40QQ
VRF Rooftop
Heat Recovery and Heat Pump
Sizes: 036, 048, 060

Carrier
turn to the experts

Installation Instructions

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SAFETY CONSIDERATIONS

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

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloths for brazing operations and have a fire extinguisher available. Read these instructions thoroughly, and follow all warnings or cautions attached to the unit. Consult local building codes and appropriate national electrical codes (in USA, ANSI/NFPA 70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

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

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

Catalog No. 18- 40QQ001- 01 Printed in U.S.A Form 40QQ- 3SI 11- 18 Replaces: 40QQ- 2SI

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing service or maintenance operations on the unit, turn off the main power switch to the 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. The unit may have more than one power switch.

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

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

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

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

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

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

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

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

NOMENCLATURE

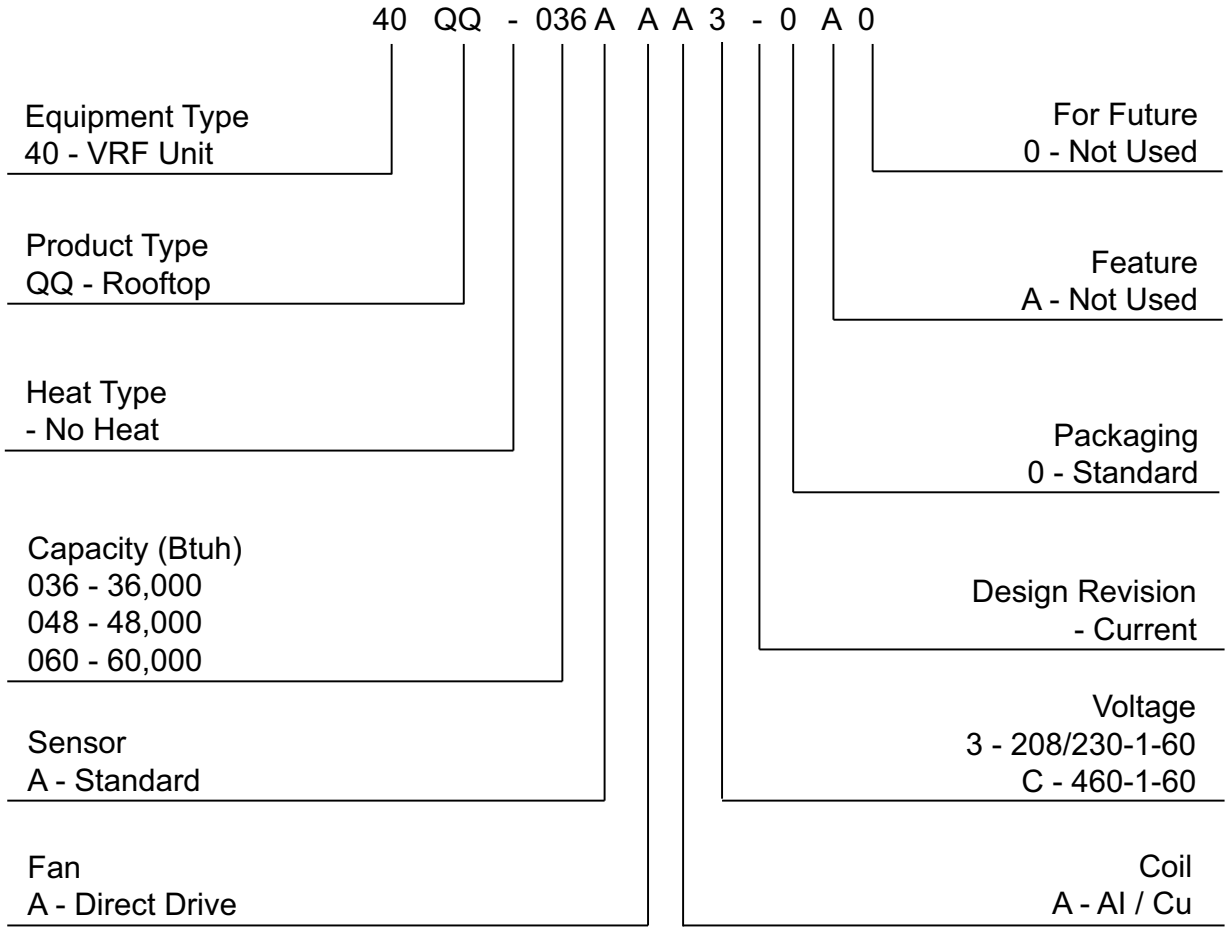


Fig. 1 - 40QQ 036-060 Model Number Nomenclature

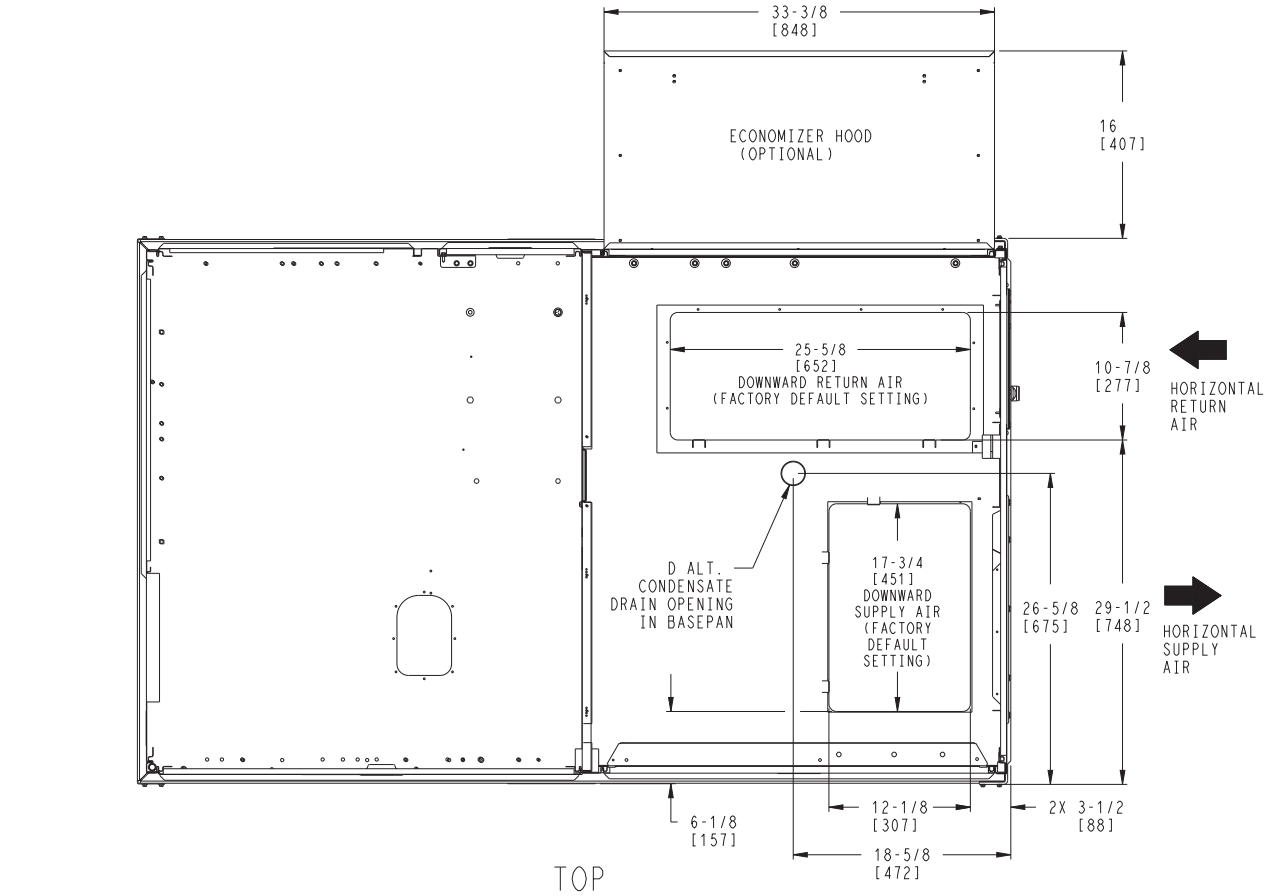
DIMENSIONS

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. DIRECTION OF AIR FLOW
3. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	J	K
40QQ-03TON	33 3/8 [847]	18 5/8 [472]
40QQ-04TON	41 3/8 [1051]	14 7/8 [377]
40QQ-05TON	41 3/8 [1051]	14 7/8 [377]

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [51] DIA POWER SUPPLY KNOCKOUT
C	7/8" [22] DIA FIELD CONTROL WIRING HOLE
D	3/4"-14 NPT CONDENSATE DRAIN
E	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT



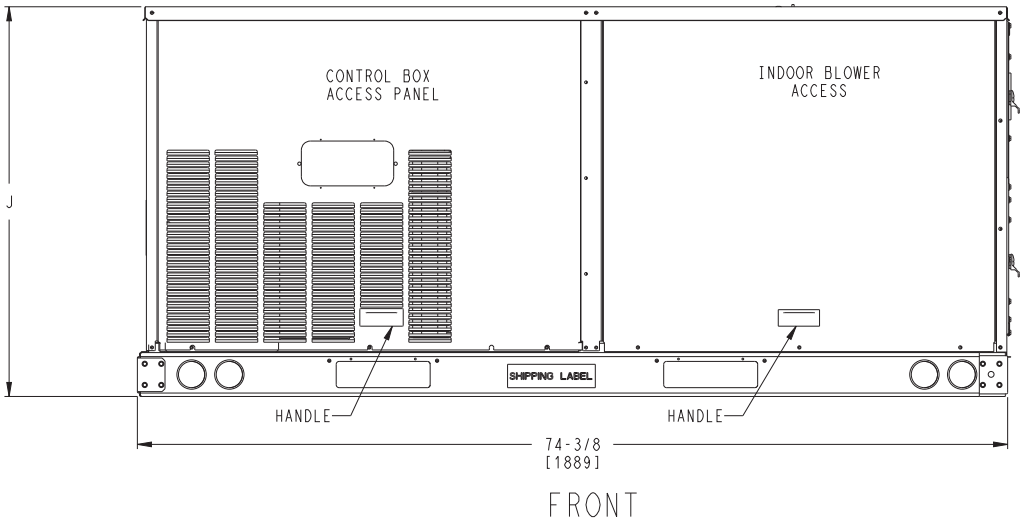


Fig. 2 - Dimensional Drawing

DIMENSIONS (CONT.)

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [51] DIA POWER SUPPLY KNOCKOUT
C	7/8" [22] DIA FIELD CONTROL WIRING HOLE
D	3/4"-14 NPT CONDENSATE DRAIN
E	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT

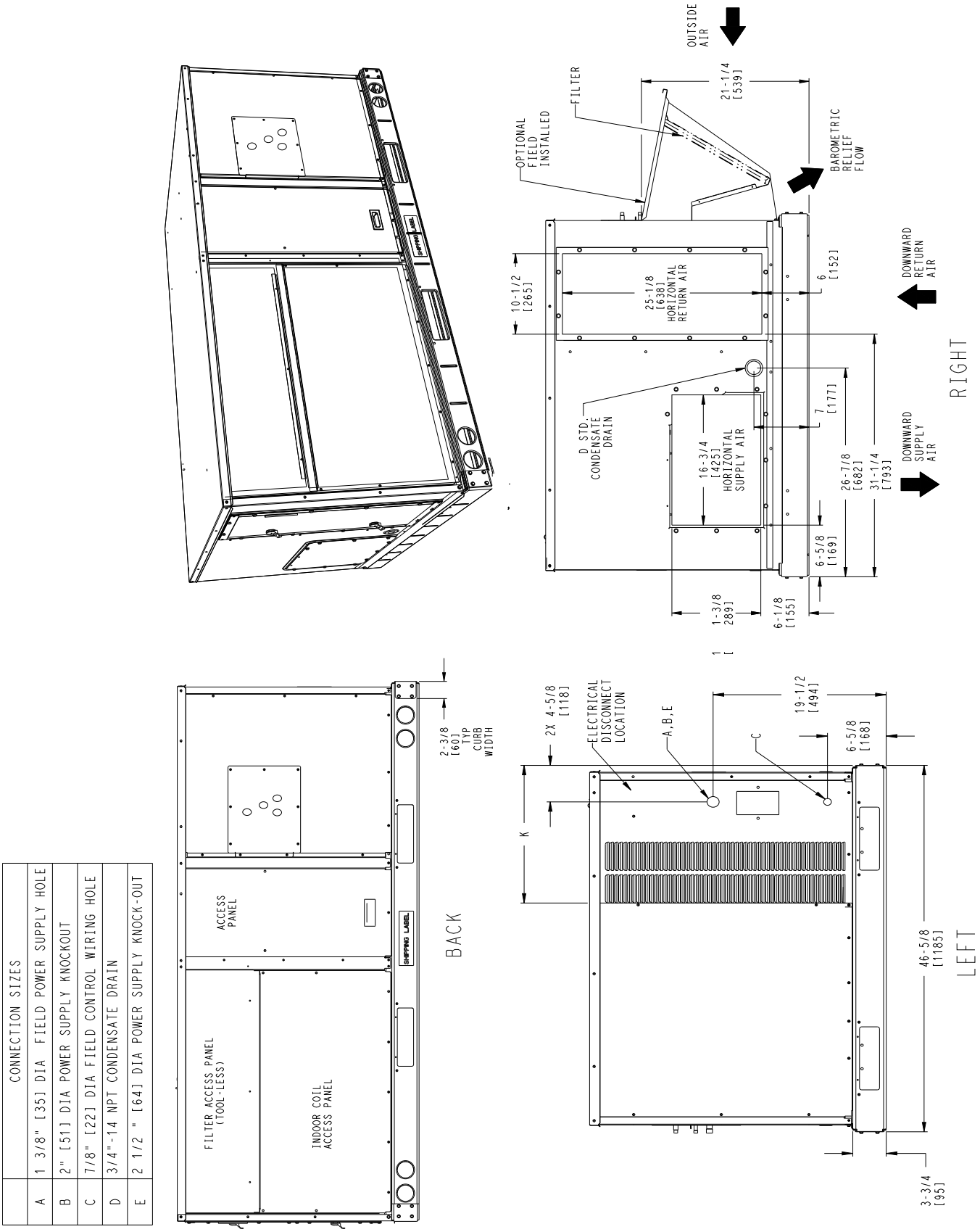


Fig. 3 - Dimensional Drawing

CENTER OF GRAVITY

UNIT	STD. UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
40QQ-03TON	364	165	86	39	87	39	96	44	95	43	39 1/2 [1003]	27 7/8 [708]	17 3/8 [441]
40QQ-04TON	385	175	91	41	92	42	102	46	101	46	39 1/2 [1003]	23 3/8 [594]	17 1/8 [435]
40QQ-05TON	394	179	93	42	94	43	104	47	103	47	39 1/2 [1003]	23 3/8 [594]	17 1/8 [435]

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

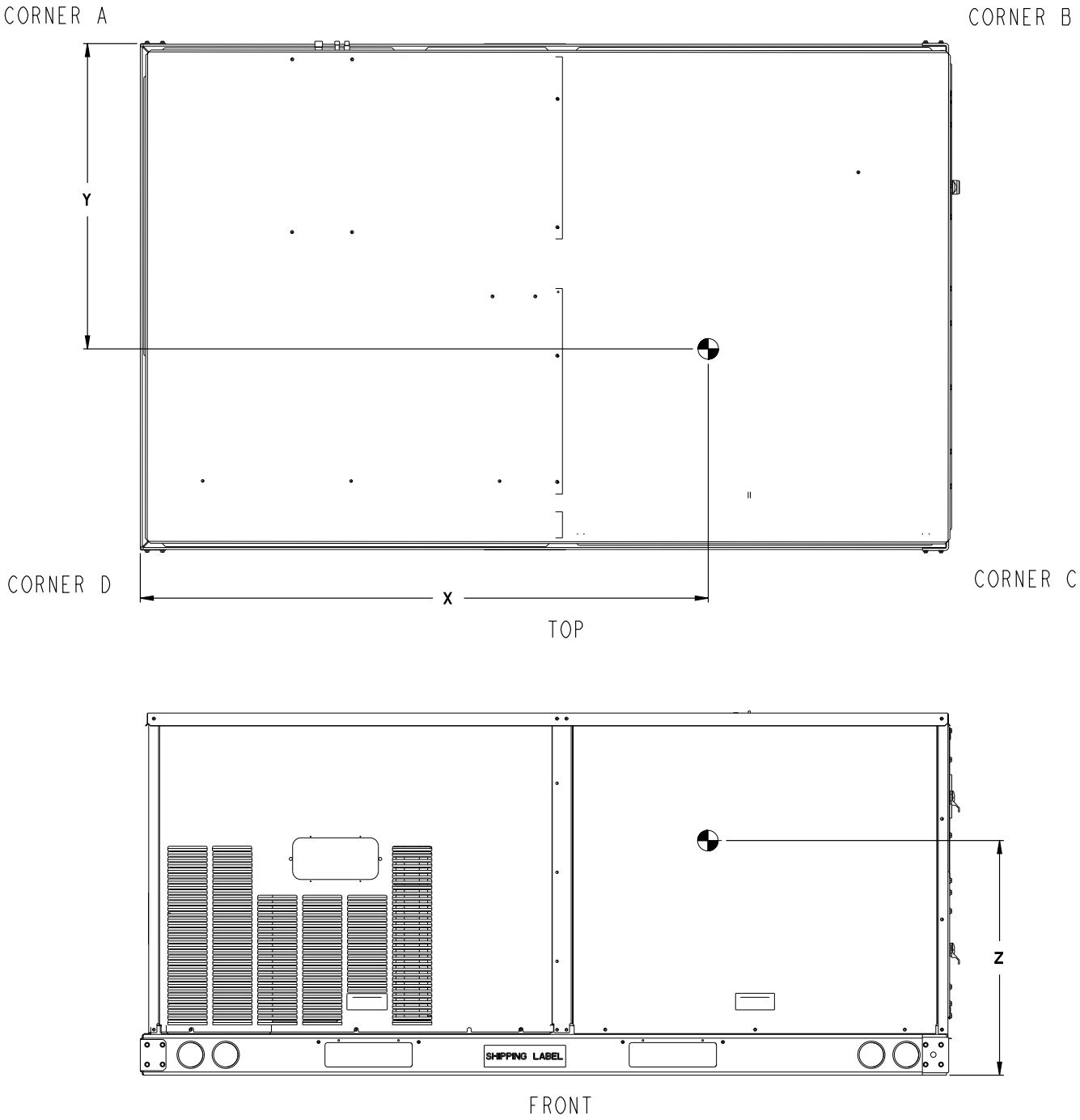


Fig. 4 - Center of Gravity Drawing

RECOMMENDED SERVICE CLEARANCE

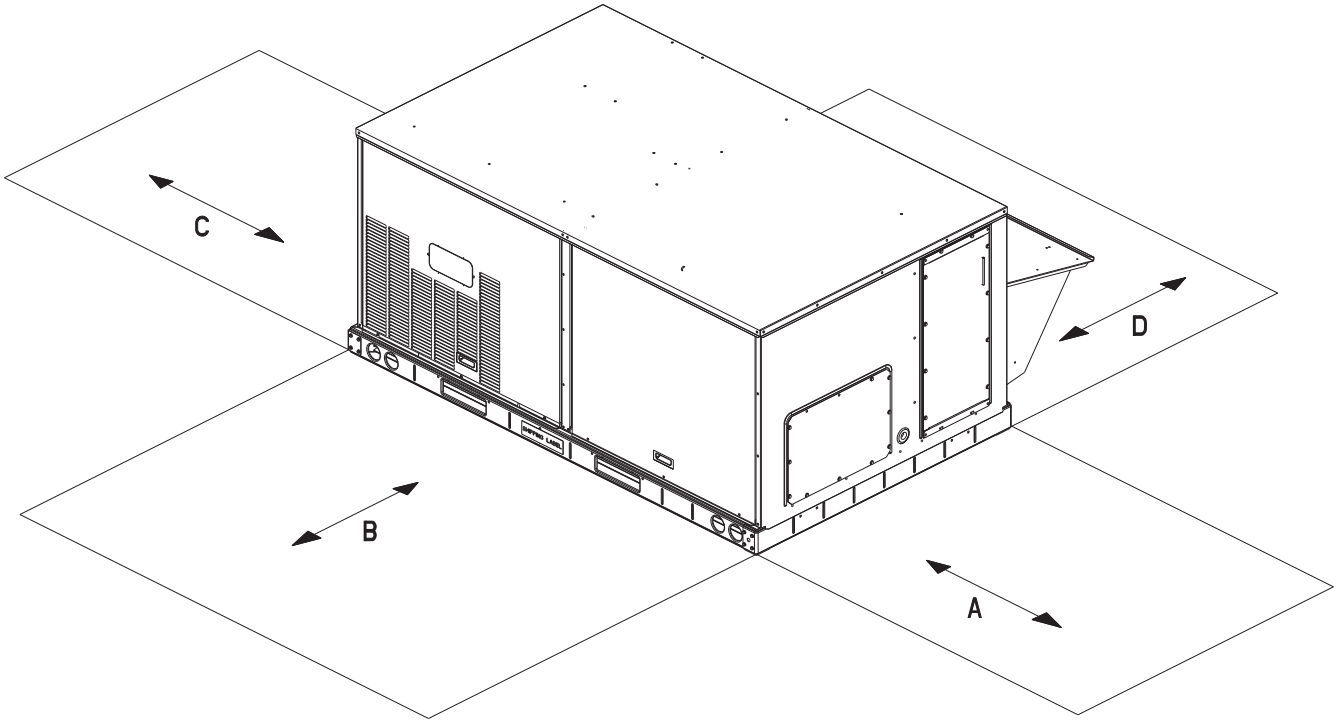


Fig. 5 - Recommended Service Clearance

Table 1 – Service Clearance Dimensions

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

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

ELECTRICAL DATA

TABLE 2 – VRF RTU

Tonnage	Model Number	Voltage	MCA (A)*	MOCP (A)*
3	40QQ- 036AAA3- 0A0	208/230- 1- 60	8.00	15
	40QQ- 036AAAC- 0A0	460- 1- 60	4.00	15
4	40QQ- 048AAA3- 0A0	208/230- 1- 60	10.00	15
	40QQ- 048AAAC- 0A0	460- 1- 60	5.00	15
5	40QQ- 060AAA3- 0A0	208/230- 1- 60	10.00	15
	40QQ- 060AAAC- 0A0	460- 1- 60	5.00	15

* Without electric heaters. If electric heaters are used, refer to Tables NO TAG and NO TAG.

