

The DFB is located in the 548J unit's main control box (see Fig. 36). All connections are factory-made through harnesses to the unit's CTB, to IFC (belt-drive motor) or to ECM (direct-drive motor), reversing valve solenoids and to defrost thermostats. Refer to Table 6 for details of DFB Inputs and Outputs.

Reversing valve control

The DFB has two outputs for unit reversing valve control. Operation of the reversing valves is based on internal logic; this application does not use an "O" or "B" signal to determine reversing valve position. Reversing valves are energized during the cooling stages and the defrost cycle and de-energized during heating cycles. Once energized at the start of a cooling stage, the reversing valve will remain energized until the next heating cycle demand is received. Once de-energized at the start of a Heating cycle, the reversing valves will remain de-energized until the next cooling stage is initiated.

Compressor control

The DFB receives inputs indicating Stage 1 Cooling, Stage 2 Cooling and Stage 1 Heating from the space thermostat or unit control system (RTU Open controller); it generates commands to start compressors with or without reversing valve operation to produce Stage 1 Cooling (one compressor runs), Stage 2 Cooling (both compressors run) or Stage 1 Heating (both compressors run).

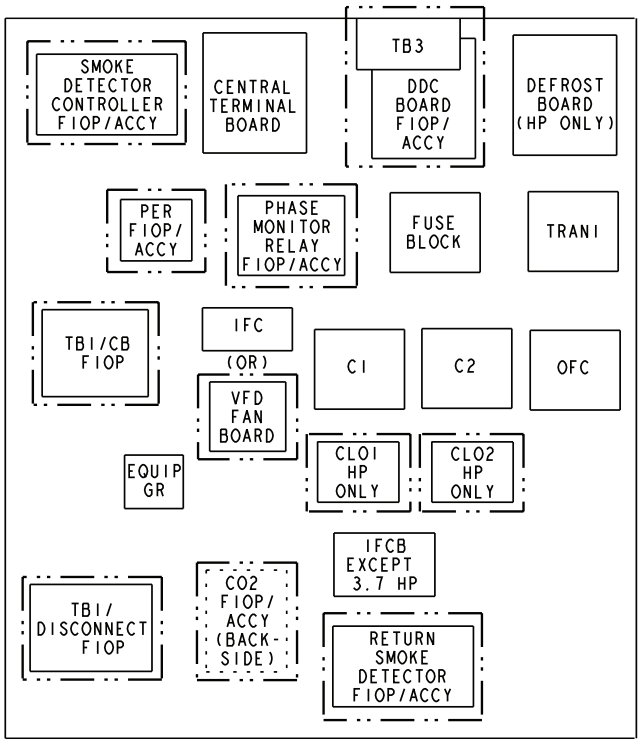


Fig. 36 — Defrost Control Board Location

Table 6 — 548J Defrost Board I/O and Jumper Configurations

INPUTS				
Point Name	**Type of I/O**	**Connection Pin Number**	**Unit Connections**	**Note**
G Fan	DI, 24VAC	P2-3	CTB-G	
Y1 Cool 1	DI, 24VAC	P2-5	CTB-Y1	
Y2 Cool 2	DI, 24VAC	P2-4	CTB-Y2	
W1 Heat 1	DI, 24VAC	P2-7	CTB-W1	
W2 Heat 2	DI, 24VAC	P2-6	CTB-W2	
R Power	24VAC	P3-1	CONTROL BRD-8	
C Common	24VAC	P3-2	CONTROL BRD-4	
Dft1	DI, 24VAC	DFT-1 TO DFT-1	—	
Dft2	DI, 24VAC	DFT-2 TO DFT-2	—	
OUTPUTS				
Point Name	**Type of I/O**	**Connection Pin Number**	**Unit Connections**	**Note**
IFO FAN ON	DO, 24VAC	P3-9	REHEAT/HP-2	
OF OD FAN ON	DO, 24VAC	OF	OFR	
RVS1	DO, 24VAC	P3-7 TO P3-5	—	ENERGIZE IN COOL
RVS2	DO, 24VAC	P3-6 TO P3-4	—	ENERGIZE IN COOL
COMP1	DO, 24VAC	P3-10	FPT1 - REHEAT/HP-6	
COMP2	DO, 24VAC	P3-8	FPT2 - REHEAT/HP-8	
HEAT 2	DO, 24VAC	E-HEAT	TB4-1	
COM	24VAC	P3-3	TB4-3	
CONFIGURATION				
Point Name	**Type of I/O**	**Connection Pin Number**	**Unit Connections**	**Note**
Select Jumper	24VAC	P1-1	—	
2 Compressor	24VAC	P1-3	—	Use For RHS 181-243
SPEED-UP CONFIGURATION				
Point Name	**Type of I/O**	**Connection Pin Number**	**Unit Connections**	**Note**
Speed-up Jumper	—	JMP17	—	
Speed-up Jumper	—	JMP18	—	

NOTES:
1. Jumper for 1-3 seconds: Factory Test — The defrost interval timing is reduced by a factor of 0.1 seconds/minute based on the positions of DIP switches SW1 and SW2 (e.g., 90 minutes will be reduced to 9 seconds).
2. Jumper for 5-20 seconds: Forced Defrost — Defrost runs for 30 seconds if DFT2 is open.

Table 7 — DIP Switch Position

SWITCH NO														
	1	2		1	2		1	2		1	2		3	
1			1			1			1			1		On
0			0			0			0			0		Off
	30 Minutes			60 Minutes (Factory Default)			90 Minutes			120 Minutes			Fan Delay	

AUXILIARY (ELECTRIC) HEAT CONTROL

The 548J unit can be equipped with one or two auxiliary electric heaters, to provide a second stage of heating. The DFB will energize this Heating System for a Stage 2 Heating Command (heaters operate concurrently with compressor(s) in the Stage 1 Heating cycle), for an Emergency Heating sequence (compressors are off and only the electric heaters are energized) and also during the Defrost cycle (to eliminate a "cold blow" condition in the space).

Defrost

The defrost control mode is a time/temperature sequence. There are two time components: The continuous run period and the test/defrost cycle period. The temperature component is provided by Defrost Thermostat 1 and 2 (DFT1 and DFT2) mounted on the outdoor coil.

The continuous run period is a fixed time period between the end of the last defrost cycle (or start of the current Heating cycle) during which no defrost will be permitted. This period can be set at 30, 60, 90 or 120 minutes by changing the positions of DIP switches SW1 and SW2 (see Fig. 37 and Tables 6 and 7). The default run period is 60 minutes for size 17 and 24 units.

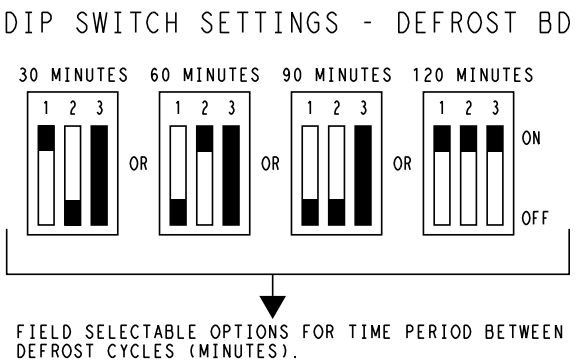


Fig. 37 — DIP Switch Settings-Defrost Board

Shorting the jumpers for a period of 5 to 20 seconds bypasses the remaining continuous run period and places the unit in a Forced Defrost mode. If the controlling DFT is closed when this mode is initiated, the unit will complete a normal defrost period that will terminate when the controlling DFT opens or the 10 minute defrost cycle limit is reached. If the controlling DFT is open when this mode is initiated, the Defrost cycle will run for 30 seconds. Both modes end at the end of the Defrost cycle.

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 low voltage wire and the high voltage circuit. Route the low voltage wire to the central terminal board (see Fig. 38).