LEGEND:
MCA- Minimum circuit amps
MOCP- MAX FUSE or HACR Breaker

NOTE: In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

INSTALLATION

Jobsite Survey

Complete the following checks before installation:

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

Step 1 — Plan for Unit Location

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

NOTE: Consider the effect of adjacent units.

The 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 sources of contaminated air.

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Step 8 — 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 3.

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. Prepare bottom condensate drain connection to suit planned condensate line routing (refer to Step 8 for details).
4. Rig and place unit.
5. Install condensate line trap and piping.
6. Make electrical connections.
7. Install other accessories.

Table 3 – Operating Weights

40QQ*	Units LB (KG)		
	036	048	060
Base Unit	364 (165)	385 (175)	394 (179)
Economizer			
Vertical	50 (23)	50 (23)	50 (23)
Horizontal	80 (36)	80 (36)	80 (36)
Curb			
14- in/356 mm	115 (52)	115 (52)	115 (52)
24- in/610 mm	197 (89)	197 (89)	197 (89)

Pad-Mounted Installation —

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

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

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

Step 4 — Provide Unit Support

Roof Curb Mount —

Accessory roof curb details and dimensions are shown in Fig. 6. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

Curb should be level, which is necessary for the unit drain to function properly. Unit leveling tolerances are shown in Fig. 7. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

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

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

Slab Mount (Horizontal Units Only) —

Provide a level concrete slab that extends a minimum of 6 inches (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 long sides of unit with a minimum of three equally spaced 4 inch x 4 inch (102 mm x 102 mm) pads on each side.

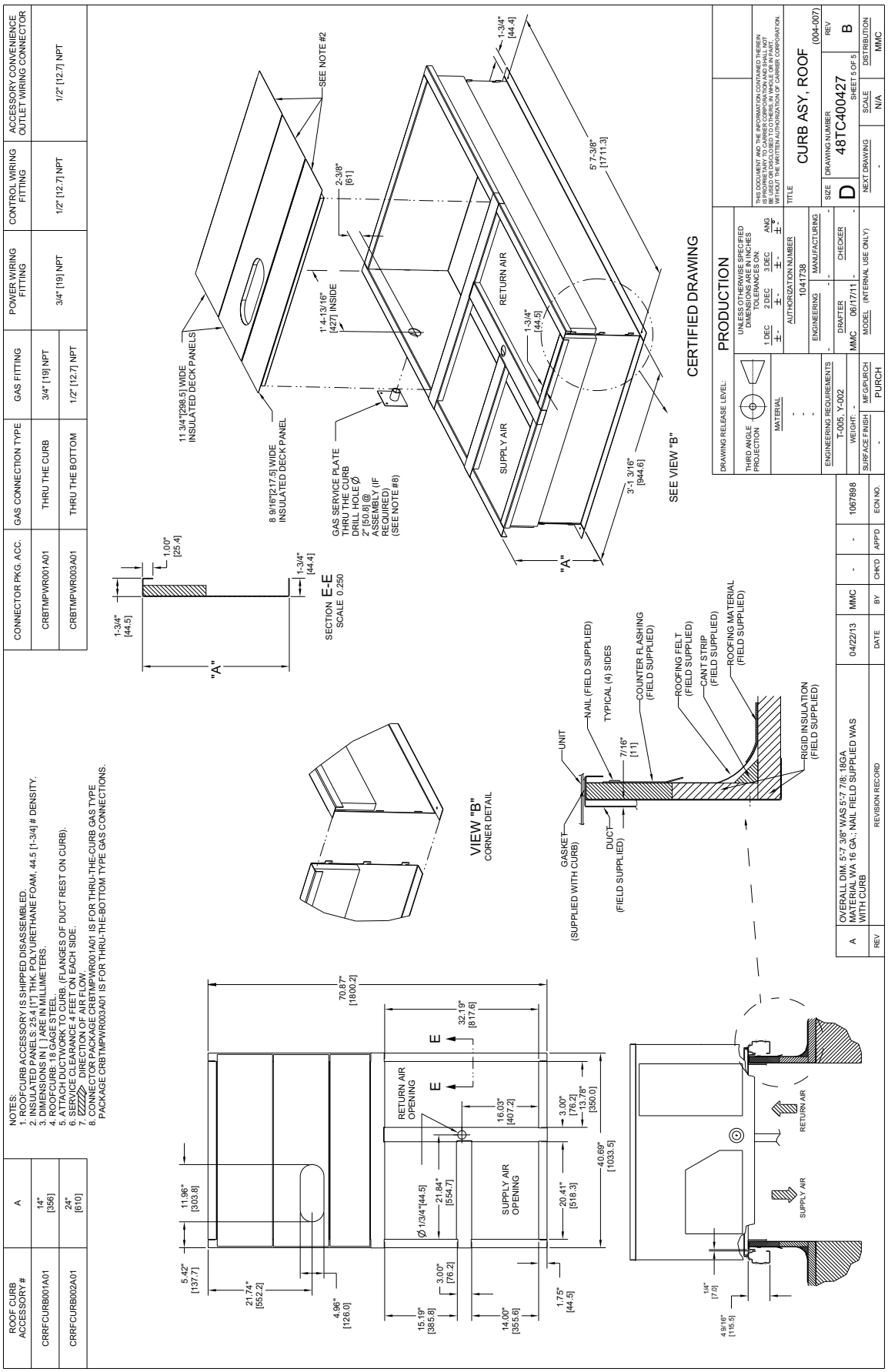
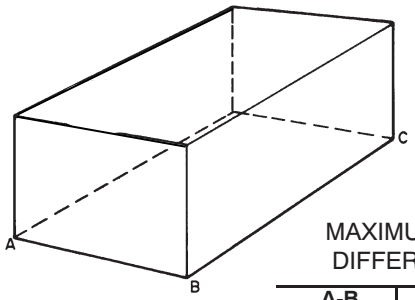


Fig. 6 - Roof Curb Details

NOTE: The 40QQ does not include gas heat. Ignore all gas references in the roof curb drawing above.



MAXIMUM ALLOWABLE DIFFERENCE IN. (MM)

A-B	B-C	A-C
0.5” (13)	1.0” (25)	1.0” (25)

Fig. 7 - Unit Leveling Tolerances

Step 5 — Field Fabricate Ductwork

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

For vertical ducted applications, secure all ducts to roof curb and building structure.

Do not connect ductwork to unit.

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

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

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

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

⚠ CAUTION

PROPERTY DAMAGE HAZARD

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

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

For Optional Electric Heaters —

All installations require a minimum clearance to combustible surfaces of 1 inch (25 mm) from the duct for the first 12 inch (305 mm) away from unit.

NOTE: A 90° 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° turn in the return ductwork between the unit and the conditioned space. If a 90° elbow cannot be installed, a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, the supply duct will require a 90° elbow.

Step 6 — Rig and Place Unit

Keep the 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 the unit frame as a reference. See Table 3 and Fig. 8 for additional information.

Lifting holes are provided in base rails as shown in Fig. 8. Refer to rigging instructions on unit.

Before setting unit onto curb, recheck gasketing on curb.

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

When using the standard side drain connection, ensure the red plug in the alternate bottom connection is tight. Do this before setting the unit in place. The red drain pan plug can be tightened with a 1/2 inch square socket drive extension. For further details see “Step 8 - Install External Condensate Trap and Line.”

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

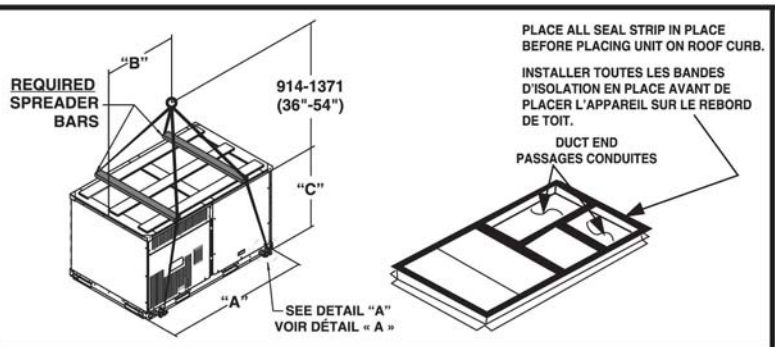
All panels must be in place when rigging. Unit is not designed for handling by forklift when packaging is removed.

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

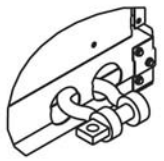
⚠ CAUTION - NOTICE TO RIGGERS:
⚠ AVERTISSEMENT - REMARQUE À L'ATTENTION DES MONTEURS

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

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



DETAIL A
DÉTAIL « A »



MODEL	MAX WEIGHT		A		B		C	
	LB	KG	IN	MM	IN	MM	IN	MM
40QQ 036	417	189	74.5	1890	39.5	1003	33.5	850
40QQ 048	438	198	74.5	1890	39.5	1003	41.5	1055
40QQ 060	447	203	74.5	1890	39.5	1003	41.5	1055

40QQ000110 A

Fig. 8 - Rigging Label

Positioning on Curb —

Position the unit on the roof curb so that the following clearances are maintained:

- 1/4 inch (6.4 mm) clearance between the roof curb and the base rail inside the front and rear
- 0.0 inch clearance between the roof curb and the base rail inside on the duct end of the unit

This will result in the distance between the roof curb and the base rail inside on the control box end of the unit being approximately 1/4 inch.

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

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

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

The unit is shipped in the vertical duct configuration. Units without the factory-installed economizer may be field-converted to horizontal ducted configuration. To convert to horizontal configuration, remove screws from the side duct opening covers and remove the covers. Using the same screws, install the covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight (See Fig. 9).

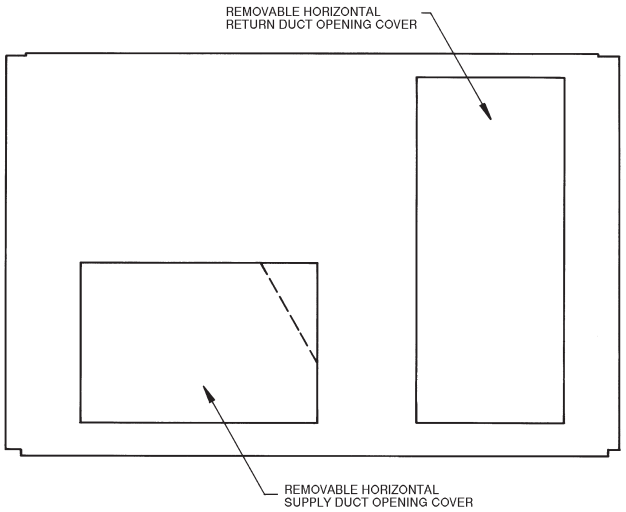


Fig. 9 - Horizontal Conversion Panels

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

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

Step 8 — Install External Condensate Trap and Line

Unit has one 3/4 inch condensate drain connection on the end of the condensate pan and an alternate connection on the bottom (See Fig. 10). Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

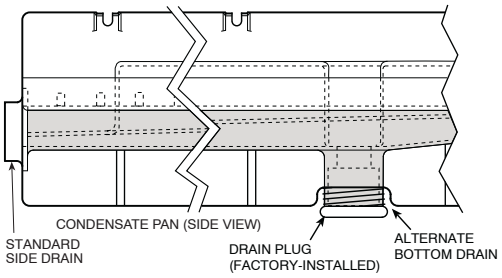
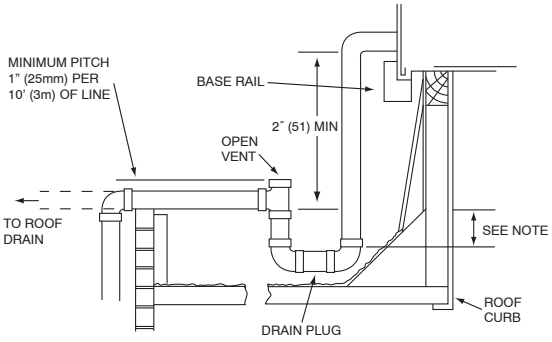


Fig. 10 - Condensate Drain Pan (Side View)

To use the alternate bottom drain connection, remove the red drain plug from the bottom connection (use a 1/2 in. square socket drive extension), and install it in the side drain connection.

The piping for the condensate drain and external trap can be completed after the unit is in place (See Fig. 11).



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

Fig. 11 - Condensate Drain Piping Details

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

Step 9 — Make Electrical Connections

⚠ WARNING

ELECTRICAL 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 an electrical wire connected to the unit ground lug in the 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: Field-supplied wiring shall conform to the limitations of minimum 63°F (33°C) rise.

Field Installed Smoke Detector

Field installed Smoke Detector by 3rd party

When smoke detector is required by the building codes, it must be installed and wired by a 3rd party vendor. Carrier offers the Totaline® 4-Wire Duct Smoke detector model# P270-3000PL. Recommended wiring requires using the dry contacts to cut power to the L1 or L2 power wiring coming into TB1.

Typical Sequence of operation:

Smoke Detector error

- Dry contacts on smoke detector open/close
- L2 is opened and power is removed from fan coil
- VRF CDU has error due to lost fan coil

Smoke Detector returns to normal operation after error

- Dry contacts on smoke detector open/close
- L2 has continuity to the FCU
- VRF CDU can regain communication to FCU

Step 10 — Install Accessories

Available accessories include:

- Curb
- Electric heaters and single-point connection kits
- EconoMi$er X (with control)

HORIZONTAL AND VERTICAL ECONOMI$ER X ACCESSORY INSTALLATION INSTRUCTIONS

Read these instructions completely before attempting to install the Horizontal EconoMi$er X Accessory.

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 the basic maintenance functions of replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags, labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves.

⚠ CAUTION

CUT HAZARD

Failure to follow this warning could 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 roof top units.

GENERAL

IMPORTANT: These economizers meet all the economizer requirements as laid out in California's Title 24 mandatory section 120.2 (fault detection and diagnostics).

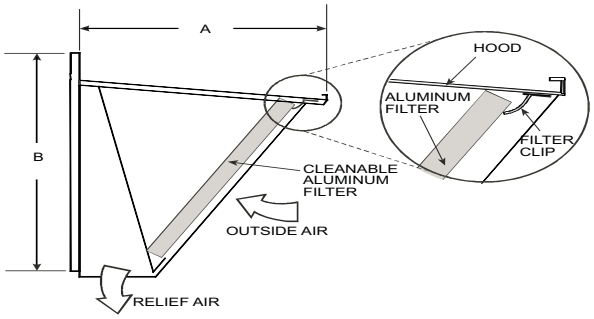
The EconoMi$er X system utilizes the latest technology available for integrating the use of free cooling with mechanical cooling for packaged rooftop units. The solid-state control system optimizes energy consumption, zone comfort, and equipment cycling by operating the compressor and PMV when the outdoor-air temperature is too warm, integrating the compressor and PMV with outdoor air when free cooling is available and closing the PMV when outdoor-air temperature is too cold. Demand control ventilation is supported.

The EconoMi$er X system utilizes gear-drive technology with a direct-mount spring return actuator that will close upon loss of power. The EconoMi$er X system comes standard with an outdoor air temperature sensor, mixed air (or supply air) temperature sensor.

Standard barometric relief dampers provide natural building pressurization control.

Table 4 – Type Horizontal and Vertical

	Type	Part Number
All Sizes	Horizontal	CRECOMZR077A00
	Vertical	CRECOMZR076A00



Economizer P/N	A	B	Ship Wt.
CRECOMZR077A00	27.09”	29.19”	95 lb
CRECOMZR076A00	33.37”	17.43”	55 lb

Fig. 12 - EconoMi$er X Hood Detail

Table 5 – Package Contents

Package Number	Qty.	Contents
CRECOMZR077A00	1	Hood Assembly
	1	Filter Access Door
	1	Aluminum Filter
	18	Screws
	1	EconoMi$er X Assembly
	1	Front Blank Off Panel
	1	HH79ZZ007 Mixed Air Temperature Sensor/Harness
	1	48TMHSRSE- A20 Harness
CRECOMZR076A00	1	Hood Top and Sides
	1	Hood Divider
	2	Aluminum Filters
	1	Econimizer X Assembly
	1	HH79ZZ007 Mixed (Supply) Temperature Sensor
	1	48TMHSRSE- A20 Harness

Table 6 – EconoMi$er X Sensor Usage

Application	Economi$er X with Outdoor Air Dry Bulb Sensor
	Accessories Required
Outdoor Air Dry Bulb	HH79ZZ007 is factory installed on economizer
Supply (mixed air sensor)	HH79ZZ007 is factory provided and field installed

ACCESSORIES LIST

The EconoMi$er X has several field-installed accessories available to optimize performance.

INSTALLATION - HORIZONTAL

1. Turn off unit power supply(s) and install lockout tag.
2. Remove the existing unit filter access panel. Raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed and discarded (See Fig. 14).

⚠ WARNING

ELECTRIC SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.
Disconnect power supply and install lockout tag before attempting to install accessory.

3. Remove the indoor coil access panel and discard (See Fig. 14).
4. The EconoMi$er X hood assembly is shipped assembled. Aluminum filter must be installed on some models.
5. Set the EconoMi$er X upright (See Fig. 15).
6. Insert the EconoMi$er X assembly into the rooftop unit positioning the EconoMi$er X to the far left side of the opening (See Fig. 18).
7. Slide the EconoMi$er X all the way back into the unit until it locks into the horizontal opening of the unit.
8. Secure the EconoMi$er X mounting flanges to the unit with the screws provided (See Fig. 17).
9. Install a screw through the pre-punched hole in the EconoMi$er X into the flange on the horizontal duct opening (See Fig. 18).
10. Remove the tape securing the relief dampers in place.
11. Remove and save the 12-pin jumper plug from the unit wiring harness (located in the upper left corner of the unit). Insert the EconoMi$er X plug into the unit wiring harness.

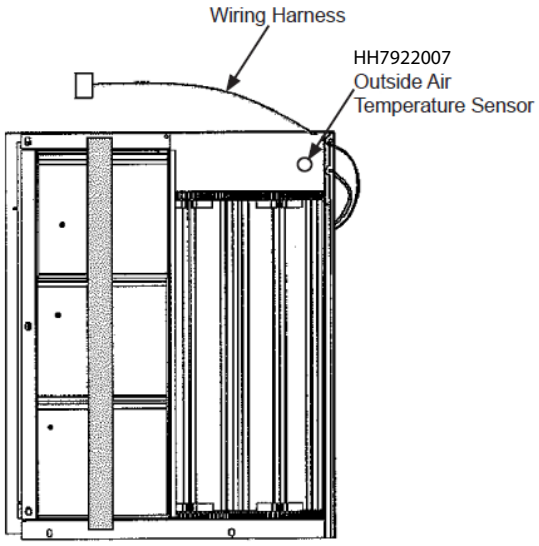


Fig. 13 - Horizontal EconoMi$er X Component Locations

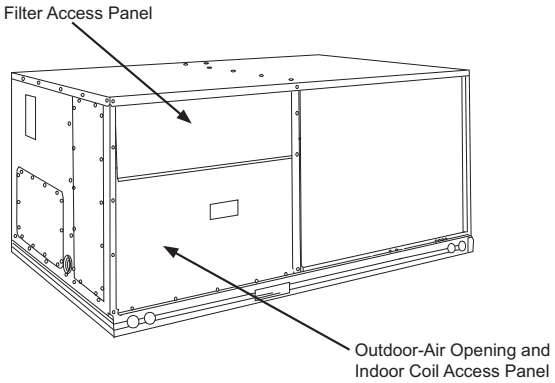


Fig. 14 - Typical Outdoor Air Section Access Panel Locations

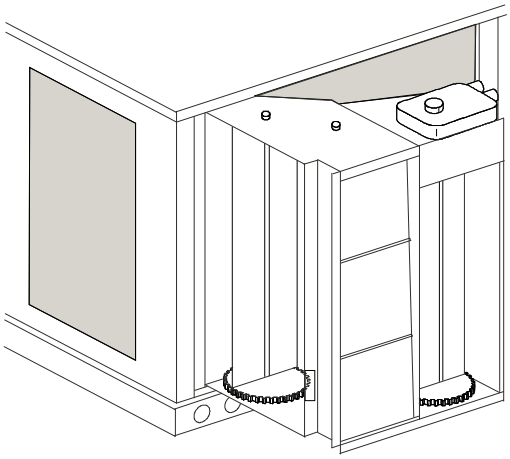


Fig. 15 - Horizontal EconoMi$er X Positioned for Installation in Unit

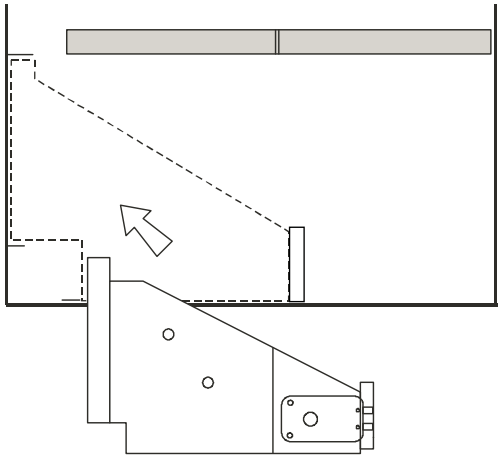


Fig. 16 - Top View of Horizontal EconoMi$er X Installation

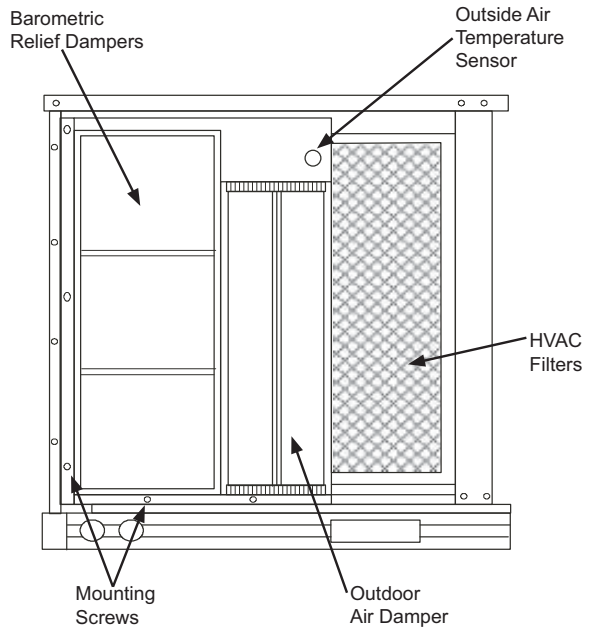


Fig. 17 - Horizontal EconoMi$er X Installed in Unit

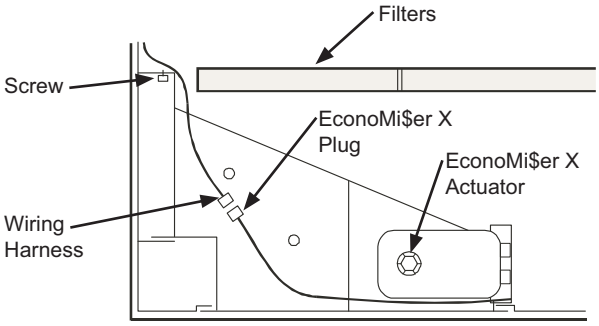


Fig. 18 - Top View of Horizontal EconoMi$er X Installed in Unit

NOTE: The 12-pin jumper plug should be saved for future use if the EconoMi$er X is removed from the unit. The jumper plug is not needed as long as the EconoMi$er X is installed.

12. Remove indoor fan motor access panel (See Fig. 19).

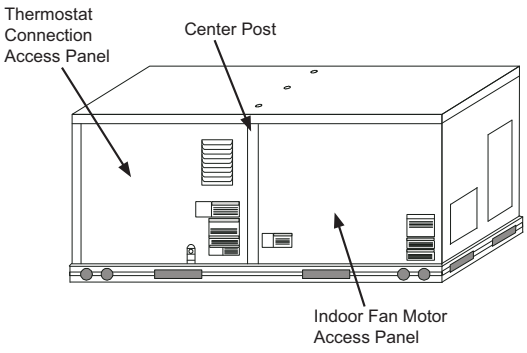


Fig. 19 - Typical Indoor Fan Motor Access Panel Locations

13. The mixed (or supply) air temperature sensor looks like an eyelet terminal with wires running to it. The sensor is located on the "crimp end" and is sealed from moisture. Locate the sensor in the economizer hardware bag. Mount the mixed air temperature sensor (provided) to the lower left section of the indoor fan blower housing (See Fig. 20). Use the screw provided and use existing hole. Locate the orange and brown wires in the wire bundle in the indoor fan section. Connect the orange and brown wires to the corresponding connections on the mixed air temperature sensor (See Figs. 78 and 79). Reinstall the indoor fan motor access panel.

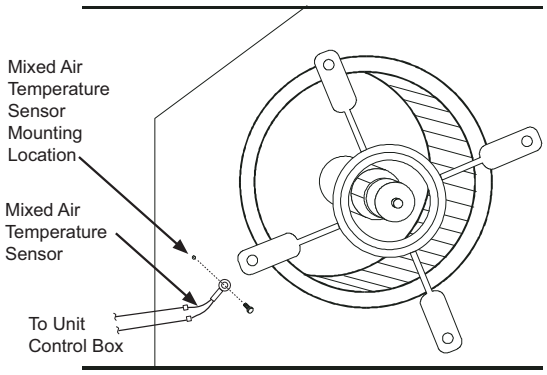


Fig. 20 - Mixed Air Sensor Placement

14. While everything is open, install and wire any other accessories and/or sensors as applicable and convenient per their installation instructions and/or the Configuration section of this instruction. Some accessories require that unit ducting already be installed.
15. On some units, the EconoMi$er X and hood do not reach to the top of the unit. In this case, a front blank-off panel must be installed. Install provided front blank-off panel above hood. Screw in place (See Fig. 22).

NOTE: The front blank-off panel must be installed before the hood because the top of the hood fits into a channel in the bottom of the panel.

16. Install the EconoMi$er X hood over the EconoMi$er X. Use screws provided (See Fig. 21 and 22). Insert screw through right side flange of hood into EconoMi$er X flange.

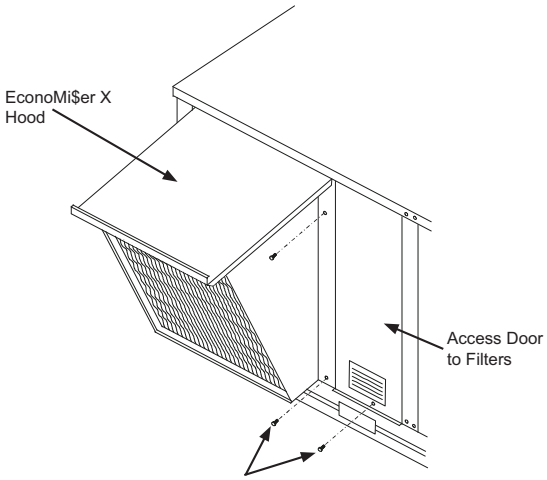


Fig. 21 - EconoMi$er X Hood Installation

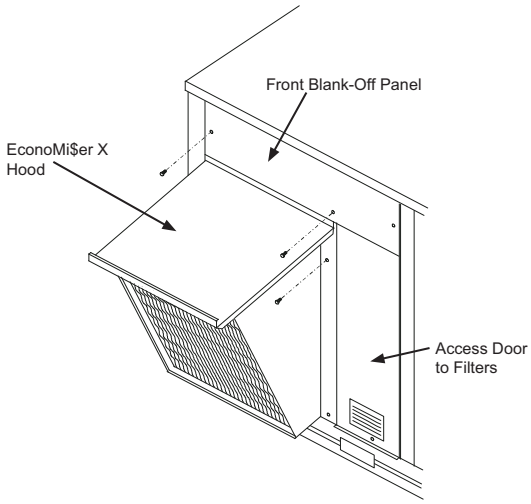


Fig. 22 - Front Blank-Off Panel Installation Panel

17. On some units, the return damper does not reach to the top of the horizontal return opening in the unit. In this case, a horizontal blank-off must be installed. Install the horizontal blank-off at the top of the horizontal return opening (See Fig. 25). Screw in place through pre-punched holes.
18. When the W7220 EconoMi$er controller is shipped, it is mounted to a steel bracket. This bracket is not used, so remove and discard it. The controller is also shipped with two harnesses, which will not be used, so disconnect them from the W7220 and discard them.
19. Install the controller in the top left corner of the unit control box as show in the wiring diagram (See Fig. 78 and 79). Attach it with 2 screws.
20. The harness that connects to relays to the right side of the W7220 is screwed to the control box (part number 40QQHSRSA—A20). Install this per wiring diagram (See Figs. 78 and 79).
21. Connect all connectors on left side of the W7220 to the corresponding terminals per the wiring diagram (See Figs. 78 and 79).
22. Connect unit plug 40QQHSRSA-A00 to PL6 on the economizer.

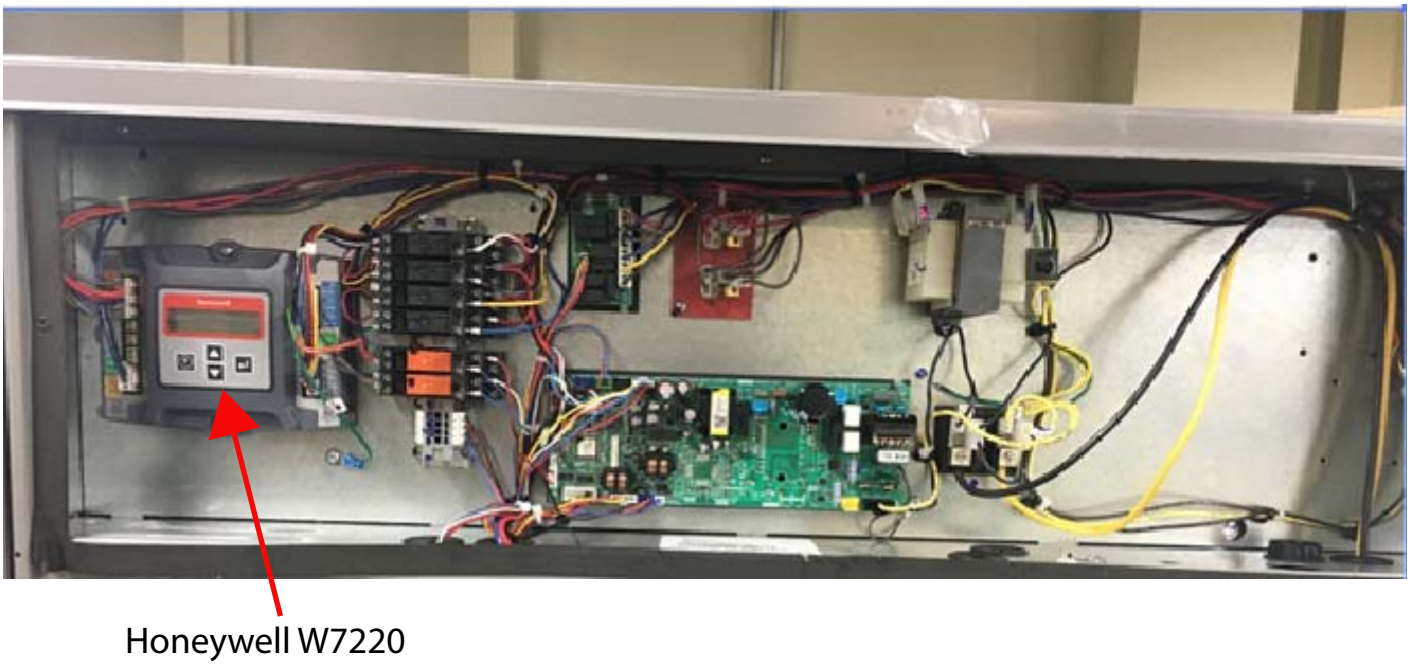


Fig. 23 - EconoMi$er Installation

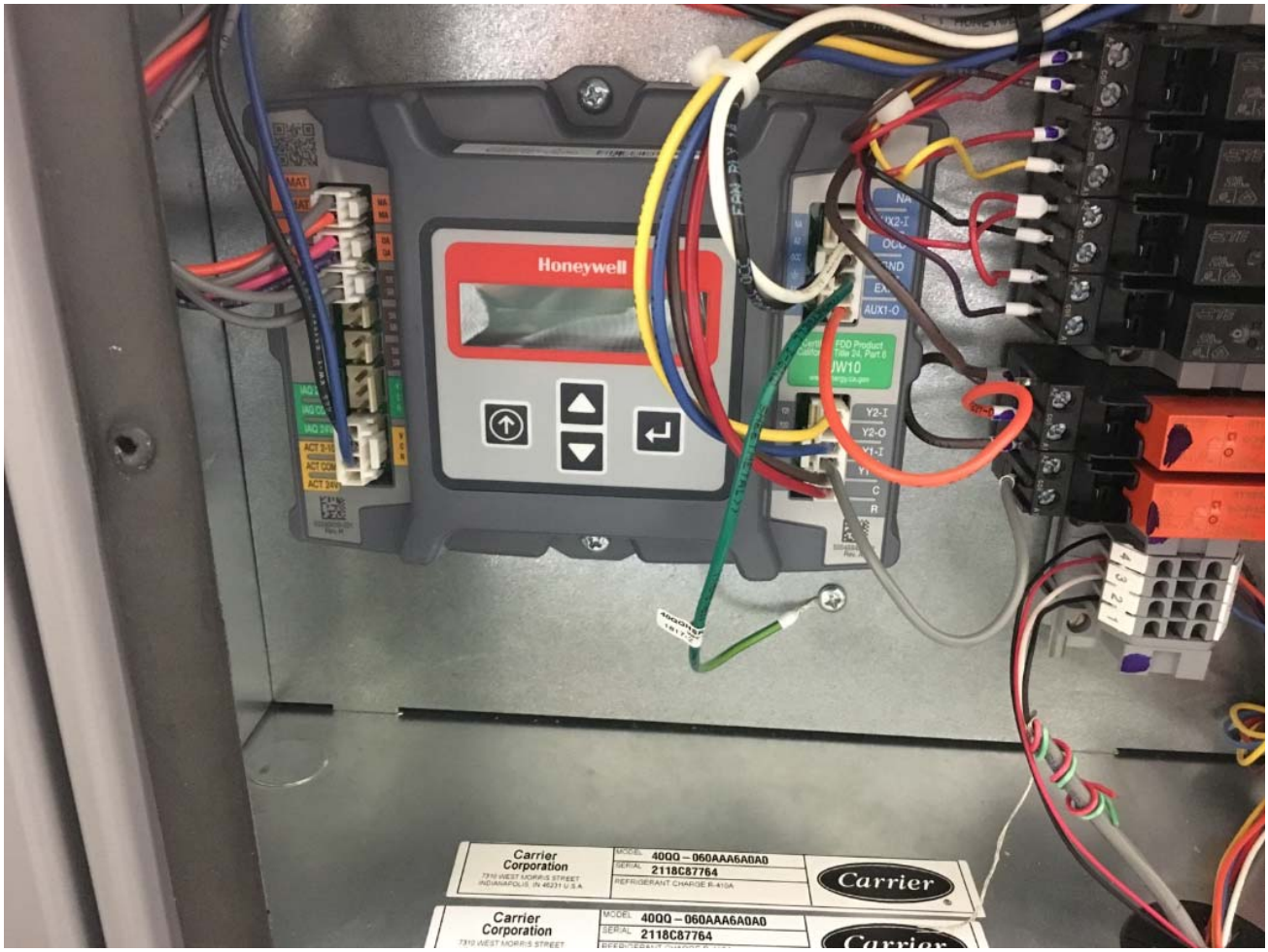


Fig. 24 - Honeywell 7220 Connections

23. Check all wiring for safety then reapply power to the unit. Verify correct operation and setting of the accessory(s) per the Configuration and Operations sections of the instruction.
24. Install access door next to hood. Screw bottom of door to HVAC unit (See Fig. 21). Use standard serrated screws along bottom of panel for all units.
25. Replace the indoor fan motor access panel.
26. Install the hood filter by opening the filter clips, which are located underneath the hood top. Insert the aluminum filter into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filter into place (See Fig. 21 and 22).

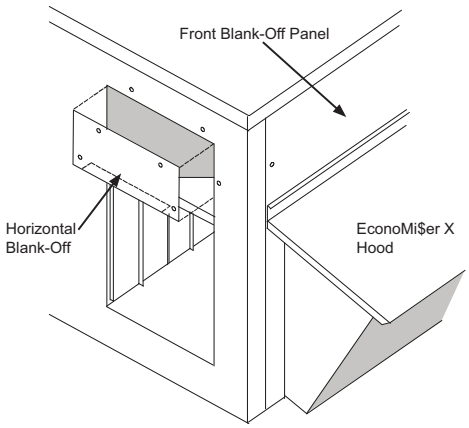


Fig. 25 - Horizontal Return Opening Blank- Off Panel

INSTALLATION - VERTICAL

1. Turn off unit power supply(s) and install lockout tag.
2. Remove the existing unit filter access panel. Raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed and discarded (See Fig. 26).

⚠ WARNING

ELECTRIC SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.
Disconnect power supply and install lockout tag before attempting to install accessory.

3. Remove the indoor coil access panel and discard (See Fig. 27).
4. The EconoMi$er X hood assembly is shipped assembled. Aluminum filter must be installed on some models.
5. Set the EconoMi$er X upright (See Fig. 28).
6. Insert the EconoMi$er X assembly into the rooftop unit positioning the EconoMi$er on the bottom left of the opening.
7. Secure the EconoMi$er X mounting flanges to the unit with the screws provided (See Fig. 28).

Follow the instructions for the horizontal economizer from step 10 onwards.

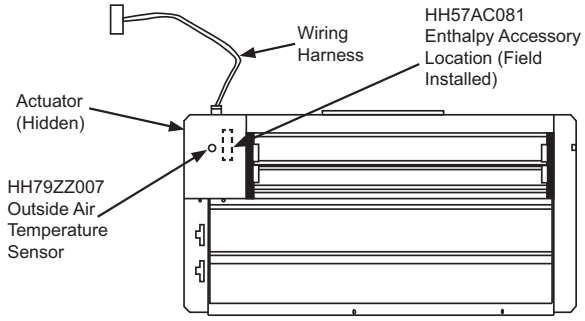


Fig. 26 - Vertical EconoMi$er X Component Locations

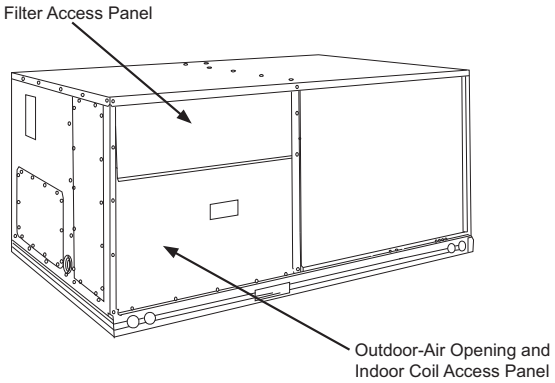


Fig. 27 - Typical Outdoor Air Section Access Panel Locations

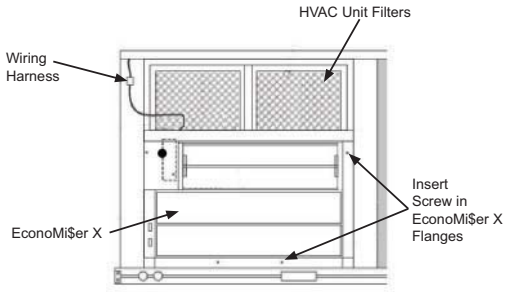


Fig. 28 - EconoMi$er X Installed in HVAC Unit

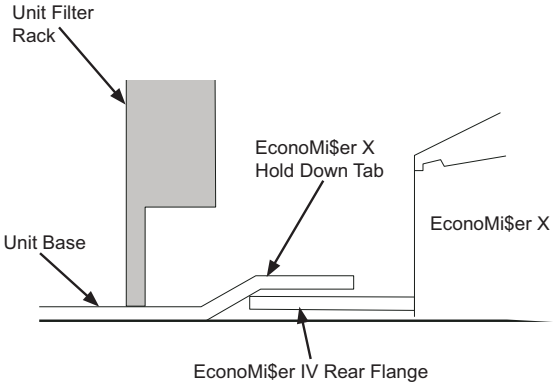


Fig. 29 - Top View of Vertical EconoMi$er X Installation

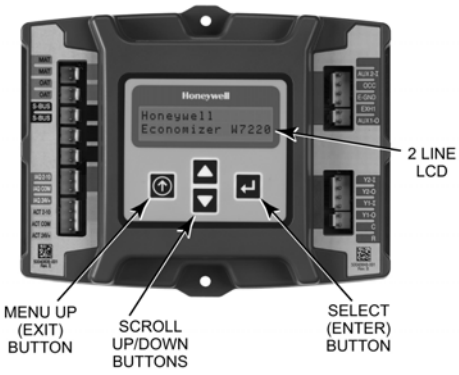


Fig. 30 - W7220 Controller

EconoMi$er X

The field-installed accessory consist of the following:

- Economizer assembly
- W7220 economizer controller
- HH79ZZ007 mixed (or supply) air sensor
- HH79ZZ007 outside air temperature sensor
- 48TMHSRSE-A20 harness

W7220 Economizer

The economizer controller used on electro mechanical units is a Honeywell W7220, which is to be located in the RTU base unit's Control Box. See the Installation Instruction for your base unit for the location of the Control Box access panel.

The W7220 controller provides the following:

- 2-line LCD interface screen for setup, configuration and troubleshooting
- On-board fault detection and diagnostics
- Sensor failure loss of communications identification
- Automatic sensor detection
- Capabilities for use with multiple-speed indoor fan systems

User Interface

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

Keypad

The four navigation buttons are used to scroll through the menus and menu items, select menu items, and change parameter and configuration settings (see Fig. 30).

Using the Keypad with Menus

To use the keypad when working with menus:

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

Using the Keypad with Settings and Parameters

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

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

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

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

Menu Structure

Table 6 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: The default setting on the W7220 controller is for a "Fan Type" with 2 speeds, which is correct for 2 or 3 speed units.

IMPORTANT: Table 6 illustrates the complete hierarchy. Your menu parameters may be be different depending on your computer configuration.