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

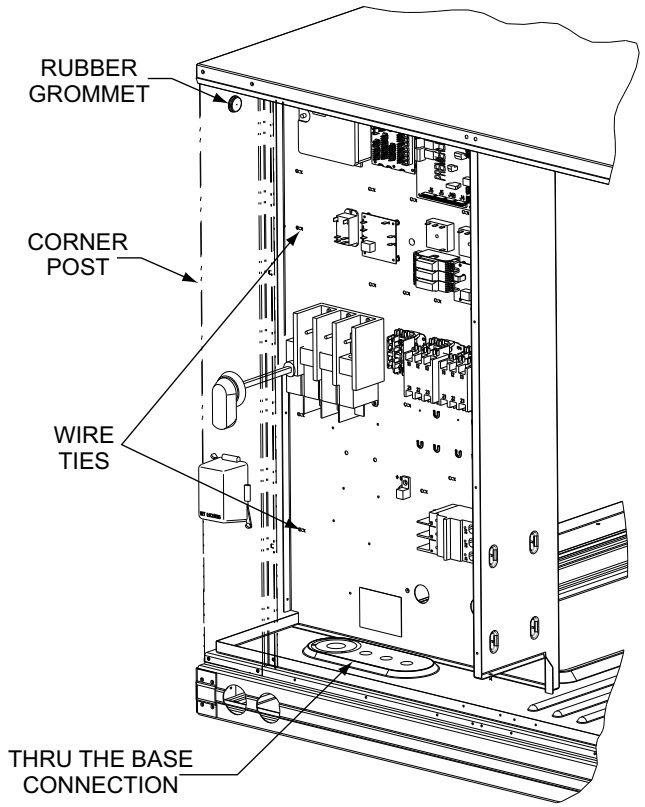


Fig. 38 — Field Control Wiring Raceway

HEAT ANTICIPATOR SETTINGS

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

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.

ELECTRIC HEATERS

548JD units may be equipped with field-installed accessory electric heaters. The heaters are modular in design.

Heater modules are installed in the compartment below the indoor blower access panel. Access is through the electric heat access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. (See Fig. 39-41.) Refer to the Electric Heater Kit Installation Instructions for complete details. See Fig. 42 for accessory electric heater control connections.

Not all available heater modules may be used in every unit. Use only those heater modules that are ETL listed for use in a

specific size unit. Refer to the label on the unit cabinet for the list of approved heaters.

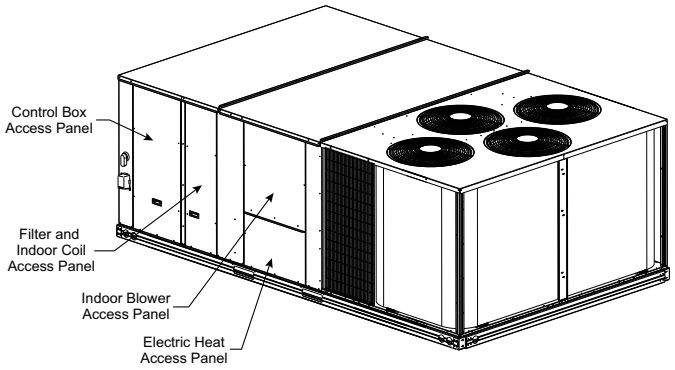


Fig. 39 — Typical Access Panel Location

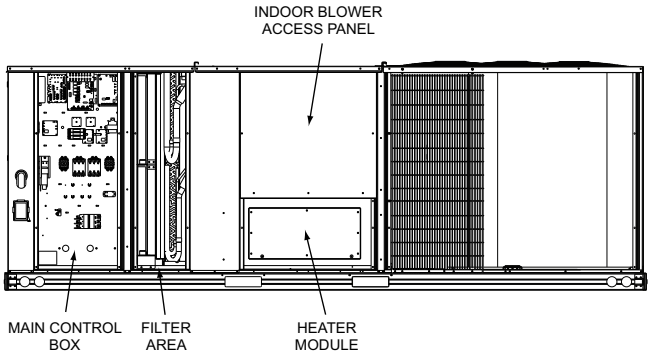


Fig. 40 — Typical Component Location

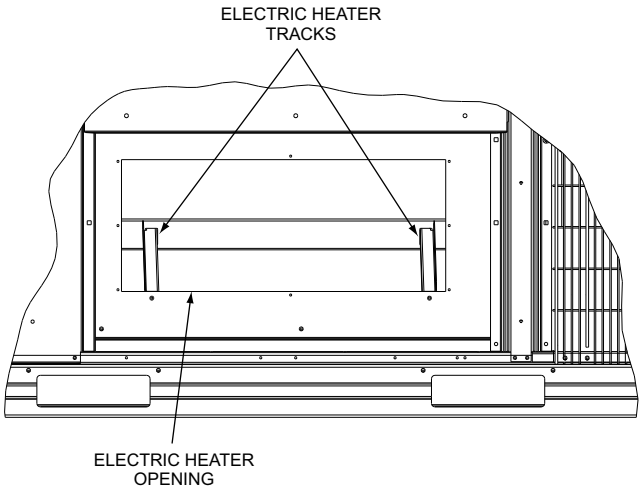
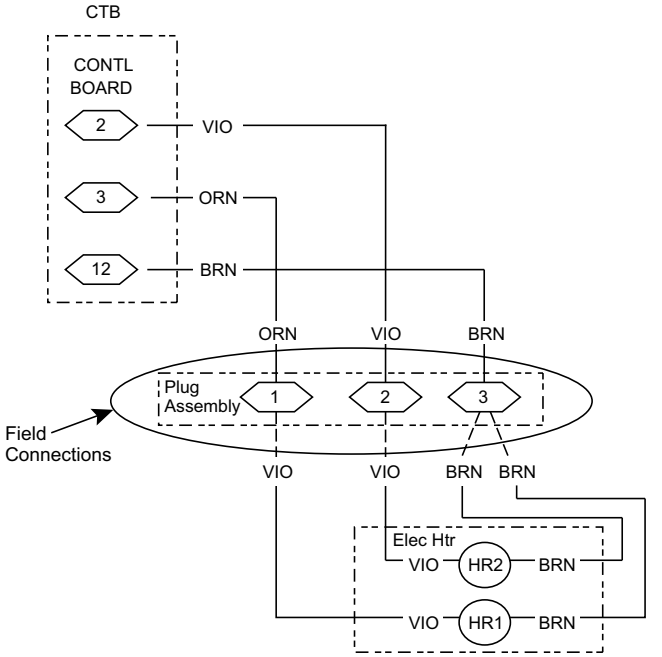


Fig. 41 — Electric Heater Compartment (Cover Removed)

LOW-VOLTAGE CONTROL CONNECTIONS

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



HR1: On Heater 1 in Position #1
HR2: On Heater 2 in Position #2 (if installed)

Fig. 42 — Accessory Electric Heater Control Connections

EconoMi$er® X (Factory-Installed Option)

Fig. 43 — W7220 Economizer Module

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. 43). The W7220 can be configured with optional sensors.

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

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

The W7220 economizer module automatically detects sensors by polling to determine which sensors are present. If a sensor

loses communications after it has been detected, the W7220 economizer controller indicates a device fail error on its LCD.

SYSTEM COMPONENTS

The 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

This is the core of the EconoMi$er X system, 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 sensor is a combination temperature and humidity sensor which is powered by and communicates on the S-Bus. Up to three sensors may be configured with the W7220 economizer module. See page 33 for details.

CO_2 Sensor (optional)

A CO_2 sensor can be added for Demand Controlled Ventilation (DCV).

SPECIFICATIONS

W7220 Economizer Module

The module is designed for use with 2 to 10 Vdc or bus communicating actuator. The module includes terminals for CO_2 sensor, mixed air sensor, and an outdoor dry bulb sensor. Enthalpy and other options are available with bus sensors.

User Interface

Provides status for normal operation, setup parameters, 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° to 150°F (-40° 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° to 150°F (-40° 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 page 32 for wiring details). 24 Vac power supply: 20 to 30 Vac 50/60Hz; 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° to 150°F (-40° to 65°C).

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

Storage Temperature

-40° to 150°F (-40° to 65°C)

Shipping Temperature

-40° to 150°F (-40° to 65°C)

Relative Humidity

5% to 95% RH non-condensing

ECONOMIZER MODULE WIRING DETAILS

Use Fig. 44 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.