Table 7 – Menu Structure[a]

Menu	Parameter	Parameter Default Value	Parameter range and Increment[b]	Notes
Status	ECON AVAIL	NO	YES/NO	YES = economizing available; the system can use outside air for free cooling when required
	ECONOMIZING	NO	YES/NO	YES = outside air being used for 1st stage cooling
	OCCUPIED	NO	YES/NO	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	Displays COOL or HEAT when system is set to heat pump (Non- conventional)
	COOL Y1- IN	OFF	ON/OFF	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	Cool stage 1 Relay Output to stage 1 mechanical cooling (Y1- OUT terminal)
	COOL Y2- IN	OFF	ON/OFF	Y2- I signal from space thermostat our unitary controller for second stage cooling ON = 24 VAC on terminal Y2- I OFF = 0 VAC on terminal Y2- I
	COOL Y2- OUT	OFF	ON/OFF	Cool Stage 2 Relay Output to mechanical cooling (Y2- OUT terminal)
	MA TEMP	__._° F	0 to 140° F	Displays value of measured mixed air from MAT sensor. Displays _ _ . _ ° F if not connected, short or out- of- range
	DA TEMP	__._° F	0 to 140° F	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	- 40 to 140° F	Displays measured value of outdoor air temperature. Displays _ _ _° F if sensor sends invalid value, short or out- of- range
	OA HUM	__%	0 to 100%	Displays measured value of outdoor humidity from OA sensor Displays _ _% if not connected short, or out- of- range
	RA TEMP	__._° F	0 to 140° F	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%	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	Displays value of measured CO^2 from CO^2 sensor. Invalid if not connected, short or out- of- range
	DCV STATUS	N/A	ON/OFF	Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO2 sensor is connected
	DAMPER OUT	2.0V	2.0 to 10.0V	Displays voltage output to the damper actuator
	EXH1 OUT	OFF	ON/OFF	Output of EXH1 terminal: ON = relay closed, OFF = relay open
	EXH2 OUT	OFF	ON/OFF	Output of AUX terminal; displays only if AUX = EXH2
	ERV	OFF	ON/OFF	Output of AUX terminal; displays only if AUX = ERV
	MECH COOL ON		0, 1, or 2	Displays stage of mechanical cooling that is active

Table 6 - Menu Structure (Cont.)[a]

Menu	Parameter	Parameter Default Value	Parameter range and Increment[b]	Notes
Setpoints	MAT SET	53° F	38 to 65° F Increment by 1	Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.
	LOW T LOCK	32° F	- 45 to 65° F Increment by 1	Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout.
	DRYBULB SET	63° F	48 to 80° F Increment by 1	Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63° F unit will economize at 62° F and below and not economize at 64° F and above. There is a 2° F deadband.
	ENTH CURVE	ES3	ES1, ES2, ES3, ES4, or ES5	Enthalpy boundary “curves” for economizing using single enthalpy
	DCV SET	1100 ppm	500 to 2000 ppm Increment by 1	Displays only if CO2 sensor is connected. Setpoint for Demand Control 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	4.4V	2 to 10 VDC	Displays ONLY if a CO2 sensor is NOT connected.
	VENTMAX With 2- speed fan units VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required	4.4V	2 to 10 VDC or 100 to 9990 cfm Increment by 10	Displays only if a CO2 sensor is connected. Used for Vbz (ventilation max cfm) setpoint. Displays 2 to 10 V if <3 sensors (RA,OA, and MA). In AUTO mode dampers controlled by CFM.
	VENTMAX L	6V		
	VENTMAX H	4.4V		
	VENTMIN With 2- speed fan units VENTMIN L (low speed fan) and VENTMIN H (high speed fan) set	2.8V	2 to 10 VDC or 100 to 9990 cfm Increment by 10	Displays only if a CO2 sensor is connected. Used for Ba (ventilation min cfm) setpoint. Displays 2 to 10 V if <3 sensors (RA, OA, and MA). Va is only set if DCV is used. This is the ventilation for less than maximum occupancy of the space. In AUTO mode dampers controlled by CFM.
	VENTMIN L	3.7V		
	VENTMIN H	2.8V		
	ERV OAT SP	32° F	0 to 50° F Increment by 1	Only when AUX1 O = ERV
	EXH1 SET With 2- speed fan units Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required	50%	0 to 100° F Increment by 1	Setpoint for OA damper position when exhaust fan 1 is powered by the economizer.
	Exh1 L	65%		
	Exh1 H	50%		
	EXH2 SET With 2- speed fan units Exh2 L (low speed fan) and Exh2 H (high speed fan) settings are required	75%	0 to 100° F Increment by 1	Setpoint for OA damper position when exhaust fan 2 is powered by the economizer. Only used when AUX is set to EHX2.
	Exh2 L	80%		
	Exh2 H	75%		

Table 6 - Menu Structure (Cont.)[a]

Menu	Parameter	Parameter Default Value	Parameter range and Increment[b]	Notes
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.
	AUX21	W	SD/W or HP(O)/HP(B)	In CONV mode: SD + Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. In HP O/B mode: HP(O) = energize heat pump on Cool (default); HP(B) = energize heat pump on heat.
	FAN TYPE	2 speed	1 speed/2 speed	Sets the economizer controller for operation of 1 speed or 2 speed supply fan. (Note: for 3 speed units (48/50LC 07- 12), setpoint is a 2 speed).
	FAN CFM	5000 cfm	100 to 15000 cfm Increment by 100	This is the capacity of the RTU. The value is found in the Project Submittal documents for the specific RTU.
	AUX OUT	NONE	NONE ERV EXH2 SYS	NONE = not configured (output is not used). ERV = Energy Recovery Ventilation. EXH2 = second damper position relay closure for second exhaust fan. SYS = use output as an alarm signal.
	OCC	INPUT	INPUT or ALWAYS	When using a setback thermostat with occupancy out (24 Vac), the 24 Vac is input “INPUT” to the OCC terminal. If no occupancy output from the thermostat then change program to “ALWAYS” OR add a jumper from terminal R to OCC terminal.
	FACTORY DEFAULT	NO	NO or YES	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to the factory default values.
Advanced Setup	MA LO SET	45%	35 to 55° F Increment by 1%	Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value).
	FREEZE POS	CLO	CLO or MIN	Damper position when freeze protection is active (closed or MIN POS).
	CO2 ZERO	0ppm	0 to 500 ppm Increment by 10	CO2 ppm level to match CO2 sensor start level.
	CO2 SPAN	2000ppm	1000 to 3000 ppm Increment by 10	CO2 ppm span to match CO2 sensor.
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 h or OFF	Delay after stage 2 cool has been active. Turns on 2nd stage of cooling when economizer is 1st stage and mechanical cooling is 2nd stage. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling.
	S D DMPR POS	CLO	CLO or OPN	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 Vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., fans, etc. will shut off.
	DCVCAL ENA	MAN	MAN (manual) AUTO	Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA, and MA sensor conditions. Requires all 3 RA, OA, and MA sensors.
	MAT T CAL	0.0° F	+/- 2.5° F	Allows for the operator to adjust for an out of calibration temperature sensor.
	OA T CAL	0.0° F	+/- 2.5° F	Allows for the operator to adjust for an out of calibration temperature sensor.
	OA H CAL	0% RH	+/- 10% RH	Allows for operator to adjust for an out of calibration humidity sensor.
	RA T CAL	0.0° F	+/- 2.5° F	Allows for operator to adjust for an out of calibration temperature sensor.
	RA H CAL	0% RH	+/- 10% RH	Allows for operator to adjust for an out of calibration humidity sensor.
	DA T CAL	0.0° F	+/- 2.5° F	Allows for the operator to adjust for an out of calibration temperature sensor.

Table 6 - Menu Structure (Cont.)[a]

Menu	Parameter	Parameter Default Value	Parameter range and Increment[b]	Notes
Checkout	DAMPER VMIN- HS	N/A	N/A	Positions damper to VMIN position.
	DAMPER VMAX- HS	N/A	N/A	Positions damper to VMAX position.
	DAMPER OPEN	N/A	N/A	Position damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure you pause in the mode to allow exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE	N/A	N/A	Position damper to the full closed position.
	CONNECT Y1- O	N/A	N/A	Closes the Y1- O relay (Y1- O).
	CONNECT Y2- O	N/A	N/A	Closes the Y2- O relay (Y2- O).
	CONNECT AUX	N/A	N/A	Energizes the AUX output. If Aux setting is: NONE = no action taken ERV = 24 VAC out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation.[d] SYS = 24 Vac out. Issues a system alarm.
Alarms				Alarms display only when they are active. The menu title "ALARMS(#)" includes the number of active alarms in parenthesis ( ). When using SYLK bus sensors, "SYLK" will appear on the screen, and when using 20k OA temperature sensors, "SENS T" will appear on the screen.
	MA T SENS ERR	N/A	N/A	Mixed 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 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	Outdoor 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 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 sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SENS T ERR	N/A	N/A	Outdoor air temperature sensor has failed or become disconnected - check wiring then replace if the alarm continues.
	ACT ERROR	N/A	N/A	Actuator has failed or become disconnected - check for stall, over voltage, undervoltage 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 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	If DCV Auto enable has been programmed, when the Jade is completing a calibration on the dampers, this alarm will display. Wait until the calibration is completed and the alarm will go away. Must have OA, MA and RA sensors for DCV calibration; set up in the Advanced setup menu.
	DA SENS ALM	N/A	N/A	Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.
	SYS ALARM	N/A	N/A	When AUX1- 0 is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1- 0 terminal has 24 Vac out.
	ACT UNDER V	N/A	N/A	Voltage received by Actuator is above expected range.
	ACT OVER V	N/A	N/A	Voltage received by Actuator is below expected range.
	ACT STALLED	N/A	N/A	Actuator stopped before achieving commanded position.

a Table 5 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.

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

c N/A = not applicable.

d 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.

Checkout Tests

Use the Checkout menu (see Table 6) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

NOTE: See User Interface 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.

Checkout test can be performed 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 damage to equipment.

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

Setup and Configuration

W7220 Economizer Module Wiring

Use Fig. 30 and Tables 7 and 8 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.

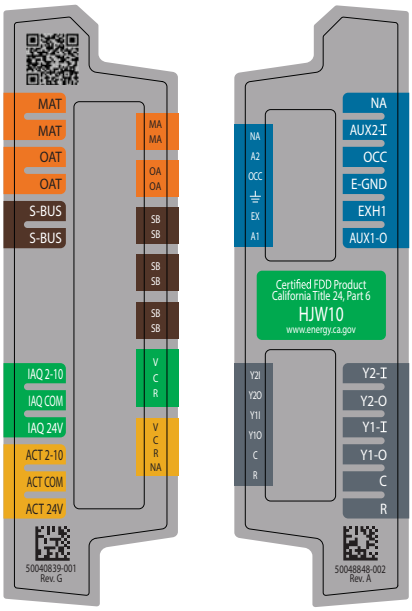


Fig. 31 - W7220 Economizer Module Terminal Connection Labels

Table 8 – Economizer Module - Left Hand Terminal Blocks

Label	Type	Description
Top Left Terminal Block		
MAT	20k NTC and COM	Mixed Air Temperature Sensor (Polarity insensitive connections)
OAT	20k NTC and COM	Outdoor Air Temperature Sensor (Polarity insensitive connections)
S- BUS	S- BUS (Sylk BUS)	Enthalpy Control Sensor (Polarity insensitive connections)
Bottom Left Terminal Block		
IAQ 2- 10	2- 10 VDC	Air Quality Sensor Input (e.g. CO2 sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24	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 24	24 VAC	Damper Actuator 24 VAC Source

Table 9 – Economizer Module - Right Hand Terminal Blocks

Label	Type	Description
Top Right Terminal Block		
	N/A	The first terminal is not used
AUX2 I	24 VAC IN	Shut Down (SD) or Heat (W) Conventional only and Heat Pump Changeover (O?B) in Heat Pump mode
OCC	24 VAC 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		
Y 2- 1	24 VAC IN	Y2 in - Cooling Stage 2 Input from space thermostat
Y 2- O	24 VAC OUT	Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling
Y 1- I	24 VAC IN	Y1 in - Cooling Stage 2 Input from space thermostat
Y 1- O	24 VAC OUT	Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling
C	COM	24 VAC Common
R	24 VAC	24 VAC Power (Hot)

Time- out and Screen Saver

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

HH79ZZ007 Dry Bulb Sensor

Economizers are shipped standard with an HH79ZZ007 outside air dry bulb sensor, which looks like an eyelet terminal with two green wires. This sensor is factory installed on the front of the economizer in the outside air stream. System default setting (high temp limit) is 63°F, and has a range of 48°F to 80°F.

NOTE: A 2nd HH79ZZ007 sensor is provided for mixed (supply) air temperature.

NOTE: California high temperature setting requirements by region are shown below.

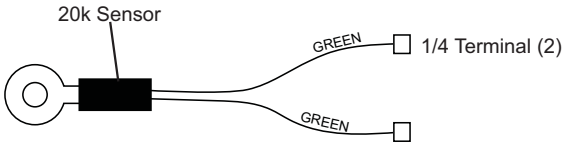


Fig. 32 - HH79ZZ007 Sensor

Table 10 – California Title 24 Regional High Limit Dry Bulb Temperature Settings (Table 140.4- B Air Economizer High Limit Shut Off Control Requirements)

Device Type	Climate Zones	Required High Limit (Economizer Off When):
		Descriptions
Fixed Dry Bulb	1, 3, 5, 11- 16	Outdoor air temperature exceeds 75° F
	2, 4, 10	Outside air temperature exceeds 73° F
	6, 8, 9	Outside air temperature exceeds 71° F
	7	Outside air temperature exceeds 69° F
Differential Dry Bulb	1, 3, 5, 11- 16	Outdoor air temperature exceeds return air temperature
	2, 4, 10	Outdoor air temperature exceeds return air temperature minus 2° F
	6, 8, 9	Outdoor air temperature exceeds return air temperature minus 4° F
	7	Outdoor air temperature exceeds return air temperature minus 6° F

a Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls, may not be used in any climate zone for compliance with Section 140.4(e)1 unless approval for use is provided by the Energy Commission Executive Director.

b At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75° F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

OPERATION

Cooling, Unit with EconoMi$er X

For occupied mode operation of EconoMi$er X, there must be a 24V signal at terminals R and OCC. Removing the signal at OCC places the EconoMi$er X control in unoccupied mode.

During occupied mode operation, indoor fan operation will be accompanied by economizer dampers moving to minimum position setpoint for ventilation. If indoor fan is off, dampers will close. During unoccupied mode operation, dampers will remain closed unless a cooling (by free cooling) or DCV demand is received.

When free cooling using outside air is not available, the unit cooling sequence will be controlled directly by the space thermostat. Outside air damper position will be closed or minimum position as determined by occupancy mode and fan signal.

When free cooling is available as determined by the appropriate changeover command, a call for cooling (Y1 closes at the thermostat) will cause the economizer control to modulate the dampers open and closed to maintain the unit supply air temperature. Default supply air temperature is 53° F with a range of 38° to 70° F.

If 100% outside air is not capable of satisfying the setpoint, space temperature will rise until Y2 is closed. The economizer control will call for PMV operation. Dampers will modulate to maintain SAT setpoint concurrent with PMV operation.

When space temperature demand is satisfied (thermostat Y1 opens), dampers return to minimum damper position if indoor fan is running or fully closed if fan is off.

Damper movement from full closed to full open (or vice versa) will take between 1-1/2 and 2-1/2 minutes.

Heating with EconoMi$er X

During occupied mode operation, indoor fan operation will be accompanied by economizer dampers moving to minimum position setpoint for ventilation. If indoor fan is off, dampers will close. During unoccupied mode operation, dampers will remain closed unless a DCV demand is received.

When the room temperature calls for heat (W1 closes), the heating controls are energized.

TROUBLESHOOTING

Power Loss (Outage or Brownout)

All setpoints and advanced settings are restored after any power loss or interruption as all settings are stored in the Economizer controller's non-volatile flash memory.

NOTE: If the power falls below 18 VAC, the W7220 controller module assumes a power loss and the five minute power up delay will become functional when power returns above 18 VAC.

Alarms

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

NOTE: When the unit is power on, the module waits several seconds before checking for alarms. This allows time for all configured devices (e.g. sensors, actuator) to become operational.

If one or more alarms are present and there has been no keypad activity for at least five minutes, the alarms menu displays and cycles through the active alarms. You can also navigate to the alarms menus at any time. See Table 6 for the alarms menu.

Clearing Alarms

Once the alarm has been identified and the cause has been removed (e.g. replaced faulty sensor). The 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 five seconds.

Table 11 – Operating Issues and Concerns

Issue or Concern	Possible Cause and Remedy
My outdoor temperature reading on the STATUS menu is not accurate	Check the sensor wiring: • Enthalpy sensors are to be wired to the S- Bus terminals. • Temperature sensors are to be wired to the OAT and MAT terminals.
If my enthalpy sensor drifts in accuracy over time, can I re- calibrate it?	The sensor is not able to be re- calibrated in the field. However there is a menu item under the ADVANCED menu where you are able to input a limited off set in temperature and humidity for each sensor you have connected to the economizer.
Can I go back to factory defaults and start over?	Under the SYSTEM SETUP menu you can change the setpoints to the factory defaults.
Will I be able to see LCD screen when it is in the unit?	The LCD screen has a backlight that is always illuminated.
What is a good setpoint for Mixed Air Temperature (MAT)?	The mixed are temperature is the temperature of air that you want to supply to the space. In a commercial building, this is between 50 to 55° F (10 to 13° C). The mixed are is the mixing of the return air and the outdoor air.
I am using enthalpy sensors. Why did the control ask me to input a dry bulb changeover temperature?	In the even the humidity sensor in the enthalpy sensors fails, the backup algorithm in the control is to default to the temperature sensor in the enthalpy sensor.
In checkout, the outdoor damper closes when I command it to open.	Check the actuator linkage or rotation. In the CHECKOUT mode, the outdoor damper should drive open or closed with the return air damper having the opposite effect.
How do I set my minimum position?	Minimum position is set using VENTMIN and VENTMAX setup in SETPOINTS menu. VENTMIN is minimum ventilation required when using an occupancy sensor and VENTMAX is minimum ventilation when not using an occupancy sensor for Demand Control Ventilation. VENTMAX position is set the dame as with the potentiometer on the analog economizers and is the output voltage to the damper actuator. The range is 2 VDC closed OA damper and 10 VDC open OA damper.
What if my damper does not go completely closed in the checkout operation?	Check the damper linkage or hub to make sure the damper is able to close completely.
How do I set the OCC?	There are two setting for OCC setting, INPUT and ALWAYS, INPUT is from space thermostat, if it has an occupancy output. ALWAYS is unit in the occupied mode, if the economizer is powered (fan on).
Does the economizer save my program values if the unit loses power?	Yes, once the changes are stored in controller they will be stored until changed by the operator.
If the unit is left in checkout, how long will the unit stay in checkout mode without input?	The unit will remain in checkout for ten minutes, then return to normal operation.

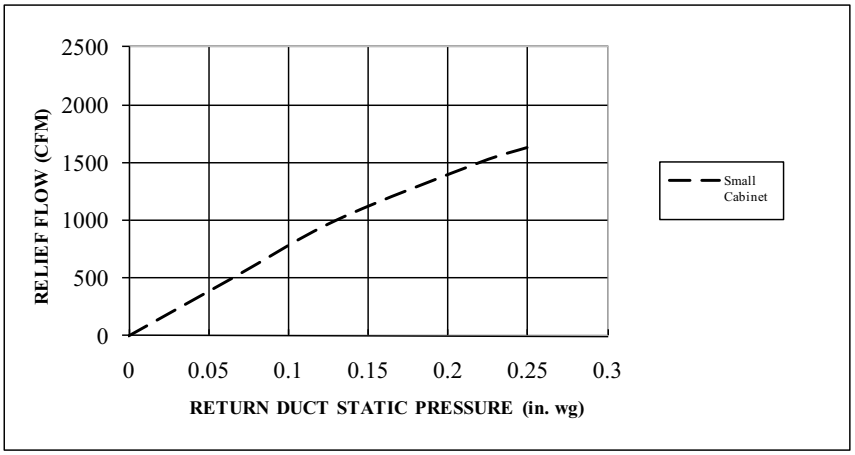


Fig. 33 - Barometric Relief Flow Capacity

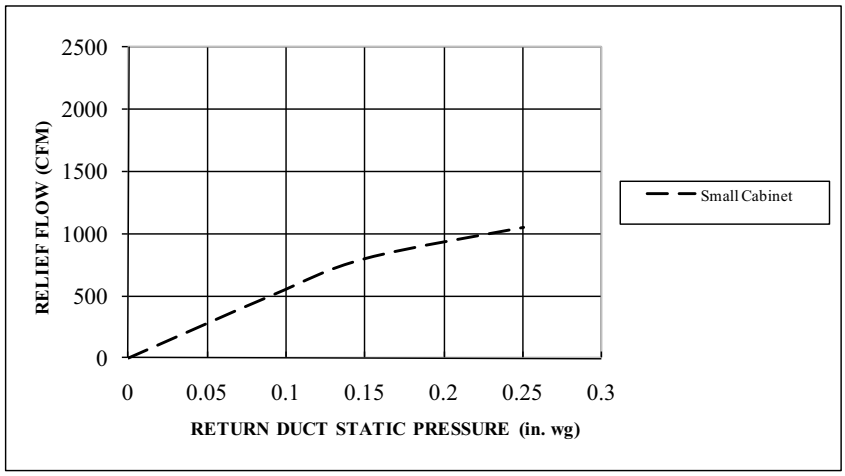


Fig. 34 - Barometric Flow Capacity

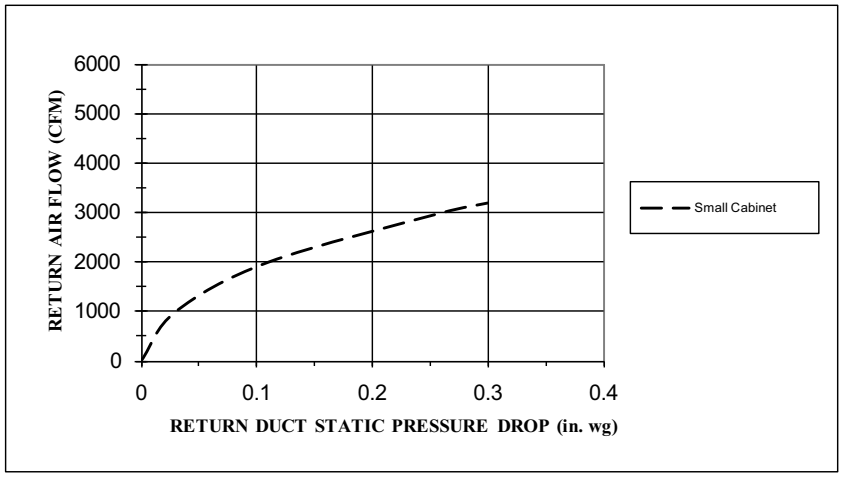


Fig. 35 - Return Air Pressure Drop

EconoMi$er Control Setting

The following is a start guide for EconoMi$er control.

Follow these step-by-step procedures after you install the EconoMi$er.

DN code setting (required to activate the EconoMi$er)

Table 12 – DN Code Settings

Set data of DN (5A)	Comments
0000	Invalid (Factory Setting)
0001	Activate

Constant Fan control Setting for Ventilation

Ensure constant air flow even if the unit is not in operation.

In specific installation there is a need to keep the indoor environment ventilated with filtered air supply from outside.

In standard condition when the system is in thermo-off the fan slows down to ultra low speed. With this setting, the unit can operate in ventilation mode only according to the settings of the room controller to keep the desired indoor air quality levels.

Change of DN code setting (Optional setting)

NOTE: This STEP is optional and should be set if necessary.

Table 13 – Change DN Code Settings (Optional)

Operational status	Default (factory setting)	Constant fan setting
Cooling Thermo-OFF - No demand - PMV=close	Fan speed= Remote Control setting speed	Fan speed= Remote Control setting speed
Heating Thermo-OFF - No demand - PMV=close	Fan speed= LL (anti cold draft)	Fan speed=setting by DN code High (HH) Mid (H) Low (L)

If you want to change fan speed while Thermo-ON, change DN(9B) value.

If you want to change fan speed while Thermo-OFF, change DN(05) value.

Table 14 – Change DN(9B) and DN(05) Value

Pattern	A	B	C	D	E	F
DN [9B] Thermo-ON	0 HH to OFF	0 HH to OFF	1 HH to LL	1 HH to LL	2 Remote Control Setting	2 Remote Control Setting
DN [05] Thermo-OFF	1 L or LL	12 Remote Control Setting	1 L or LL	12 Remote Control Setting	1 L or LL	12 Remote Control Setting
	Factory Setting					

CRHEATER ACCESSORY INSTALLATION INSTRUCTIONS

IMPORTANT: Read these instructions completely before attempting to install this accessory and follow all safety considerations.

Table 15 – Electric Heat (Field Installed Only) (208/230V-3Ph-60Hz)

Tonnage	Electric Heater Part Number	E- Heater (Phase)	Single Pt Kit Part #	Nominal (kW)	Application (kW)	Nominal (kBTU)	FLA	MCA	Max Fuse
3 Ton	CRHEATER101A00	3	CRSINGLE037A00	4.4	3.3/4.0	15.01	9.2/10.6	19/21	20/25
	CRHEATER102A00	3	CRSINGLE037A00	6.5	4.9/6.0	22.18	13.6/15.6	25/27	25/30
	CRHEATER103B00	3	CRSINGLE037A00	8.7	6.5/8.0	29.68	18.1/20.9	30/34	30/35
	CRHEATER104B00	3	CRSINGLE037A00	10.5	7.9/9.6	35.83	21.9/25.3	35/39	35/40
4 Ton	CRHEATER102A00	3	CRSINGLE037A00	6.5	4.9/6.0	22.18	13.6/15.6	27/29	30/30
	CRHEATER103B00	3	CRSINGLE037A00	8.7	6.5/8.0	29.68	18.1/20.9	32/36	35/40
	CRHEATER105A00	3	CRSINGLE037A00	16	12.0/14.7	54.59	33.4/38.5	51/58	60/60
5 Ton	CRHEATER102A00	3	CRSINGLE037A00	6.5	4.9/6.0	22.18	13.6/15.6	27/29	30/30
	CRHEATER104B00	3	CRSINGLE037A00	10.5	7.9/9.6	35.83	21.9/25.3	37/41	40/45
	CRHEATER105A00	3	CRSINGLE037A00	16	12.0/14.7	54.59	43.8/50.5	64/73	70/80
	CRHEATER104B00,104B00	3	CRSINGLE038A00	21	15.8/19.3	71.65	33.4/38.5	51/58	60/60

Table 16 – Electric Heat (Field Installed Only) (460V-3Ph-60Hz)

Tonnage	Electric Heater Part Number	E- Heater (Phase)	Single Pt Kit Part #	Nominal (kW)	Application (kW)	Nominal (kBTU)	FLA	MCA	Max Fuse
3 Ton	CRHEATER106A00	3	CRSINGLE037A00	6	5.5	20.47	7.2	13	15
	CRHEATER107A00	3	CRSINGLE037A00	8.8	8.1	30.03	10.6	18	20
	CRHEATER108A00	3	CRSINGLE037A00	11.5	10.6	39.24	13.8	22	25
4 Ton	CRHEATER106A00	3	CRSINGLE037A00	6	5.5	20.47	7	14	15
	CRHEATER108A00	3	CRSINGLE037A00	11.5	10.6	39.24	10.5	23	25
	CRHEATER109A00	3	CRSINGLE037A00	14	12.9	47.77	16.8	16	30
5 Ton	CRHEATER106A00	3	CRSINGLE037A00	6	5.5	20.47	7	14	15
	CRHEATER108A00	3	CRSINGLE037A00	11.5	10.6	39.24	13.8	23	25
	CRHEATER109A00	3	CRSINGLE037A00	14	12.9	47.77	16.8	26	30
	CRHEATER108A00,108A00	3	CRSINGLE037A00	23	21.1	78.48	27.7	40	40

PACKAGE CONTENTS

Table 17 – Package Contents - CRHEATER 101A00 to 109A00, 103B00, and 104B00

Quantity	Contents
1	Heater module
1	Heater slider track*
4	Screws*
1	Wiring label
1	Red wire (10 gage)†
1	Splice connector†
1	Wire tie†
1	Label, max temp/static
1	Heater cover

*Not included with CRHEATER101A00- 109A00

†Supplied with electric heater packages CRHEATER101A00, 102A00, 103B00, 104B00 only.

Table 18 – CRSINGLE037A00

Item Description	Quantity
Single Point Box Housing Assembly (Height 18 in/449 mm)	1
Terminal block	1
Conductors, Tap, #10	3
Rain shield with conduit seal	1
Screws, #10 x 1/2 in	12
Wire ties	7
Tube clamp	1
Seal strip	1

Table 19 – CRSINGLE038A00

Item Description	Quantity
Single Point Box Housing Assembly (Height 18 in/449 mm)	1
Terminal block/Fuse holder	1
Fuse block	1
Fuses, 60A class RK5	6
Power distribution harness	1
Conductors, Tap, #10	3
Rain shield with conduit seal	1
Screws, #10 x 1/2 in	12
Wire ties	7
Tube clamp	1
Seal strip	1

GENERAL

This installation instruction manual describes the installation of electric heaters and associated fuse block/field power termination kits (single point box or SPB) on select small rooftop units in nominal cooling capacities from 3 to 5 tons.

This information does not include selection data. Refer to project plans, job submittals and selection programs for heater and field power termination/SPB kit usage.

Electric Heaters

Heaters are shipped with one heater per carton. The carton is marked with a sales package number.

The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, limit switches and one or two control contactors. Power conductors are attached. One or two heater modules may be used in a unit.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening (See Fig. 47). Some heaters are ”keyed” with a restrictor bar on the heater frame or restrictor plate on the back of the heater mounting plate to be able to go in only one slot. These keyed heaters have been designed and qualified to go only into the designated slot. Do not remove the key for the purpose of putting the heater in the wrong slot. Placing a keyed heater in the wrong slot could lead to overheating and unit damage from the heater not operating properly.

NOTE: The following heaters do not use the slide track: CRHEATER101A00-109A00.

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

Single Point Boxes and Fuses

Single Point Box (SPB) kits provide field power termination location plus an enclosure for heater fuses when required by code. The SPBs are installed under unit’s main control box and include a cover plus all internal wiring. Minimum components of the SPB are a field power terminal block with tap conductors to connect to the unit’s main control box field terminals. Maximum component population includes up to five fuse blocks.

Fuses for electric heater circuits are required and provided when the unit’s MOCP exceeds 60-A or when the total heater full load amp value exceeds 48-A. When fuses are required and provided, the cooling circuit is also provided with fuse protection. Some units require minor wiring changes in the main control box (see section on TB10 terminal blocks).

No Fuses

If the unit's MOCP device rating is 60-A or less, then the MOCP device is recognized as providing the required overcurrent protection to the heater and no internal fusing is required. If two heater modules are installed, a single point box that contains only a field power terminal block is required.

Single Point Box Contents

See Package Content tables for a list of components included in each single point box kit. Note the height differences and their use in specific size units.

Control Wiring

Heater modules contain one or two heater control contactors.

Table 20 – Heater Model Number

Bare Heater Model Number	C	R	H	E	A	T	E	R	0	0	1	A	0	0
Heater Sales Package PNO Includes: **Bare Heater** **Carton and Packing Material** **Installation Sheet**	C	R	H	E	A	T	E	R	1	0	1	A or B	0	0

40QQ

GENERAL INSTALLATION SEQUENCE

1. Pre-stage heater packages and single point boxes by placing the required component cartons at each unit.
2. Check the heater sales package number and single point box part number (if used) against the part numbers on the unit's rating plate.
3. Disconnect power wiring into unit control box from factory-installed disconnect switch or HACR breaker and withdraw wiring from control box.
4. Install the single point box, and connect power wiring tap conductors to field power terminals in main control box.
5. Install the electric heater module(s) and connect heater power conductors to single point box or main unit control box per appropriate connections.
6. Connect the heater control contactors to unit terminal block TB4.
7. Mark the unit rating plate to indicate which heater module(s) have been installed.
8. Note the required wire size ampacity for the field power supply conductors as marked on the unit info plate as MIN CKT AMPS for accessory heater(s) plus convenience outlet and power exhaust when provided. Select and install suitable field power conductors from external safety disconnect to unit power connection points, or confirm wiring already provided is suitable for required MIN CKT AMPS.

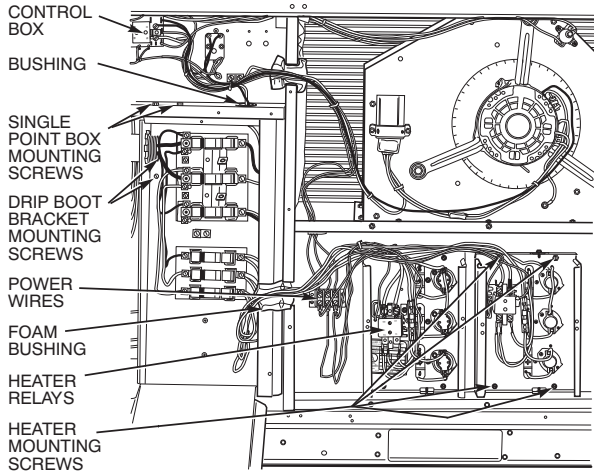


Fig. 36 - Typical Single Point Kit Installation

Check sales packages – Following the project drawing schedule tables or submittal documents, select the scheduled heaters and single point boxes (if used) and place at each unit.

Compare the sales package number(s) for scheduled heater modules against the approved usage table on the unit's info plate. If the scheduled heater usage does not appear on the unit info plate label, STOP. Contact the project engineer or the local distributor sales office for clarification. Open the cartons and inspect for damage.

Disconnect field power supply

1. Disconnect power to the unit. Lock-out/tag-out on unit disconnect switch.
2. Remove the outdoor access panel, control box cover, and indoor access panels from the unit. Save screws (See Fig. 37, 38, and 39).
3. Use a voltmeter to check that no power is present at unit terminal block.

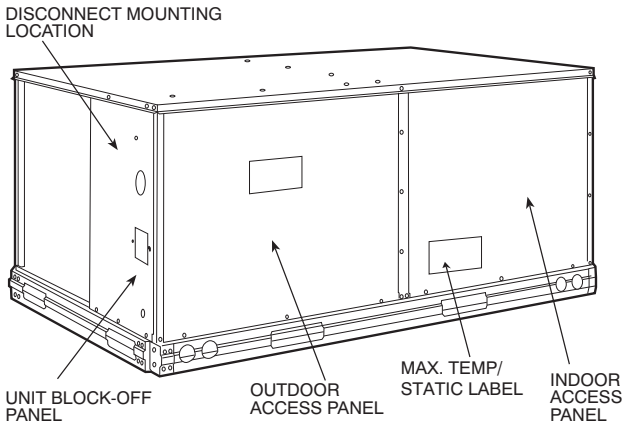


Fig. 37 - Typical Access Panel Location

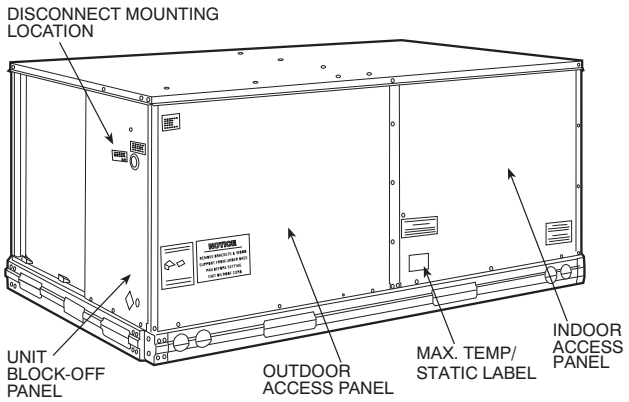


Fig. 38 - Typical Access Panel Location

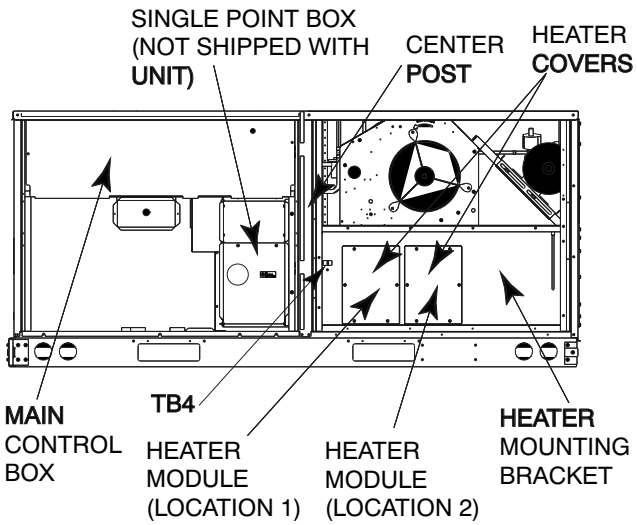


Fig. 39 - Typical Component Location

4. Remove control box cover and center post. Save screws (See Fig. 39).
5. Add seal strip to the rear bottom corner of the control panel as shown in Fig. 40. Foil tape open screw holes on the back of the single point box as shown in Fig. 40. Different single point boxes will have different screw holes open.
6. All bushings in the area of the control box where the single point box (SPB) mounts must be removed prior to securing the SPB to the control box (See Fig. 41). Also, for units installed in the snow belt, all unplugged holes in the bottom of the control box, which are not used must be plugged before installing the SPB. Use foil tape or reinstall the bushings from the outside of the control box prior to securing the SPB (See Fig. 42).
7. Remove the single point box cover. Secure single point box to the underside of the control box with the two screws provided. Re-install bushing on the SPB tap conductors (See Fig. 36).
8. Secure the rain shield (conduit drip boot bracket) assembly to the back of the single point box with 2 of the screws provided. The channel portion of the bracket assembly extends to the top panel behind the control box. Secure all wires to bracket with field-supplied wire tie as shown (See Fig. 43).

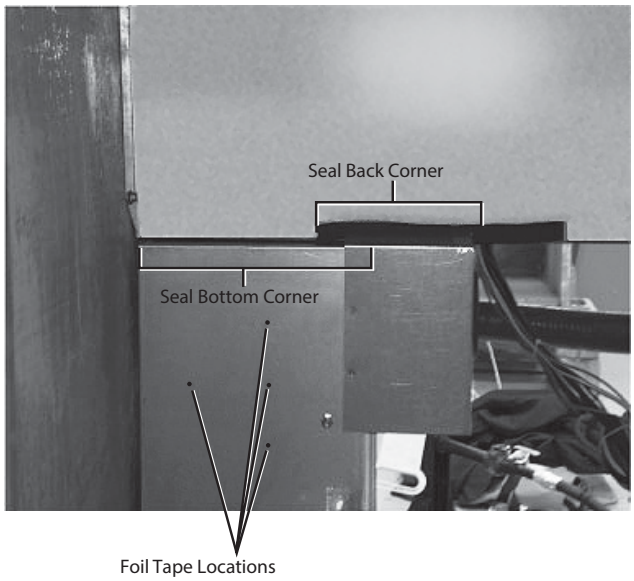


Fig. 40 - Seal Strip and Foil Tape Location

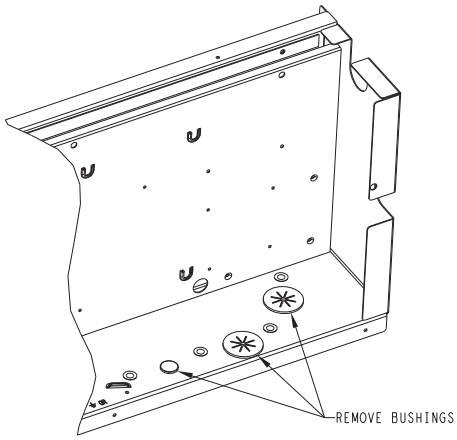


Fig. 41 - Control Box - Bushings to Remove

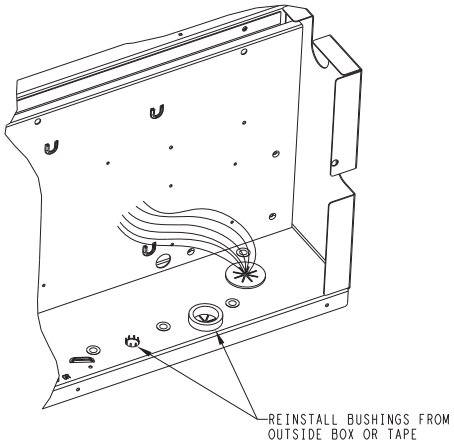


Fig. 42 - Bushings Replaced from Outside Control Box

9. Connect power tap conductors to unit main control box.

   Single point box

   Route power wires thru conduit opening in the unit and connect to the single point terminal block. For main control box power, take two legs and run them thru the grommet to the main power terminal block.

Installing Electric Heater

1. Identify heater cover(s) to remove (See Fig. 46).

   a. All two-heater installations: Remove both heater covers. Save covers and screws.

   b. All single-heater installations: Remove the heater cover at Heater 1 position. Save cover and screws.

2. Open the heater package(s) and remove the heater module, heater support track (where provided), heater cover (where provided), screws, wiring label, miscellaneous parts.

   a. Heaters 101A00-109A00: To install module, insert heater frame into location notch in heater bracket opening in unit and slide heater through the opening. Fasten heater module to heater mounting bracket with the four screws saved from Step 1 (See Fig. 46).

   c. All other heaters: To install module, engage flange on heater with track in unit and slide heater through mounting bracket opening. Fasten heater module to heater mounting bracket with the four screws saved from Step 1 (See Fig. 46).

3. Single-phase heater conversion 208/230-v heaters 101A00-104B00 are factory-wired for 3-phase applications but can be converted to single-phase by changing one wire as described below.

   Three-phase applications: Skip to Step 4. For single-phase applications, rewire the heater as follows (see Fig. 42):

   a. Connect RED wire provided with kit to Heater Relay (HR) and to L1 as shown.

   b. Disconnect YELLOW wire from HR Terminal 2 and reconnect to HR Terminal 3.

   c. Using the wire tie provided, fasten the RED wire to heater power wire harness near existing wire tie on heater module. This provides strain relief for the RED wire. (See Fig. 47).

Connect BLACK and RED conductors in heater power wire harness to the same L1 pole on single point box TB or fuse block. Connect BLUE and YELLOW conductors in the heater power wire harness to the same L2 pole on single point box TB or fuse block (See Fig. 43).

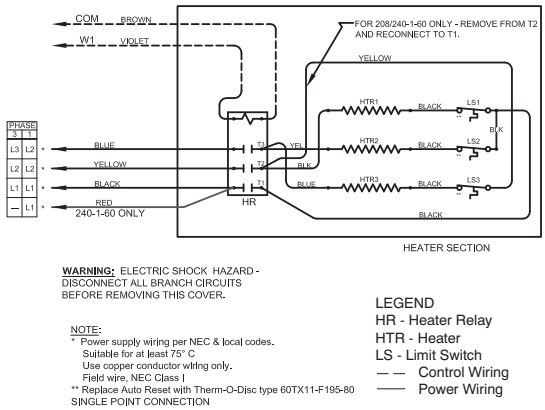


Fig. 43 - Single-Phase Heater Wiring

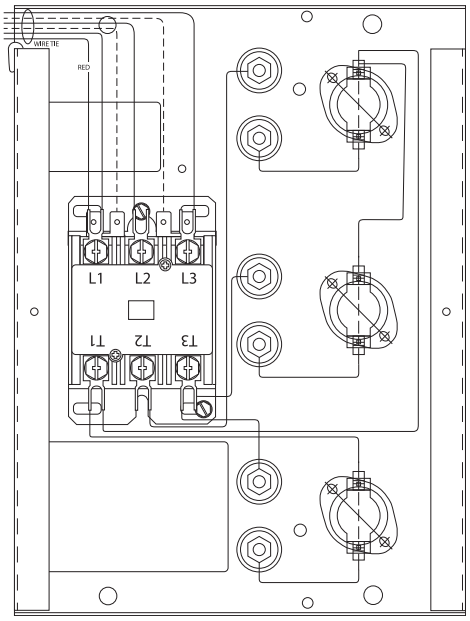


Fig. 44 - Typical Single-Phase Wiring Installed

4. Route power wires from heater module(s) through the foam bushing in the center partition and into the single point box. Connect to terminal block or fuse blocks.