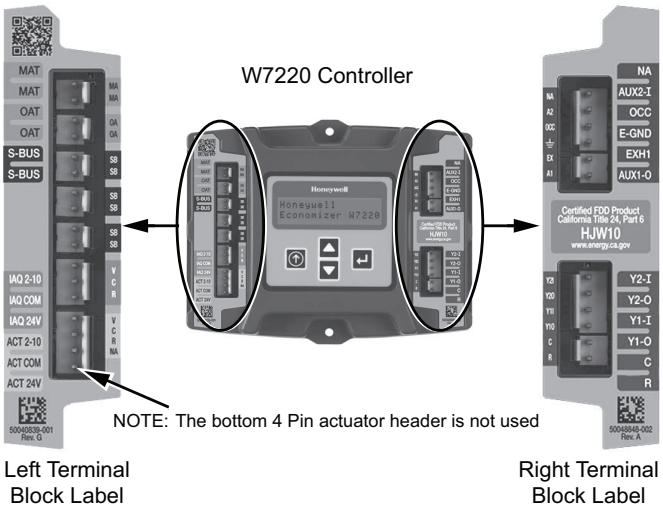


Fig. 44 — W7220 Economizer Module Terminal Connections Labels

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. 44 and Table 10 to locate the wiring terminals for each S-Bus sensor.

Use Fig. 45 and Table 11 to set the DIP switches for the desired use of the sensor.

Table 8 — Economizer Module — Left Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
TOP LEFT TERMINAL BLOCK		
MAT/MAT	20k NTC and COM	Supply Air Temperature Sensor (polarity insensitive connection)
OAT/OAT	20k NTC and COM	Outdoor Air Temperature Sensor (polarity insensitive connection)
S-BUS/S-BUS	S-BUS (Sylk*Bus)	Enthalpy Control Sensor (polarity insensitive connection)
BOTTOM LEFT TERMINAL BLOCK		
IAQ 2-10	2 - 10 VDC	Air Quality Sensor Input (e.g. CO_2 sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24V	24 VAC	Air Quality Sensor 24 Vac Source
ACT 2-10	2 -10 VDC	Damper Actuator Output (2–10 Vdc)
ACT COM	COM	Damper Actuator Output Common
ACT 24V	24 VAC	Damper Actuator 24 Vac Source
	N/A	The bottom pin is not used.

* Sylk is a trademark of Honeywell International Inc.

Table 9 — Economizer Module- Right Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
TOP RIGHT TERMINAL BLOCK		
AUX2 I	24 VAC IN	Shut Down (SD) or Heat (W) Conventional only or Heat Pump Changeover (O/B) in Heat Pump mode.
OCC	24VAC IN	Occupied / Unoccupied Input
E-GND	E-GND	Earth Ground – System Required
EXH1	24 VAC OUT	Exhaust Fan 1 Output
AUX1 O	24 VAC OUT	Programmable: Exhaust fan 2 output or Erv or System Alarm output
BOTTOM RIGHT TERMINAL BLOCK		
Y2-1	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 1 Input from space thermostat
Y1-O	24 VAC OUT	Y1 out – Cooling Stage 1 Output to stage 1 mechanical cooling
C	COM	24 Vac Common
R	24 VAC	24 Vac Power (Hot)

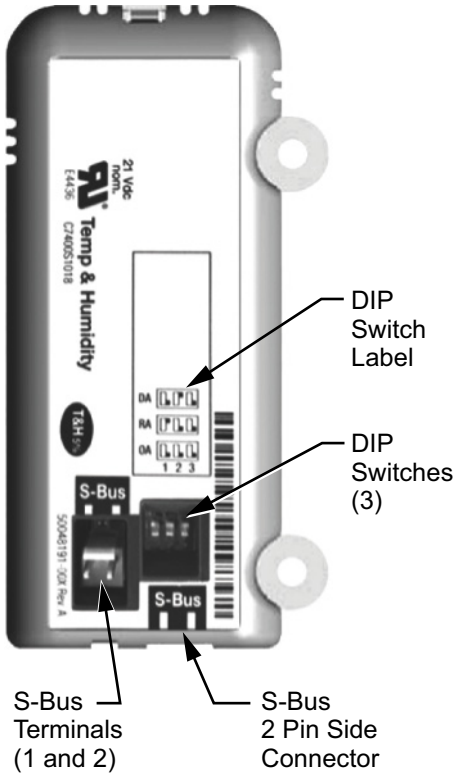


Fig. 45 — S-Bus Sensor DIP Switches

Table 10 — Enthalpy Control Sensor Wiring Terminations*

TERMINAL		TYPE	DESCRIPTION
Nbr	Label		
1	S–BUS	S–BUS	S–bus Communications (Enthalpy Control Sensor Bus)
2	S–BUS	S–BUS	S–bus Communications (Enthalpy Control Sensor Bus)

* Terminals are polarity insensitive.

Table 11 — Enthalpy Control Sensor DIP Switch Settings

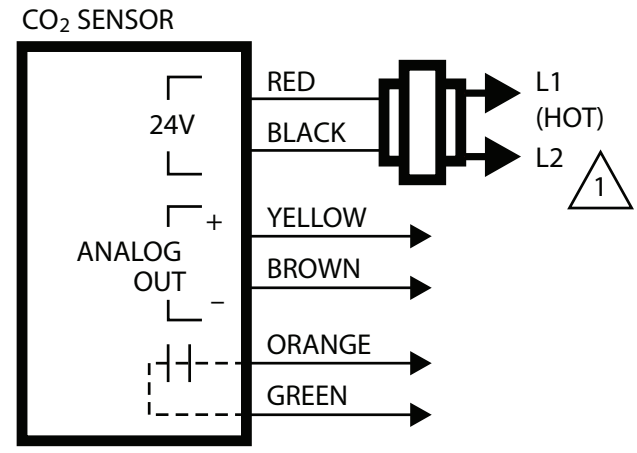
USE	DIP SWITCH POSITIONS FOR SWITCHES 1, 2, AND 3		
	1	2	3
DA*	OFF	ON	OFF
RA†	ON	OFF	OFF
OA**	OFF	OFF	OFF

* DA = Discharge Air
† RA = Return Air
** OA = Outside Air

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.

CO_2 SENSOR WIRING

When using a CO_2 sensor the black and brown common wires are internally connected and only one is connected to "IAQ COM" on the W7220. Use the power from the W7220 to power the CO_2 sensor OR make sure the ground for the power supplies are common. See Fig. 46 for CO_2 sensor wiring.



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

Fig. 46 — Wiring for CO_2 Sensor

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.

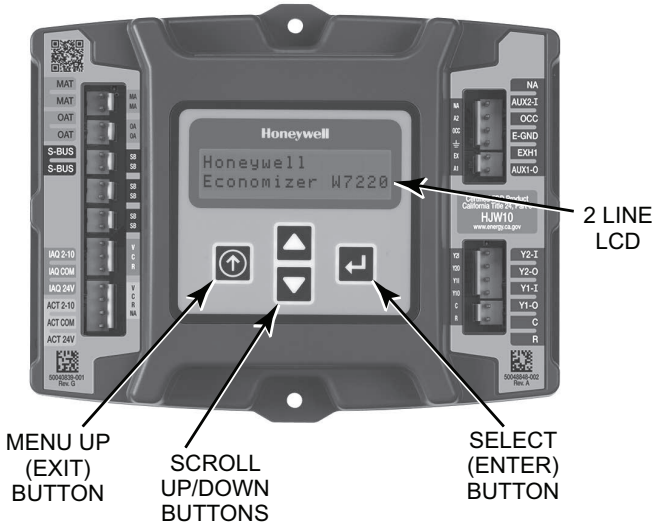


Fig. 47 — W7220 Controller

Keypad

The four navigation buttons (see Fig. 47) 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 ▲ button to move to the previous menu.
- Press the ▼ button to move to the next menu.
- Press the ↵ 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.

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

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

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

7. Press the ↵ button to accept the displayed value and store it in nonvolatile RAM.
8. "CHANGE STORED" displays.
9. Press the ↵ button to return to the current menu parameter.
10. Press the ⓘ (Menu Up/Exit) button to return to the previous menu.

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

IMPORTANT: 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 (CO_2) sensor, then none of the DCV parameters appear and only MIN POS will display. If you have a CO_2 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).