   If no single point box is required for the unit and heater combination, run the heater power supply wiring through the grommet holes to the main unit control box's field power connection points or to optional factory-supplied disconnect.

5. Factory control wiring for heaters runs from unit control box to terminal block TB-4, mounted in heater compartment to left of module 1 location (See Fig. 39). Connect the heater control wiring at TB-4.

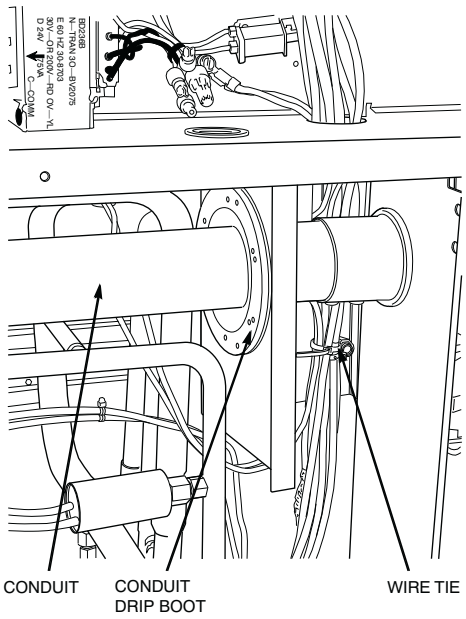


Fig. 45 - Typical Conduit Installation

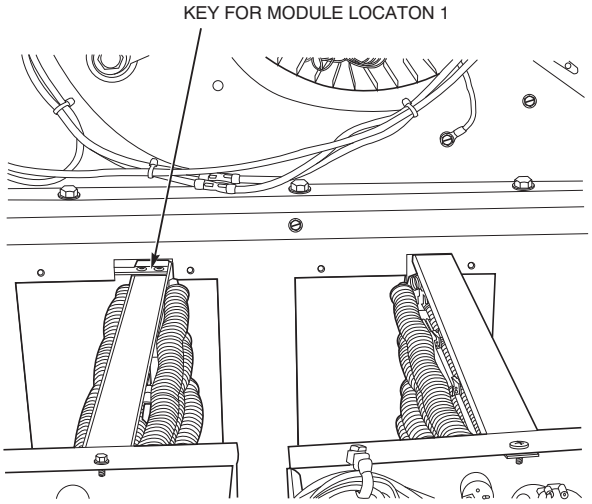


Fig. 46 - Typical Electric Heat Installation

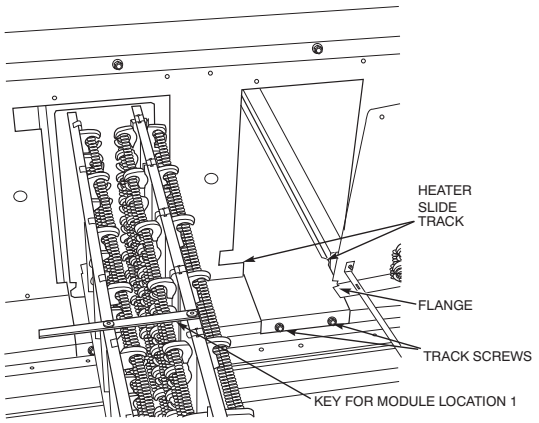


Fig. 47 - Typical Module Installation

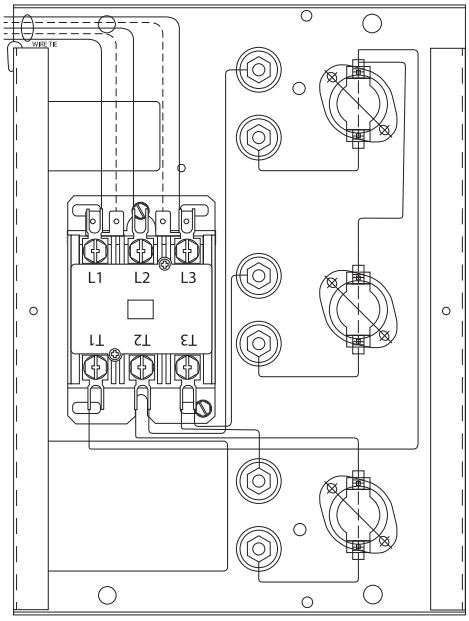


Fig. 48 - Typical 3- Phase Wiring Installed

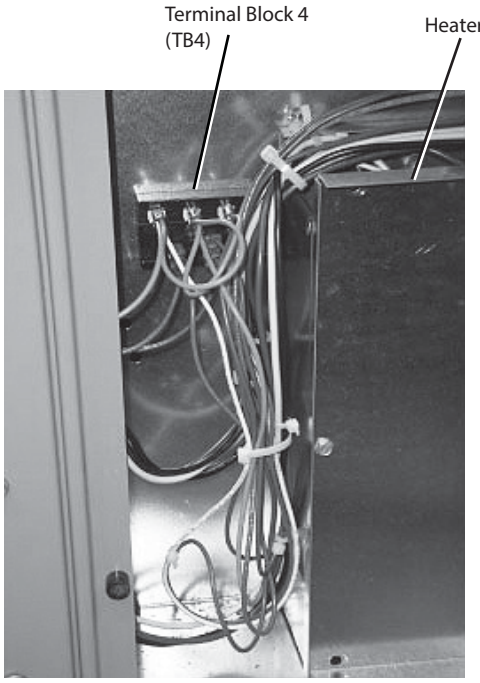


Fig. 49 - Heater Wiring

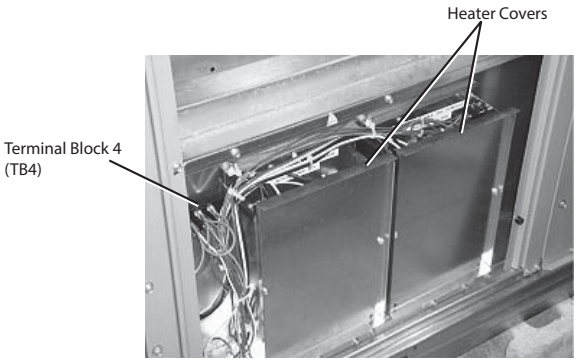


Fig. 50 - Heater Wiring and Covers

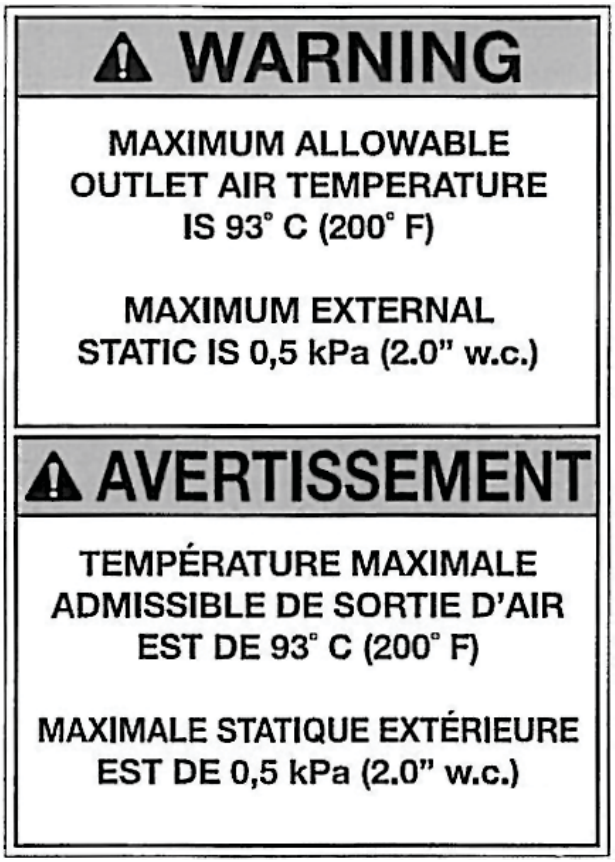


Fig. 51 - Max. Air Temp/Max. Ext. Static

UNIT POWER SUPPLY WIRING – ALL UNITS

NOTE: Installers of unit power supply wiring connecting to these air conditioning and heat pump units must be familiar with applicable requirements of the National Electrical Code (NFPA Standard 70), Articles 440, 430 and 424 dealing with multiple load systems incorporating refrigeration compressors, motors, and electric heating equipment. Installers must be familiar with and observe all local codes regarding unit power supply wiring.

In most instances, adding electric heaters to these units will result in an increase in unit power supply wire size compared to base unit electrical loads. These changes may also impact the size selection of the branch circuit overload protection device and the unit safety disconnect switch. Check the unit's informative data label for minimum wiring sizing ampacity for full combined load (including power exhaust if also installed) for branch circuit protection size (a maximum value) and for unit minimum disconnect switch size.

Table 21 – Infoplate Designation

Device	Infoplate Designation
Power Supply Wire	MIN CKT AMPS
Branch Circuit Protection	FUSE OR HACR BREAKER
Disconnect Switch	MINIMUM UNIT DISCONNECT

All wiring that terminates at a unit-mounted terminal must be selected from wiring materials under the NEC Table 310.15(B)(16), 75 C (or higher) column only. Check specifications for external disconnect lug sizes to determine if 60 C wiring materials may be used between branch circuit origin and the disconnect switch.

There are four different situations that an installer can encounter with these units. Three are for new unit installations (base unit has not been connected to a power supply), unit without factory disconnect switch, unit with factory disconnect switch, and unit with factory HACR breaker. The fourth situation is for an existing unit that is already connected to a power supply and the heaters are being retrofitted. For each situation, there is usually one of the following conditions: (1) without single point box, with single point box

Each situation is discussed below.

New Unit Installation Without Factory Disconnect or HACR

Unit power supply wires from the external (field-supplied) disconnect switch are connected to the base unit's power connection terminal lugs. Refer to unit wiring label to identify these terminals (these may be lugs on contactors or at power terminal block). The heater power wires are also connected at these terminals.

Installation WITH Single Point Box

Remove knockouts for appropriate size conduit from unit block-off panel and single point box. Install conduit (rigid or electrometallic tubing) through conduit drip boot as shown (See Fig. 45).

Drip boot will accept conduit sizes 3/4-in. to 1-1/2 inches. The drip boot eliminates the need for watertight conduit fittings at the single point box.

Unit power supply wires from the external (field-supplied) disconnect switch are connected to power lugs on field connection device provided in Single Point Box. This device may be a terminal block or fuse block FU2's line side terminals. The heater power wires are connected to the load side terminals on the same device.

Existing Unit

An existing unit will usually have been installed following values marked on the base unit's informative data plate for wire sizing, branch circuit over-current protection and disconnect switch rating. When electric heaters are added to air conditioning (cooling) units, these values may be changed. When electric heaters are added to heat pump units, one or more of these values will be changed.

Check the installed unit's field power wires for conductor size, and determine conductor rated ampacity per NEC Table 310.15(B)(16). Compare this value to the MIN CKT AMPS value on the unit infoplate for base unit plus electric heaters (plus power exhaust if connected). If the MIN CKT AMPS value is greater than the rated ampacity of the power supply wires, the unit power supply conductors must be replaced.

NOTE: Supply wiring must comply with NEC (National Electrical Code) and all local requirements.

Check the installed unit's branch circuit over-current protection device (fuse or HACR breaker) for rating in amps. Compare this value to the FUSE OR HACR BREAKER value on the unit infoplate for base unit plus electric heaters (plus power exhaust if connected). If the FUSE OR HACR BREAKER value is greater than the rated ampacity of the installed device, the unit branch circuit over-current protection device must be replaced. Check the installed unit's disconnect switch for rating in amps. Compare this value to MINIMUM UNIT DISCONNECT value on the unit infoplate for base unit plus electric heaters (plus power exhaust if connected). If the MINIMUM UNIT DISCONNECT value is greater than the rated ampacity of the installed disconnect switch, the unit disconnect switch must be replaced.

To complete the unit power wiring at the Single Point Box or base unit terminals, follow the appropriate directions under "New Unit" discussions above.

Complete Unit Installation

1. Mark the appropriate block on the unit nameplate for the accessory heater kW installed. Note the required MIN CKT AMPS value for this unit-heater combination. Ensure the field power conductors are sized to handle this ampacity.
2. Locate heater covers. For all heaters. The heater cover is the plate removed from heater mounting bracket.
3. Place adhesive-backed wiring label on flanged side of heater cover.
4. Fasten heater cover to heater module with 2 screws provided with heater. Flanges of cover must face out. (See Fig 50).
5. Close single point box cover and secure with one screw.
6. Replace control box cover, using remainder of screws saved from Step 4 of Installing Single Point Box section.
7. Run conduit through (rigid or EMT) the conduit drip boot in the rain shield bracket to the single point box. Provide an appropriate fitting to connect the conduit to the single point box wall and ground appropriately. Drip boot eliminates the need for watertight conduit fittings at the single point box.
8. Run wire through conduit connecting outside power to the designated terminals at the top of the single point box. Ground appropriately.
9. Replace indoor and outdoor panels with screws saved from Step 2 of Disconnect Field Supply section and Step 3 of Install Single Point Box section. Place adhesive-backed Max. Air/Max. Static label on external panel covering heaters (See Fig. 37 and 38).
10. If all other work on the unit is done, reapply unit power per lock-out/tag-out procedures.

FS BOX INSTALLATION INSTRUCTIONS

Table 22 – FS Box Compatibility with 208/230V Rooftop Units

Rooftop Model Number	40QQ- 036AAA3-0A0	40QQ- 048AAA3-0A0	40QQ- 060AAA3-0A0
FX Box Part Number	RBM- Y0383FUL	RBM- Y0613FUL	RBM- Y0613FUL

Table 23 – FS Box Compatibility with 460V Rooftop Units

Rooftop Model Number	40QQ- 036AAAC-0A0	40QQ- 048AAAC-0A0	40QQ- 060AAAC-0A0
FX Box Part Number	RBM- Y0383FUL	RBM- Y0613FUL	RBM- Y0613FUL

1. Remove the three panels necessary as shown in Figs. 52 and 53.

Fig. 52 - 40QQ Rooftop Unit

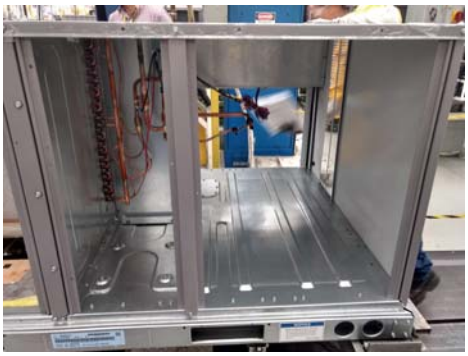


Fig. 53 - 40QQ Rooftop Unit with Panels Removed

2. Hang the FS box from the top cover bracket using the threaded rods. The threaded rods are shown in Fig. 54. Nuts and washers are included in the installation packet bag, which is found in the control box of the unit. Fig. 54 shows the mounted FS box.

Fig. 54 - FS Unit Mounted to Threaded Rods

3. If required, braze the appropriate adapter fittings onto both sides of the FS box as shown in Fig. 55. The adapter fittings are included with the FS box. Reference the FS box installation manual for sizing. Then braze the liquid and suctions lines on the rooftop unit onto the FS box adapter fittings while purging with nitrogen.

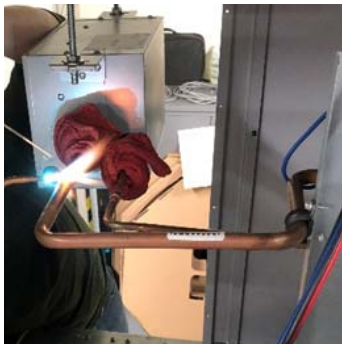


Fig. 55 - Braze Adapter Fittings

4. Knock out the three holes shown in Fig. 56 on the square panel of the rooftop unit. Braze in the three field installed line sets running from the FS box to the outdoor unit. Be sure to put the three field-installed line sets through the three holes in the square panel prior to brazing.

Fig. 56 - Knockouts and Line Sets

5. Remove the side panel of the FS box control board. A control wire harness will be included with the FS box (See Fig 57).

Fig. 57 - FS Box with Panel Removed

6. Connect the green connector of the control wire to CN02 on the FS box control board. Apply the plastic strain relief mounted to the FS box. See Fig. 58.

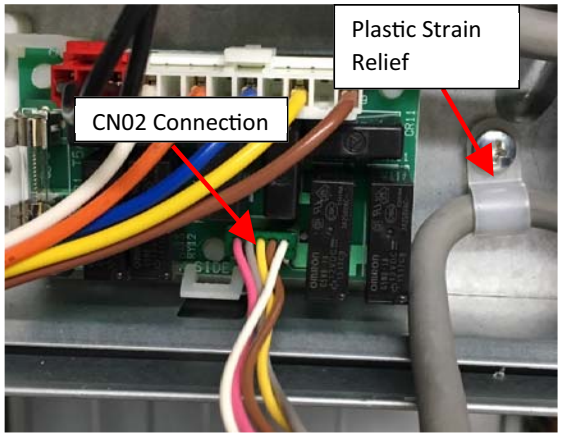


Fig. 58 - CN02 Connector and Plastic Strain Relief

7. On the other end, connect the black connector to CN81 on the rooftop unit control board and push the ferrite core through the rubber bushing to provide strain relief. Then bundle and tie the extra wire.

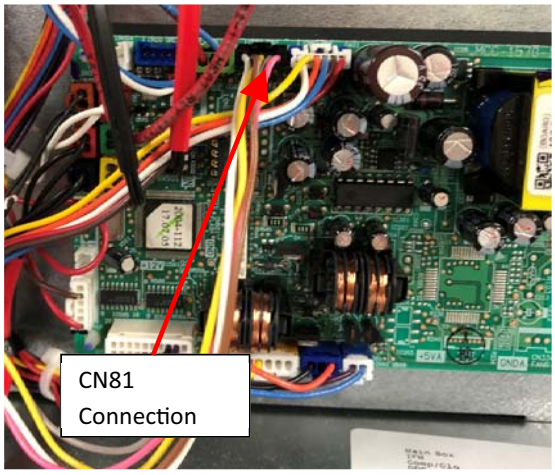


Fig. 59 - CN81 Connector

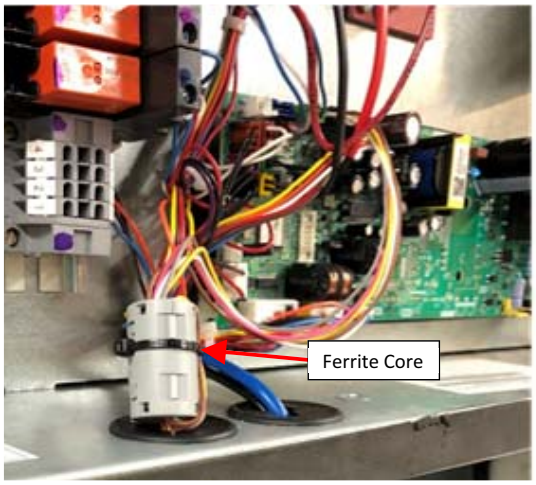


Fig. 60 - Ferrite Core

8. Knock out the hole on the back of the FS box and install a Romex connector (field-supplied) in the hole as shown in Fig. 61. A power wire will be included with the FS box.

Fig. 61 - Romex Connector

9. Connect the red connector on the power wire to CN01 on the FS box control board and use the Romex connector as strain relief as shown in Fig. 62.

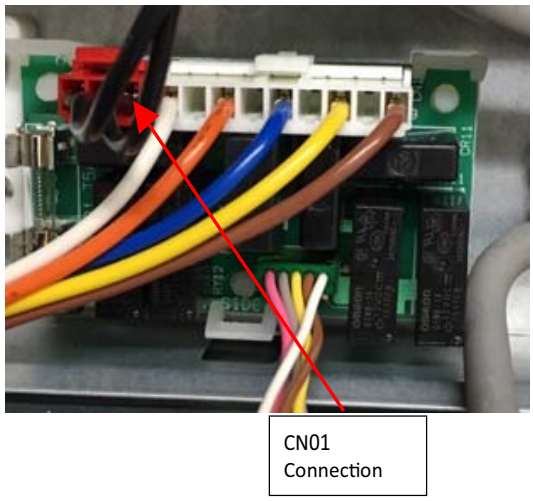


Fig. 62 - CN01 Connection

10. Route the power wire through the rubber grommet on the bottom of the control box. Then bundle and tie the extra wire as shown in Figs. 63 and 64.

Fig. 63 - Route Wire Through Bottom of Control Box

11. For 460V rooftop units, use the two L1 and L2 adapter harnesses included with the rooftop unit (located in the bag in the control box) to connect to the secondary side of the 460V to 208/230V transformer (TRAN2). See Figs. 64 and 65

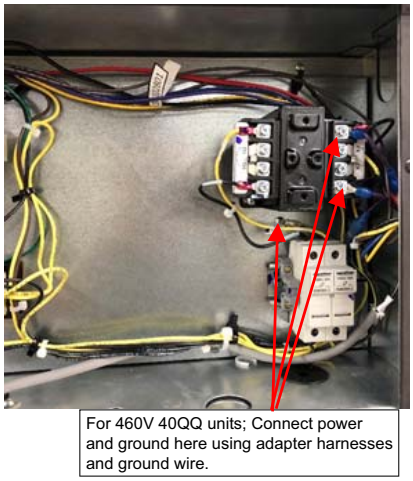


Fig. 64 - FS Box Power and Ground Connections for 460V 40QQ Units

Fig. 65 - L1 and L2 Adapter for 460V Units

12. For 208/230V rooftop units, connect directly to the Main power terminal block (TB1) in the rooftop control box shown. See Fig. 66.

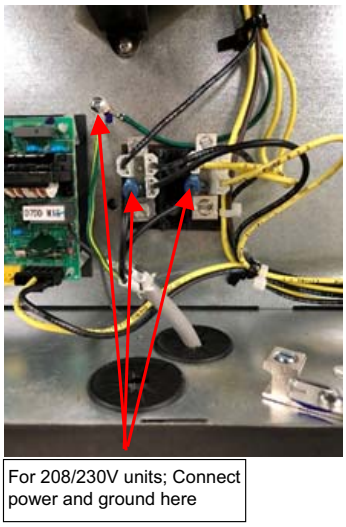


Fig. 66 - FS Box Power and Ground Connections for 208/230V 40QQ Units

13. Replace all panels and seal the three holes for the field installed line sets using insulation.

CONNECTOR SPECIFICATIONS OF P.C. BOARD MCC-1570

Table 24 – Connector Specifications of P.C. Board MCC-1570

Function	Connector	Pin	Function	Remarks
Output signal of Fan speed, Electric Heater, Cooling Stage1, Cooling Stage2	CN510 (WHI)	1	COM (DC12V)	Connected to MCC-1431/CN02PIN1
		2	(no function)	
		3	Fan speed “Low” output	Connected to MCC-1431/CN02PIN3
		4	Cooling Stage1	Connected to Cooling Stage1 relay
		5	Fan speed “Medium” output	Connected to MCC-1431/CN02PIN5
		6	Cooling Stage2	Connected to Cooling Stage2 relay
		7	Fan speed“High” output	Connected to MCC-1431/CN02PIN7
		8	(no function)	
		9	Electrical heater output	Connected to MCC-1431/CN02PIN9
		10-20	(No function)	
External error input	CN80 (GRN)	1	COM (DC12V)	Error input from outside (EconoMi$er or others). Only if this condition continue more than 1 minute. Connected to Alarm relay or other equipments.
		2	(no function)	
		3	External error input	
Thermo OFF input (Free cooling mode input)	CN73 (RED)	1	Demand input	Forced thermo-off input. Connected to Thermo OFF relay.
		2	0V (COM)	
HA	CN61 (YEL)	1	ON/OFF input	Start/Stop input
		2	0V (COM) for pin 1, 3	
		3	Remote control disabling input	Enables/Disables start/stop control via remote control
		4	Operation ON output	ON signal output during Remote controller ON
		5	DC12V (COM) for pin 4, 6	
		6	Alarm output	ON signal output during alarm ON
Optional output	CN60 (WHI)	1	DC12V (COM)	
		2	Defrosting output	ON while outdoor unit defrosted
		3	Thermostat ON output	ON while real thermostat ON
		4	Cooling output / auxiliary heating output	SW501 bit1/2=ON/OFF or OFF/ON set, ON while air conditioner in cooling or related operation (COOL, DRY, or cooling under AUTO mode)
				SW501 bit1/2=OFF/OFF or ON/ON and DN[DC] set as 0001 to 0010, this output become “auxiliary heating” output.
		5	Heating output	Cooling : Open, Heating : Close. Connected to Heating outpu relay.
		6	Fan output	ON while fan ON
Fan output	CN32 (WHI)	1	DC12V (COM)	Factory default setting : ON when indoor unit in operation and OFF when indoor unit at rest. *Fan can be operated on its own by pressing FAN button on remote control (DN31)
		2	Fan Output	
Float switch input	CN34 (RED)	1	COM (DC12V)	Error code P10, Normal close. (Short pin is connected as default)
		2		
		3	External safety contact	
Option error input	CN70 (WHI)	1	Option	Option error input
		2	0V (COM)	
CHK Operation check	CN71 (WHI)	1	Check mode input	Used for indoor operation check (prescribed operational status output, such as indoor fan “H”, to be generated without communication with outdoor unit or remote controller).
		2	0V (COM)	
DISP Display mode	CN72 (WHI)	1	Display mode input	Product display mode –Communication just between indoor unit and remote control becomes available (upon turning on of power) Timer short-circuited out (always)
		2	0V (COM)	

ADVANCED CONTROL

REQUIREMENT

NOTES:

- Powering on the unit and interface for the first time, it takes time for the remote control to recognize the operation input. This is not a malfunction.
- For details on the auto address setting of air conditioners when operating together with VRF system (adjust the auto address setting on the circuit board of the outdoor interface).
- Turn on the indoor unit first. Refer to the installation manual of the air conditioner about its power supply.
- When shipped from the factory, all of the setting are set to [Factory default]. Change the setting using the main remote control (wired remote control).
- The settings cannot be changed using the wireless remote control, the sub remote control, or a system without a remote control (system with only the central remote control). Therefore, prepare the main remote control and install.

Functional setting by DN code

Changing of settings for applicable controls (DN code setting)

Basic procedure for changing settings

Change the settings while the air conditioner is not working.

(Be sure to stop the air conditioner before making settings).

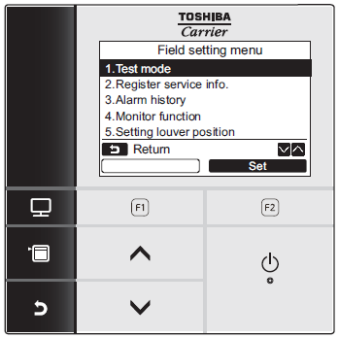


Fig. 67 - Field Settings Menu

Procedure 1

1. Push the [**MENU**] button.
2. Push the [**MENU**] / [ ] button simultaneously for more than 4 seconds.
3. Push the [ ] / [ ] button to select "7. DN setting" on the "Field setting menu" screen.
4. Then push the [F2 **F2**] button.
5. Move the cursor to select "DN code" with the "<" [F1] button.
6. Set "DN code" with the [ ] / [ ] button.
7. Move the cursor to select "data" with the [F2 **F2**] button, then set "data" with the [ ] / [ ] button.

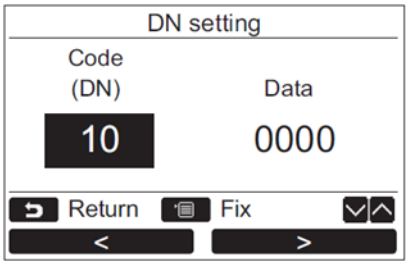


Fig. 68 - DN Setting

Procedure 2

Refer to this installation manual for details about the DN code and data.

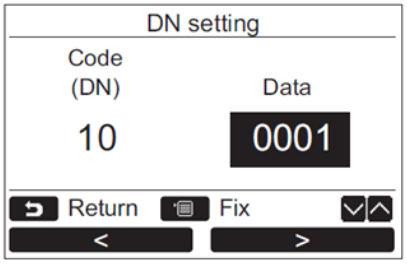


Fig. 69 - DN Code and Data

Procedure 3

1. Push the [**MENU**] button to set the other DN codes.
2. After "Continue?" is displayed on the screen, push the "Yes" [F1 **F1**] button.

Procedure 4

1. Push the "No" [F2 **F2**] button to finish the setting operation.
2. "⧖" appears on the screen for a while.
3. Then the screen returns to the "Field setting menu" screen.

FUNCTION CODE (DN CODE) SETTING

Table 25 – DN Code Setting

DN Code	Items	Description	At Shipment
1	Filter display delay timer	0000 : None 0001 : 150H 0002 : 2500H 0003 : 5000H 0004 : 10000H	0000 : None
2	Dirty state of filter	0000 : Standard 0001 : High degree of dirt (Half of standard time)	0000 : Standard
3	Central control address	0001 : No.1 unit to 0064 : No.64 unit, 0099 : Unfixed	0099 : Unfixed
4	Specific indoor unit priority	0000 : No priority 0001 : Priority	0000 : No priority
5	Constant fan	0001 : L tap during heating thermo- off 0012 : Fan tap by remote control set during heating thermo- off	0001 : L tap
6	Heating temp. shift	0000 : No shift 0001 : +1°C (+1.8°F) 0002 : +2°C (+3.6°F) to 0010 : +10°C (+18°F) (Up to +6 recommended)	0002 : +2°C (+3.6°F)
0D	Existence of [AUTO] mode	0000 : Provided 0001 : not provided (Automatic selection from connected outdoor unit	0001 : Not provided
0E	FS unit connection set of multiple indoor units	0000 : Standard (1 FS unit : 1 indoor unit) 0001 : Multiple unis connected (1 FS unit : Multiple indoor units)	0000 : Standard
0F	Cooling only	0000 : heat pump 0001 : Cooling only (no display of [AUTO] [HEAT])	0000 : Heat pump
10	Model code	0029 : Vertical air handling unit	29
12	Line (System) address	0001: No.1 unit to 0030: No.30 unit	0099 : Unfixed
13	Indoor address	0001 : No.1 unit to 0064 : No.64 unit	0099 : Unfixed
14	Group address	0000 : Individual 0001 : Header unit of group 0002 : Follower unit of group	0099 : Unfixed
28	Automatic restart of power failure	0000 : None 0001 : Restart	0001 : Restart
2E	HA terminal (CN61) select	0000 : Usual 0001: Leaving- ON prevention control 0002 : Fire alarm input	0000 : Usual (HA terminal)
31	Ventilation fan control	0000 : Unavailable 0001 : Available	0000 : Unavailable
32	Remote control sensor	0000 : Body TA sensor 0001 : Remote control sensor	0000 : Body TA sensor
33	Temperature unit select	0000 : °C, 0001 : °F	0001 : °F
5A	EconoMi$er Free cooling mode	0000 : Unavailable 0001 : Available	0000 : Unavailable
60	Timer setting (wired remote controller)	0000 : Available (Can be performed) 0001 : Unavailable (Cannot be performed)	0000 : Available
77	Dual set point	0000 : Unavailable 0002 : Available	0000 : Unavailable
C5	Change of secondary heating mode	0000 : VRF primary (Secondary heat) 0001 : VRF secondary (Flip secondary heat)	0000 : VRF primary
C6	Outside temperature TO sensor control value in secondary heating mode (TSO- H)	0000 : 32°F (0°C) - 0015 : 5°F to 0015 : 59°F	0000 : 32°F (0°C)
C7	Activation of outside temperature TO sensor judgment in secondary heating mode (ΔTOH- L)	0000 : Unavailable (Heater output appears at any outside air temperature) 0001 : Δ1.8°F(Available) to 0010 : Δ18°F (Available)	0000 : Unavailable
DB	Differential value of output ON/ OFF(ΔAH- L)	0006 : Δ5.4 °F 0000 : 0 °F to 0010 : Δ9 °F	0006 : Δ5.4°F
DC	Activation of secondary heating control (ΔAS- H)	0000 : Unavailable 0001 : 0.9 °F (Available) to 0010 : 9 °F (Available)	0000 : Unavailable
FD	Priority operation mode (Flow selector unit)	0000 : Heating 0001 : Cooling	0000 : Heating
92	Alarm clearance condition	0000 : Operation stop 0001 : Release signal received	0000 : Operation stop
9B	Setting of “prevention of cold air discharge” control	0000 : Prevention control of cold air discharge “enable” 0001 : Prevention control of cold air discharge without “Fan off” zone 0002 : Work in remote control setting fan speed. (prevention control of cold air discharge “disable”)	0000 : Enable

ELECTRIC HEATER CONTROL SETTING

The following is a start guide for electric heater control.

Follow these step-by-step procedures after installed electrical heater.

STEP1: Change of SW501 (Required setting activation for Electric heater control)

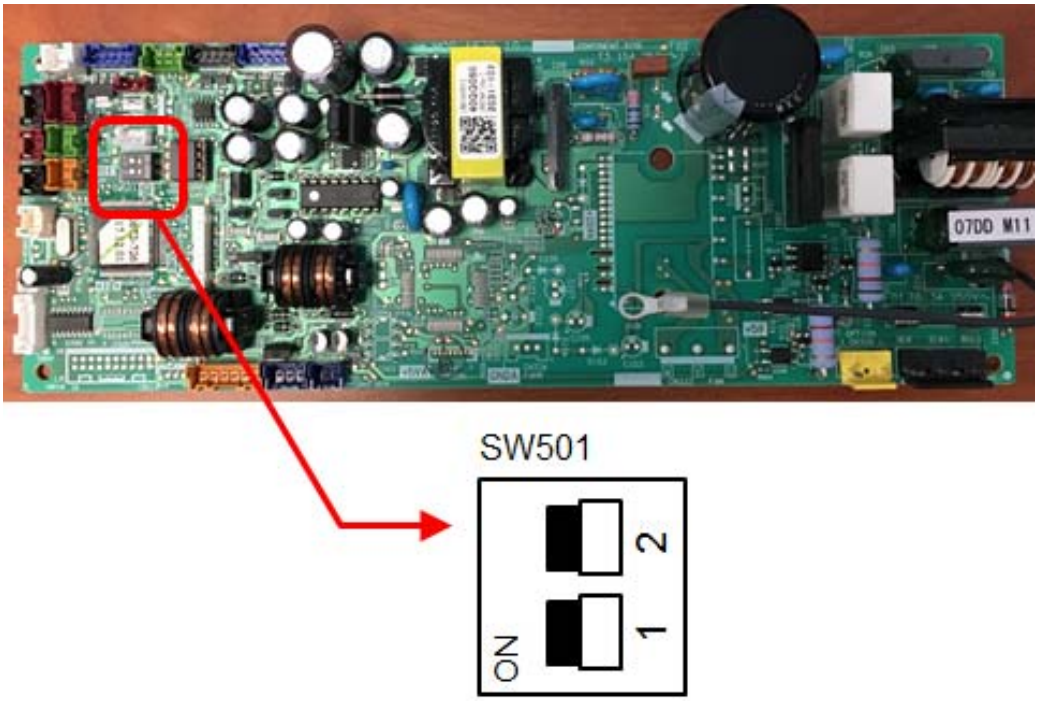


Fig. 70 - SW501

Table 26 – SW501 Settings

SW501_1	SW501_2	Comments
OFF	OFF	Factory Setting
ON	OFF	Activate EHeater

STEP2: Change of DN code setting (Required setting activation for Electric heater control)

Table 27 – DN Code Settings

Set data of DN (DC)	Comments
0000	Factory Setting
0001 or more	Activate EHeater

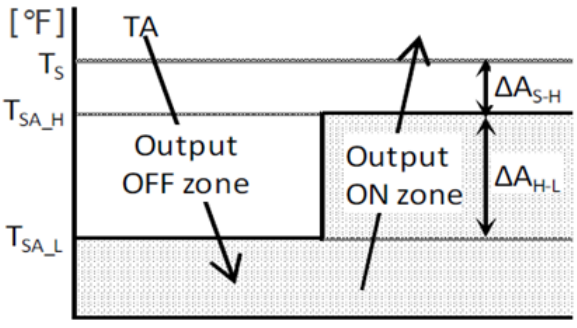


Fig. 71 - Control Outline (TA)

*DN(DC) determines the value of ΔAS-H.

Set Data	0000	0001	0002	0003	0004	0005
ΔAS-H (°F)	0.0	0.9	1.8	2.7	3.6	4.5

Set Data	0006	0007	0008	0009	0010
ΔAS-H (°F)	5.4	6.3	7.2	8.1	9.0

TA : Temperature of room sensor

Ts : Temperature set point on Remote controller

TSA_H : Temperature set air high (= TS-ΔAS-H)

TSA_L : Temperature set air low (= TSA_H-ΔAH-L)

STEP3: Advance setting for electric heater control (Optional setting)

NOTE: STEP 3 is optional and should be set if necessary.

Item1:Change of ΔAH-L value by DN (DB)

It is possible to change the following DN setting as an optional function.

Set Data of DN (DB)	Comments
0006	Active (Factory setting: 5.4°F)

DN(DB) determines the value of ΔAH-L.

Set Data	0000	0001	0002	0003	0004	0005	0006	0007	0008	0009	0010
ΔAH-L (°F)	0.0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0
							Factory Setting				

TEST RUN

Preparation

Before turning on the power supply, carry out the following procedure.

1. Using 500V- Megger, check the resistance between the terminal block of the power supply and the earth (grounding). The resistance must by 1Mohm or more.
2. If resistance of less than 1Mohm is detected, do not run the unit.

- When a test run is performed together with air conditioners, follow the installation manuals of the air conditioners.
- Never press the electromagnetic contactor to forcibly perform the test run because the protective device does not work.

Before starting a test run, be sure to set addresses per the installation manual supplied with the outdoor unit.

Performing the test mode

1. Push the [MENU] button to display the menu screen.
2. Push and hold the [MENU] button and the button at the same tine to display the “Field setting menu.”

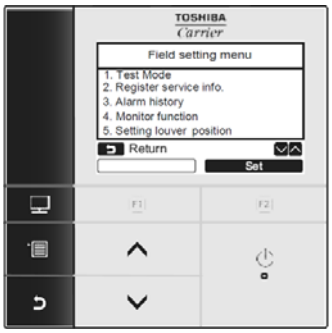


Fig. 72 - Field Setting Menu

3. Push and hold the buttons for more than 4 seconds.
4. Select “1 Test mode” on the “Field setting menu” screen, then push the “Set” [F2 F2] button.

Pushing the “Yes” [F1 F1] button sets the test mode and the screen returns to the “Field setting menu” screen.

5. Push [CANCEL] twice, the following screen displays.

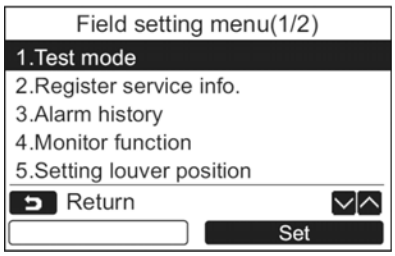


Fig. 73 - Field Setting Menu (Test Mode)

6. Push the [ON/OFF] button to start the test mode. The following screen displays.

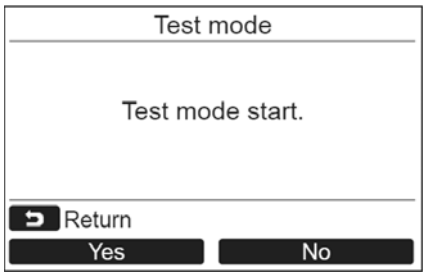


Fig. 74 - Test Mode

7. The following screen displays when the operation is stops. Perform test mode in “Cool” or “Heat” mode.

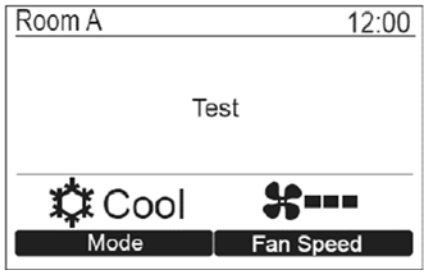


Fig. 75 - Perform Test in Cool or Heat Mode

8. When test mode is finished, push the [ ] [ ] button to select “1. Test mode” on the “Field setting menu” screen, then push the “Set” [F2 F2] button. The screen (3) appears. Pushing the “Yes” [F1 F1] button stops the test mode screen and continues the normal operation.

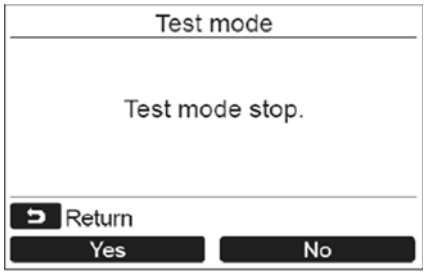


Fig. 76 - Stop Test Mode

Alternatively (using a wired remote controller), a forced test run can be executed in the procedure above mentioned even if the operation stops by thermo- OFF. In order to prevent a serial operation, the forced test run is released after 60 minutes have passed and returns to the usual operation.

⚠ CAUTION

Do not use the forced test run for cases other than the test run because it applies excessive load to the devices

TROUBLESHOOTING

Confirmation and Check

When a malfunction occurs, refer to the check code on the remote controller.

NOTE: The check code only appears during operation while the unit is running.

Push the [MONITOR] button or [CANCEL] button to display the check information screen.

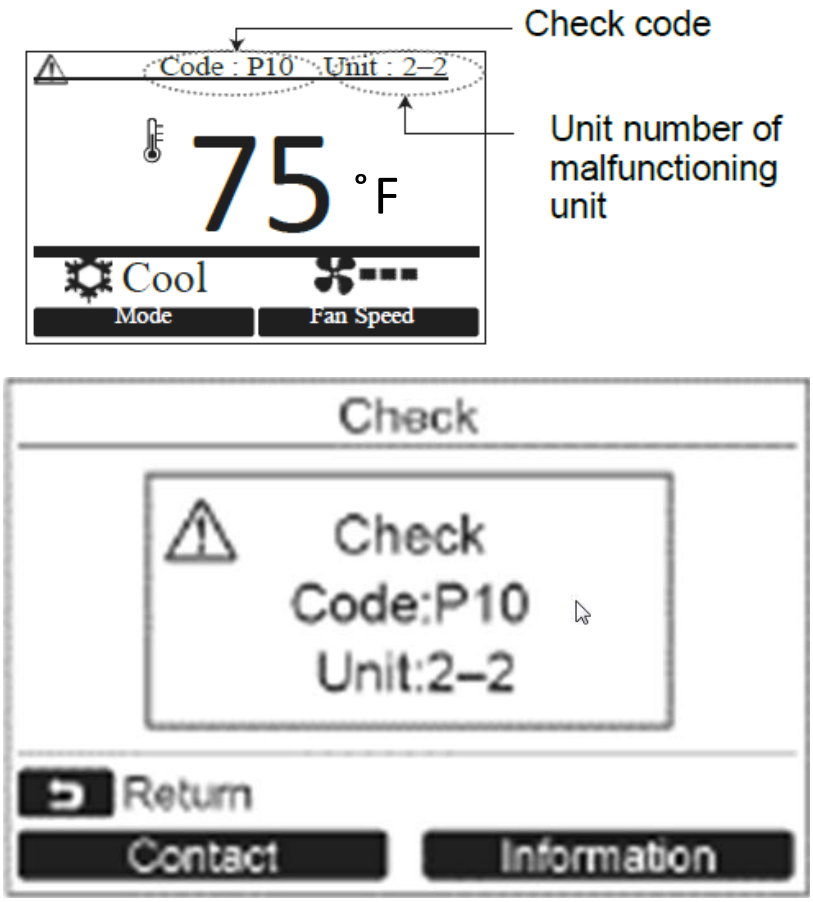


Fig. 77 - Check Information Screen

CHECK CODES AND PARTS TO BE CHECKED

Check Method

On the remote control (Wired remote control, Central control remote control) and the interface P.C. board of the outdoor unit (I/F), a check display LCD (Remote control) or 7-segment display (on the outdoor interface P.C. board) to display the operation is provided. Therefore, the operation status can be known. With this self-diagnosis function, a trouble or position with error of the unit can be found as shown in the table below.