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

Setup and Configuration

Before being placed into service, the W7220 economizer module must be 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. Press the ▲ and ▼ 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*

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
STATUS	ECON AVAIL	NO	YES/NO	ECONOMIZING AVAILABLE YES = economizing available; the system can use outside air for free cooling when required.
	ECONOMIZING	NO	YES/NO	ECONOMIZING ACTIVE YES = Outside air being used for first stage cooling. NO = Economizing not active.
	OCCUPIED	NO	YES/NO	OCCUPIED YES = OCC signal received from space thermostat or unitary controller. YES = 24 Vac on terminal OCC. NO = 0 Vac on terminal OCC.
	HEAT PUMP	n/a**	COOL/HEAT	HEAT PUMP MODE Displays COOL or HEAT when system is set to heat pump (non-conventional).
	COOL Y1-IN	OFF	ON/OFF	FIRST STAGE COOLING DEMAND (Y1–IN) - Y1–I signal from space thermostat or unitary controller for Cooling Stage 1. ON = 24 Vac on terminal Y1–I. OFF = 0 Vac on terminal Y1–I.
	COOL Y1-OUT	OFF	ON/OFF	FIRST STAGE COOLING RELAY OUTPUT- Cool Stage 1 Relay Output to mechanical cooling (Y1–OUT terminal).
	COOL Y1-IN	OFF	ON/OFF	SECOND STAVE COOLING DEMAND (Y2–IN) - Y2–I signal from space thermostat or unitary controller for Cooling Stage 2. ON = 24 Vac on terminal Y2–I. OFF = 0 Vac on terminal Y2–I.
	COOL Y2-OUT	OFF	ON/OFF	SECOND STAGE COOLING RELAY OUTPUT- Cool Stage 2 Relay Output to mechanical cooling (Y2–OUT terminal).
	MA TEMP	_ _._°F (OR _ _._°C)	–40° TO 150°F (–18° TO 60°C)	SUPPLY AIR TEMPERATURE, Cooling Mode - Displays value of measured mixed/cooled air from SAT sensor in fan section. Displays – –.– if not connected, short or out-of-range. See Menu Note 2.
	DA TEMP	_ _._°F (OR _ _._°C)	–40° TO 150°F (–18° TO 60°C)	DISCHARGE AIR TEMPERATURE, after Heating section - (accessory sensor required) Displays when Discharge Air sensor is connected and displays measured discharge temperature. Displays – –.–°F if sensor sends invalid value, if not connected, short or out-of-range.
	OA TEMP	_._°F (OR _ _._°C)	–40° TO 140°F (–40° TO 60°C)	OUTSIDE AIR TEMPERATURE - Displays measured value of outdoor air temperature. Displays – –°F if sensor sends invalid value, if not connected, short or out-of-range.
	OA HUM	_ _%	0 TO 100%	OUTSIDE AIR RELATIVE HUMIDITY - Displays measured value of outdoor humidity from OA enthalpy sensor.
	RA TEMP	_ _._°F(OR _ _._°C)	–40° TO 150°F (–18° TO 60°C)	RETURN AIR TEMPERATURE (accessory sensor required) - Displays measured value of return air temperature from RAT sensor. Displays – –°F if sensor sends invalid value, if not connected, short or out-of-range.
	RA HUM	_ _%	0 TO 100%	RETURN AIR RELATIVE HUMIDITY (accessory enthalpy sensor required) - Displays measured value of return air humidity from RA sensor. Displays – –% if sensor sends invalid value, if not connected, short or out-of-range.
	IN CO2	_ _ _ PPM	0 TO 2000 PPM	SPACE/RETURN AIR CO2 (CO_2 sensor required, accessory or factory option) - Displays value of measured CO_2 from CO_2 sensor. Invalid if not connected, short or out-of-range. May be adjusted in Advanced menu by Zero offset and Span.
	DCV STAUS	N/A	ON/OFF	DEMAND CONTROLLED VENTILATION STATUS (CO_2 sensor required, accessory or factory option) - Displays ON if IN CO2 value above setpoint DCV SET, and OFF if below setpoint DCV SET.
	DAMPER OUT	2.0V	2.0 TO 10.0V	Displays output voltage or position to the damper actuator. ***
	ACT POS	N/A	0 TO 100%	Displays actual position of outdoor air damper actuator.
	ACT COUNT	N/A	1 TO 65535	Displays number of times actuator has cycled. 1 Cycle equals accrued 180°of actuator movement in any direction.
	ACTUATOR	N/A	OK/ALARM (ON ALARM MENU)	Displays Error if voltage or torque is below actuator range.

Table 12 — Menu Structure* (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
STATUS (cont)	EXH1 OUT	OFF	ON/OFF	EXHAUST STAGE 1 RELAY OUTPUT - Output of EXH1 terminal. Displays On when damper position reaches programmed percentage setpoint. ON = 24 Vac Output; OFF = No Output.
	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT - Output of AUX1 O terminal Displays ON when damper position reaches programmed percentage setpoint. ON = 24 Vac Output, OFF = No Output; displays only if AUX1 O = EXH2
	ERV	OFF	ON/OFF	ENERGY RECOVERY UNIT RELAY OUTPUT - Output of AUX1 O terminal, ON = 24 Vac Output, OFF = No Output; displays only if AUX1 O = ERV
	MECH COOL ON (or) HEAT STAGE ON	0	0, 1, OR 2	Displays stage of mechanical cooling that is active. Displays the stage of heat pump heating that is active.
	FAN SPEED	N/A	LOW OR HIGH	SUPPLY FAN SPEED - Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT ON)	N/A	ON/OFF	HEAT DEMAND STATUS - Displays status of heat demand on a 2-speed fan unit.
SETPOINTS	MAT SET	53°F (12°C)	38° to 70°F; (3° to 21°C) increment by 1	SUPPLY AIR SETPOINT - Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature. See Menu Note 2.
	LOW T LOCK	32°F (0°C)	–45° to 80°F; (–43° to 27°C) increment by 1	COMPRESSOR LOW TEMPERATURE LOCKOUT - Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout. Ator below the setpoint the Y1–O and Y2–O will not be energized on the controller.
	DRYBLB SET	63°F (17°C)	48° to 80°F (9° to 27°C) increment by 1	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 (17°C), unit will economize at 62°F (16.7°C) and below and not economize at 64°F (17.8°C) and above. There is a 2°F (1.1°C) deadband. See Menu Note 3.
	ENTH CURVE	ES3	ES1, ES2, ES3, ES4, or ES5	ENTHALPY CHANGEOVER CURVE - (requires enthalpy sensor option) Enthalpy boundary “curves” for economizing using single enthalpy. See page 43 for description of enthalpy curves.
	DVC SET	1100ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROLLED VENTILATION SETPOINT - Displays only if CO_2 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.
	MIN POS	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION - Displays ONLY if a CO_2 sensor is NOT connected. With 2-speed fan units MIN POS L (low speed fan) and MIN POS H (high speed fan) settings are required. Default for MIN POS L is 3.2V and MIN POS H is 2.8V.
	VENTMAX	2.8 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION - Displays only if a CO_2 sensor is connected. Used for Vbz (ventilation max cfm) setpoint. VENTMAX is the same setting as MIN POS would be if you did not have the CO_2 sensor.
			100 to 9990 cfm increment by 10	If OA, MA RA and CO_2 sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 cfm.
			2 to 10 Vdc	With 2-speed fan units VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required. Default for VENTMAX L is 3.2V and VENTMAX H is 2.8V.

Table 12 — Menu Structure* (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
SETPOINTS (cont)	VENTMIN	2.25 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION - Displays only if CO_2 sensor is connected. Used for Va (ventilation min cfm) setpoint. This is the ventilation requirement for less than maximum occupancy of the space.
			100 to 9990 cfm increment by 10	If OA, MA RA and CO_2 sensors are connected and DCV CAL ENABLE is set to AUTO mode, the OA dampers are controlled by CFM and displays from 100 to 9990 cfm.
			2 to 10 Vdc	With 2-speed fan units VENTMIN L (low speed fan) and VENTMIN H (high speed fan) settings are required. Default for VENTMIN L is 2.5V and VENTMIN H is 2.25V.
	ERV OAT SP††	32°F (0°C)	0° to 50°F; (–18° to 10°C) increment by 1	ENERGY RECOVERY VENTILATION UNIT OUTDOOR AIR TEMPERATURE SETPOINT- Only when AUX1 O = ERV.
	EXH1 SET	50%	0 to 100%; Increment by 1	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%.
	EXH2 SET	75%	0 to 100%; Increment by 1	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 EHX2. With 2-speed fan units Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required. Default for Exh2 L is 80% and Exh2 H is 75%.
SYSTEM SETUP	INSTALL	01/01/10		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	n/a	Shutdown (SD)/Heat/ (W1)/HP (O)/HP (B)	In CONV mode: SD = Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. NOTE: If using 2–speed fan mode, you must program CONV mode for W. Shutdown is not available in 2–speed fan mode. 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	1speed	1 speed/2 speed	Sets economizer controller for operation of 1 speed or 2 speed supply fan. The controller does not control the fan but positions the OA and RA dampers to the heating or cooling mode. See page 36 for modes and position. NOTE: 2-speed fan option also needs Heat (W1) programmed in AUX 2 In. See Menu Note 4.
	FAN CFM	5000cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter ONLY if using DCVCAL ENA = AUTO. The value is found the nameplate label for the specific RTU.
	AUX1 OUT	NONE	NONE,ERV,EXH2,SYS	Select OUTPUT for AUX1 O relay NONE = not configured (output is not used) ERV = Energy Recovery Ventilator. †† EXH2 = second damper position 24 Vac out for second exhaust fan SYS = use output as an alarm signal.
	OCC	UNPUT	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. See Menu Note 2.
	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.

Table 12 — Menu Structure* (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
ADVANCED SETUP	MA LO SET	45°F(7°C)	35°to 65°F; (2° to 18°C) Incremented by 1°	SUPPLY AIR TEMPERATURE LOW LIMIT - Temperature to activate 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. CLO = closed/MIN = MIN POS or VENTMAX.
	CO2 ZERO	0ppm	0 to 500 ppm; Increment by 10	CO_2 ppm level to match CO_2 sensor start level.
	CO2 SPAN	2000ppm	1000 to 3000 ppm; Increment by 50	CO_2 ppm span to match CO_2 sensor. e.g.; 500-1500 sensor output would be 500 CO_2 zero and 1000 CO_2 span.
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals Up to 4 h or OF	COOLING STAGE 3 DELAY - Delay after stage 2 for cool has been active. Turns on second stage of mechanical cooling when economizer is first stage call and mechanical cooling is second stage call. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling.
	SD DMPR POS	CLO	CLO or OPN	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 Vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., Y1–O, Y2–O, EXH1, etc. will shut off. NOTE: Function NOT AVAILABLE with 2-speed mode.
	DA LO ALM	45°F(7°C)	NONE, 35° to 65°F; (2°to 18°C) Incremented by 5°	Used for alarm for when the DA air temperature is too low. Set lower range of alarm, below this temperature the alarm will show on the display.
	DA HI ALM	80°F(27°C)	NONE, 70° to 180°F; (21°to 82°C) Incremented by 5°	Used for alarm for when the DA air temperature is too high. Set high 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 sensors (RA, OA, MA and CO_2). NOTE: This operation is not operable with a 2-speed fan unit.
	MAT T CAL	0.0°F (or °C)	±2.5°F (±1.4°C)	SUPPLY AIR TEMPERATURE CALIBRATION– Allows for the operator to adjust for an out of calibration supply air temperature (SAT) sensor.
	OAS T CAL	1.0°F(or °C)	±2.5°F (±1.4°C)	OUTSIDE AIR TEMPERATURE CALIBRATION - Allows for the operator to adjust for an out of calibration outside air temperature (OAT) sensor.
	OAS H CAL	0% RH	±10% RH	OUTSIDE AIR HUMIDITY CALIBRATION - Allows for the operator to adjust for an out of outside air enthalpy sensor.
	RA T CAL	0.0°F(or C)	±2.5°F (±1.4°C)	RETURN AIR TEMPERATURE CALIBRATION - Allows for the operator to adjust for an out of calibration return air temperature (RA) sensor.
	RA H CAL	0% RH	±10% RH	RETURN AIR HUMIDITY CALIBRATION - Allows for the operator to adjust for an out of calibration return air enthalpy sensor.
	DA T CAL	0.0°F(or °C)	±2.5°F (±1.4°C)	DISCHARGE AIR TEMPERATURE CALIBRATION - Allows for the operator to adjust for an out of calibration discharge air temperature (DAT) sensor.
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON SECOND STAGE ECONOMIZING - When in economizing mode this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.

Table 12 — Menu Structure* (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
CHECKOUT†††	DAMPER MINIMUM POSITION	n/a	n/a	The checkout for the damper minimum positions is based on the system. See Table 13.
	DAMPER OPEN	n/a	n/a	Positions damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure you pause in this mode to allow for exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE	n/a	n/a	Positions damper to the fully closed position.
	CONNECT Y1–O	n/a	n/a	Closes the Y1–O relay (Y1–O). See CAUTION on page 44.
	CONNECT Y2–O	n/a	n/a	Closes the Y2–O relay (Y2–O). See CAUTION on page 44.
	CONNECT AUX1–O	n/a	n/a	Energizes the AUX1–O output. If AUX1–O 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 good for ERV operation.†† SYS – 24 Vac out. Issues a system alarm.
	CONNECT EXH1	n/a	n/a	Closes the power exhaust fan 1 relay (EXH1).
ALARMS(#)	**Alarms display only when they are active. The menu title "ALARMS(#)" includes the number of active alarms in parenthesis ( ). When using S–bus sensors, "SYLK" will appear on the screen, and when using 20k OA temperature sensors, "SENS T" will appear on the screen.**			
	MA T SENS ERR	n/a	n/a	SUPPLY AIR TEMPERATURE SENSOR ERROR - Supply air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	CO2 SENS ERR	n/a	n/a	CO2 SENSOR ERROR - CO_2 sensor has failed, gone out of range or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK T ERR	n/a	n/a	OUTSIDE AIR S–BUS SENSOR ERROR - Outside air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK H ERR	n/a	n/a	
	RA SYLK T ERR	n/a	n/a	RETURN AIR S–BUS SENSOR ERROR - Return air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	RA SYLK H ERR	n/a	n/a	
	DA SYLK T ERR	n/a	n/a	DISCHARGE AIR S–BUS SENSOR ERROR - Discharge air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SENS T ERR	n/a	n/a	OUTSIDE AIR TEMPERATURE SENSOR ERROR - Outside air temperature sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	ACT ERROR	n/a	n/a	ACTUATOR ERROR - Actuator has failed or become disconnected - check for stall, over voltage, under voltage and actuator count. Replace actuator if damper is moveable and supply voltage is between 21.6 V and 26.4 V. Check actuator count on STATUS menu.
	FREEZE ALARM	n/a	n/a	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 setup menu. When conditions are back in normal range then the alarm will go away.
	SHUTDOWN ACTIVE	n/a	n/a	AUX2 IN is programmed for SHUTDOWN and 24 V has been applied to AUX 2IN terminal.
	DMP CAL RUNNING	n/a	n/a	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 is in the Advanced setup menu.
	DA SENS ALM	n/a	n/a	DISCHARGE AIR TEMPERATURE SENSOR ALARM - Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.

Table 12 — Menu Structure* (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	EXPANDED PARAMETER NAME NOTES
ALARMS(#) (cont)	SYS ALARM	n/a	n/a	When AUX1–O is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1–O terminal has 24 Vac out.
	ACT UNDER V	n/a	n/a	ACTUATOR VOLTAGE LOW - Voltage received at actuator is below expected range.
	ACT OVER V	n/a	n/a	ACTUATOR VOLTAGE HIGH - Voltage received at actuator is above expected range.
	ACT STALLED	n/a	n/a	ACTUATOR STALLED - Actuator stopped before reaching commanded position.

* 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 (CO_2) 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.
*** When used with communicating actuator the damper out is reported in XX.X% open verses XX.X Vdc.
††† After 10 minutes without a command or mode change, the controller will change to normal operation.
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 checkout menu readings, see Table 13. For dry bulb operation with a 1 speed fan, with or without DCV, see Tables 14 and 15. For enthalpy operation with a 1 speed fan, with or without DCV, see Tables 16 and 17. For dry bulb operation with a 2 speed fan, with or without DCV, see Tables 18 and 19. For enthalpy operation with a 2 speed fan, with or without DCV, see Tables 20 and 21.