Check Code List

The following list shows each check code. Find the check contents from the list according to part to be checked.

- To check from indoor remote control: See "Wired remote control display" in the list.
- To check from outdoor unit: See "Outdoor 7-segment display" in the list.
- To check from indoor unit with a wireless remote control: See "Sensor block display of receiving unit" in the list.

Legend

IPDU : Intelligent Power Drive Unit

Lighting Flashing Goes Off

ALT : Flashing is alternately when there are two flashing LED.

SIM : Simultaneous flashing when there are two flashing LED.

Check code			Wireless remote control				Check code name	Judging device
Wired remote control display	Outdoor 7-segment display		Sensor block display of receiving unit					
		Auxiliary code	Operation	Timer	Ready	Flash		
E01	—	—	¤	●	●		Communication trouble between indoor and remote control (Detected at remote control side)	Remote control
E02	—	—	¤	●	●		Remote control transmission trouble	Remote control
E03	—	—	¤	●	●		Communication trouble between indoor and remote control (Detected at indoor side)	Indoor
E04	—	—	●	●	¤		Communication circuit trouble between indoor / outdoor (Detected at indoor side)	Indoor
E06	E06	No. of indoor units in which sensor has been normally received	●	●	¤		Decrease of No. of indoor units	I/F
—	E07	—	●	●	¤		Communication circuit trouble between indoor / outdoor (Detected at outdoor side)	I/F
E08	E08	Duplicated indoor addresses	¤	●	●		Duplicated indoor addresses	Indoor / I/F
E09	—	—	¤	●	●		Duplicated header remote controls	Remote control
E10	—	—	¤	●	●		Communication trouble between indoor MCU	Indoor
E12	E12	01: Indoor / Outdoor communication 02: Communication between outdoor units	¤	●	●		Automatic address start trouble	I/F
E15	E15	—	●	●	¤		Indoor is nothing during automatic addressing	I/F
E16	E16	00: Capacity over 01 ~:No. of connected units	●	●	¤		Capacity over / No. of connected indoor units Combined capacity of indoor units exceeds 120% of combined capacity of outdoor units. (SMMS-i only)	I/F
E18	—	—	¤	●	●		Communication trouble between indoor units	Indoor
E19	E19	00: Header is nothing 02: Two or more header units	●	●	¤		Outdoor header units quantity trouble	I/F
E20	E20	01: Outdoor of other line connected 02: Indoor of other line connected	●	●	¤		Other line connected during automatic address	I/F
E23	E23	—	●	●	¤		Sending trouble in communication between outdoor units	I/F
E25	E25	—	●	●	¤		Duplicated follower outdoor addresses	I/F
E26	E26	No. of outdoor units which received signal normally	●	●	¤		Decrease of No. of connected outdoor units	I/F
E28	E28	Detected outdoor unit number	●	●	¤		Follower outdoor unit trouble	I/F

Table 28 – Check Code 1

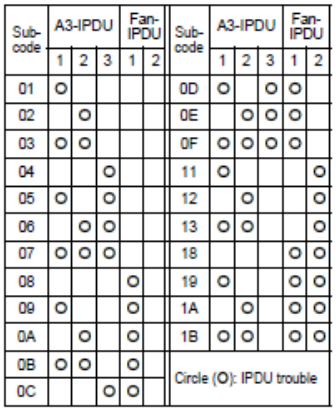
Check code			Wireless remote control				Check code name	Judging device
Wired remote control display	Outdoor 7-segment display		Sensor block display of receiving unit					
		Auxiliary code	Operation	Timer	Ready	Flash		
E31	E31		●	●	☼		IPDU communication trouble	I/F
F01	—	—	☼	☼	●	ALT	Indoor TCJ sensor trouble	Indoor
F02	—	—	☼	☼	●	ALT	Indoor TC2 sensor trouble	Indoor
F03	—	—	☼	☼	●	ALT	Indoor TC1 sensor trouble	Indoor
F04	F04	—	☼	☼	○	ALT	TD1 sensor trouble	I/F
F05	F05	—	☼	☼	○	ALT	TD2 sensor trouble	I/F
F06	F06	TE1 sensor TE2 sensor	☼	☼	○	ALT	TE1 sensor trouble TE2 sensor trouble	I/F
F07	F07	—	☼	☼	○	ALT	TL sensor trouble	I/F
F08	F08	—	☼	☼	○	ALT	TO sensor trouble	I/F
F09	F09	01: TG1 02: TG2					TG1 sensor trouble TG2 sensor trouble	I/F
F10	—	—	☼	☼	●	ALT	Indoor TA sensor trouble	Indoor
F11	—	TF sensor	☼	☼	●	ALT	TF sensor trouble	Indoor
F12	F12	01: TS1 sensor 03: TS3 sensor	☼	☼	○	ALT	TS1 sensor trouble, TS3 sensor trouble	I/F
F13	F13	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	☼	☼	○	ALT	TH sensor trouble	IPDU
F15	F15	—	☼	☼	○	ALT	Outdoor temp. sensor miswiring (TE1, TL)	I/F
F16	F16	—	☼	☼	○	ALT	Outdoor pressure sensor miswiring (Pd, Ps)	I/F
F22	F22	—	☼	☼	○	ALT	TD3 trouble	I/F
F23	F23	—	☼	☼	○	ALT	Ps sensor trouble	I/F
F24	F24	—	☼	☼	○	ALT	Pd sensor trouble	I/F
F29	—	—	☼	☼	●	SIM	Indoor other trouble	Indoor
F31	F31	—	☼	☼	○	SIM	Indoor EEPROM trouble	I/F
H01	H01	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	●	☼	●		Compressor break down	IPDU
H02	H02	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	●	☼	●		Compressor trouble (lock)	IPDU
H03	H03	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	●	☼	●		Current detect circuit system trouble	IPDU
H05	H05	—	●	☼	●		TD1 miswiring	I/F
H06	H06	—	●	☼	●		Low pressure protective operation	I/F
H07	H07	—	●	☼	●		Oil level down detective protection	I/F

Table 29 – Check Code 2

Check code			Wireless remote control				Check code name	Judging device
Wired remote control display	Outdoor 7-segment display		Sensor block display of receiving unit					
		Auxiliary code	Operation	Timer	Ready	Flash		
H08	H08	01: TK1 sensor trouble 02: TK2 sensor trouble 03: TK3 sensor trouble 04: TK4 sensor trouble 05: TK5 sensor trouble	●	☼	●		Oil level detective temp sensor trouble	I/F
H15	H15	—	●	☼	●		TD2 miswiring	I/F
H16	H16	01: TK1 oil circuit system trouble 02: TK2 oil circuit system trouble 03: TK3 oil circuit system trouble 04: TK4 oil circuit system trouble 05: TK5 oil circuit system trouble	●	☼	●		Oil level detective circuit trouble	I/F
H25	H25	—	●	☼	●		TD3 miswiring	I/F
L03	—	—	☼	●	☼	SIM	Indoor center unit duplicated	Indoor
L04	L04	—	☼	○	☼	SIM	Outdoor line address duplicated	I/F
L05	—	—	☼	●	☼	SIM	Duplicated indoor units with priority (Displayed in indoor unit with priority)	I/F
L06	L06	No. of indoor units with priority	☼	●	☼	SIM	Duplicated indoor units with priority (Displayed in unit other than indoor unit with priority)	I/F
L07	—	—	☼	●	☼	SIM	Group line in individual indoor unit	Indoor
L08	L08	—	☼	●	☼	SIM	Indoor group / Address unset	Indoor, I/F
L09	—	—	☼	●	☼	SIM	Indoor capacity unset	Indoor
L10	L10	—	☼	○	☼	SIM	Outdoor capacity unset	I/F
L17	L17	—	☼	○	☼	SIM	Outdoor unit model unmatch trouble	I/F
L20	—	—	☼	○	☼	SIM	Duplicated central control addresses	Indoor
L28	L28	—	☼	○	☼	SIM	Over No. of connected outdoor units	I/F
L29	L29	The same as E31	☼	●	☼	SIM	No. of IPDU trouble	I/F
L30	L30	Detected indoor address	☼	○	☼	SIM	Indoor outside interlock	Indoor
—	L31	—		—			Extended I/C trouble	I/F
P01	—	—	●	☼	☼	ALT	Indoor fan motor trouble	Indoor
P03	P03	—	☼	●	☼	ALT	Discharge temp. TD1 trouble	I/F
P04	P04	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	☼	●	☼	ALT	High-pressure SW system operation	IPDU
P05	P05	00: Detected phase loss	☼	●	☼	ALT	Phase loss trouble / interruption of power supply	I/F
		01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side					Inverter DC voltage (Vdc) trouble	
P07	P07	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	☼	●	☼	ALT	Heat sink overheat trouble	IPDU, I/F
P10	P10	Detected indoor address	●	☼	☼	ALT	Indoor overflow trouble	Indoor
P12	—	—	●	☼	☼	ALT	Indoor fan motor trouble or duct setting miss	Indoor
P13	P13	—	●	☼	☼	ALT	Outdoor liquid back detection trouble	I/F
P15	P15	01: TS condition 02: TD condition	☼	●	☼	ALT	Gas leak detection	I/F
P17	P17	—	☼	●	☼	ALT	Discharge temp. TD2 trouble	I/F
P18	P18	—	☼	●	☼	ALT	Discharge temp. TD3 trouble	I/F
P19	P19	Detected outdoor unit number	☼	●	☼	ALT	4-way valve inverse trouble	I/F
P20	P20	—	☼	●	☼	ALT	High-pressure protective operation	I/F
P22	P22	0✱ : IGBT circuit 1✱ : Location detection circuit trouble 3✱ : Motor lock-up trouble 4✱ : Motor current was detected. C✱ : Abnormal temperature was detected by the TH sensor. D✱ : TH sensor trouble E✱ : Inverter DC voltage trouble (outdoor unit fan) Caution) Although letters 0 to F appear at locations indicated by "✱", please ignore them.	☼	●	☼	ALT	Outdoor fan IPDU trouble	IPDU
P26	P26	01: Comp. 1 side 02: Comp. 2 side 03: Comp. 3 side	☼	●	☼	ALT	G-TR short protection trouble	IPDU

Table 30 – Check Code 3

WIRING DIAGRAMS

FAN TAP TABLE

UNIT	1	2	3	4	5
036	BRN	YEL			BLU
048	BRN		YEL		BLU
060	BRN	YEL			BLU

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. 203/230V 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.
3. USE COPPER CONDUCTOR ONLY.
4. REMOVE JUMPER FOR ECONOMIZER.
5. SEE TABLE FOR FAN TAPS BASED ON TONNAGE.
6. ECONOMIZER HARNESS SHIPPED LOOSE IN BAG IN CONTROL BOX.

[LEGEND]
DISC DISCONNECT SWITCH
HTR ELECTRIC HEAT STRIP
LS LIMIT SWITCH
TRAN TRANSFORMER
——— FACTORY WIRING
— — FIELD WIRING
HC HEATER CONTACTOR
——— OPTION WIRING

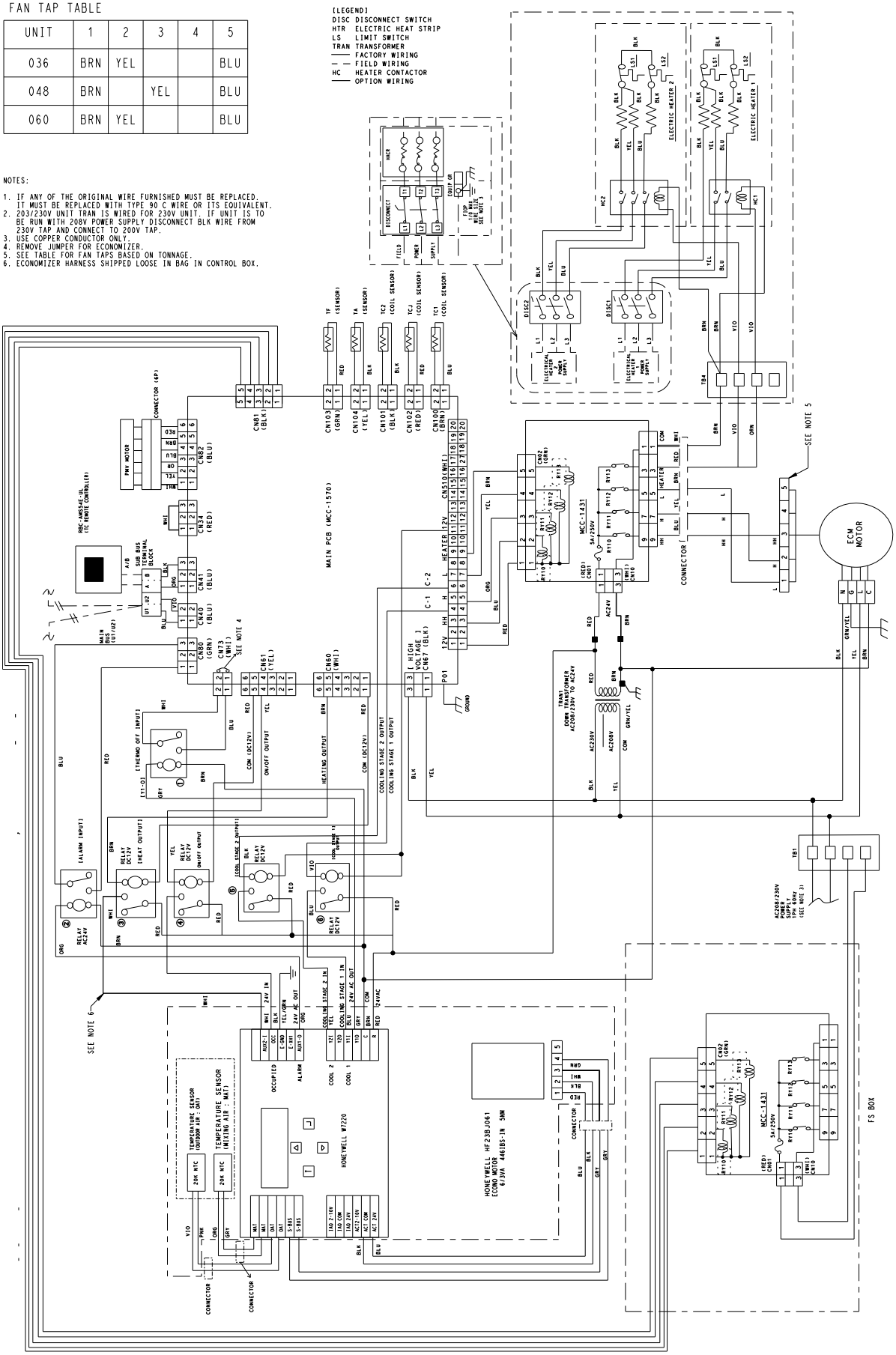


Fig. 78 - 40QQ Power Wiring Diagram, 208/230V, 60Hz

WIRING DIAGRAMS (CONT.)

FAN TAP TABLE

UNIT	1	2	3	4	5
3T	BRN	YEL			BLU
4T	BRN		YEL		BLU
5T	BRN	YEL			BLU

[LEGEND]
DISC DISCONNECT SWITCH
HTR ELECTRIC HEAT STRIP
LS LIMIT SWITCH
TRAN TRANSFORMER
—— FACTORY WIRING
– – FIELD WIRING
HC HEATER CONTACTOR
—— OPTION WIRING

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. 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 208V TAP.
3. USE COPPER CONDUCTOR ONLY.
4. REMOVE JUMPER FOR ECONOMIZER.
5. SEE TABLE FOR FAN TAPS BASED ON TONNAGE.
6. ECONOMIZER HARNESS SHIPPED LOOSE IN BAG IN CONTROL BOX.
7. PIGTAIL SUPPLIED LOOSE IN BAG IN CONTROL BOX.

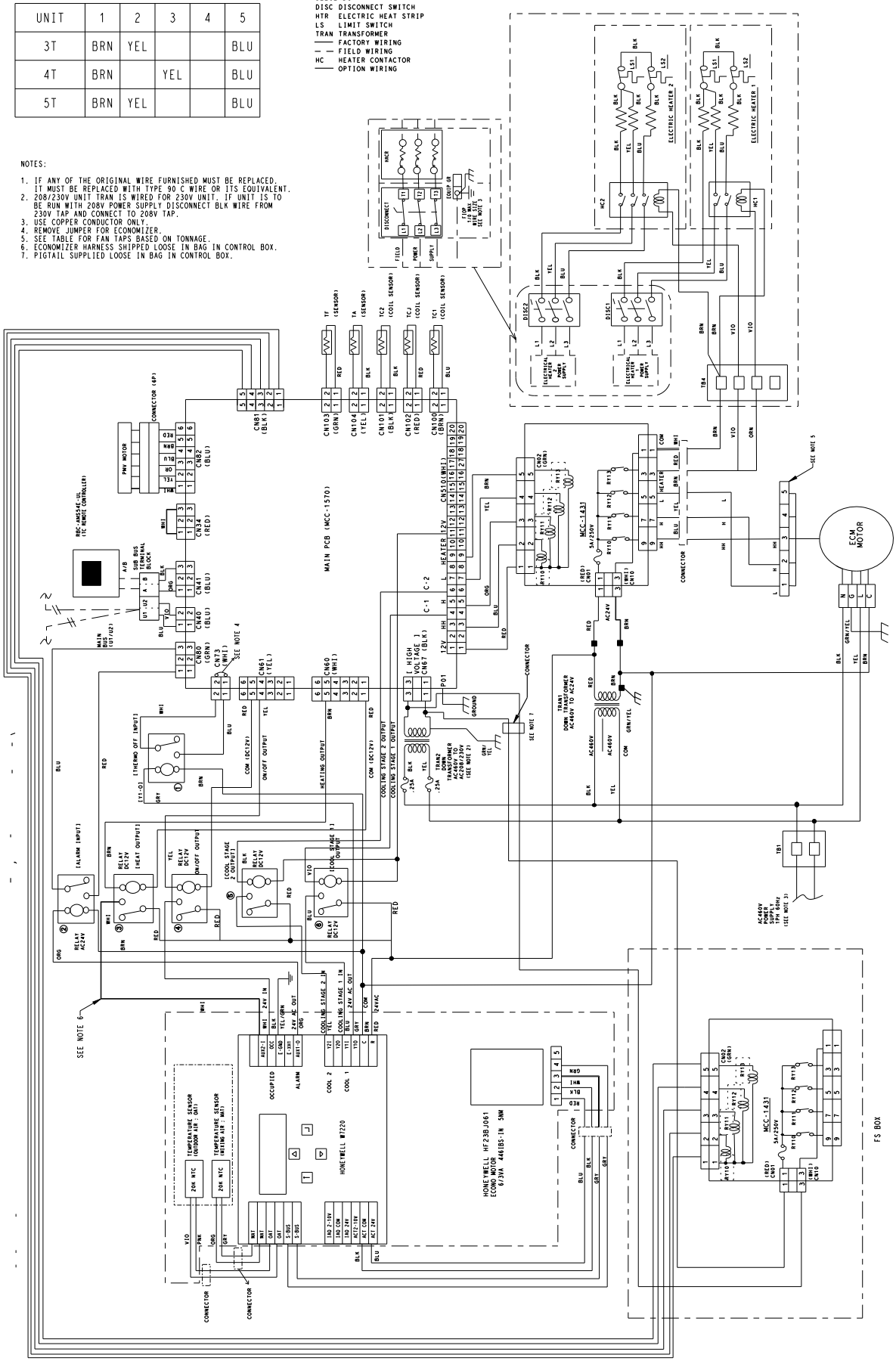


Fig. 79 - 40QQ Power Wiring Diagram, 460V, 60Hz

40QQ VRF ROOFTOP UNIT

STARTUP REPORT

Job Name		City	
Sales Order #		Unit Tag	
Model Number		Serial Number	
Installer		Quantity of Units	

Group	Checklist Item	Yes	No
Electrical / Operational	Does electrical service correspond to unit nameplate?		
	- Nameplate supply voltage/phase: Rated_____Measured		
	- Nameplate rated FLA motor current: Rated_____Measured		
	Does all field wiring conform to unit wiring diagram?		
	Is field- provided freeze protection present (if required)?		
	Is fan wheel turning in the correct direction?		
	Is the filter clean?		
Structural	Is the unit properly supported?		
	Is unit installed level (necessary for proper condensate drainage)?		
	Is properly sized condensate trap present?		
	Is the condensate disposal system operating correctly?		
Piping Checklist	Is the DX system charged per the condensing unit instructions?		
	Is unit piping correct and insulated to prevent condensation?		
	Are the refrigerant pipe lines properly insulated?		
	Are there any leaks detected: interior to unit or at connections?		

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