Table 13 — Damper Minimum Position and Readings on Checkout Menu

DEMAND CONTROLLED VENTILATION (CO2 SENSOR)	FAN SPEED	SETPOINTS	CHECKOUT
NO	1	MIN POS	VMAX-HS
		N/A	N/A
	2	MIN POS H	VMAX-HS
		MIN POS L	VMAX-LS
YES	1	VENT MIN	VMIN- HS
		VENT MAX	VMAX-HS
	2	VENT MIN H	VMIN-HS
		VENT MAX H	VMAX-LS
		VENT MIN L	N/A
		VENT MAX L	N/A

Table 14 — Dry Bulb Operation No DCV (CO_2 Sensor) — 1 Speed Fan

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

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

Table 15 — Dry Bulb Operation With DCV (CO_2 Sensor) — 1 Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR-GOOD TO ECONOMIZE?	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below Co_2 Set	No	Off	Off	High	0-v/off	0-v/off	VENTMIN	Closed
		On	Off	High	24-v/on	0-v/off	VENTMIN	Closed
		On	On	High	24-v/on	24-v/on	VENTMIN	Closed
	Yes	Off	Off	High	0-v/off	0-v/off	VENTMIN	Closed
		On	Off	High	0-v/off	0-v/off	VENTMIN to Full-open	Closed To Full-open
		On	On	High	24-v/on	0-v/off*	VENTMIN to Full-open	Closed To Full-open
Above Co_2 Set	No	Off	Off	High	0-v/off	0-v/off	VENTMIN to VENTMAX	Closed
		On	Off	High	24-v/on	0-v/off	VENTMIN to VENTMAX	Closed
		On	On	High	24-v/on	24-v/on	VENTMIN to VENTMAX	Closed
	Yes	Off	Off	High	0-v/off	0-v/off	VENTMIN to VENTMAX	Closed
		On	Off	High	0-v/off	0-v/off	VENTMIN to Full-open	Closed To Full-open
		On	On	High	24-v/on	0-v/off*	VENTMIN to Full-open	Closed To Full-open

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

Table 16 — Enthalpy Operation No DCV (CO_2 Sensor) - 1 Speed Fan

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

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

Table 17 — Enthalpy Operation No DCV (CO_2 Sensor) — 1 Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR – GOOD TO ECONOMIZE?	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below Set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	VENTMIN to Full- Open	Closed to Full-Open
Above Set	No	Off	Off	High	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	High	24-v/On	0-v/Off	VENTMIN to VENTMAX	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	Off	High	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	High	DELAY† 24-v/Off	0-v/Off*	VENTMIN to Full-Open	Closed to Full-Open

* With stage 3 delay (STG3 DLY) in Advanced setup menu can turn on second stage of mechanical cooling Y2 –O after the delay if the call for Y1–I and Y2–I have not been satisfied.
† With 2SP FAN DELAY (Advanced Setup Menu) when in the economizing mode there is a delay for the high speed fan to try to satisfy the call for second stage cooling by turning on the fan to high and opening the OA damper 100% before the first stage mechanical cooling is enabled.

Table 18 — Dry Bulb Operation No DVC (CO_2 Sensor) — 2 Speed Fan

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

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

Table 19 — Dry Bulb Operation With DVC (CO Sensor) — 2 Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR – GOOD TO ECONOMIZE?	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
Below Set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	On	Low	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	24-v/On	0-v/Off*	VENTMIN H to Full-Open	Closed to Full-Open
Above Set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L to VENTMAX	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H to VENTMAX	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX	Closed
		On	Off	Low	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	DELAY† 24-v/On	0-v/Off*	VENTMIN H 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.

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

Table 20 — Enthalpy Operation No DVC (CO_2 Sensor)- 2 Speed Fan

DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR– GOOD TO ECONOMIZE?	Y1-I	Y2-I	FAN SPEED	Y1-O	Y2-O	OCCUPIED	UNOCCUPIED
NO CO_2 SENSOR	No	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	24-v/On	0-v/Off	MIN POS L	Closed
		On	On	High	24-v/On	24-v/On	MIN POS H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	0-v/Off	0-v/Off	MIN POS L to Full-Open	Closed to Full-Open
		On	On	High	DELAY† 24-v/On	0-v/Off*	MIN POS L 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.

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

Table 21 — Enthalpy Operation With DVC (CO_2 Sensor) - 2 Speed

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

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

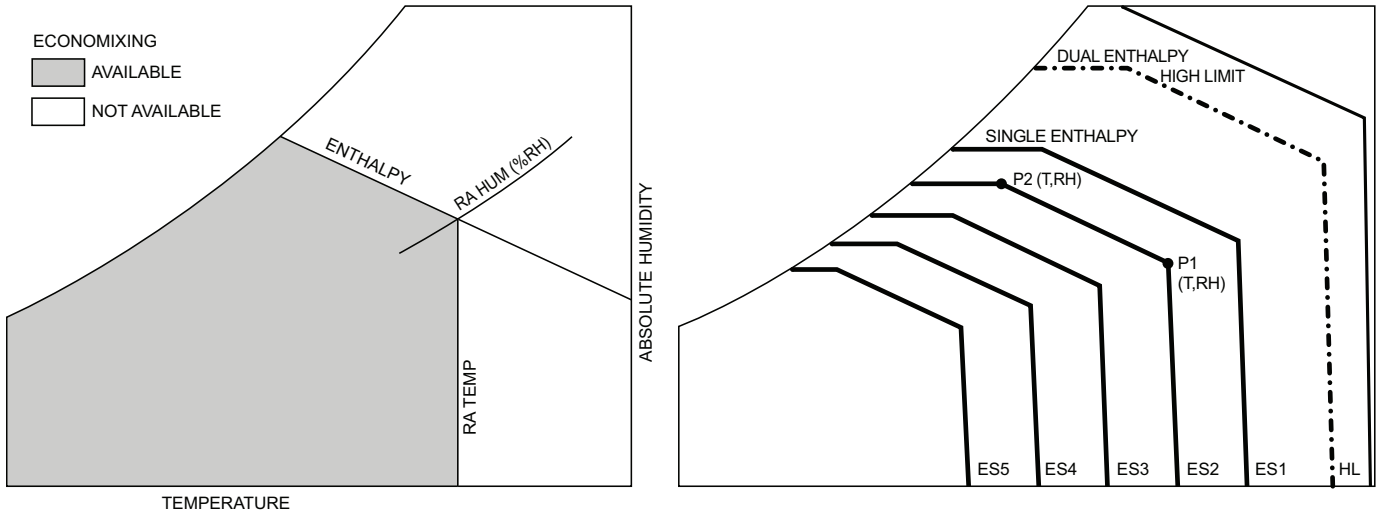


Fig. 48 — Single Enthalpy Curve and Boundaries

Table 22 — Single Enthalpy and Dual Enthalpy High Limit Curves (EN Units)

ENTHALPY CURVE	TEMP. DRY–BULB (°F)	TEMP. DEWPOINT (°F)	ENTHALPY (BTU/LB/DA)	POINT P1		POINT P2	
				Temp. (°F)	Humidity %RH	Temp. (°F)	Humidity %RH
ES1	80.0	60.0	28.0	80.0	36.8	66.3	80.1
ES2	75.0	57.0	26.0	75.0	39.6	63.3	80.0
ES3	70.0	54.0	24.0	70.0	42.3	59.7	81.4
ES4	65.0	51.0	22.0	65.0	44.8	55.7	84.2
ES5	60.0	48.0	20.0	60.0	46.9	51.3	88.5
H	86.0	66.0	32.4	86.0	38.9	72.4	80.3

ENTHALPY SETTINGS

When the OA temperature, enthalpy and dew point are below the respective setpoints, the outdoor air can be used for economizing. Figure 48 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 48 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.

Table 23 — Fan Speeds

STATE	FAN SPEED
OCC	Low
Y1	Low
Y2	High
W	High

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

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

- The Y2 In call will be satisfied with the damper 100% open and fan on high speed and the call will turn off

OR

- If the call for additional cooling in the space has not been satisfied then the first stage of mechanical cooling will be enabled through Y1 Out or Y2 Out.

CHECKOUT

Inspect all wiring connections at the economizer module's terminals, and verify compliance with the installation wiring diagrams.

For checkout, review the Status of each configured parameter and perform the Checkout tests.

NOTE: See "Interface Overview" on page 34 for information about menu navigation and use of the keypad.

⚠ WARNING

ELECTRIC 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).

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.

* All settings are stored in non-volatile flash memory.

Status

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

NOTE: See "Interface Overview" on page 34 for information about menu navigation and use of the keypad.

CHECKOUT TESTS

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

NOTE: See "Interface Overview" on page 34 for information about menu navigation and use of the keypad.

To perform a Checkout test:

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

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

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Be sure to allow enough time for compressor startup and shutdown between checkout tests so that you do not short-cycle the compressors.

TROUBLESHOOTING

Alarms

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

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

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

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

Clearing Alarms

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

To clear an alarm, perform the following:

1. Navigate to the desired alarm.
2. Press the ↵ 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.

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

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.

See Fig. 49 for the RTU Open wiring diagram.

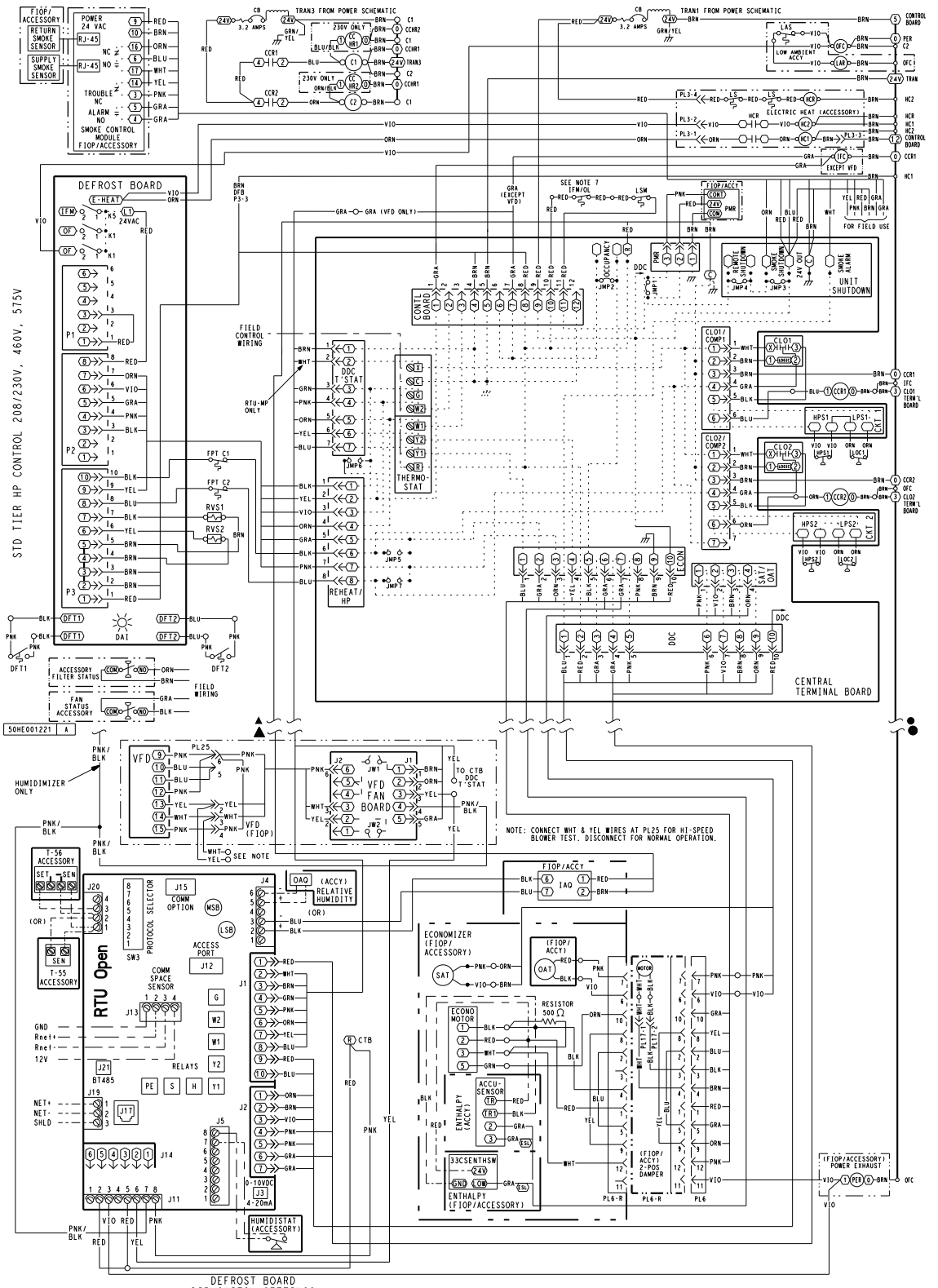


Fig. 49 — RTU Open System Controller Wiring Diagram

Smoke Detectors

Smoke detectors are available as factory-installed options on 548J models. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

RETURN AIR SENSOR TUBE INSTALLATION

The return air sampling tube is shipped in the unit's supply fan section, attached to the blower housing. (See Fig. 50). Its operating location is in the return air section of the unit (see Fig. 51, unit without economizer, or Fig. 52, unit with economizer), inserted into the return air sensor module housing which protrudes through the back of the control box.

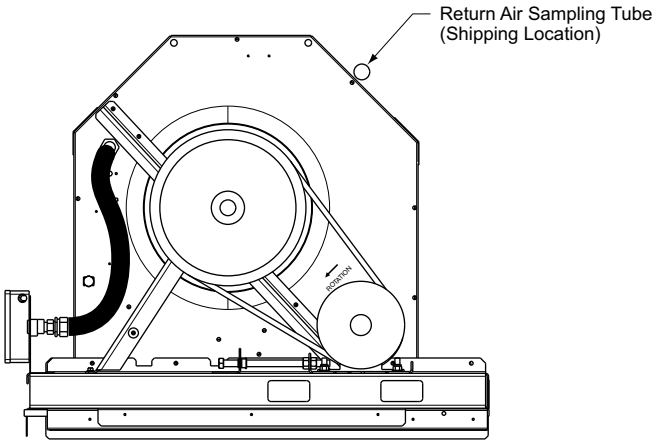


Fig. 50 — Typical Supply Air Smoke Detector Sensor Location

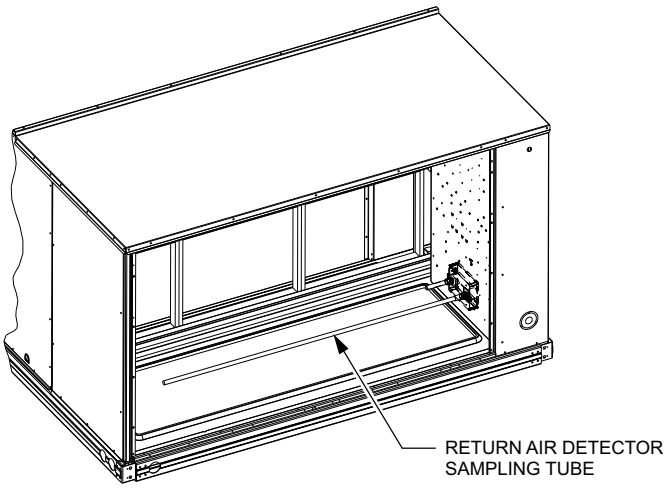


Fig. 51 — Return Air Sampling Tube Location in Unit w/out Economizer

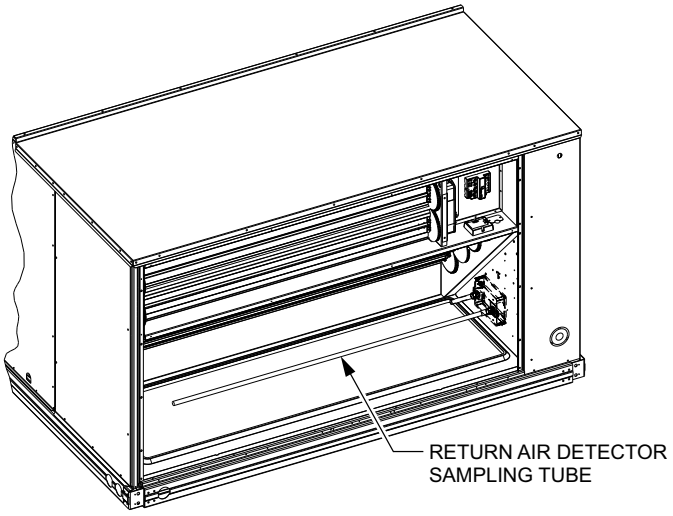


Fig. 52 — Return Air Sampling Tube Location in Unit with Economizer

To install the return air sensor sampling tube:

1. Remove the tube from its shipping location.
2. Open the unit end to access the return air sensor (located on right-hand partition).
3. Orient the tube's sampling holes into the return air flow direction. Position the sampling holes on the bottom of the tube, facing into the bottom return duct opening for vertical unit's and on the side of the tube, facing the unit's end panel for horizontal units.
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 *Factory Installed Smoke Detectors for Small and Medium Rooftop Units 2 to 25 Tons* for discussions on additional control features of these smoke detectors including multiple unit coordination.

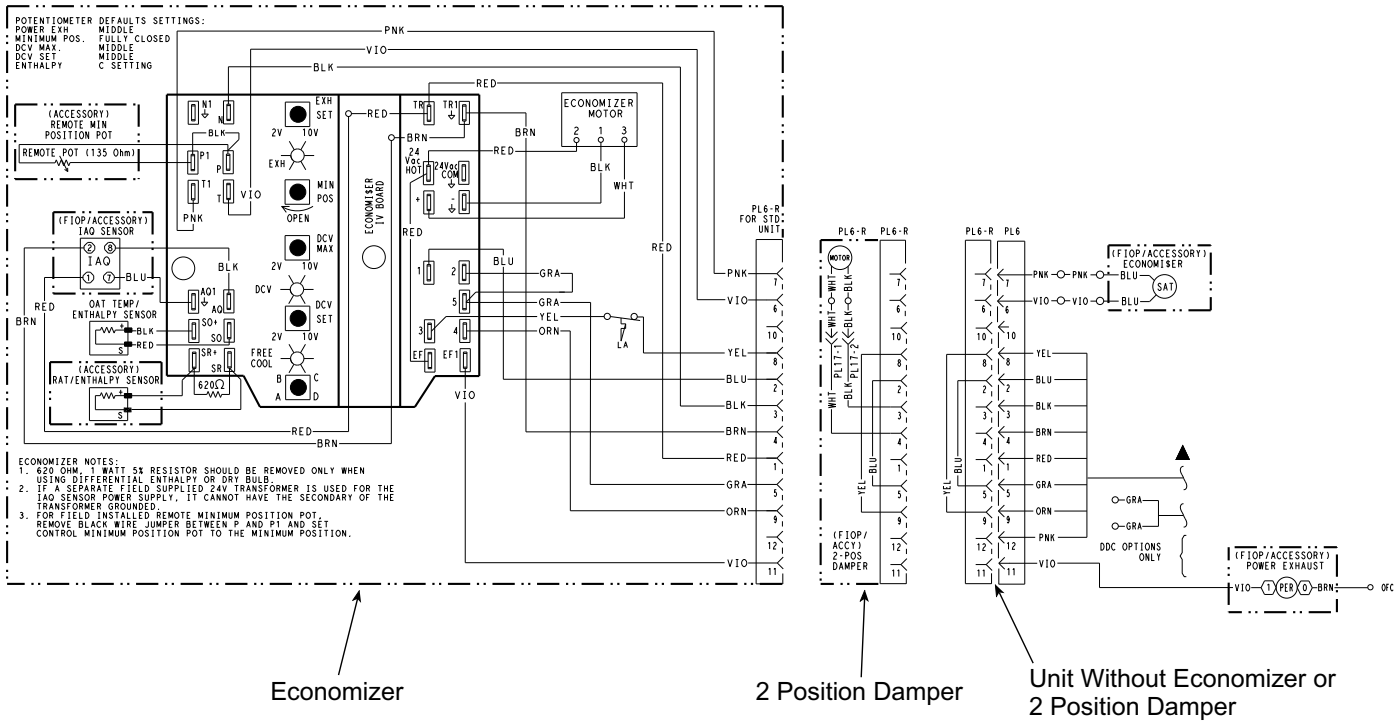


Fig. 53 — Economi$er® IV Wiring

Step 12 — Adjust Factory-Installed Options

SMOKE DETECTORS

Smoke detector(s) will be connected at the Controls Connections Board, at terminals marked "Smoke Shutdown". Remove jumper JMP 3 when ready to energize unit.

ECONOMI$ER IV OCCUPANCY SWITCH

Refer to Fig. 53 for general EconoMi$er IV wiring. External occupancy control is managed through a connection on the Central Terminal Board.

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

Step 13 — Install Accessories

Available accessories include:

- Roof curb
- Thru-base connection kit (must be installed before unit is set on curb)
- Manual outside air damper
- Two-position motorized outside air damper
- EconoMi$er IV (with control and integrated barometric relief)
- EconoMi$er2 (without control/for external signal and integrated barometric relief)
- Power exhaust
- Differential dry-bulb sensor (EconoMi$er IV)
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Electric heaters
- Single point kits
- Low ambient controls
- Thermostat / sensors
- CO_2 sensor
- 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. 54. Calculate the required deflection by multiplying the belt span length by 1/64. For example, if the belt span length is 32 inches: 32 x 1/64 = 1/2 inch deflection.

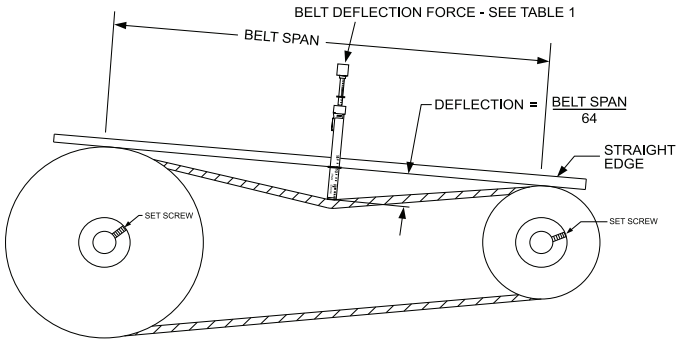
BELT FORCE - DEFLECTION METHOD

Check the belt tension with a spring-force belt force deflection gauge.

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 gauge to the desired tension (see Fig. 54). 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 loosing the motor mounting plate front bolts and rear bolt (see Fig. 55) 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 FORCE DEFLECTION METHOD - REQUIRES BELT FORCE - DEFLECTION GAUGE (AVAILABLE FROM DRIVE BELT MANUFACTURER)



TORQUE ALL SHEAVE SET SCREWS TO 110-130 IN LBS.

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

TABLE 1

BELT TENSION METHOD - REQUIRES BELT TENSION GAUGE THAT MEASURES TENSION IN BELT IN UNITS OF LBS FORCE.

	TENSION FORCE IN BELT (LBS)
NEW	100
USED	80

TABLE 2

48TM002309 REV -

Fig. 54 — V-Belt Force Label

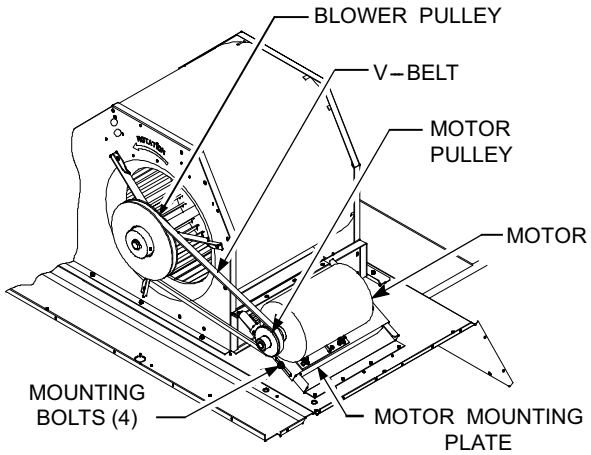


Fig. 55 — Belt Drive Motor Mounting

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Replaces:II548J-17-24-02

START-UP CHECKLIST - 548J*D 17, 24 SINGLE PACKAGE ROOFTOP HEAT PUMP 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.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN:_____

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

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

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

ELECTRICAL

SUPPLY VOLTAGE	L1-L2_____	L2-L3_____	L3-L1_____
CIRCUIT 1 COMPRESSOR AMPS	L1_____	L2_____	L3_____
CIRCUIT 2 COMPRESSOR AMPS	L1_____	L2_____	L3_____
INDOOR-FAN AMPS			

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	DB_____	WB_____
RETURN-AIR TEMPERATURE	DB_____	WB_____
COOLING SUPPLY AIR	DB_____	WB_____

PRESSURES (Cooling Mode)

REFRIGERANT SUCTION, CIRCUIT 1	_____kPa	_____PSIG	_____ °C	_____°F
REFRIGERANT SUCTION, CIRCUIT 2	_____kPa	_____PSIG	_____ °C	_____°F
REFRIGERANT DISCHARGE, CIRCUIT 1	_____ kPa	_____PSIG	_____ °C	_____°F
REFRIGERANT DISCHARGE, CIRCUIT 2	_____kPa	_____PSIG	_____ °C	_____°F

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

GENERAL

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

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE