



WeatherMaster® Hybrid Heat 48QE**12 Single Package Rooftop Heat Pump with Gas Heat 2 and 3 Stage Models with Puron Advance™ (R-454B) Refrigerant and EcoBlue™ Fan Technology

Installation Instructions

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SAFETY CONSIDERATIONS

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

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

Follow all local building codes and appropriate national electrical codes (in USA, ANSI/NFPA 70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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

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

injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ 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.

The following symbols may be seen on the equipment:

SYMBOL	CODE	MEANING
	GHS02: Flammable	Flammable gas
	ISO 7000-0790 (2004-01)	Read operator's manual.
	ISO 7000-1659 (2004-01)	Service indicator: read technical manual.
	ISO 7000-1641 (2004-01)	Operator's manual: operating instructions

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

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

⚠ ADVERTISSEMENT

RISQUE D'INCENDIE OU D'EXPLOSION

Le non-respect de cet avertissement peut entraîner la mort, des blessures graves et/ou des dommages matériels.

Débranchez la tuyauterie de gaz de l'appareil lors d'un essai de pression à une pression supérieure à 0,5 psig (3450 Pa). Une pression supérieure à 0,5 psig endommagera la valve de gaz et créera une situation dangereuse. Si la valve de gaz est soumise à une pression supérieure à 0,5 psig, elle doit être remplacée avant utilisation. Lors d'un essai de pression sur une tuyauterie de gaz fournie sur site à une pression inférieure ou égale à 0,5 psig, l'appareil raccordé à cette tuyauterie doit être isolé en fermant la ou les valves de gaz manuelles.

⚠ DANGER

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ WARNING

RISK OF FIRE OR EXPLOSION

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Leave the building immediately.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

⚠ AVERTISSEMENT

RISQUE D'INCENDIE OU D'EXPLOSION

Si les consignes de sécurité ne sont pas suivies à la lettre, cela peut entraîner la mort, de graves blessures ou des dommages matériels.

Ne pas entreposer ni utiliser d'essence ni autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.

QUE FAIRE SI UNE ODEUR DE GAZ EST DÉTECTÉE

- Ne mettre en marche aucun appareil.
- Ne toucher aucun interrupteur électrique; ne pas utiliser de téléphone dans le bâtiment.
- Quitter le bâtiment immédiatement.
- Appeler immédiatement le fournisseur de gaz en utilisant le téléphone d'un voisin. Suivre les instructions du fournisseur de gaz.
- Si le fournisseur de gaz n'est pas accessible, appeler le service d'incendie.

L'installation et l'entretien doivent être effectués par un installateur ou une entreprise d'entretien qualifié, ou le fournisseur de gaz.

⚠ WARNING

CARBON-MONOXIDE POISONING HAZARD

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

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

Check that furnace vent (and air intake) terminal(s) are not obstructed in any way during all seasons.

⚠ AVERTISSEMENT

RISQUE D'INTOXICATION AU MONOXYDE DE CARBONE

Si ces directives ne sont pas suivies, cela peut entraîner des blessures graves ou une intoxication au monoxyde de carbone pouvant causer la mort, si des produits de combustion s'infiltrent dans le bâtiment.

Vérifier que toutes les ouvertures pratiquées dans le mur extérieur autour du ou des tuyaux d'évent (et de la prise d'air) sont scellées de manière à empêcher l'infiltration de produits de combustion dans le bâtiment.

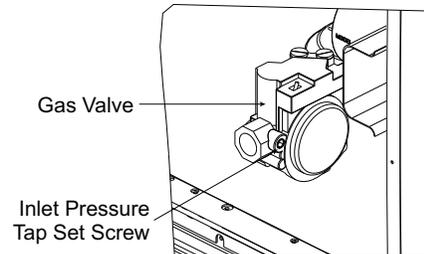
Veiller à ce que la ou les sorties de l'évent de l'appareil de chauffage (et la prise d'air) ne soient, en aucune façon, obstruées, quelle que soit la saison.

⚠ WARNING

FIRE HAZARD

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

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

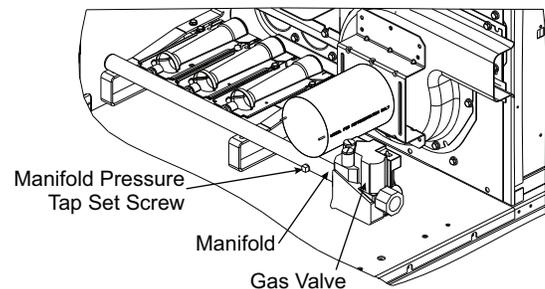


⚠ WARNING

FIRE HAZARD

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

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

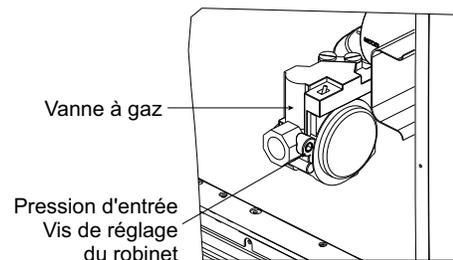


⚠ ADVERTISSEMENT

RISQUE D'INCENDIE

Le non-respect de cet avertissement pourrait entraîner des blessures graves et/ou des dommages matériels.

La vis de réglage du robinet de pression d'entrée doit être serrée et un bouchon de tuyau NPT de 1/8 po doit être installé pour éviter les fuites de gaz.

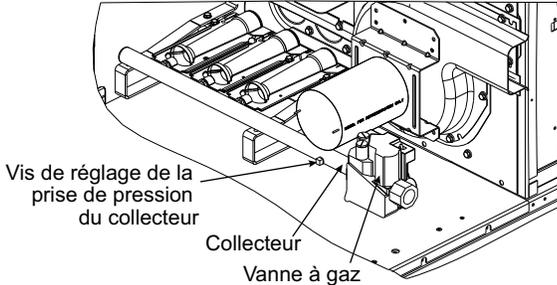


⚠ ADVERTISSEMENT

RISQUE D'INCENDIE

Le non-respect de cet avertissement pourrait entraîner des blessures graves et/ou des dommages matériels.

La vis de réglage du robinet de pression du collecteur doit être serrée et un bouchon de tuyau NPT de 1/8 po doit être installé pour éviter les fuites de gaz.



⚠ ADVERTISSEMENT

Cet équipement n'est pas destiné à être utilisé par des personnes (y compris des enfants) ayant des capacités physiques, sensorielles ou mentales réduites, ou un manque d'expérience et de connaissances, à moins qu'elles n'aient reçu une supervision ou des instructions concernant l'utilisation de l'appareil par une personne responsable de leur sécurité. Les enfants doivent être surveillés pour s'assurer qu'ils ne jouent pas avec l'appareil.

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

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

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing installation, service, or maintenance on this unit, turn off the main power disconnect to the unit and install lock and lockout tag. Some equipment may have multiple power disconnects.

⚠ ADVERTISSEMENT

RISQUE DE BLESSURE CORPORELLE

Le non-respect de cette mise en garde peut entraîner des blessures corporelles.

Les pièces en tôle peuvent présenter des bords tranchants ou des bavures. Soyez prudent et portez des vêtements de protection appropriés, des lunettes de sécurité et des gants lors de la manipulation des pièces et de l'entretien des équipements de climatisation.

⚠ ADVERTISSEMENT

RISQUE DE CHOC ÉLECTRIQUE

Le non-respect de cet avertissement pourrait entraîner des blessures corporelles, voire la mort.

Avant d'effectuer l'installation, l'entretien ou la maintenance de cet appareil, coupez l'alimentation principale de l'appareil et installez des verrous et des étiquettes de verrouillage. Certains équipements peuvent avoir plusieurs alimentations de courant.

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

R-454B is an A2L refrigerant. All service equipment or components must be A2L refrigerant rated. Do not use non-A2L rated equipment or components on R-454B refrigerant equipment.

⚠ WARNING

This equipment is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

⚠ WARNING

Use caution when servicing compressor terminal pins. System or compressor abnormalities can dislodge pins allowing oil and refrigerant to vent under pressure.

⚠ AVERTISSEMENT

Soyez prudent lors de l'entretien des bornes du compresseur. Les anomalies du système ou du compresseur peuvent déloger les bornes, permettant à l'huile et au réfrigérant de s'évacuer sous pression.

⚠ WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

⚠ AVERTISSEMENT

RISQUE D'INCENDIE OU D'EXPLOSION

Si les consignes de sécurité ne sont pas suivies à la lettre, cela peut entraîner la mort, de graves blessures ou des dommages matériels.

Ne jamais vérifier la présence de fuites de gaz au moyen d'une flamme nue. Vérifier tous les raccords en utilisant une solution savonneuse commerciale conçue spécialement pour la détection de fuites. Un incendie ou une explosion risque de se produire, ce qui peut entraîner la mort, des blessures ou des dommages matériels.

A2L REFRIGERATION INFORMATION

This equipment contains R-454B, a mildly flammable refrigerant classified as A2L. Read all instructions prior to transporting, storing, installing, or servicing this equipment.



⚠ WARNING

Only use equipment and components that are designed for use with R-454B refrigerant.

⚠ AVERTISSEMENT

Utilisez uniquement les équipements et les composants conçus pour être utilisés avec le réfrigérant R-454B.

Transportation

Follow all local, state, or federal regulations when transporting equipment containing A2L refrigerant. Carrier applied RTUs are

designed to be transported on a flatbed trailer or flatbed rail car. Ensure the proper safety equipment, driver training, and any required trailer markings are in place prior to transporting equipment containing an A2L refrigerant. Units with an A2L refrigerant charge are not approved for air or cargo vessel transportation.

Minimum Conditioned Space Area

The space area served by ducted equipment with A2L refrigerant is restricted by building code based on refrigerant volume that the releasable to the conditioned space served by the duct system.

Determine the conditioned space area by calculating the floor area (room length x room width) of all spaces served by a common duct system and adding them all together to get the total conditioned space area.

Compare the calculated total conditioned space area to the minimum conditioned space area (TA_{min}) listed in Table 1, based on the unit size and configuration.

Table 1 – Minimum Conditioned Space Area (MCSA or TA_{min})

UNIT	(TA _{MIN}) ^a	
	Sq Ft	Sq Meter
48QE*M/R/T/X12	602	56
48QE*N/S/U/Y12	1013	94

NOTE(S):

a. TA_{min} is based on a minimum ceiling height of 7.2 ft (2.2 m) and the worst-case unit refrigerant charge.

If the space area is above the minimum conditioned space area listed in Table 1 based on unit size and configuration, no action is needed.

If the conditioned space area is below the minimum conditioned space area listed in Table 1 based on unit size and configuration, then additional ventilation may be required. Refer to local code, UL-60335-2-40, or ASHRAE^{®1} standard 15.

⚠ CAUTION

Do not install an ignition source or potential ignition source in a space where the total conditioned area is below the minimum total conditioned area (TA_{min}), unless a flame arresting device has been installed.

⚠ AVERTISSEMENT

N'installez pas de source d'inflammation ou de source d'inflammation potentielle dans un espace où la surface totale conditionnée est inférieure à la surface totale conditionnée minimale (TA_{min}), à moins qu'un dispositif pare-flamme n'ait été installé.

GENERAL

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

Rated Indoor Airflow

Table 2 lists the rated indoor airflow used for the AHRI efficiency rating for the units covered in this document.

Table 2 – AHRI Efficiency – Rated Indoor Airflow

MODEL NUMBER	FULL LOAD AIRFLOW (cfm)
48QE**12	4400

1. Third-party trademarks and logos are the property of their respective owners.

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	4	8	Q	E	S	M	1	2	A	2	A	6	-	3	A	0	A	0

Unit Heat Type

48 = Gas Heat Packaged Rooftop

Model Series - WeatherMaster®

QE = Mid Tier Hybrid Heat with Puron Advance™

Heat Type

S = Low Gas Heat, Stainless Steel (SS) Heat Exchanger
R = Medium Gas Heat, SS Heat Exchanger
T = High Gas Heat, SS Heat Exchanger

Refrigerant Options

M = Two Stage Cooling/Single Circuit
N = Two Stage Cooling/Single Circuit with Humidi-MiZer® System
R = Three Stage Cooling/Single Circuit with Chicago Code Relief Valve
S = Three Stage Cooling/Single Circuit with Humidi-MiZer System and Chicago Code Relief Valve
T = Three Stage Cooling/Single Circuit
U = Three Stage Cooling/Single Circuit with Humidi-MiZer System
X = Two Stage Cooling/Single Circuit with Chicago Relief Valve
Y = Two Stage Cooling/Single Circuit with Humidi-MiZer System and Chicago Code Relief Valve

Cooling Tons

12 = 10 tons

Sensor Options

A = None
B = Return Air Smoke Detector (RA)
C = Supply Air Smoke Detector (SA)
D = RA + SA Smoke Detector
J = Condensate Overflow Switch (COFS)
K = Condensate Overflow Switch + RA Smoke Detector
L = Condensate Overflow Switch + RA and SA Smoke Detectors
M = Condensate Overflow Switch + SA Smoke Detector

Indoor Fan Options - Vane Axial EcoBlue Fan System

2 = Standard/Medium Static Motor
3 = High Static Motor
5 = Standard/Medium Static Motor, Filter Status Switch
6 = High Static Motor - Vertical Supply and Filter Status Switch

Coil Options – RTPF (Outdoor – Indoor – Hail Guard)

A = Al/Cu – Al/Cu
B = Precoat Al/Cu – Al/Cu
C = E-coat Al/Cu – Al/Cu
D = E-coat Al/Cu – E-coat Al/Cu
M = Al/Cu – Al/Cu – Louvered Hail Guard
N = Precoat Al/Cu – Al/Cu – Louvered Hail Guard
P = E-coat Al/Cu – Al/Cu – Louvered Hail Guard
Q = E-coat Al/Cu – E-coat Al/Cu – Louvered Hail Guards
R = Cu/Cu – Al/Cu – Louvered Hail Guard
S = Cu/Cu – Cu/Cu – Louvered Hail Guard

Voltage

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

Packaging Compliance

0 = Standard

Electrical Options

A = None
B = HACR Breaker
C = Non-Fused Disconnect (NFDC)
D = Thru-The-Base Connections (TTB)
E = HACR + TTB
F = NFDC + TTB
N = Phase Monitor Protection (PMR)
P = PMR + HACR
Q = PMR + NFDC
R = PMR + TTB
S = PMR + HACR + TTB
T = PMR + NFDC + TTB
1 = HSCCR® (High Short Circuit Current Rating)
2 = HSCCR® + TTB

Service Options

0 = None
1 = Unpowered Convenience Outlet (NPCO)
2 = Powered Convenience Outlet (PCO)
3 = Hinged Panels (HP)
4 = Hinged Panels + NPCO
5 = Hinged Access Panels + PCO
6 = MERV-13 Filters (M13)
7 = NPCO + MERV-13 Filters
8 = PCO + MERV-13 Filters
9 = Hinged Panels + MERV-13 Filters
A = HP + NPCO + MERV-13 Filters
B = HP + PCO + MERV-13 Filters
C = Foil Faced Insulation (FF)
D = FF + NPCO
E = FF + PCO
F = FF + HP
G = FF + HP + NPCO
H = FF + HP + PCO
J = FF + MERV-13 Filters
K = FF + NPCO + MERV-13 Filters
L = FF + PCO + MERV-13 Filters
M = FF + HP + MERV-13 Filters
N = FF + HP + NPCO + MERV-13 Filters
P = FF + HP + PCO + MERV-13 Filters

Intake / Exhaust Options

A = None
B = Temperature Economizer with Barometric Relief
F = Enthalpy Economizer with Barometric Relief
L = ULL (Ultra Low Leak) Temperature Economizer with Barometric Relief and CO₂ Sensor
M = ULL Enthalpy Economizer with Barometric Relief and CO₂ Sensor
U = ULL Temperature Economizer with Barometric Relief
W = ULL Enthalpy Economizer with Barometric Relief

Base Unit Controls

3 = SystemVu™ Controller

Design Revision

- = Factory Design Revision

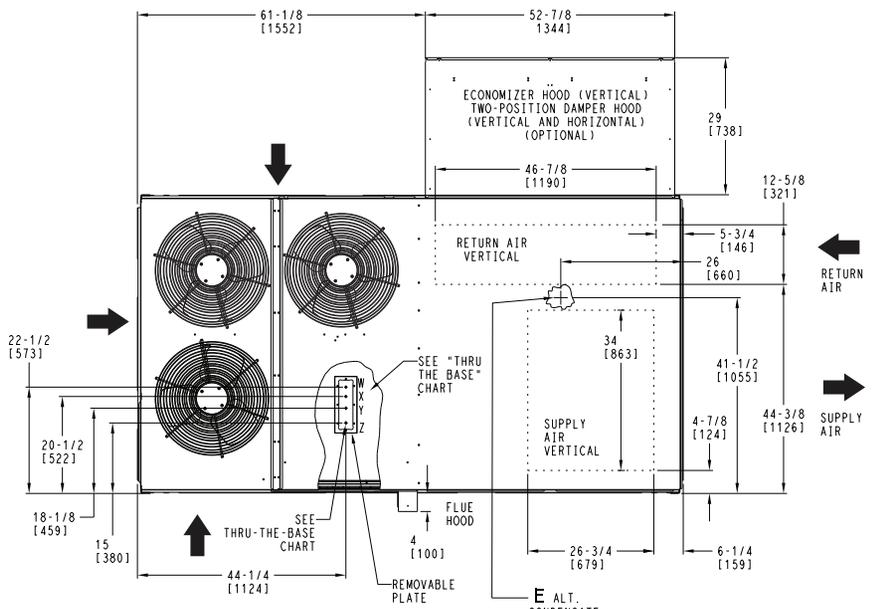
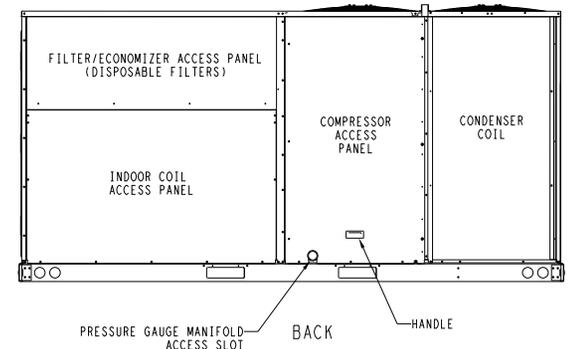
NOTE(S):

a. Not available on the following models/options: 575V, Head Pressure Control, Phase Loss Monitor, Non-Fused Disconnect, HACR Breaker, Powered Convenience Outlet, or Two Stage units with Humidi-MiZer System.

Fig. 1 – 48QE12 Unit Model Number Nomenclature**

- NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [] ARE IN MILLIMETERS.
 2.  CENTER OF GRAVITY
 3.  DIRECTION OF AIR FLOW

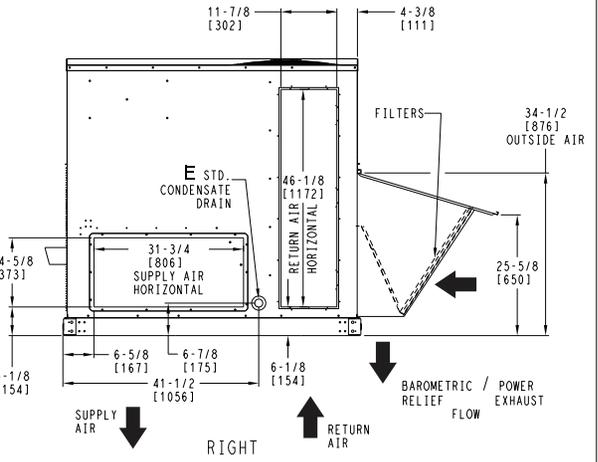
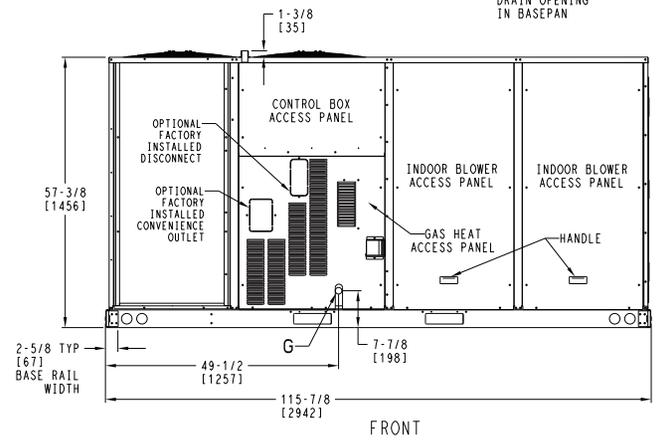
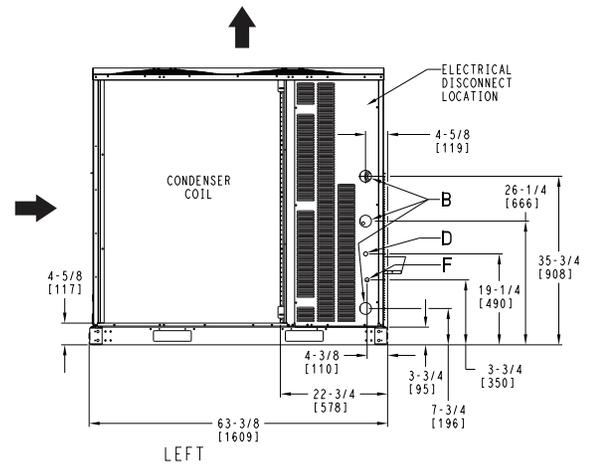
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CONNECTION SIZES	
B	2 1/2" [64] DIA POWER SUPPLY HOLE
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	7/8" [22] DIA FIELD CONVENIENCE OUTLET HOLE
G	3/4"-14 NPT GAS CONNECTION

THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPW005A00,006A00,007A00				
ACCESSORY NO.	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)	
005	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	1 1/4"	POWER	1 1/2" [38.1]
006	Z	3/4" PIPE	ACC.	1 3/4" [44.5]
	W	1/2"	GAS	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
007	Y	1 1/2"	POWER	2" [50.8]
	Z	3/4" PIPE	GAS	1 3/4" [44.5]
	W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]	
Y	2"	POWER	2 1/2" [63.5]	
Z	3/4" PIPE	GAS	1 3/4" [44.5]	

FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR X & Y ARE PROVIDED AS SPECIFIED ON "006".



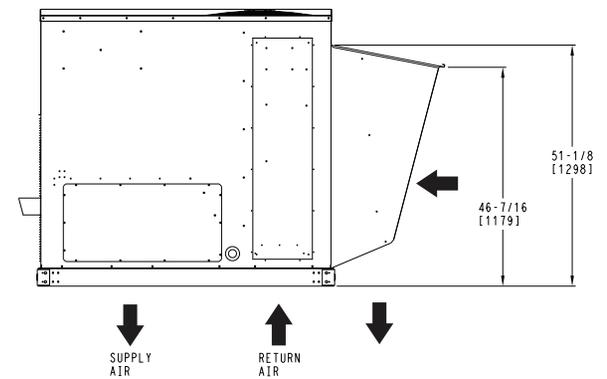
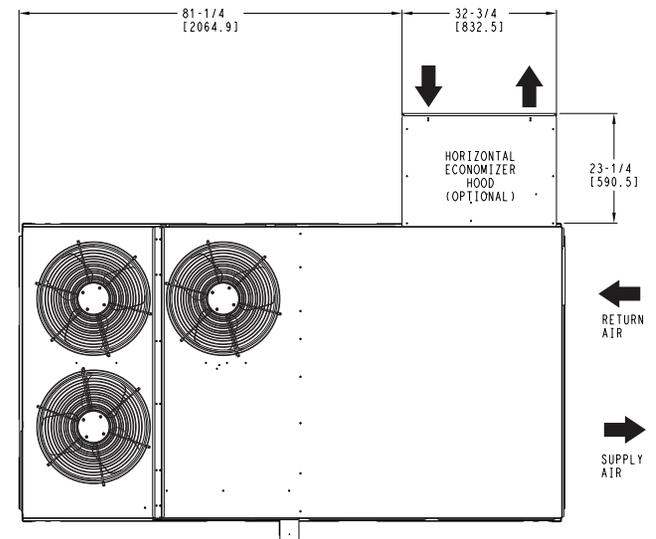
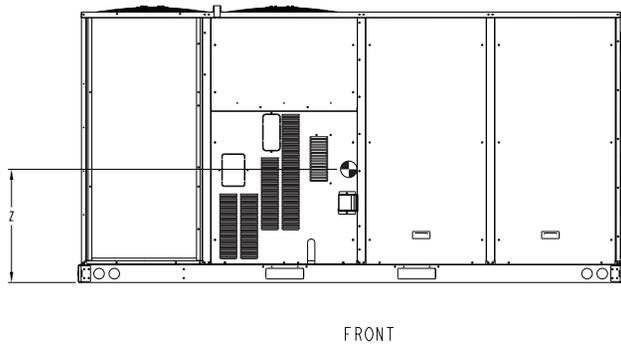
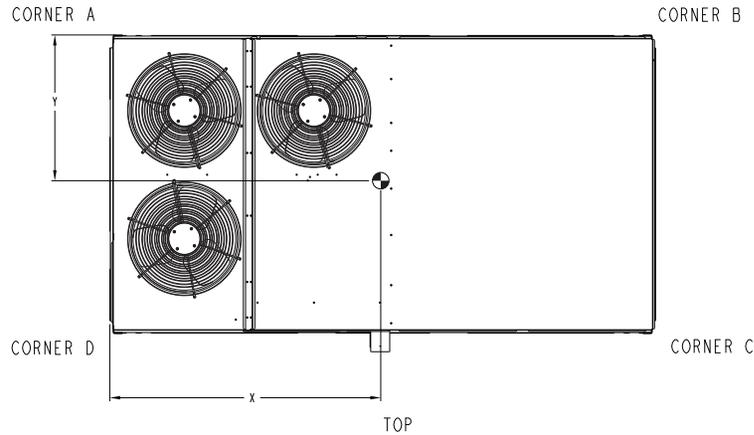
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48QE 12 SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	48TM010129	REV
U.S. ECCN:NSR	1 OF 2	7/11/25	03/17/25			B

Fig. 2 — 48QE**12 Unit Dimensional Drawing

UNIT	STD UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48QE 12	1296	588	296	134	287	130	351	159	362	164	57 [1448]	28 1/2 [724]	24 [610]

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

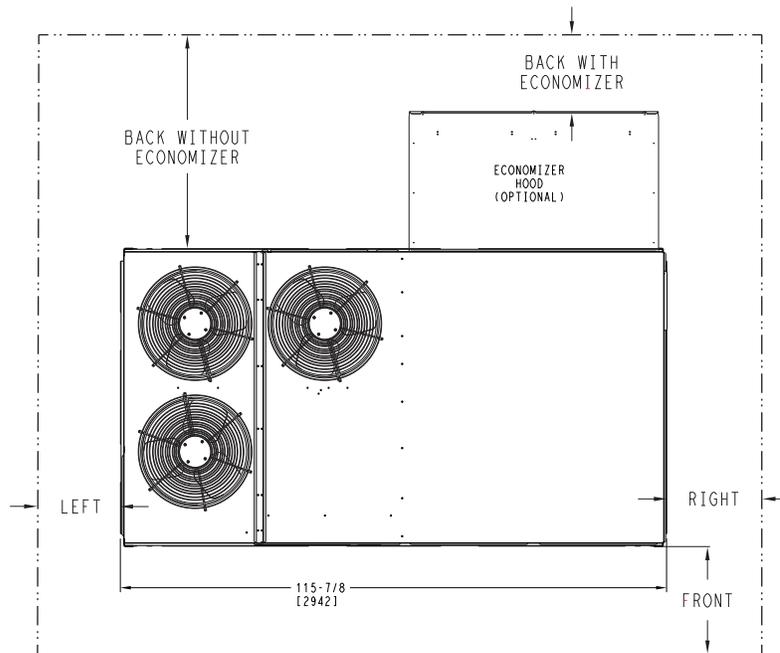
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HORIZONTAL ECONOMIZER

ITC CLASSIFICATION U.S. ECCN:NSR	SHEET 2 OF 2	DATE 7/11/25	SUPERCEDES 3/11/25	48QE 12 SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	48TM01029	REV B
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Fig. 2 — 48QE12 Unit Dimensional Drawing (cont)**



CLEARANCE

SURFACE	Service with Conductive Barrier	Service with Non-conductive Barrier	Operating Clearance
FRONT	48 in. (1219 mm)	36 in. (914 mm)	18 in. (457 mm)
LEFT	48 in. (1219 mm)	42 in. (1067 mm)	18 in. (457 mm)
BACK WITHOUT ECONOMIZER	48 in. (1219 mm)	42 in. (1067 mm)	18 in. (457 mm)
BACK WITH ECONOMIZER	36 in. (914 mm)	36 in. (914 mm)	18 in. (457 mm)
RIGHT	36 in. (914 mm)	36 in. (914 mm)	18 in. (457 mm)
LEFT	72 in. (1829 mm)	72 in. (1829 mm)	72 in. (1829 mm)

NOTE(S):

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

Fig. 3 – Service Clearances – 48QE12 Units**

INSTALLATION

Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

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

NOTE: Consider also the effect of adjacent units.

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

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

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

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

Select a unit mounting system that provides adequate height to allow for removal and disposal of frost and ice that will form during the heating-defrost mode as well as allow installation of condensate trap per requirements. See Install External Condensate Trap and Line on page 18 for required trap dimensions.

ROOF MOUNT

Check building codes for weight distribution requirements. Unit operating weight is shown in Table 3.

Table 3 — Operating Weights

48QE**12	LB (kg)
BASE UNIT	1296 (588)
ECONOMIZER	
VERTICAL	130 (47)
HORIZONTAL	242 (110)
HUMIDI-MIZER® COIL	55 (25)
POWERED OUTLET	35 (16)
CURB	
14 in. (356 mm)	180 (82)
16 in. (610 mm)	245 (116)

Step 2 — Plan for Sequence of Unit Installation

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

CURB-MOUNTED INSTALLATION

1. Install curb
2. Install field-fabricated ductwork inside curb

3. Install accessory thru-base service connection package (affects curb and unit) (refer to accessory installation instructions for details)
4. Prepare bottom condensate drain connection to suit planned condensate line routing (see Install External Condensate Trap and Line on page 18 for details)
5. Rig and place unit
6. Install outdoor air hood
7. Install flue hood
8. Install gas piping
9. Install condensate line trap and piping
10. Make electrical connections
11. Install other accessories

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 outdoor air hood
7. Install flue hood
8. Install gas piping
9. Install condensate line trap and piping
10. Make electrical connections
11. Install other accessories

FRAME-MOUNTED INSTALLATION

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

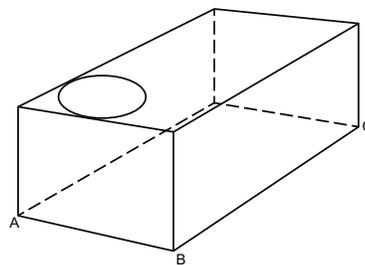
Step 3 — Inspect Unit

Inspect unit for transportation damage. File any claim with transportation agency. Confirm before installation of unit that voltage, amperage and circuit protection requirements listed on unit data plate agree with power supply provided.

Step 4 — Provide Unit Support

ROOF CURB MOUNT

Accessory roof curb details and dimensions are shown in Fig. 5. Assemble and install accessory roof curb in accordance with instructions shipped with the curb. Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 4. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



MAXIMUM ALLOWABLE DIFFERENCE in. (mm)

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

Fig. 4 — Unit Leveling Tolerances

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

Install insulation, cant strips, roofing felt, and counter flashing as shown. Ductwork must be attached to curb and not to the unit.

SLAB MOUNT (HORIZONTAL UNITS ONLY)

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

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

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

A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4 in. x 4 in. (102 mm x 102 mm) pads on each side.

Step 5 — Field Fabricate Ductwork

NOTE: Cabinet return-air static pressure (a negative condition) shall not exceed 0.35 in. wg (87 Pa) with economizer or 0.45 in. 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 in. (458 mm) of duct length from the unit basepan.

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

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

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

A minimum clearance is not required around ductwork.

CAUTION

PROPERTY DAMAGE HAZARD

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

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

Outlet grilles must not lie directly below unit discharge.

WARNING

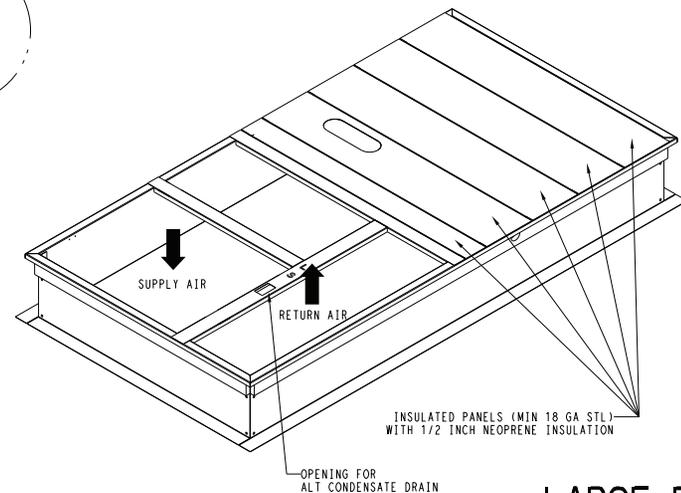
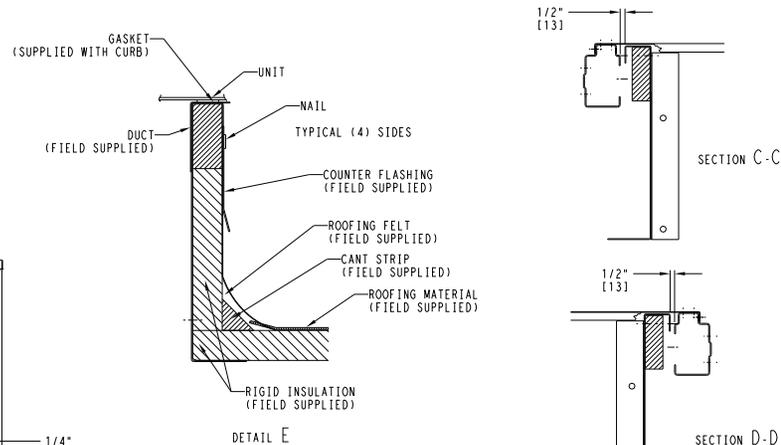
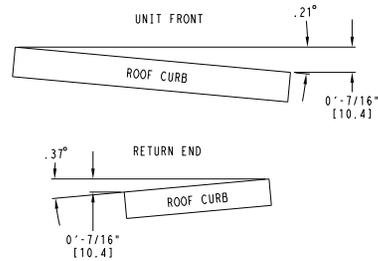
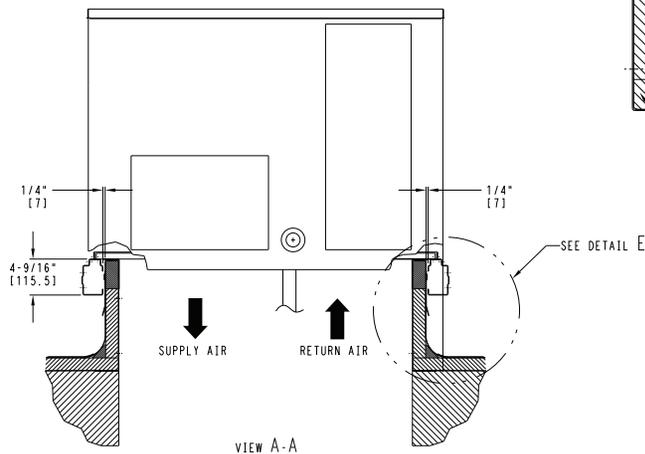
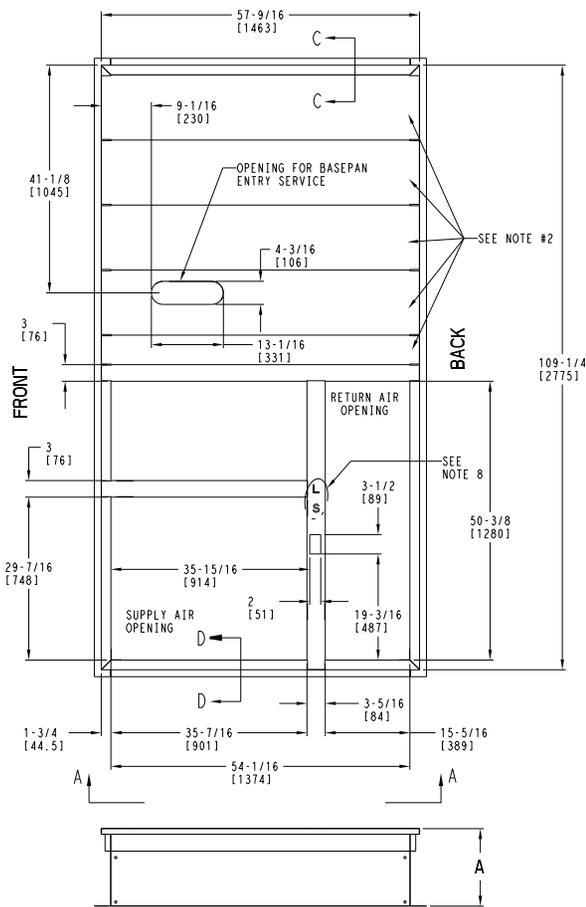
PERSONAL INJURY HAZARD

Failure to follow this warning could cause personal injury.

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

ROOF CURB ACCESSORY #	A
CRRFCURB074A00	14" [356]
CRRFCURB075A00	24" [610]

- NOTES:
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
 2. INSULATED PANELS: 1/2" THK. NEOPRENE FOAM, 1.0# DENSITY.
 3. DIMENSIONS IN [] ARE IN MILLIMETERS.
 4. ROOFCURB SIDEWALLS: 16 GAGE STEEL.
 5. ATTACH DUCTWORK TO CURB, (FLANGES OF DUCT REST ON CURB).
 6. SERVICE CLEARANCE 4 FT ON EACH SIDE.
 7. DIRECTION OF AIR FLOW.
 8. "L" & "S" DESIGNATIONS DENOTE LOCATION OF COMMON CROSS RAIL. (POSITION "L" FOR LARGE DUCT OPENING CURB).

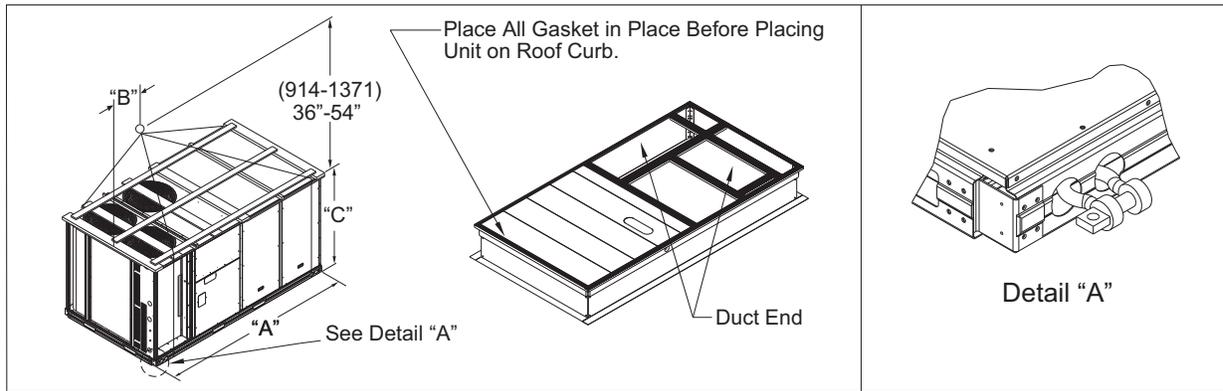


LARGE DUCT OPENINGS

50TM500780

REV B

Fig. 5 — 48QE**12 Roof Curb Details



UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
48QE**12	2064	936	116.0	2945	57.0	1450	59.0	1500

NOTE(S):

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

Fig. 6 – Rigging Details

Step 6 – Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 3 and Fig. 6 for additional information.

Lifting holes are provided in base rails as shown in Fig. 6. Refer to rigging instructions on unit.

Rigging materials under unit (cardboard or wood to prevent base pan damage) 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 can be tightened with a 1/2 in. square socket drive extension. For further details see Install External Condensate Trap and Line on page 18.

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

Remove all shipping materials and top skid. Remove extra center post from the condenser end of the unit so that the condenser end of the unit matches Fig. 24 and 25. Recycle or dispose of all shipping materials.

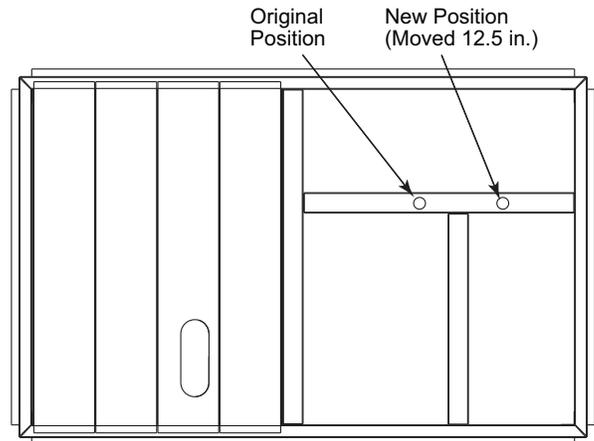


Fig. 7 – Alternative Condensate Drain Hole Positions

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

Unit is shipped in the vertical duct configuration. Unit without factory-installed economizer or return air smoke detector option may be field-converted to horizontal ducted configuration using accessory CRDUCTCV002A00. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers.

Discard the supply duct cover. Install accessory CRDUCTCV002A00 to cover the vertical supply duct opening. Use the return duct cover removed from the end panel to cover the vertical return duct opening.

ALL UNITS

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.

⚠ CAUTION

UNIT DAMAGE HAZARD

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

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

POSITIONING ON CURB

For full perimeter curbs CRRFCURB074A00 and 075A00, the clearance between the roof curb and the front and rear base rails should be 1/4 in. (6.4 mm). The clearance between the curb and the end base rails should be 1/2 in. (13 mm).

If the alternative condensate drain location through the bottom of the unit is used in conjunction with a retrofit curb, the hole in the curb must be moved 12-1/2 in. (320 mm) towards the duct end of the unit. See Fig. 7.

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

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

Step 8 — Install Outside Air Hood

ECONOMIZER HOOD REMOVAL (FACTORY OPTION)

1. The hood is shipped in knock-down form and located in the return air compartment. It is attached to the economizer using two plastic tie-wraps.
2. To gain access to the hood, remove the filter access panel (see Fig. 8).
3. Locate and cut the (2) plastic tie-wraps being careful (see Fig. 9). Be careful to not damage any wiring or cut tie-wraps securing any wiring.
4. Carefully lift the hood assembly (with metal tray) through the filter access opening and assemble per the steps outlined in *Economizer Hood Setup*, below.

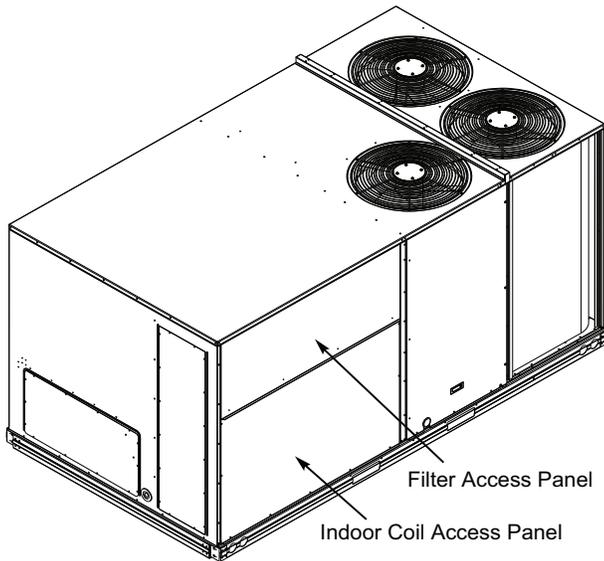


Fig. 8 — Typical Access Panel Locations

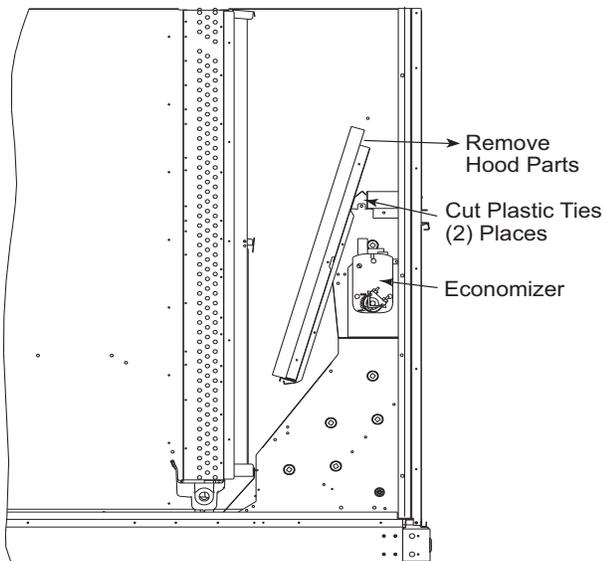


Fig. 9 — Economizer Hood Package Location

ECONOMIZER HOOD SETUP

NOTE: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be

discarded. Save the aluminum filter for use in the power exhaust hood assembly.

1. The indoor coil access panel will be used as the top of the hood. If the panel is still attached to the unit, remove the screws along the sides and bottom of the panels. See Fig. 10.
2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Be careful not to lift the panel too far, as it might fall out. Use the screws provided to attach the hood sides to the hood top. Use screws provided to attach the hood sides to the unit. See Fig. 11.
3. Remove the shipping tape holding the economizer barometric relief damper in place (economizer only).
4. Insert the hood divider between the hood sides. See Fig. 11 and 12. Secure hood divider with 2 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Open 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. 12.
6. Caulk the ends of the joint between the unit top panel and the hood top.
7. Replace the filter access panel.

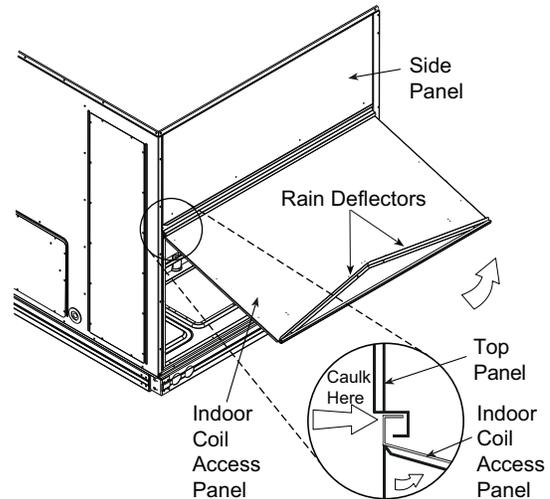


Fig. 10 — Indoor Coil Access Panel Relocation

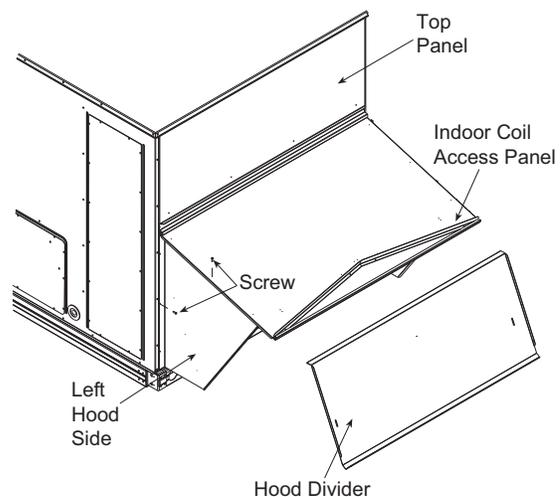


Fig. 11 — Economizer Hood Construction

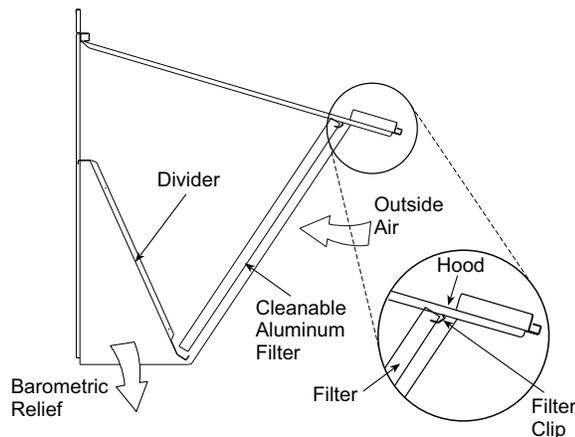


Fig. 12 — Economizer Filter Installation

Step 9 — Install Flue Hood

Flue hood is shipped screwed to the basepan beside the burner compartment access panel. Remove from shipping location and using screws provided, install flue hood and screen in location shown in Fig. 13.

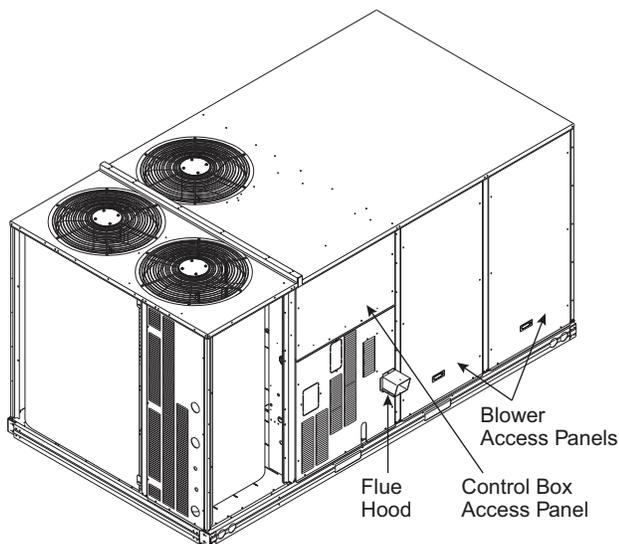


Fig. 13 — Flue Hood Details

Step 10 — Install Gas Piping

Installation of the gas piping must be accordance with local building codes and with applicable national codes. In U.S.A., refer to NFPA 54/ANSI Z223.1 National Fuel Gas Code (NFGC). In Canada, installation must be in accordance with the CAN/CSA B149.1 and CAN/CSA B149.2 installation codes for gas-burning appliances. This unit is factory equipped for use with natural gas (NG) fuel at elevations up to 2000 ft (610 m) above sea level. Unit may be field converted for operation at elevations above 2000 ft (610 m) and/or for use with liquefied petroleum (LP) fuel. See accessory kit installation instructions regarding these accessories.

NOTE: Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. The input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level.

NOTE: Installation of this furnace at altitudes above 2000 ft (610 m) shall be made in accordance with the Listed High Altitude Conversion Kit available with this furnace.

NOTE: L'installation de ce générateur de chaleur à des altitudes supérieures à 2000 pi (610 m) doit être effectuée conformément aux instructions accompagnant la trousse de conversion pour haute altitude fournie avec cet appareil.

For natural gas applications, gas pressure at unit gas connection must not be less than 4 in. wg (996 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating (see Table 4). For liquefied petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13.0 in. wg (3240 Pa) at the unit connection (see Table 5).

Table 4 — Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
48QES/R/T	12	4.0 in. wg (996 Pa)	13.0 in. wg (3240 Pa)

Table 5 — Liquid Propane Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
48QES/R/T	12	11.0 in. wg (2740 Pa)	13.0 in. wg (3240 Pa)

The gas supply pipe enters the unit at the burner access panel on the front side of the unit through the long slot at the bottom of the access panel. The gas connection to the unit is made to the 3/4-in. FPT gas inlet port on the unit gas valve (see Table 6).

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

Table 6 — Natural Gas Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48QES/R/T	12	3.5 in. wg (872 Pa)	2.0 in. wg (498 Pa)

Manifold pressure for LP fuel use must be adjusted to specified range (see Table 7). Follow instructions in the accessory kit to make initial readjustment.

Table 7 — Liquid Propane Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48QES/R/T	12	10.0 in. wg (2490 Pa)	5.7 in. wg (1420 Pa)

⚠ CAUTION

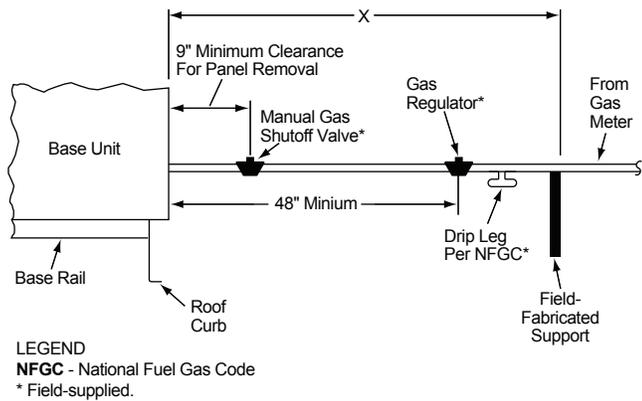
EQUIPMENT DAMAGE

Failure to follow this caution may result in equipment damage.

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

Install a gas supply line that runs to the unit heating section. Refer to the NFPA 54/NFGC or equivalent code for gas pipe sizing data. Do not use a pipe size smaller than 1/2-inch. Size the gas supply line to allow for a maximum pressure drop of 0.5 in. wg (124 Pa) between gas regulator source and unit gas valve connection when unit is operating at high-fire flow rate.

The gas supply line can approach the unit in three ways: horizontally from outside the unit (across the roof), thru-curb/under unit basepan (accessory kit required) or through unit basepan (factory-option or accessory kit required). Consult accessory kit installation instructions for details on these installation methods. Observe clearance to gas line components per Fig. 14.



LEGEND
 NFGC - National Fuel Gas Code
 * Field-supplied.

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

Fig. 14 — Gas Piping Guide (with Accessory Thru-the-Curb Service Connections)

FACTORY-OPTION THRU-BASE GAS CONNECTIONS

This service connection kit consists of a 3/4-in. NPT gas adapter fitting (stainless steel), a 1/2-in. electrical bulkhead connector and a 1-1/2-in. electrical bulkhead connector, connected to an “L” bracket covering the embossed (raised) section of the unit basepan in the condenser section. See Fig. 15.

1. Remove the “L” bracket assembly from the unit (see Fig. 15).
2. Cut and discard the wire tie on the gas fitting. Hand-tighten the fitting if it has loosened in transit.
3. Remove connector plate assembly from the “L” bracket and discard the “L” bracket, but retain the washer head screws and the gasket (located between the “L” bracket and the connector plate assembly)

NOTE: Take care not to damage the gasket, as it is reused in the following step.

4. Place the gasket over the embossed area in the basepan, aligning the holes in the gasket to the holes in the basepan. See Fig. 16.
5. Install the connector plate assembly to the basepan using 8 of the washer head screws.

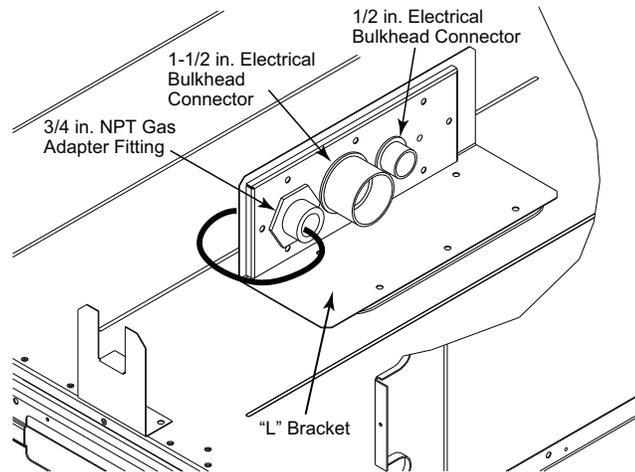


Fig. 15 — Thru-Base Connection Fittings

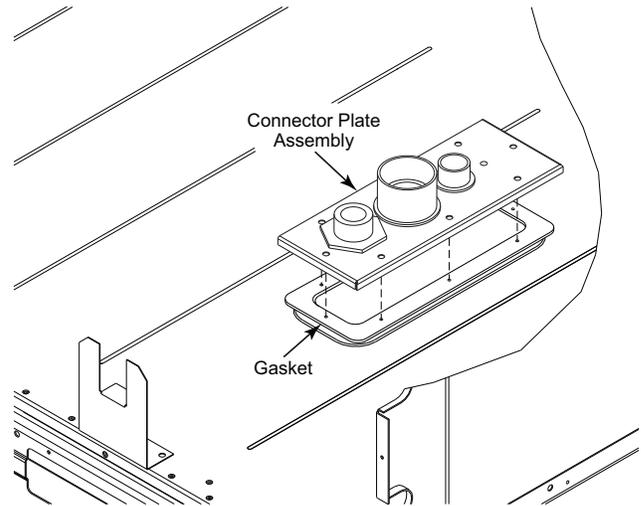


Fig. 16 — Completing Installation of Thru-the-Base Option

NOTE: If gas and/or electrical connections are not going to occur at this time, tape or otherwise cover the fittings so that moisture does not get into the building or conduit in the interim.

The thru-base gas connector has male and female threads. The male threads protrude above the basepan of the unit; the female threads protrude below the basepan.

Check tightness of connector lock nuts before connecting gas piping.

Install a 3/4-in. NPT street elbow (field-supplied) on the thru-base gas fitting. Attach a 3/4-in. pipe nipple with minimum length of 16-in. (406 mm) (field-supplied) to the street elbow and extend it through the access panel at the gas support bracket (see Fig. 17).

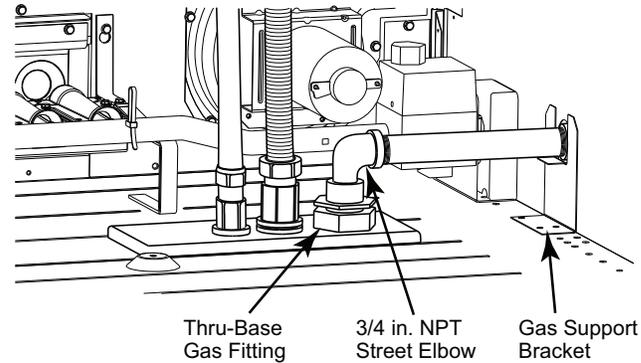


Fig. 17 — Gas Line Piping

All Units

Other hardware required to complete the installation of the gas supply line will include a manual shutoff valve, a sediment trap (drip leg), and a ground-joint union. A pressure regulator valve may also be required (to convert gas pressure from pounds to inches of pressure). The manual shutoff valve must be located within 6 ft (1.83 m) of the unit. The union, located in the final leg entering the unit, must be located at least 9-in. (230 mm) away from the access panel to permit the panel to be removed for service. If a regulator valve is installed, it must be located a minimum of 4 ft (1220 mm) away from the unit’s flue outlet. Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 18 and 19 for typical piping arrangements for gas piping that has been routed through the side-wall of the curb. See Fig. 20 for typical piping arrangement when thru-base is used. Ensure that all piping does not block access to the unit’s main control box or limit the required working space in front of the control box.

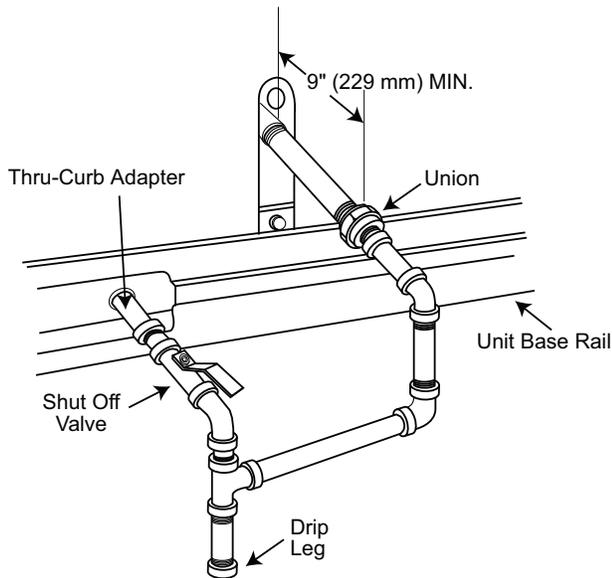


Fig. 18 — Gas Piping with Thru-Curb Accessory

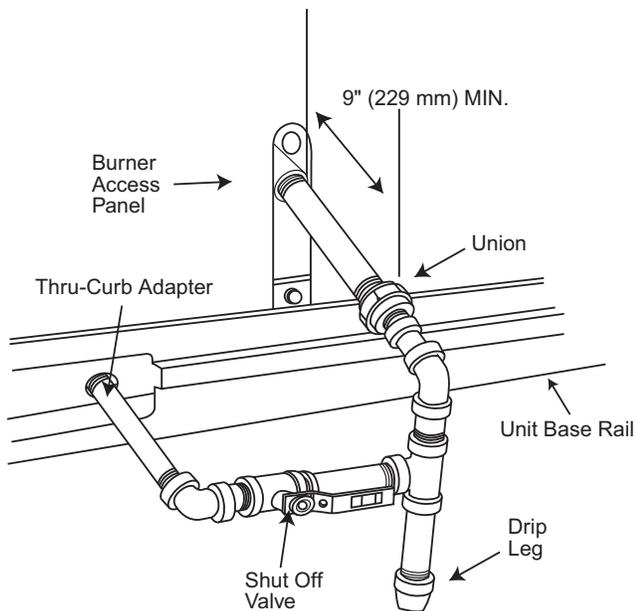


Fig. 19 — Gas Piping with Thru-Curb Accessory (Alternate Layout)

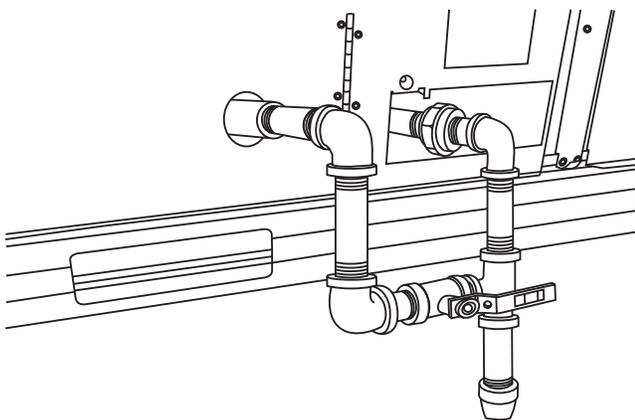


Fig. 20 — Gas Piping Thru-Base Connections

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

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

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

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

⚠ WARNING

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

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

NOTE: If orifice hole appears damaged or it is suspected to have been re-drilled, check orifice hole with a numbered drill bit of correct size. Never re-drill an orifice (see Fig. 21). A burr-free and squarely aligned orifice hole is essential for proper flame characteristics.

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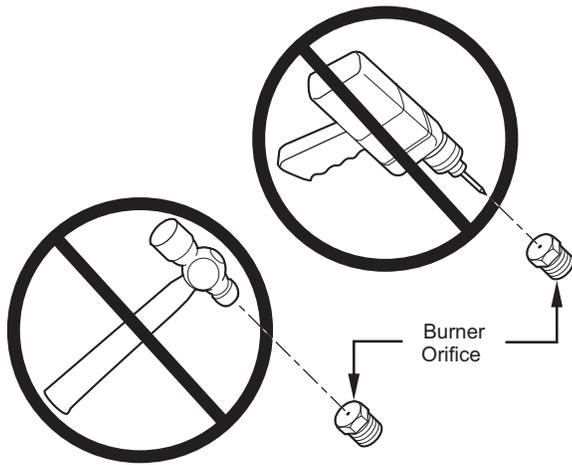


Fig. 21 — Orifice Hole

Step 11 — Install External Condensate Trap and Line

The unit has one 3/4 in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 22. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

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. 22 and 23.

NOTE: If the alternate bottom drain is not used, check the drain plug for tightness prior to setting the unit on the roof curb.

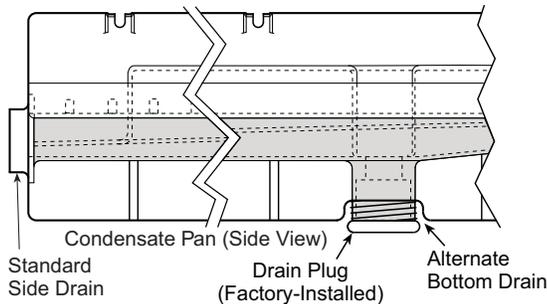
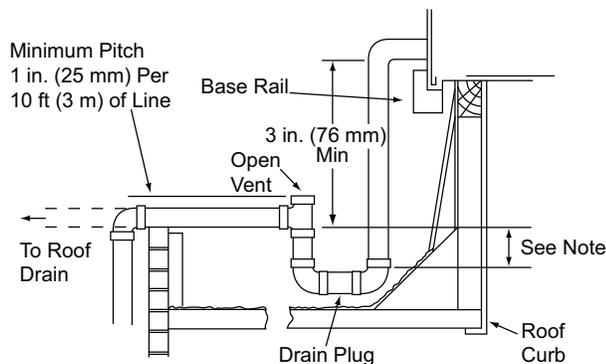


Fig. 22 — Condensate Drain Pan (Side View)



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

Fig. 23 — Condensate Drain Piping Details

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

Step 12 — Make Electrical Connections

⚠ WARNING

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

Do not use gas piping as an electrical ground.

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

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

Field Power Supply

For those units without through-the-curb power, conduit must be used to route the main power from the condenser end, via the power entry in the corner post of the unit (see Fig. 24-26) to either the factory option disconnect or the bottom of the control box. A 1 in. conduit is provided wrapped around compressor. A second conduit is provided with factory-installed powered convenience outlet. For those units that require a conduit larger than 1 in., the conduit must be field-supplied. Figures 24-26 show the wire routings.

If the field disconnect is larger than 100-A, it must be attached to the unit using accessory CRDISBKT001A00 — disconnect switch bracket (see Fig. 27). Follow the instructions provided with this accessory. For smaller field disconnects, be sure to use 1/2 in. screws to mount the disconnect directly to the end panel (see Fig. 28). In either case, set the disconnect vertical location on the unit so that a 90 degree fitting can be used to connect the conduit to the disconnect.

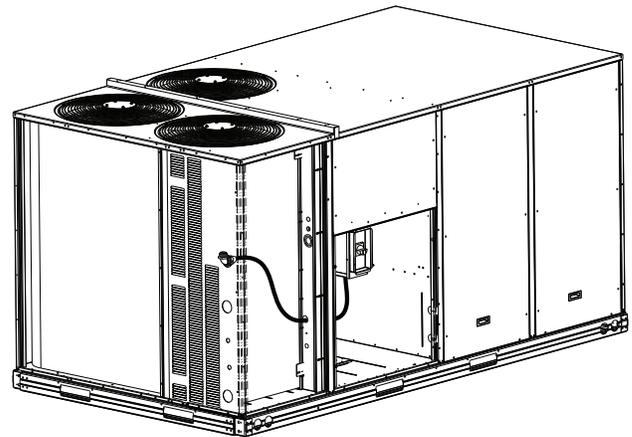


Fig. 24 — Conduit into Factory Option Disconnect

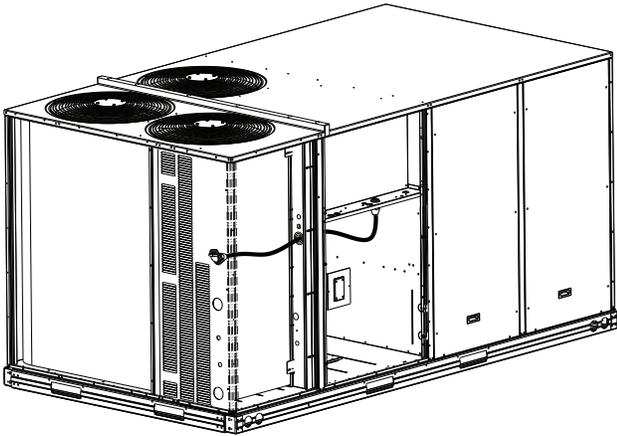


Fig. 25 – Conduit into Control Box

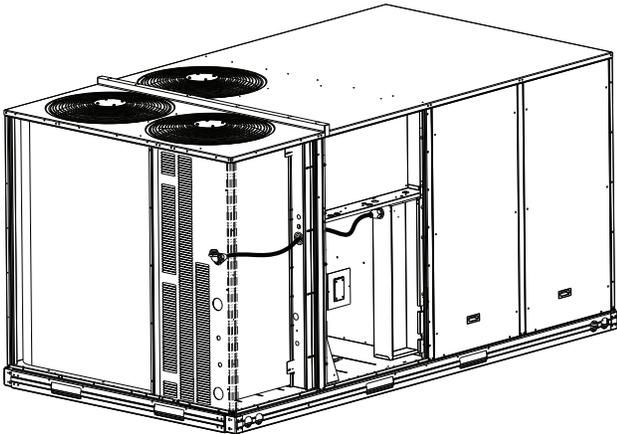


Fig. 26 – Conduit into Single Point Box

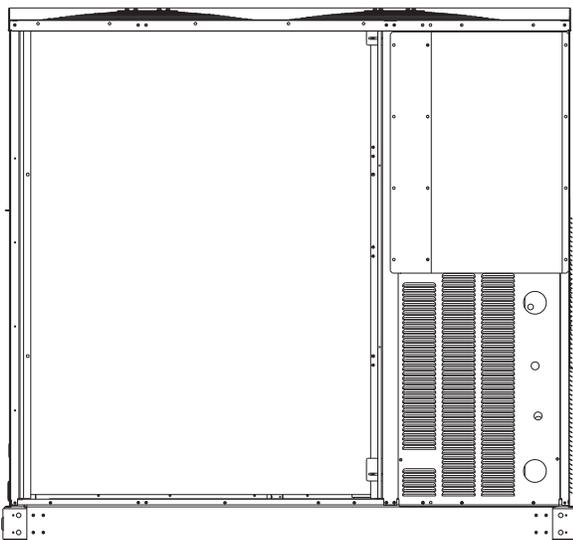


Fig. 27 – Mounting Position for Field Disconnects (over 100A)

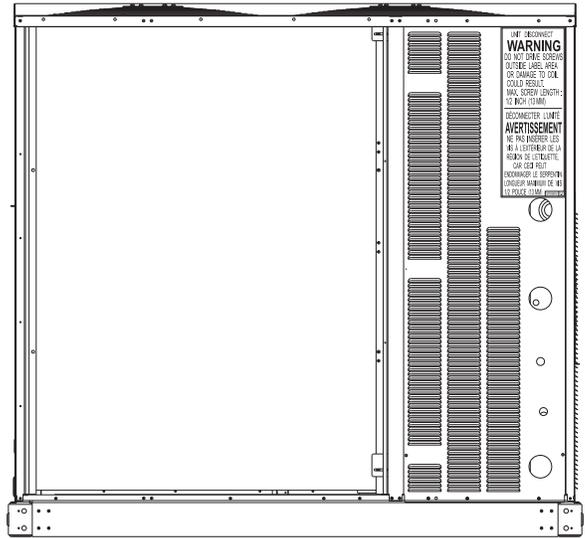


Fig. 28 – Mounting Position for Field Disconnects (up to 100A)

Field power wires are connected to the unit at line-side pressure lugs at the main terminal block (TB1) or at factory-installed option non-fused disconnect switch. See Fig. 29. Max wire size is no. 2 AWG (copper only). See Fig. 30.

⚠ WARNING

FIRE HAZARD
 Failure to follow this warning could result in personal injury, death, or property damage.
 Do not connect aluminum wire between disconnect switch and unit. Use only copper wire. See Fig. 29.

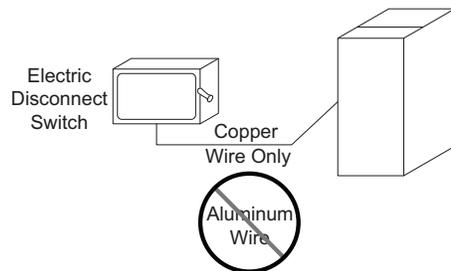
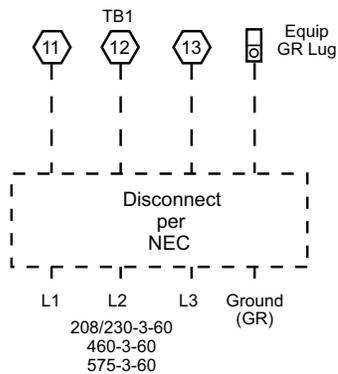


Fig. 29 – Disconnect Switch and Unit

Units Without Disconnect or HACR Option



Units With Disconnect or HACR Option

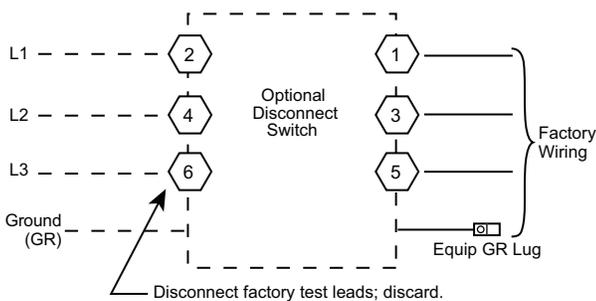


Fig. 30 — Power Wiring Connections

TEST LEADS - Unit may be equipped with short leads (pigtailed) on the field line connection points off the optional disconnect switch. These leads are for factory run-test purposes only; remove and discard before connecting field power wires to unit connection points. Make field power connections directly to line connection pressure lugs only.

Refer to Table 8 for maximum wire size at connection lugs. Use copper wire only. See Fig. 29 and 30.

Table 8 — Connection Lug Min/Max Wire Sizes

CONNECTION	MINIMUM	MAXIMUM
TB1 In Unit Control Box	No. 14	No. 1
80A Disconnect Option	No. 14	No. 4
100A Disconnect Option	No. 8	1/0
25A HACR Option	No. 14	1/0
30A HACR Option	No. 14	1/0
35A HACR Option	No. 14	1/0
40A HACR Option	No. 14	1/0
50A HACR Option	No. 14	1/0
60A HACR Option	No. 14	1/0
70A HACR Option	No. 14	1/0
80A HACR Option	No. 14	1/0
90A HACR Option	No. 14	1/0
100A HACR Option	No. 14	1/0

FIELD WIRING

All field wiring must comply with the NEC and local requirements.

All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the control transformer must be rewired by moving the black wire with the 1/4 in. female spade connector from the 230-v connection and moving it to the 200-v 1/4 in. male terminal on the primary side of the transformer. Refer to unit label diagram for additional information.

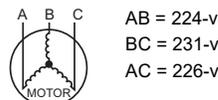
Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 30 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Maximum wire size is 2/0 AWG per pole.

Provide a ground-fault and short-circuit overcurrent protection device (fuse or breaker) per NEC Article 440 (or local codes). Refer to unit informative data plate for MOCP (Maximum Overcurrent Protection) device size.

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

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

Example: Supply voltage is 230-3-60



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

Determine maximum deviation from average voltage.

(AB) 227-224 = 3-v

(BC) 231-227 = 4-v

(AC) 227-226 = 1-v

Maximum deviation is 4-v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227} = 1.76\%$$

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

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

⚠ CAUTION

UNIT DAMAGE HAZARD

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

UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR CIRCUIT BREAKER

The factory-installed option non-fused disconnect (NFD) switch (see Fig. 31) or HACR circuit breaker (see Fig. 32) is located in a weatherproof enclosure located under the main control box. The manual switch handle is shipped in the disconnect or HACR circuit breaker enclosure. Assemble the shaft and handle to the switch or HACR circuit breaker at this point. Discard the factory test leads (see Fig. 32). The factory disconnect is either an 80A or 100A depending on the unit voltage, indoor motor and options.

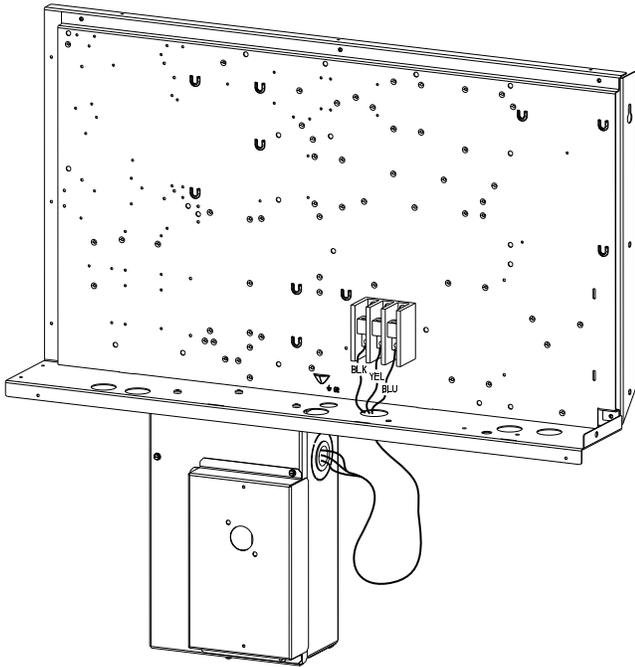


Fig. 31 — Location of Non-Fused Disconnect Enclosure

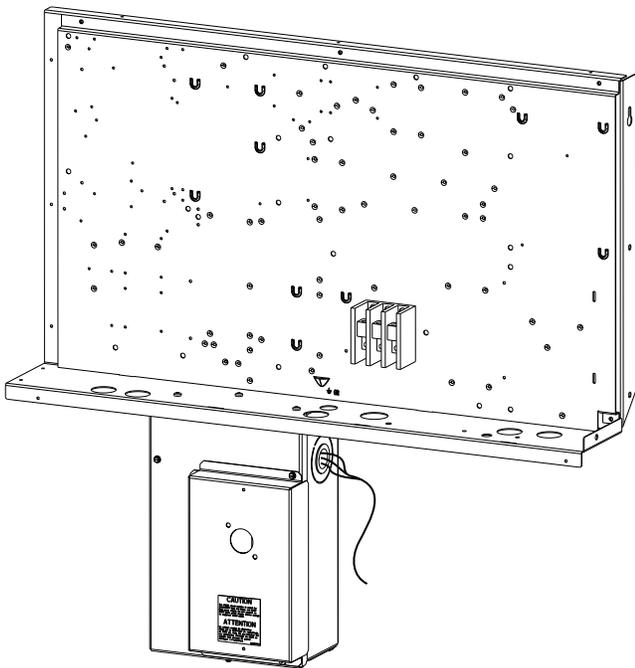


Fig. 32 — Location of HACR Circuit Breaker Enclosure

To field install the NFD shaft and handle:

1. Remove the unit front panel (see Fig. 2).
2. Remove (3) hex screws on the NFD enclosure - (2) on the face of the cover and (1) on the bottom (see Fig. 33).
3. Remove the front cover of the NFD enclosure. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob is at OFF).
4. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.

5. Measure the tip of the shaft to the top surface of the pointer to be 3.75 to 3.88 in. (95 to 99 mm) for 80A and 100A NFD and 3.43 to 3.56 in. (87 to 90 mm) for 200A NFD.
6. Tighten the locking screw to secure the shaft to the NFD.
7. Turn the handle to the OFF position with red arrow pointing at OFF.
8. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
9. Secure the handle to the painted cover with (2) screws and lock washers supplied.
10. Engaging the shaft into the handle socket, reinstall (3) hex screws on the NFD enclosure.
11. Reinstall the unit front panel.

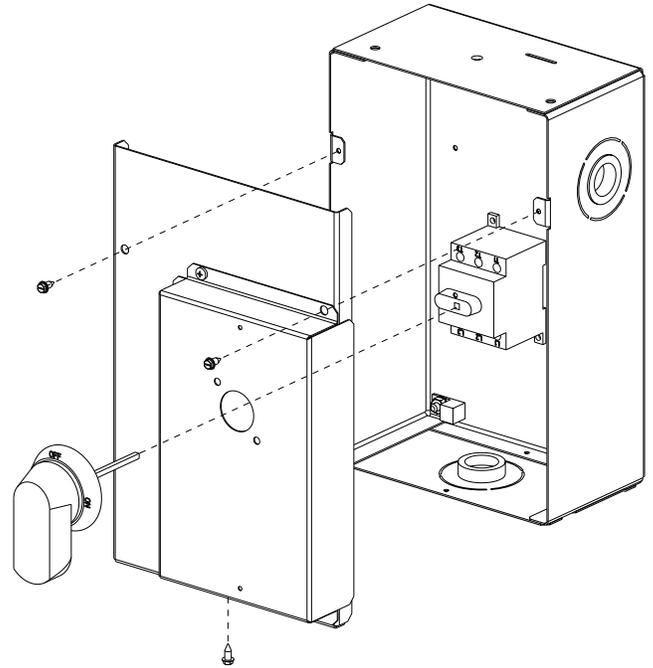


Fig. 33 — Handle and Shaft Assembly for NFD

To field install the HACR circuit breaker shaft and handle:

1. Remove the unit front panel (see Fig. 2).
2. Remove (3) hex screws on the HACR circuit breaker enclosure - (2) on the face of the cover and (1) on bottom (see Fig. 34).
3. Remove the front cover of the HACR circuit breaker enclosure.
4. Make sure the HACR circuit breaker shipped from the factory is at OFF position (the white arrow pointing at OFF).
5. Insert the shaft all the way with the cross pin on the top of the shaft in the horizontal position.
6. Tighten the locking screw to secure the shaft to the HACR circuit breaker.
7. Turn the handle to the OFF position with red arrow pointing at OFF.
8. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
9. Secure the handle to the painted cover with (2) screws and lock washers supplied.
10. Engaging the shaft into the handle socket, reinstall (3) hex screws on the HACR circuit breaker enclosure.
11. Reinstall the unit front panel.

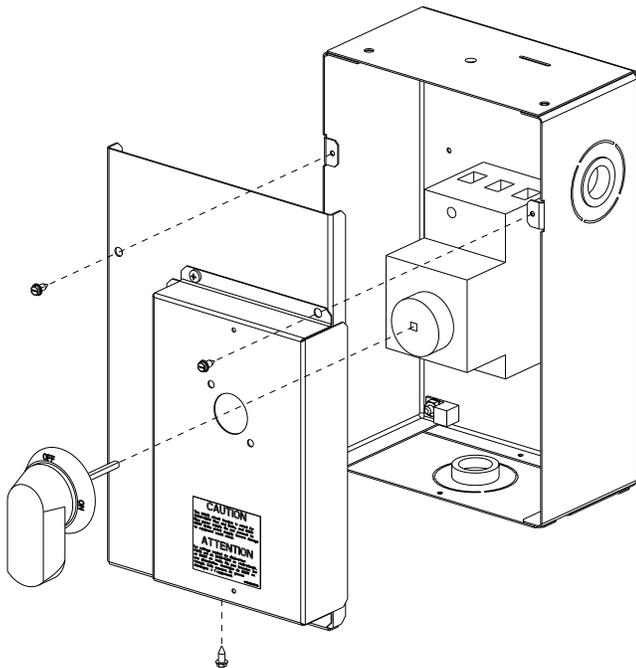


Fig. 34 — Handle and Shaft Assembly for HACR Circuit Breaker

UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR CIRCUIT BREAKER

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

CONVENIENCE OUTLETS

⚠ WARNING
ELECTRICAL OPERATION HAZARD
Failure to follow this warning could result in personal injury or death.
Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

Two types of convenience outlets are offered on 48QE models: non-powered and unit-powered. Both types provide a 125-v GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the end panel of the unit. See Fig. 35.

Installing Weatherproof Cover

A weatherproof cover is now required by UL standards for the factory-installed convenience outlets. This cover cannot be factory-mounted due to its depth; it must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

The kit includes the hinged cover, a backing plate and gasket. See Fig. 36.

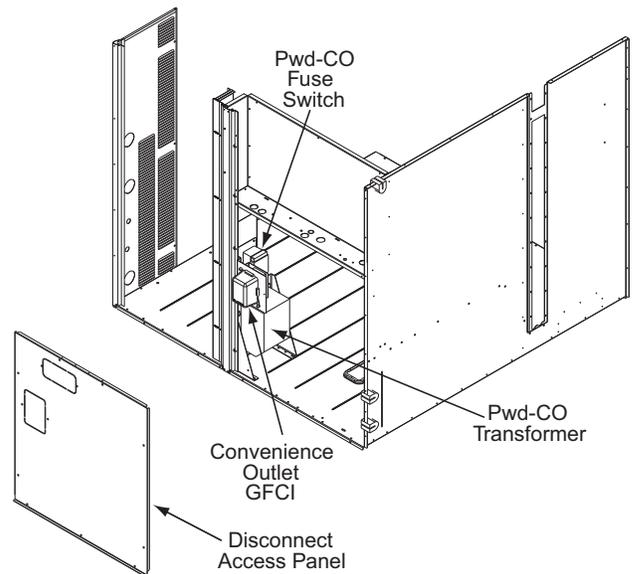


Fig. 35 — Convenience Outlet Location

Disconnect All Power to Unit and Convenience Outlet. Lock-Out and Tag-Out All Power

Remove the blank cover plate at the convenience outlet; discard the blank cover.

Loosen the two screws at the GFCI duplex outlet, until approximately 1/2 in. (13 mm) under screw heads is exposed. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).

Mount the weatherproof cover to the backing plate as shown in Fig. 36. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.

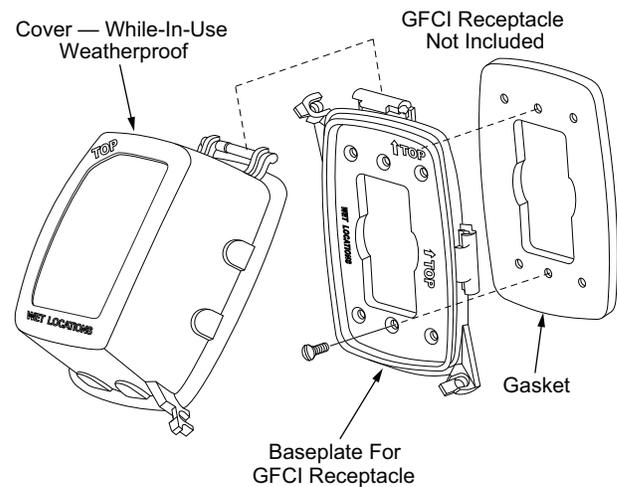


Fig. 36 — Weatherproof Cover Installation

Non-Powered Type

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

Unit-Powered Type

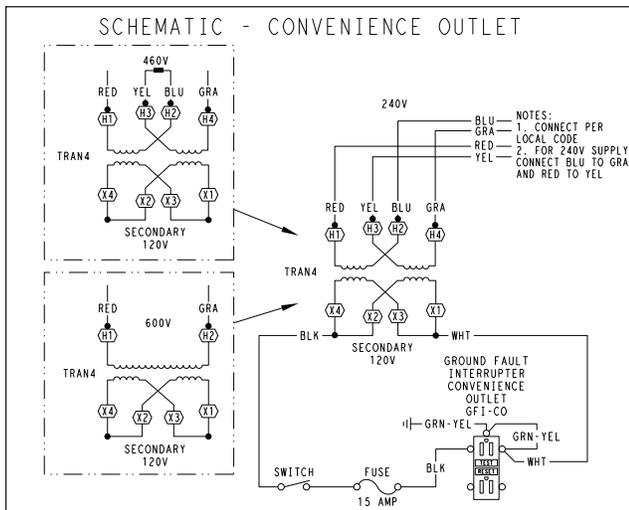
A unit-mounted transformer is factory-installed to step-down the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse,

located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 35.

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect or HACR breaker switch; this will provide service power to the unit when the unit disconnect switch or HACR switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect or HACR switch is open. See Fig. 37. On a unit without a unit-mounted disconnect, connect the source leads to the main terminal block (TB3).

If the convenience outlet transformer is connected to the line side of a field disconnect, the conduit provided with the unit must be used to protect the wires as they are routed from the transformer to the field disconnect. The end of the conduit with the straight connector attaches to the field disconnect. The other end does not need to connect to the transformer; however, the conduit must be routed so that all wiring is either in the conduit or behind the access panel.

If the convenience outlet transformer is connected to the line side of the factory disconnect option, route the wires through the web bushing located on the bottom of the disconnect box. For the load-side wiring to the factory option disconnect, route the wires through the hole on the right side of the disconnect. Be sure to create a drip loop at least 6 inches long.



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

Fig. 37 — Powered Convenience Outlet Wiring

ALL UNITS

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

Unit-Mounted Convenience Outlets

Outlets will often require that two disconnects be opened to de-energize all power to the unit. Treat all units as electrically

energized until the convenience outlet power is also checked and de-energization is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

Fuse on Power Type

The factory fuse is a Bussman™ Fusetron™ T-15, non-renewable screw-in (Edison base) type plug fuse. See Fig. 38 for maximum continuous use amp limitations.

NOTICE

Convenience Outlet Utilization

Maximum Continuous use: 15 Amps for receptacle outlets, and 8 Amps for factory supplied transformers

50HJ542739 C

Fig. 38 — Convenience Outlet Utilization Notice Label

FACTORY-OPTION THRU-BASE CONNECTIONS (ELECTRICAL CONNECTIONS)

This service connection kit consists of a 1/2 in. electrical bulkhead connector and a 1-1/2 in. electrical bulkhead connector, connected to an "L" bracket covering the embossed (raised) section of the unit basepan in the condenser section. See Fig. 39. The 1/2 in. bulkhead connector enables the low-voltage control wires to pass through the basepan. The 1-1/2 in. electrical bulkhead connector allows the high-voltage power wires to pass through the basepan.

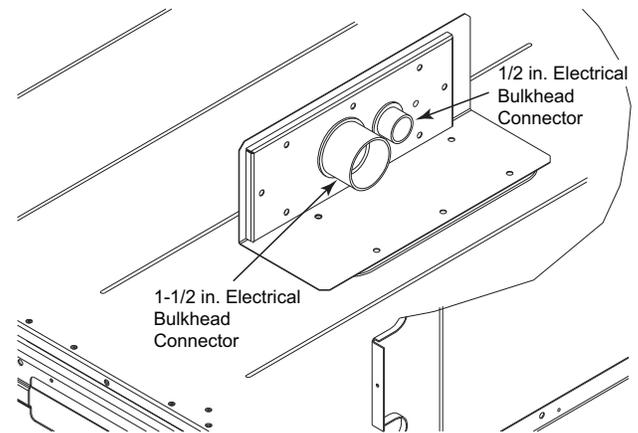


Fig. 39 — Thru-the-Base Option, Shipping Position

1. Remove the "L" bracket assembly from the unit.
2. Remove connector plate assembly from the "L" bracket and discard the "L" bracket, but retain the washer head screws and the gasket (located between the "L" bracket and the connector plate assembly).

NOTE: Take care not to damage the gasket, as it is reused in the following step.

3. Place the gasket over the embossed area in the basepan, aligning the holes in the gasket to the holes in the basepan. See Fig. 40.
4. Install the connector plate assembly to the basepan using 8 of the washer head screws.

NOTE: If electrical connections are not going to occur at this time, tape or otherwise cover the fittings so that moisture does not get into the building or conduit in the interim.

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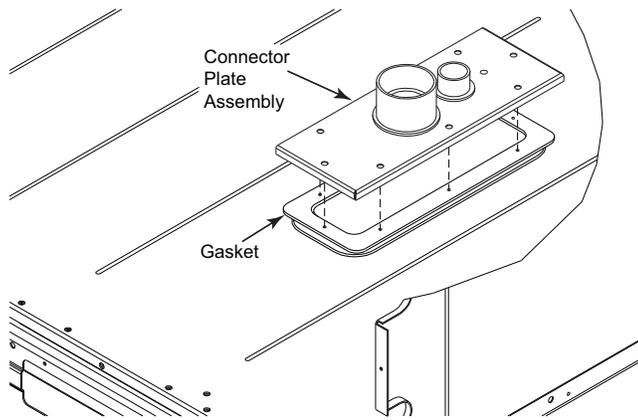


Fig. 40 — Completing Installation of Thru-the-Base Option

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquid tight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage through appropriate conduits. Connect the power conduit to the internal disconnect (if unit is so equipped) or to the external disconnect (through unit side panel). A hole must be field cut in the main control box bottom on the left side so the 24-v control connections can be made.

Connect the control power conduit to the unit control box at this hole.

Units Without Thru-Base Connections

1. Install power wiring conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 30.

Field Control Wiring

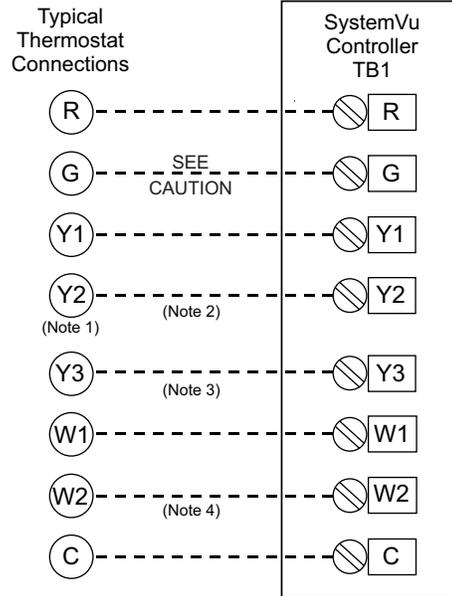
48QE units are equipped with the SystemVu™ controller which can be used on a Carrier Comfort Network® or as a stand-alone control. All field added wire must comply with UL and local NEC standards. See (below) and use the routing path shown in Fig. 42 to help with compliance as needed.

Thermostat

Install a Carrier-approved accessory 2-stage or 3-stage thermostat according to installation instructions included with the accessory. For complete economizer function and 2-stage or 3-stage compressor operation, select a two-stage or three-stage cooling thermostat. If a 2-stage or 3-stage cooling thermostat is not available, use a single stage cooling thermostat instead, but note that this will limit cooling to just 1 stage. Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

If the thermostat contains a logic circuit requiring 24-v power, use a thermostat cable or equivalent single leads of different colors with minimum of seven leads for 2 stage units and eight leads for 3 stage units. If the thermostat does not require a 24-v source (no “C” connection required), use a thermostat cable or equivalent with minimum of six leads for 2 stage units and seven leads for 3 stage units. See Fig. 41. Check the thermostat installation instructions for additional features which might require additional conductors in the cable. For wire runs up to 50 ft (15 m), use no. 18 AWG (American Wire Gauge) insulated wire 95°F (35°C minimum).

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



- NOTES:
1. Typical multi-function marking. Follow manufacturer's configuration instructions to select Y2.
 2. Y2 to Y2 connection required on single-stage cooling units when integrated economizer function is desired.
 3. Y3 terminal is configurable in the software.
 4. W2 connection not required on units with single-stage heating.
- Field Wiring

Fig. 41 — Typical Low-Voltage Control Connections

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may cause a short circuit.

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

Unit without Thru-Base Connection Kit

Pass the thermostat control wires through the bushing on the unit end panel. Route the wire through the snap-in wire tie and up to the web bushing near the control box. Route the wire through the bushing and into the bottom left side of the control box after removing one of the two knockouts in the corner of the box. Use a connector at the control box to protect the wire as it passes into the control box. Pull the wires over to the terminal strip at the lower left corner of the SystemVu controller. Use the connector at the control box and the wire tie to take up any slack in the thermostat wire to ensure that it will not be damaged by contact with the condenser coil. See Fig. 42.

NOTE: If thru-the-bottom connections accessory is used, refer to the accessory installation instructions for information on routing power and control wiring.

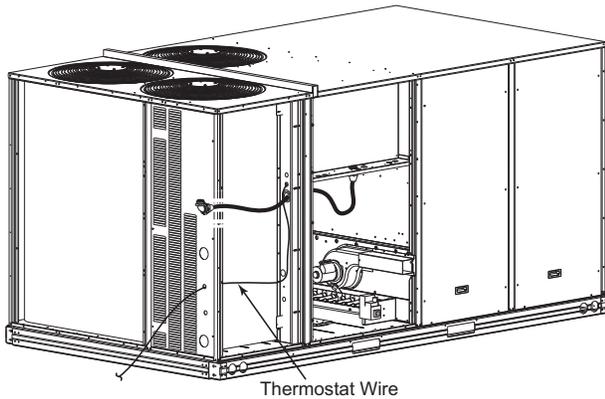


Fig. 42 — Thermostat Wire Routing

ZS SPACE SENSOR

The ZS Standard, Plus, or Pro can be wired into J20 or J24 of the SystemVu controller (see Fig. 47), J20 provides an easy field connection plug. A maximum of 5 ZS sensors can be connected but a separate power supply may be needed. Use the ZS SENSOR CFG menu (*SETTINGS*→*NETWORK SETTINGS*) when setting up the ZS sensors in SystemVu. The Sensor addresses have to be unique and set in the actual sensors via DIP also. The Typical default for the ZS Sensor is address 1. Follow the ZS installation instruction for further details on the sensors. ZS sensor data can be monitored on SystemVu in the ZS Sensor Info menu (*INPUTS*→*NETWORK*→*ZS SENSOR INFO*).

- J20-1 Sensor Common
- J20-2 Sensor Communication Positive (+)
- J20-3 Sensor Communication Negative(-)
- J20-4 Sensor +12 vdc Power

HUMIDI-MIZER® CONTROL CONNECTIONS

Humidi-MiZer Space RH Controller

NOTE: The Humidi-MiZer system is a factory-installed option.

The Humidi-MiZer dehumidification system requires a field-supplied and field-installed space relative humidity control device such as Carrier’s Connect Plus thermostat with isolated contact set for dehumidification control. See Fig. 43.



Fig. 43 — Field-Installed Connect Plus Thermostat

Connecting the Carrier Connect Plus (33TCSPL-4)

1. Route the multi-conductor thermostat cable (field-supplied) through the bushing the on unit’s louvered end panel.
2. Route the cable through the snap-in wire tie and up to the web bushing near the control box. This provides the UL-required clearance between high-voltage and low-voltage wiring.

3. Feed the cable through the bushing and into the bottom left side of the control box after removing one of the two knock-outs in the corner of the box. Use a connector to protect the cable as it enters the control box.
4. Use the connector and the wire tie to reduce any slack in the thermostat cable to ensure that it will not be damaged by contact with the condenser coil.
5. For connections to the SystemVu controller MBB (Main Base Board) see Fig. 44. Refer to the installation instructions included with the Carrier Connect Plus thermostat for more information.

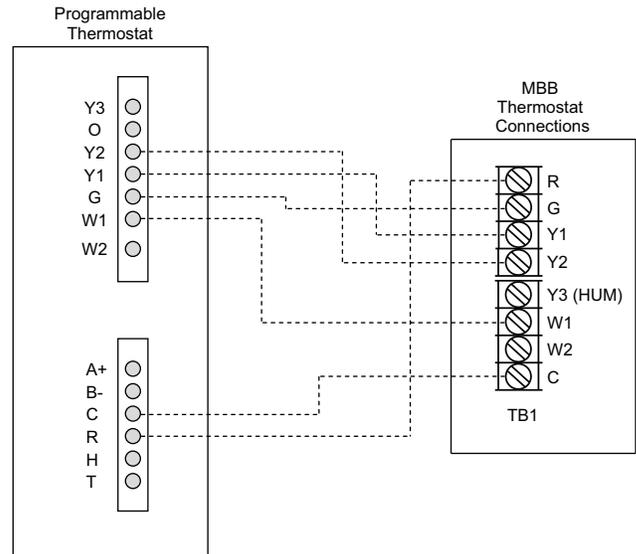


Fig. 44 — Typical Thermostat Connections – SystemVu Controller MBB

Humidi-MiZer Connections to Connect Plus Thermostat

1. Route the humidistat 2-conductor cable (field-supplied) through the bushing on the unit’s louvered end panel.
2. Route the cable through the snap-in wire tie and up to the web bushing near the control box. This provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Feed the cable through the bushing and into the bottom left side of the control box after removing one of the two knock-outs in the corner of the box. Use a connector to protect the cable as it enters the control box.
4. Use the connector and the wire tie to reduce any slack in the humidistat cable to ensure that it will not be damaged by contact with the condenser coil.
5. For 2-Stage SystemVu controller units connect one of the leads from the 2-conductor cable to the Y3 (HUM) terminal on the MBB (Main Base Board). Connect the other lead to the R terminal on the MBB. See Fig. 45.
6. For 3-Stage SystemVu controller units, if TB3 terminals 1 and 2 or 5 and 6 are open, connect one of the leads from the 2-conductor cable to TB3 terminal 1 (or 5) on the MBB (Main Base Board), and connect the other lead to TB3 terminal 2 (or 6) on the MBB (see Fig. 46.). If these terminals are not open, use a space or relative humidity sensor or communicating space sensor. More instructions can be found in the *FEQ/GEQ/QE Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting* manual.

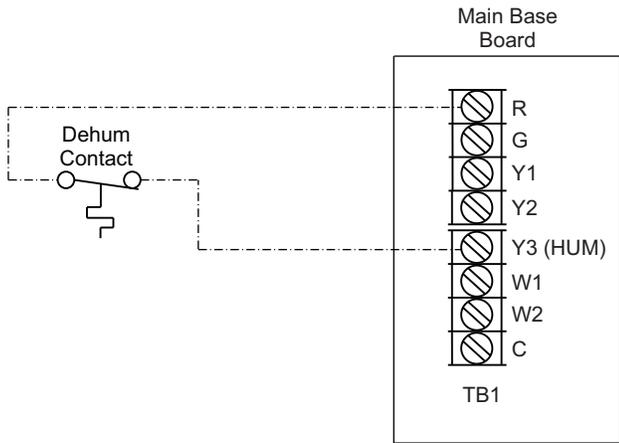


Fig. 45 — Humidistat Connections to MBB (2-Stage SystemVu Units)

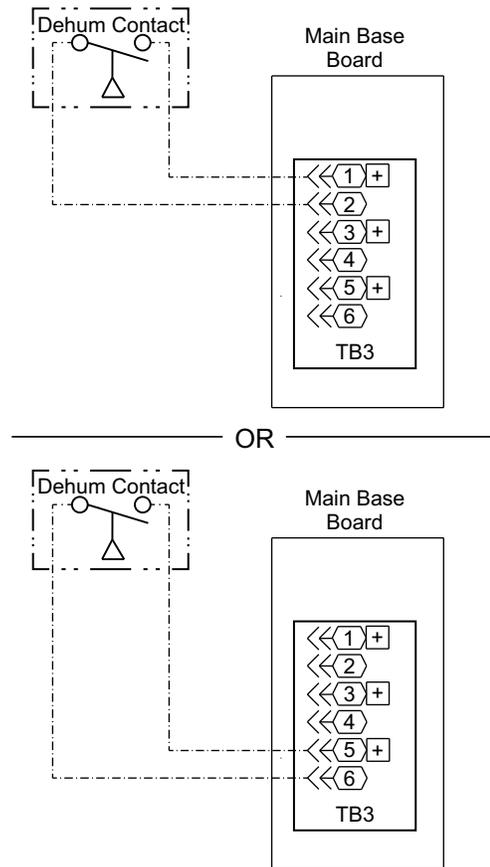
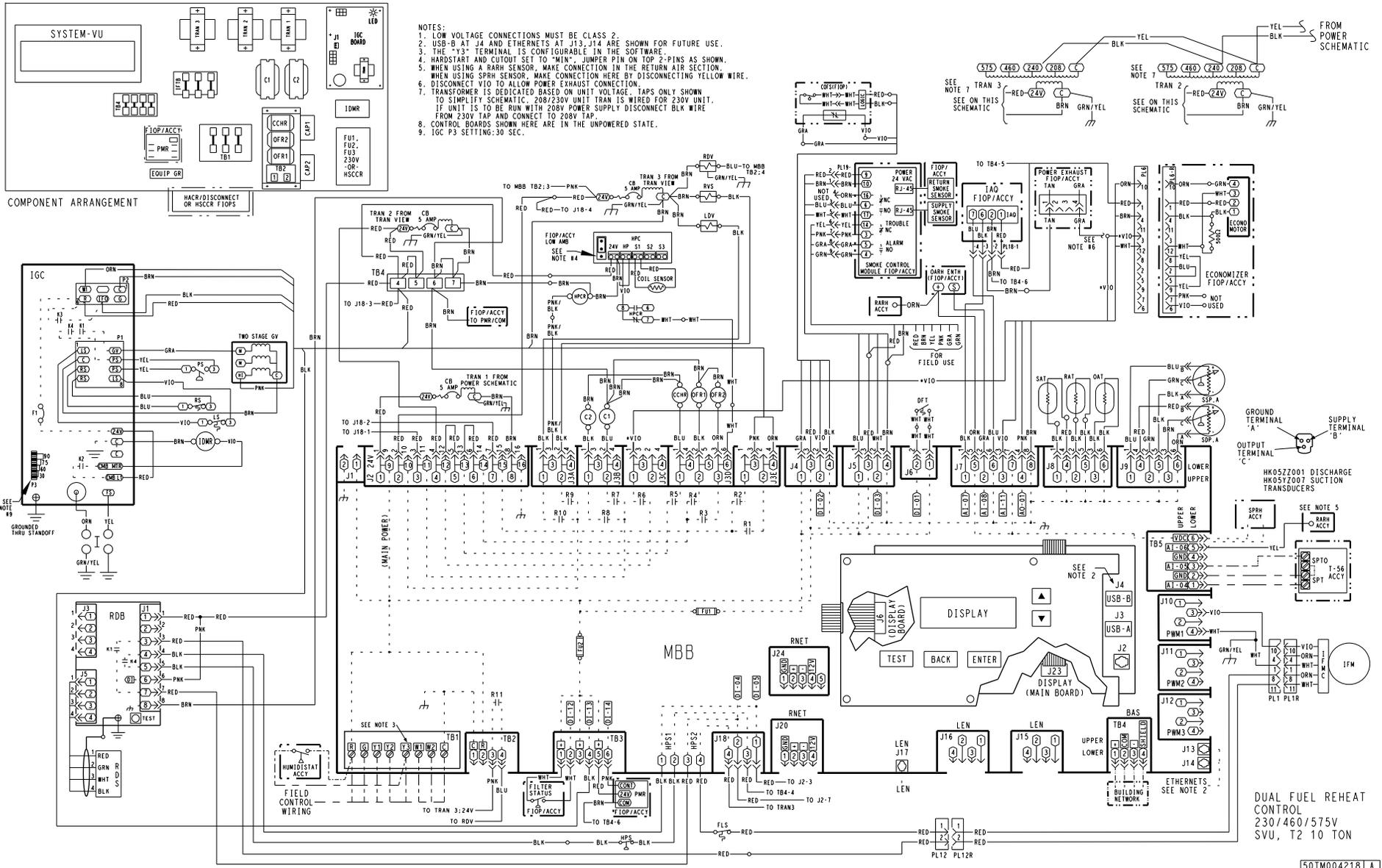
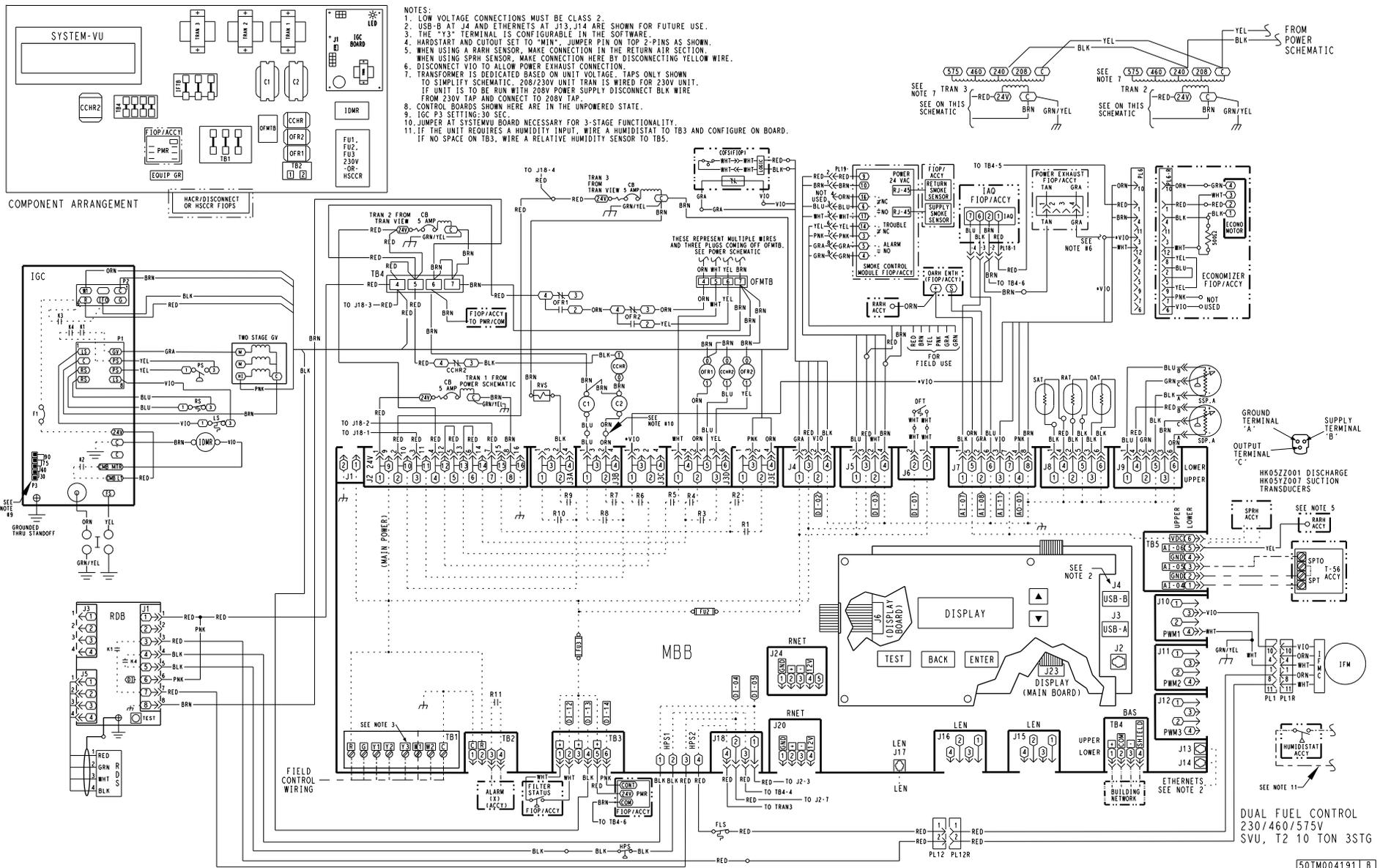


Fig. 46 — Humidistat Connections to MBB (3-Stage SystemVu Units)

CONTROL AND POWER WIRING DIAGRAMS

Figures 47-52 are typical control and power wiring diagrams. These wiring diagrams are mounted on the inside of the unit control box. Refer to the wiring diagrams in the unit control box when making field power wiring connections.





- NOTES:
1. LOW VOLTAGE CONNECTIONS MUST BE CLASS 2.
 2. USB-B AT J4 AND ETHERNETS AT J13, J14 ARE SHOWN FOR FUTURE USE.
 3. THE *V5 TERMINAL IS CONFIGURABLE IN THE SOFTWARE.
 4. HARDSTART AND CUTOFF SET TO "MIN". JUMPER PIN ON TOP 2-PINS AS SHOWN.
 5. WHEN USING A RARH SENSOR, MAKE CONNECTION IN THE RETURN AIR SECTION.
 6. DISCONNECT V10 TO ALLOW POWER EXHAUST CONNECTION.
 7. TRANSFORMER IS DEDICATED BASED ON UNIT VOLTAGE. TAPS ONLY SHOWN TO SIMPLIFY SCHEMATIC. 208/230V UNIT TRN 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.
 8. CONTROL BOARDS SHOWN HERE ARE IN THE UNPOWERED STATE.
 9. FCC P3 SETTING-30 SEC.
 10. JUMPER AT SYSTEM/BOARD NECESSARY FOR 3-STAGE FUNCTIONALITY.
 11. IF THE UNIT REQUIRES A HUMIDITY INPUT, WIRE A HUMIDISTAT TO TB3 AND CONFIGURE ON BOARD. IF NO SPACE ON TB3, WIRE A RELATIVE HUMIDITY SENSOR TO TB5.

Fig. 49 — Typical 3-Stage 48QE 12 Control Wiring Diagram, SystemVu™ Controller, 230, 460, 575-3-60 Unit Shown

50TM004191 B

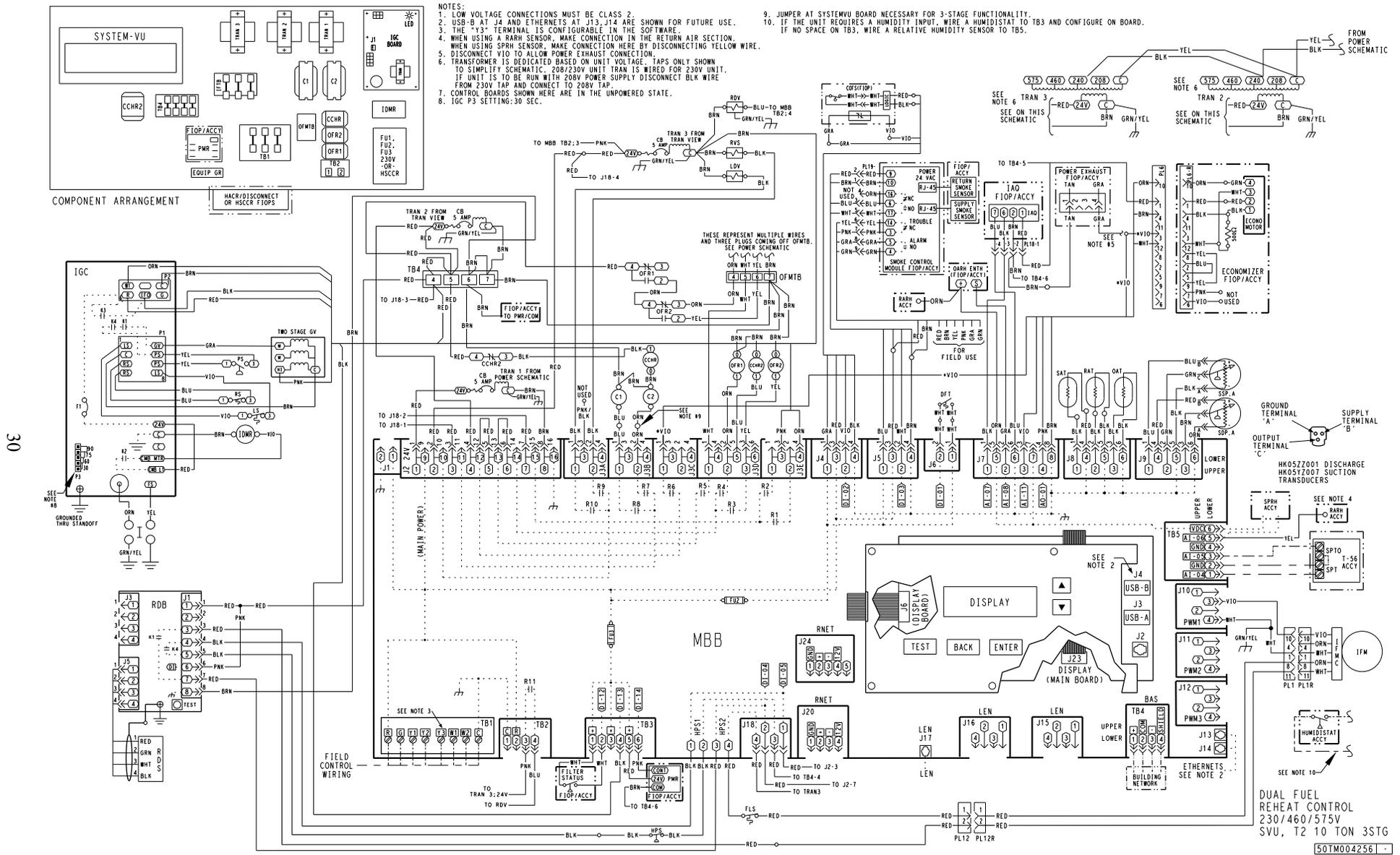


Fig. 50 — Typical 3-Stage 48QE 12 Control Wiring Diagram, SystemVu™ Controller with Humidi-MiZer System Option, 230, 460, 575-3-60 Unit Shown

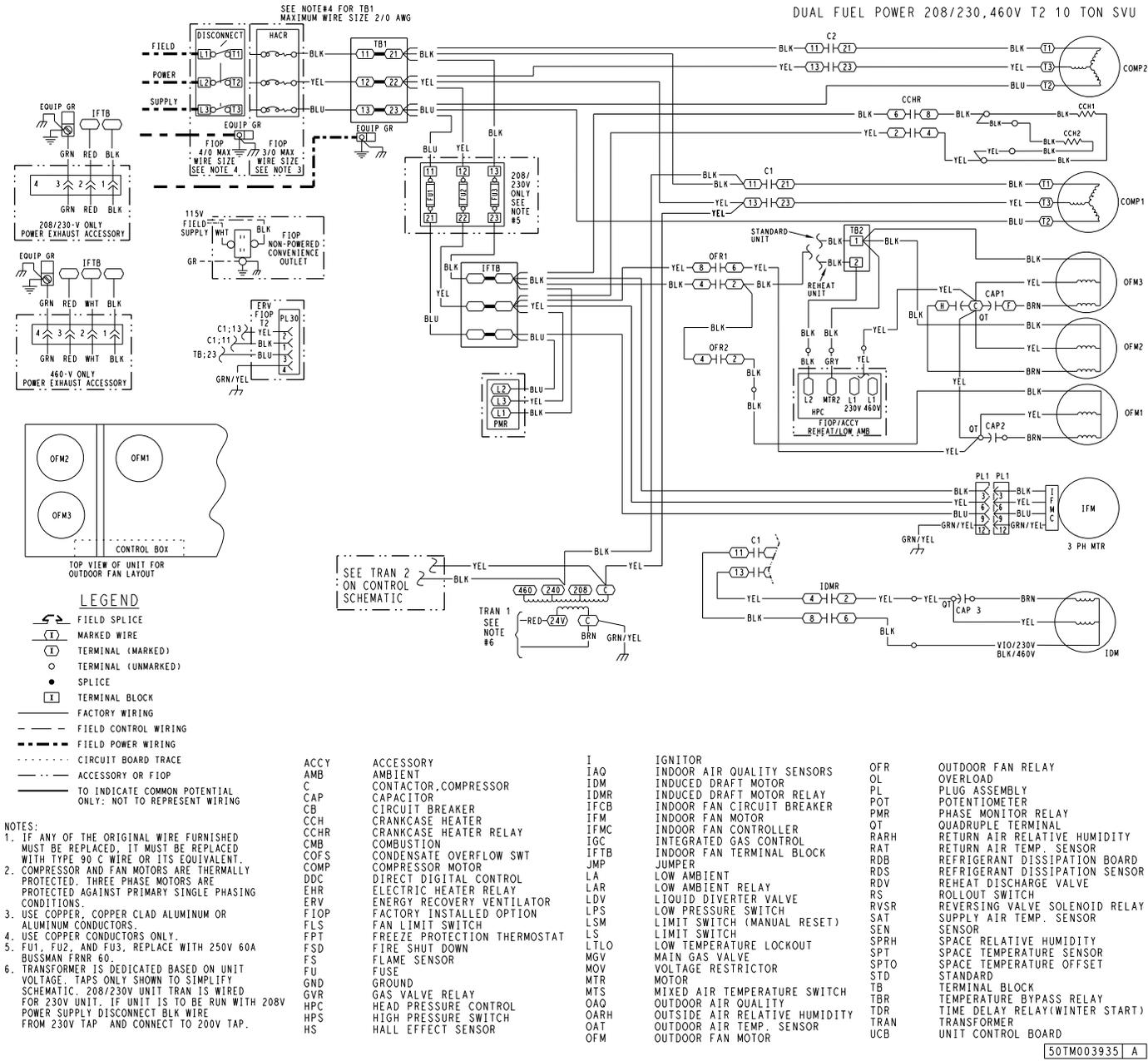


Fig. 51 — Typical 2-Stage 48QE 12 Power Wiring Diagram, SystemVu Controller — 208/230, 460-3-60 Unit Shown

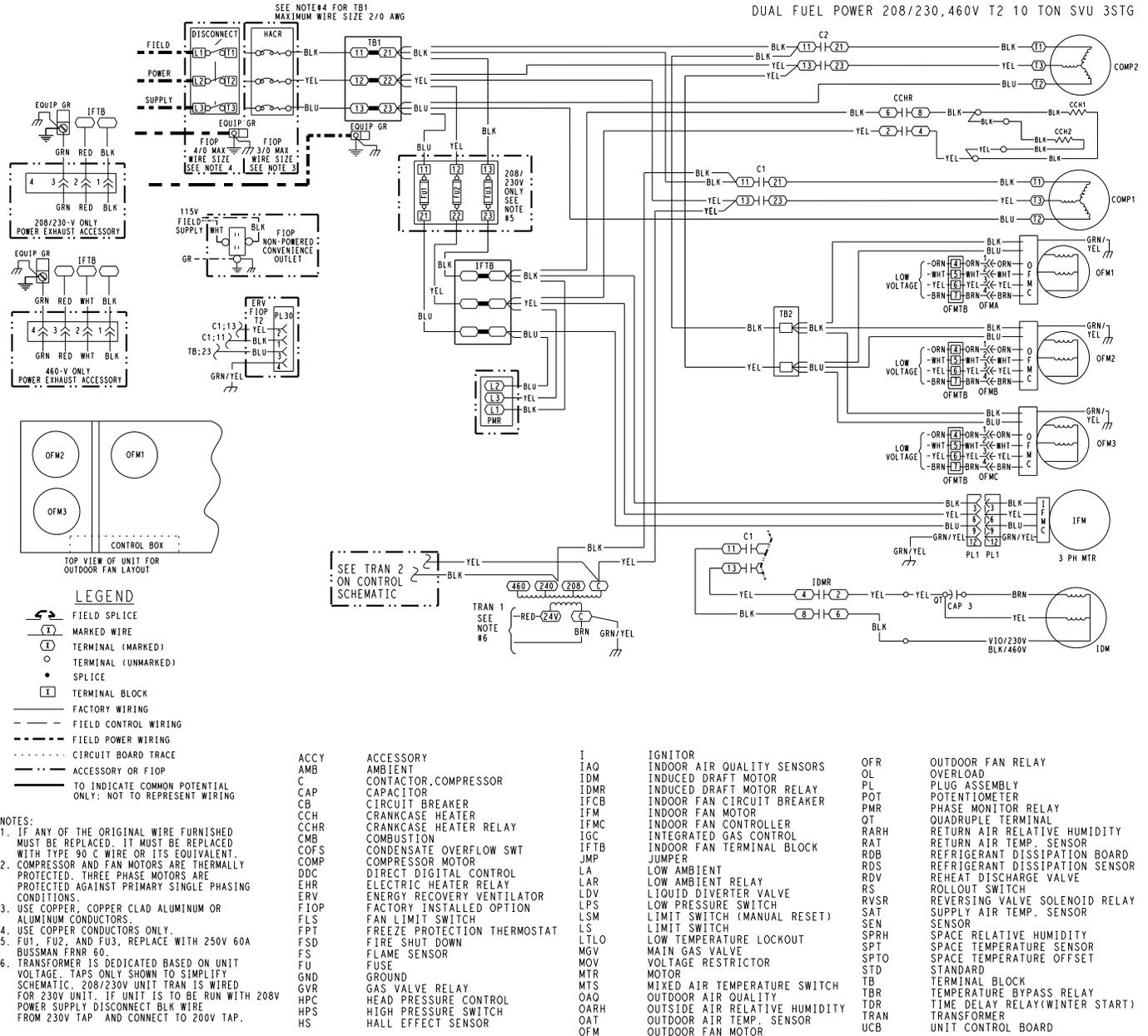


Fig. 52 — Typical 3-Stage 48QE 12 Power Wiring Diagram, SystemVu Controller — 208/230, 460-3-60 Unit Shown

Integrated Gas Controller

This unit contains an Integrated Gas Controller (IGC) board. The IGC control board uses a flue gas pressure switch that senses pressure drop in the heat exchanger due to the combustion inducer. See Fig. 53.

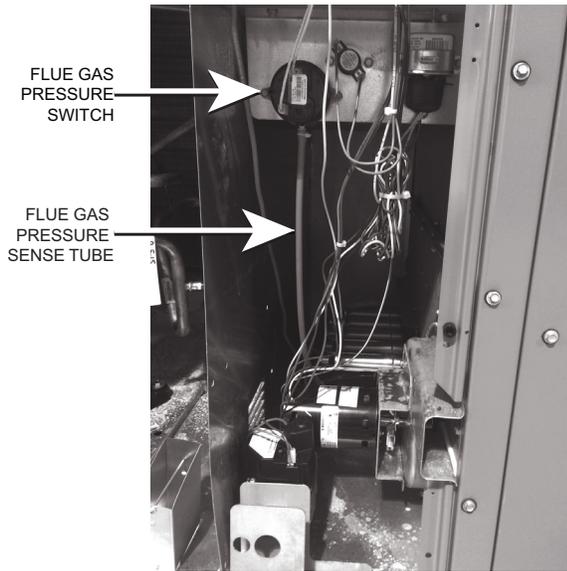


Fig. 53 — Flue Gas Pressure Switch and Pressure Sense Tube (Typical Location)

When the thermostat calls for heating, power is sent to W on the Integrated Gas Controller (IGC) board. An LED (light emitting diode) on the IGC board turns on and remains on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed, and that the pressure switch is open. If the check was successful, the induced draft motor is energized. When the pressure in the heat exchanger is low enough to close the pressure switch, the ignition activation period begins. Once ignition occurs, the IGC board will continue to monitor the condition of the rollout switch, the limit switches, the pressure switch, and the flame sensor. 45 seconds after ignition occurs, the IFO sends 24vac to TB3-4 to prove fan output to DI-13, and the outdoor air dampers will open to their minimum position. If the “over temperature limit” opens prior to the start of the indoor fan blower, the IGC will shut down the burners, and the control will shorten the 45 second delay to 5 seconds less than the time to trip the limit. For example, if the limit trips at 37 seconds, the control will change the “fan on delay” from 45 seconds to 32 seconds. Once the “fan on delay” has been modified, it will not change back to 45 seconds unless power is reset to the control. On units with 2 stages of heat, W2 closes and initiates power to the second stage of the main gas valve when additional heat is required. See Fig. 55 for IGC operating sequence.

When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto, the indoor fan motor will continue to operate for an additional 90 seconds, then stop. An LED indicator is provided on the IGC to monitor operation. See Table 9 for details on the IGC board LED alarm codes.

See Fig. 54 for IGC board component layout. See Fig. 47 for typical IGC control wiring connections to the SystemVu controller. Table 9 lists the IGC Board LED Alarm Codes.

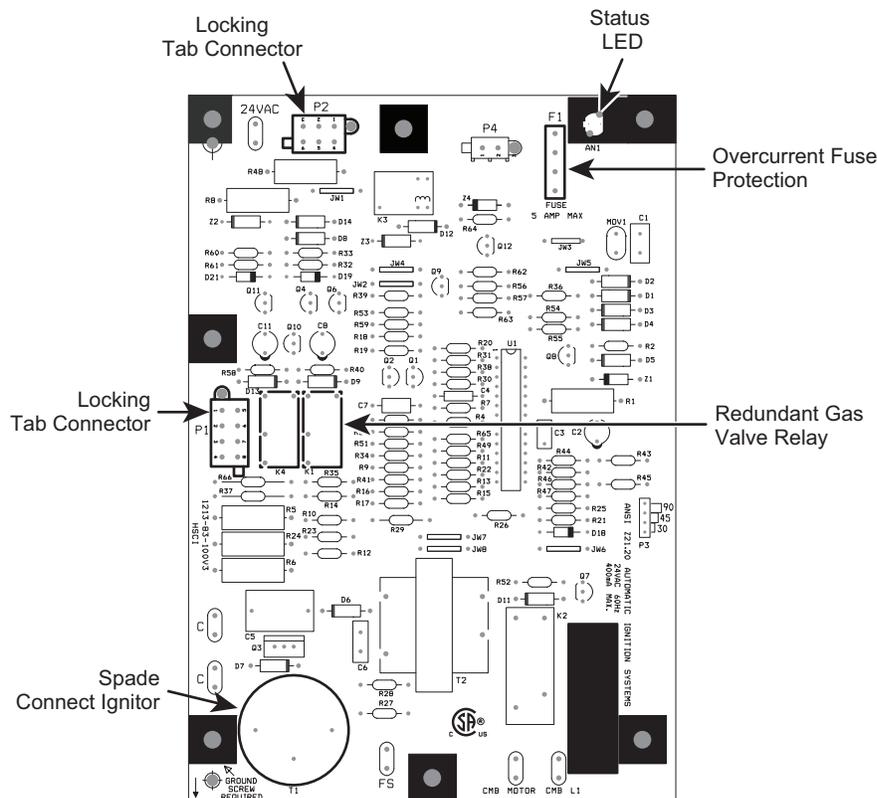


Fig. 54 — IGC Board Component Layout

Table 9 – IGC Board LED Alarm Codes^{a,b,c,d}

LED FLASH CODE	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
On	Normal Operation	—	—	—
Off	Hardware Failure	No gas heating.	—	Loss of power to the IGC. Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, transformer, and wiring to the IGC.
1 Flash	Indoor Fan On/Off Delay Modified	5 seconds subtracted from On delay. 5 seconds added to Off delay (3 minute maximum).	Power reset.	High temperature limit switch opens during heat exchanger warm-up period before fan-on delay expires. High temperature limit switch opens within 10 minutes of heat call (W) Off. See Limit Switch Fault.
2 Flashes	Limit Switch Fault	Gas valve and igniter Off. Indoor fan and inducer On.	Limit switch closed or heat call (W) Off.	High temperature limit switch is open. Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is within the range on the unit nameplate. Check wiring and limit switch operation.
3 Flashes	Flame Sense Fault	Indoor fan and inducer On.	Flame sense normal. Power reset for LED reset.	The IGC sensed a flame when the gas valve should be closed. Check wiring, flame sensor, and gas valve operation.
4 Flashes	Four Consecutive Limit Switch Fault	No gas heating.	Heat call (W) Off. Power reset for LED reset.	Four consecutive limit switch faults within a single call for heat. See Limit Switch Fault.
5 Flashes	Ignition Fault	No gas heating.	Heat call (W) Off. Power reset for LED reset.	Unit unsuccessfully attempted ignition for 15 minutes. Check igniter and flame sensor electrode spacing, gaps, etc. Check flame sense and igniter wiring. Check gas valve operation and gas supply.
6 Flashes	Induced Draft Motor/Pressure Switch Fault	If heat off: no gas heating. If heat on: gas valve Off and inducer On.	Inducer sense normal or heat call (W) Off.	Inducer sense On when heat call Off, or inducer sense Off when heat call On. Check wiring, voltage, and operation of IGC motor. Check inducer motor and flue gas pressure switch.
7 Flashes	Rollout Switch Lockout	Gas valve and igniter Off. Indoor fan and inducer On.	Power reset.	Rollout switch has opened. Check gas valve operation. Check induced-draft blower wheel is properly secured to motor shaft.
8 Flashes	Internal Control Lockout	No gas heating.	Power reset.	IGC has sensed internal hardware or software error. If fault is not cleared by resetting 24-v power, check for bad gas valve, replace the IGC.
9 Flashes	Temporary Software Lockout	No gas heating.	One hour auto reset or power reset.	Electrical interference is disrupting the IGC software.

NOTE(S):

- a. There is a 3-second pause between alarm code displays.
- b. If more than one alarm code exists, then all applicable alarm codes will be displayed in numerical sequence.
- c. Alarm codes on the IGC will be lost if power to the unit is interrupted.
- d. If the flue gas inducer pressure switch is stuck closed on a W1 call, then the unit will sit idle, and the IGC will produce no fault codes.

LEGEND

- IGC** — Integrated Gas Unit Control
LED — Light-Emitting Diode

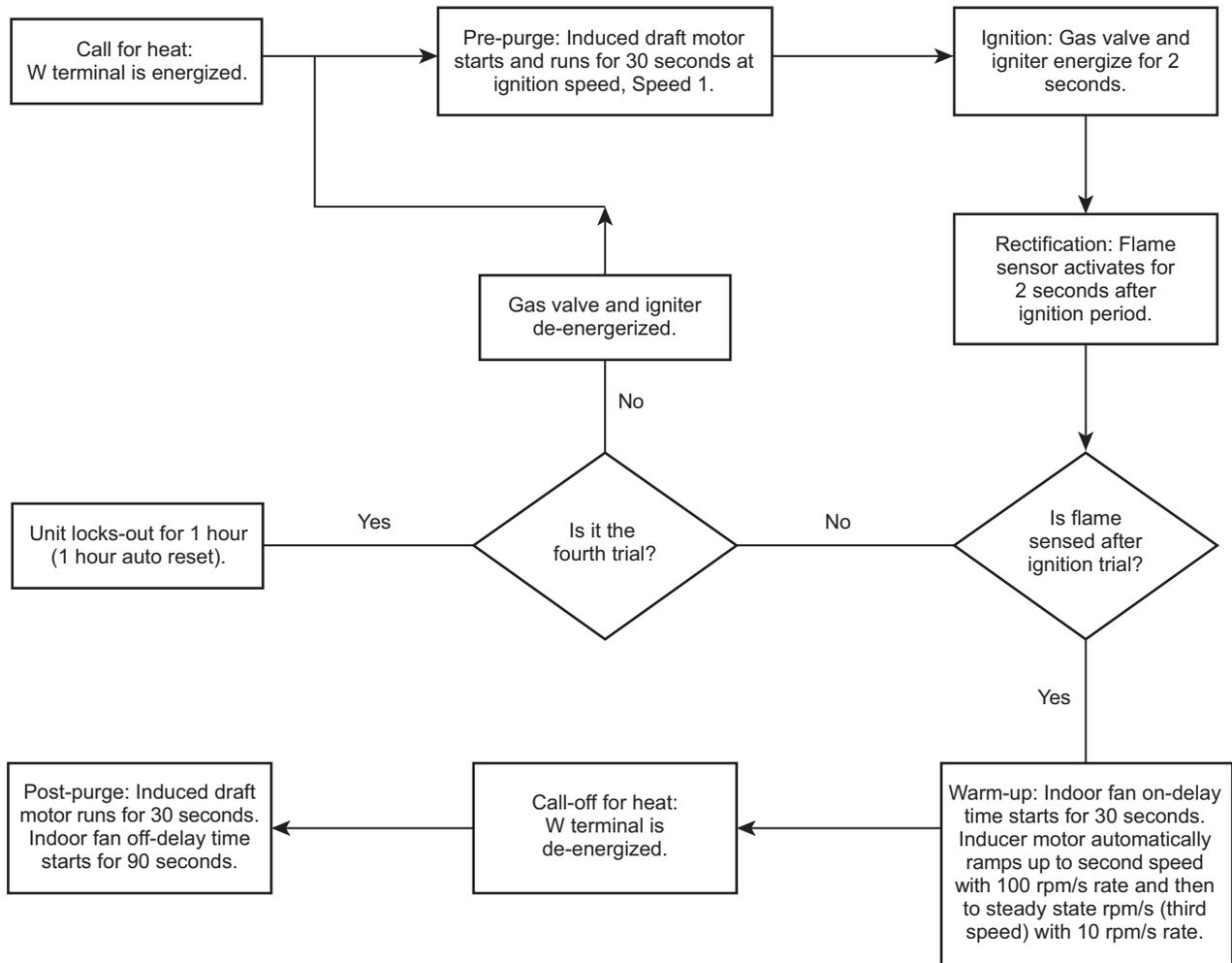


Fig. 55 – IGC Operating Sequence

Leak Dissipation System

48QE units use R-454B refrigerant. These units are equipped with a factory installed R-454B leak dissipation system to ensure safe operation in the event of a refrigerant leak. This system consists of an A2L sensor (Fig. 56) and the dissipation control board (see Fig. 57) which are located in the Indoor Coil section of the unit (see the view labeled “BACK” in Fig. 2 on page 7). The A2L sensor is located between the indoor coil and the air filters.

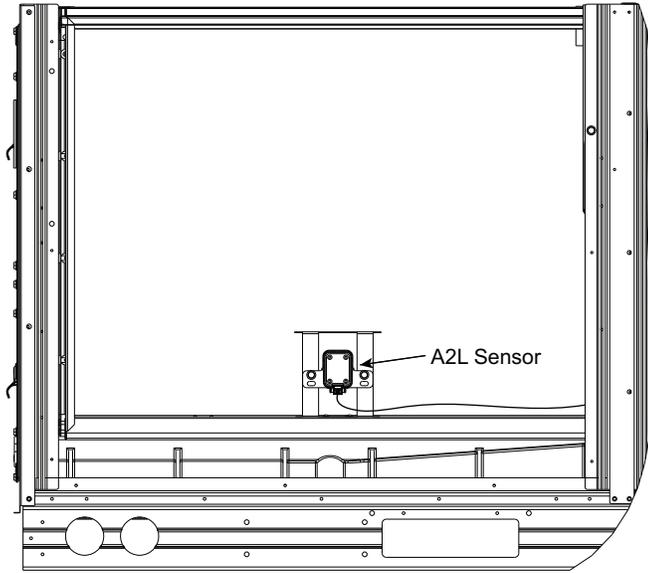


Fig. 56 — Location of AL2 Sensor

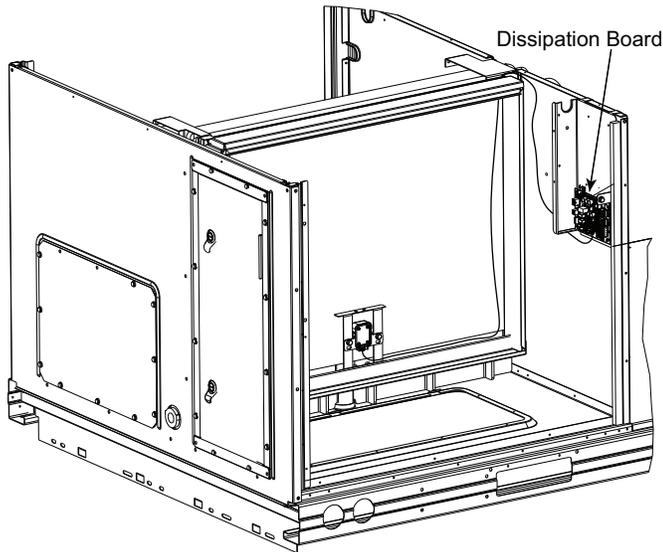


Fig. 57 — Location of Dissipation Control Board (shown with dust cover removed)

The A2L detection sensor communicates via a wiring harness to the dissipation board. The sensor harness is routed on the bottom of the filter rack towards the unit bulkhead and secured with wire ties. The sensor harness then runs up the side of the filter rack and exits over the top of the rack towards the dissipation board.

NOTE: The drain wire must be properly connected to the ground lug on the dissipation board via the quick connect and ground harness. Failure of proper sensor harness grounding can lead to false dissipation events.

SEQUENCE OF OPERATION

The control functions as an R454B refrigerant dissipation system. If the refrigerant detection sensor sends a signal indicating a refrigerant leak, the control board will prevent heating and cooling operation and begin dissipating the sensed refrigerant with a blower request. The refrigerant dissipation board will display a flash code from the yellow status LED (see Fig. 58) indicating the sensor that detected the refrigerant. See Fig. 60 on page 38 for the full text on the Dissipation Control dust cover label.

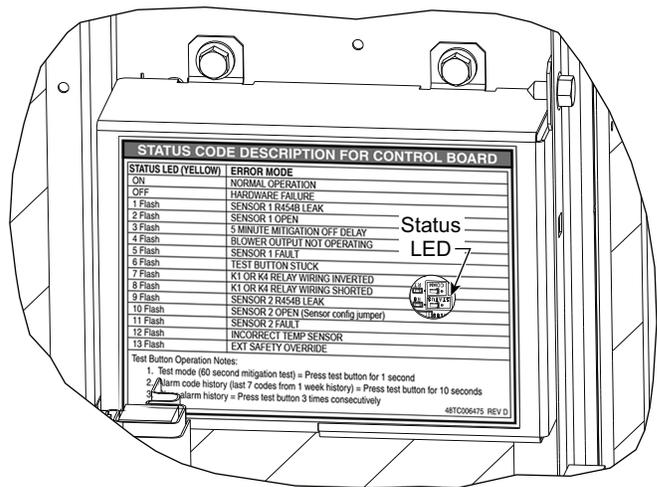
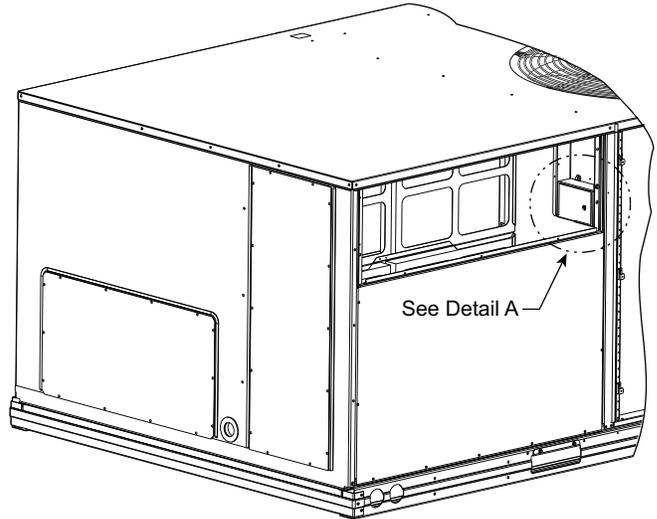
When the sensor signal indicates the refrigerant has dissipated, the dissipation board yellow status LED will display a flash code 3 and return to its normal state and allow unit operations after a 5 minute delay.

LEAK DISSIPATION SYSTEM SELF-TEST

Power on the unit and verify proper functioning of equipment. The yellow Status LED on the dissipation board should be steady (see Fig. 58). If flash codes are present, see Troubleshooting on page 38.

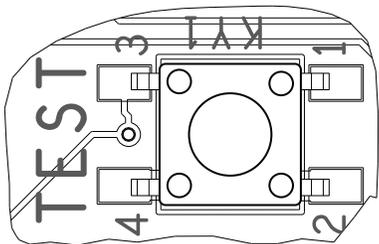
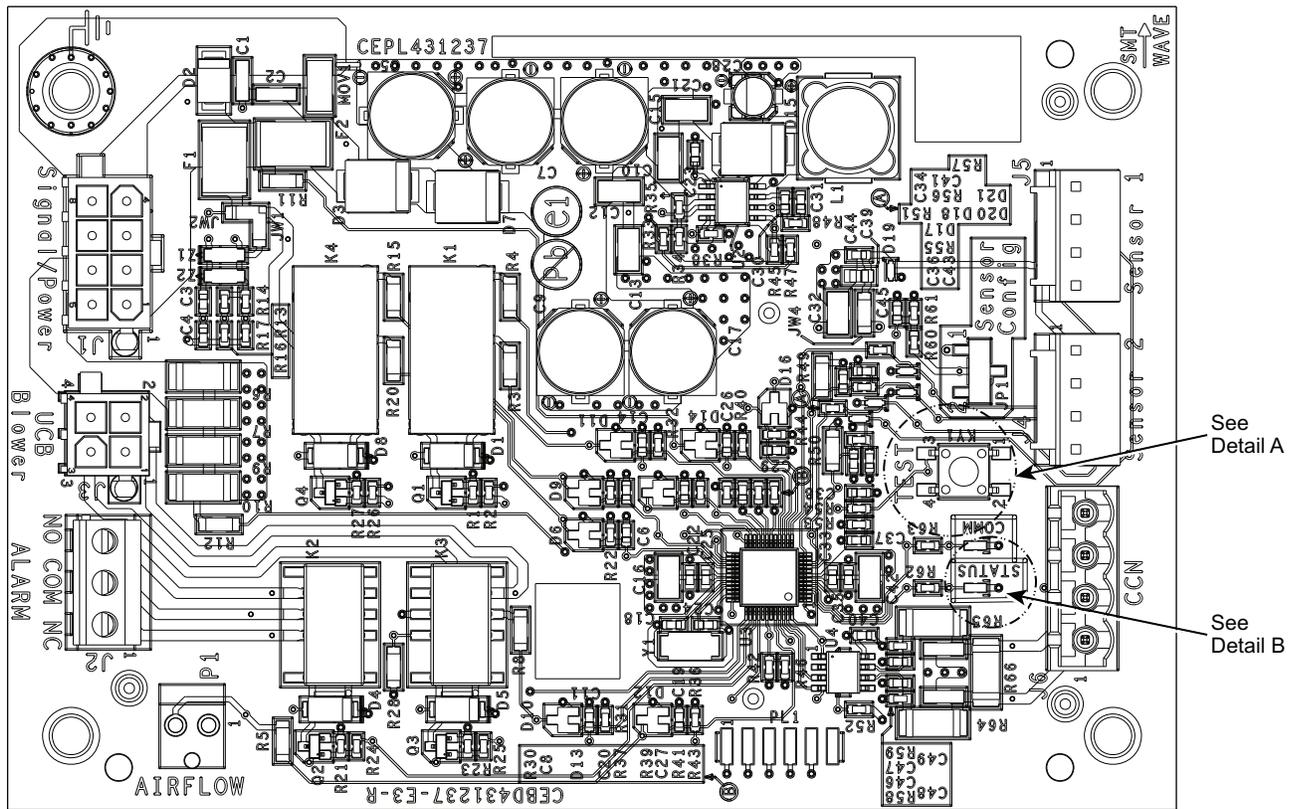
NOTE: Operation of the Test Mode is only possible if no faults exist on the dissipation board.

Remove the dust cover from the Dissipation control board to access the Test button (see Fig. 59). The Test button is located above the COMM LED.

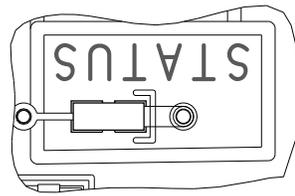


Detail A

Fig. 58 — Yellow STATUS LED



Detail A — Test Button



Detail B — Status LED

Fig. 59 — Dissipation Control Board — shown without dust cover

Press the Test button on the dissipation system control board to ensure proper dissipation system operation under each test condition listed below. After pressing the Test button, system will enter Dissipation Mode for 60 seconds to help verify correct operation.

IMPORTANT: Press the Test button for roughly ONE SECOND to enter Test Mode. Pressing the Test button for a longer periods enables different functions (see Table 10).

Table 10 — Dissipation Board Test Button Functions

HOLD BUTTON TIME (SEC)	FUNCTION
1-4	Dissipation Mode for 60 seconds
5-29	Display flash code history
30+	Flash code 6
3 Rapid Presses	Clear flash code history

Ensure that the unit is able to meet the minimum required dissipation mode airflows. These required minimum airflow rates during Dissipation Mode are listed in Table 11. They are based on the total system refrigerant charge quantity.

Table 11 — Minimum Dissipation Air Flows

MINIMUM DISSIPATION AIR FLOW (cfm)	
UNIT	cfm
48QE*M/R/T/X12	550
48QE*N/S/U/Y	930

Table 12 details the required operational checks to ensure proper dissipation system function.

Table 12 — Dissipation System Required Operational Checks

NORMAL OPERATION				
TEST NO.	UNIT DEMAND	COMPRESSOR	INDOOR FAN	ELECTRIC/GAS HEAT
1	None	Off	Off	Off
2	Cool	On	On	Off
3	Heat	On	On	On
DISSIPATION ACTIVATED				
4	None	Off	On	Off
5	Cool	Off	On	Off
6	Heat	Off	On	Off

Figure 60 shows the flash codes displayed on the Dissipation Control Board.

STATUS CODE DESCRIPTION FOR CONTROL BOARD	
STATUS LED (YELLOW)	ERROR MODE
ON	NORMAL OPERATION
OFF	HARDWARE FAILURE
1 Flash	SENSOR 1 R454B LEAK
2 Flash	SENSOR 1 OPEN
3 Flash	5 MINUTE MITIGATION OFF DELAY
4 Flash	BLOWER OUTPUT NOT OPERATING
5 Flash	SENSOR 1 FAULT
6 Flash	TEST BUTTON STUCK
7 Flash	K1 OR K4 RELAY WIRING INVERTED
8 Flash	K1 OR K4 RELAY WIRING SHORTED
9 Flash	SENSOR 2 R454B LEAK
10 Flash	SENSOR 2 OPEN (Sensor config jumper)
11 Flash	SENSOR 2 FAULT
12 Flash	INCORRECT TEMP SENSOR
13 Flash	EXT SAFETY OVERRIDE

Test Button Operation Notes:

1. Test mode (60 second mitigation test) = Press test button for 1 second
2. Alarm code history (last 7 codes from 1 week history) = Press test button for 10 seconds
3. Clear alarm history = Press test button 3 times consecutively

48TC006475 REV D

Fig. 60 – Dissipation Control Cover Label

TROUBLESHOOTING

For all flash codes, first try power cycling the system to remove the code.

No Power

Verify the wiring to/from pins 1 and 8 on the power harness plug. Check the 24V system wiring from the transformer.

See Table 13 for details on the operating status and troubleshooting of the Dissipation system for the various flash codes.

Table 13 – Status LED Troubleshooting Table

STATUS LED	REASON	CONTROL VERBIAGE	MODE
Flashing 1	Sensor 1 \geq 20% LFL	SENSOR 1 R454B LEAK	Dissipation in Process
Flashing 2	Sensor 1 Open	SENSOR 1 OPEN	Dissipation in Process
Flashing 3	5 Minute Blower Operating, Sensor < 20% LFL and sensors are not opened (done after fault 1, 2, 9 and 10)	MITIGATION OFF DELAY ACTIVE	Dissipation in Process
Flashing 4	0 VAC sensed on G output.	BLOWER OUTPUT NOT OPERATING	Dissipation in Process
Flashing 5	Fault with the A2L digital sensor	SENSOR 1 FAULT	Dissipation in Process
Flashing 6	If KY1 is stuck pressed for more than 30 seconds.	TEST BUTTON STUCK	To prevent a shorted KY1 to keep the mitigation running continuously.
Flashing 7	Y out switched with Y in or W out switched with W in	Y (K4) OR W (K1) WIRING INVERTED	Normal mode
Flashing 8	Y or W shorted (relay detects both sides are high)	Y (K4) OR W (K1) OUTPUT SHORTED TO Y (K4) OR W (K1) INPUT	Normal mode
Flashing 9^a	Sensor 2 \geq 20% LFL	SENSOR 2 R454B LEAK	Dissipation in Process
Flashing 10^a	Sensor 2 Open	SENSOR 2 OPEN	Dissipation in Process
Flashing 11^a	Fault with the second A2L digital sensor	SENSOR 2 FAULT	Dissipation in Process
Flashing 12	High temperature sensor attached on commercial	INCORRECT TEMP SENSOR	Normal mode
Flashing 13	G input signal is lost. Indicates another unit safety will override dissipation.	EXT SAFETY OVERRIDE	Normal mode

NOTE(S):

- There is only one sensor mounted in these units. This table represents the standard label being put on all commercial equipment. The hardware changes only allow one sensor to be connected to the board; the software remains the same for a one or two sensor board. Although unlikely these flash codes may appear if the board malfunctions.

LEGEND

LFL — Lower Flammable Limit

Humidi-MiZer Dehumidification System (Optional)

Units with the factory-installed Humidi-MiZer system option are capable of providing multiple modes of improved dehumidification as a variation of the normal cooling cycle. The Humidi-MiZer system option includes additional valves in the liquid line and discharge line of the refrigerant circuit and a reheat coil downstream of the evaporator.

NOTE: The reheat coil is downstream of the evaporator coil on the air side (not the refrigerant side). Figures 61-63 show both refrigerant and air flow.

Humidi-MiZer system operation requires the installation and configuration of a relative humidity switch input or a space relative humidity sensor. These provide the dehumidification demand to the control.

With Humidi-MiZer system units there are two additional HVAC modes available for the user: Dehumidification and Dehum/Mech Cooling. Selection of the Dehum/Mech Cooling mode is determined by the dehumidification demand and the cooling demand. Table 14 shows the corresponding circuit mode and output status for the different demand combinations.

NORMAL COOLING

This mode is the standard rated cooling system performance, and occurs when there is cooling demand without dehumidification demand.

For 48QE**12 units, refrigerant flows from the outdoor condenser through the de-energized 3-Way Liquid Diverter Valve (LDV)

to the expansion device bypassing the reheat condenser coil. The Reheat Discharge Valve (RDV) is closed. (See Fig. 61.)

DEHUM/MECH COOLING (SUBCOOLING) MODE

This mode increases the latent heat removal and decreases sensible cooling compared to normal cooling. This occurs when there is a cooling and dehumidification demands.

For 48QE**12 units, refrigerant flows from the outdoor condenser, through the energized 3-Way LDV and through the reheat condenser coil to the expansion device. The RDV is closed. (See Fig. 62.)

DEHUMIDIFICATION (HOT GAS REHEAT) MODE

This mode provides maximum latent cooling with little to no sensible capacity. This occurs when there is a dehumidification demand and no cooling demand.

For 48QE**12 units, this is the same as the Subcooling mode but the RDV is open, which provides some compressor discharge gas to the reheat condenser to further increase the reheat of the evaporator air stream. (See Fig. 63.)

REHEAT CONTROL

When there is only a cooling demand, the unit will operate in normal cooling mode. When there is only dehumidification demand, the unit will operate in Dehumidification mode (Hot Gas Reheat). When there is both cooling demand and dehumidification demand, the unit will operate in Dehum/Mech Cooling mode (Subcooling). During Dehumidification and Dehum/Mech cooling mode, the unit will run all cooling stages.

Table 14 – Humidi-MiZer System Control Modes (48QE**12)

DEMAND AND MODE			OUTPUTS		
Space Humidity	Circuit Cooling Demand	Circuit Mode	Circuit Compressor	LDV Valve 3-WAY	RDV Valve 2-WAY
—	—	No power	Off	Off	Off (closed)
Low	No	Off	Off	Off	Off (closed)
	Yes	Cool	On	Off	Off (closed)
High	Yes	Dehum/Mech Cooling	On	On	Off (closed)
	No	Dehum	On	On	On (open)

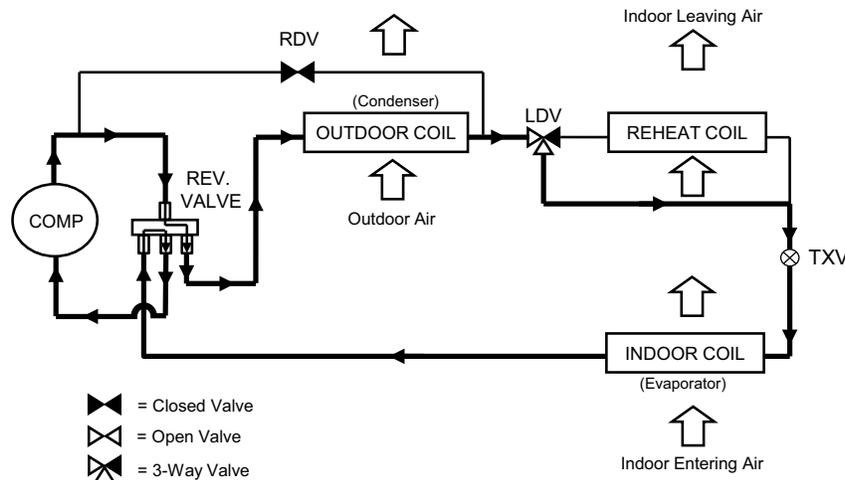


Fig. 61 – Normal Cooling Mode – Humidi-MiZer System for 48QE**12

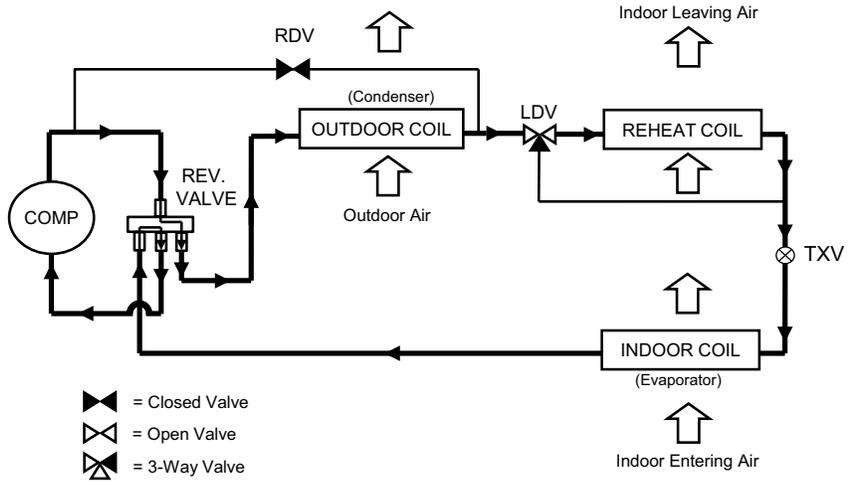


Fig. 62 – Subcooling Mode – Humidi-MiZer System for 48QE12**

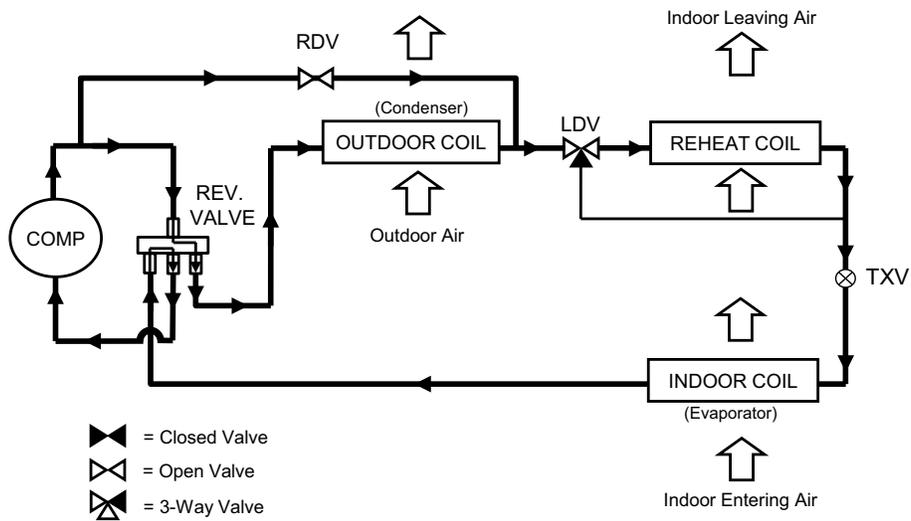


Fig. 63 – Hot Gas Reheat Mode – Humidi-MiZer System for 48QE12**

SystemVu™ Controller

48QE units are equipped with the SystemVu controller (standard), refer to the FEQ/GEQ/QE Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting manual.

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on 48QE models. Smoke detectors may be specified for supply air only, for return air without or with economizer, or in combination of supply air and return air. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to SystemVu controller may be necessary to complete the unit and smoke detector configuration to meet project requirements.

Units equipped with factory-optional return-air smoke detectors require a relocation of the sensor module at unit installation. See Fig. 64 for the as-shipped location.

COMPLETING INSTALLATION OF RETURN-AIR SMOKE SENSOR

1. Unscrew the two screws holding the return-air smoke detector assembly. See Fig. 65, Step 1.
2. Save the screws.
3. Turn the assembly 90 degrees and then rotate end to end. Make sure that the elbow fitting is pointing down. See Fig. 65, Step 2.
4. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 65, Step 3.
5. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.

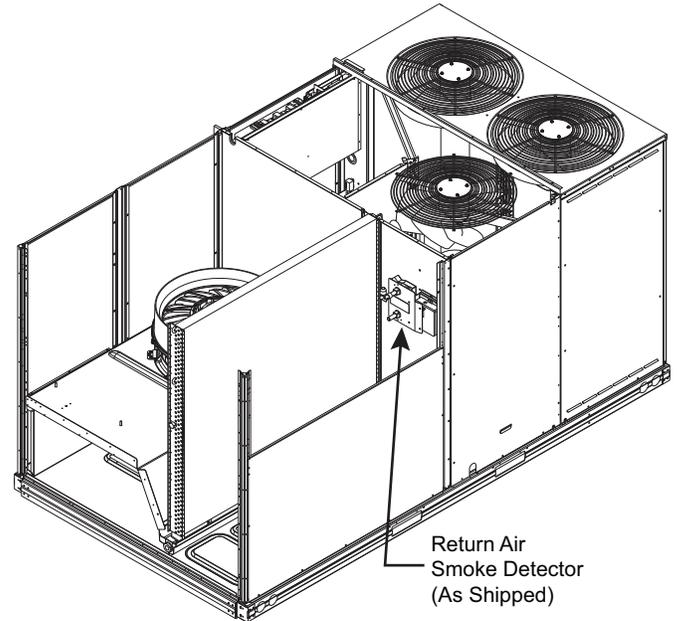


Fig. 64 — Return Air Smoke Detector; Shipping Position

ADDITIONAL APPLICATION DATA

Refer to the application data sheet titled “*Factory-Installed Smoke Detector, for Small and Medium Rooftop Units 2 to 25 Tons*” for discussions on additional control features of these smoke detectors including multiple unit coordination.

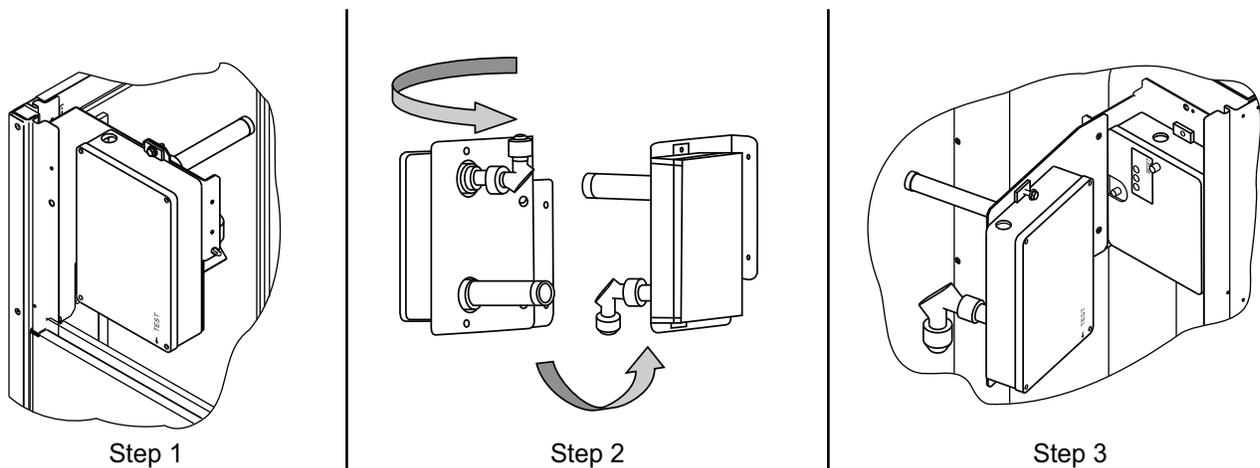


Fig. 65 — Completing Installation of Return Air Smoke Sensor

Step 13 — Install Accessories

Available accessories include:

- Roof curb
- Thru-base connection kit (must be installed before unit is set on curb)
- LP conversion kit
- Economizer
- Manual outside air damper
- Two-Position motorized outside air damper
- Power exhaust
- Differential dry-bulb sensor
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- Low ambient controls
- Thermostat / Sensors
- CO₂ sensor
- Louvered hail guard
- Flue discharge deflector
- Phase monitor control

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

Step 14 — Fan Speed Set Up

NOTE: The Indoor Fan motor is equipped with an internal protection relay that is designed to disable unit operation if it detects a problem. See Typical Wiring Diagram (Fig. 47) for the red wires in the Indoor fan plug.

The Fan Speed settings are accessed through the SystemVu interface.

1. Check the job specifications for the cfm (cubic feet per minute) and ESP (external static pressure) required.
2. Using the chart on the Fan Speed Set Up labels (see Fig. 66), calculate the RPM from the cfm and ESP for the base unit plus any field accessories (as listed on the label).
3. If installing any accessories listed at the bottom of the Set Up Label, add accessory rpm to base unit rpm in upper portion of label.

NOTE: The Fan Speed Set Up labels are located on the High Voltage cover in the Control Box.

4. Press any key on the SystemVu interface to activate the display backlight and then press the MENU key.
5. Using the UP and DOWN arrow keys highlight SETTINGS and then press ENTER.
6. Use the DOWN arrow key highlight the UNIT CONFIGURATIONS menu then press ENTER.
7. Highlight UNIT CONFIGURATIONS then press ENTER.
8. Highlight INDOOR FAN and then press ENTER.
9. Refer to the job specifications to set the following, determining the values per the RPM Calculator label (see Fig. 66). Use the UP and DOWN arrow keys and the BACK key to set the values. Press ENTER after setting each value to continue to the next selection.

- IDF VENT SPD
- IDF HEAT SPD
- IDF HIGH COOL SPD
- IDF FREE COOL SPD

For further details, see the *FEQ/GEQ/QE Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting* manual.

MAIN MENU:

FAN SPEED SETUP (RPM)

SETTINGS

↳ UNIT CONFIGURATIONS

↳ INDOOR FAN

- ↳ IDF VENT SPD -RPM
- ↳ IDF HEAT SPD -RPM
- ↳ IDF HIGH COOL SPD -RPM
- ↳ IDF FREE COOL SPD -RPM

↓ DETERMINE RPM FROM BELOW ↓

48TC003136 REV. B

RPM Calculator

		ESP in. wg										
		0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	
UNIT MODEL NUMBER	CFM	3000	1250	1348	1441	1528	1610	1688	1762	1832	1899	1963
		3250	1336	1428	1515	1598	1677	1753	1824	1893	1959	2021
		3500	1423	1509	1591	1670	1746	1819	1888	1955	2020	2081
		3750	1510	1591	1669	1744	1817	1887	1954	2019	2082	2143
		4000	1598	1675	1749	1820	1890	1957	2022	2085	2146	
		4250	1687	1759	1829	1898	1964	2029	2092	2153		
		4500	1776	1845	1912	1977	2041	2103	2163			
		4750	1866	1931	1995	2057	2118	2178				
		5000	1955	2018	2079	2138	2197					
Field Accessories:												
	Economizer	89	89	89	89	89	89	89	89	89	89	

NOTE(S): Values in the Field Accessories section are RPM adders.

Fig. 66 – Example of Fan Speed Set Up Labels for SystemVu™ Controls

COMPRESSOR ROTATION

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution can result in premature wear and damage to equipment.

Scroll compressors can only compress refrigerant if rotating in the right direction. Reverse rotation for extended times can result in internal damage to the compressor. Scroll compressors are sealed units and cannot be repaired on site location.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gauges to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.
4. Turn off power to the unit.
5. Reverse any two of the three unit power leads.
6. Reapply electrical power to the compressor. The suction pressure should drop and the discharge pressure should rise which is normal for scroll compressors on start-up.
7. Replace compressor if suction/discharge pressures are not within specifications for the specific compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

PRESSURE RELIEF VALVES

Units with the pressure relief option contain a pressure relief valve in the unit liquid line for compliance with Chicago Municipal Code 18-28-1102.3. The pressure relief valve is set to open above 650 PSI and is intended to vent refrigerant in the event the refrigerant pressure exceeds the equipment design pressure. The pressure relief valve is single use and must be replaced after refrigerant discharge.

The relief valve can be found behind the unit access panel with a label indicating its location. See Fig. 67 and Fig. 68 for example location details.

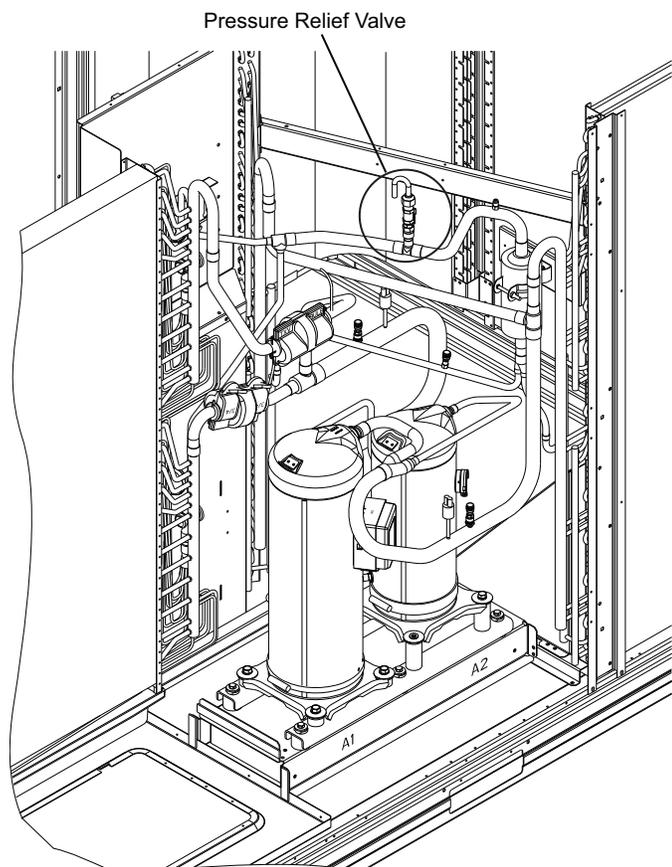


Fig. 67 — Pressure Relief Valve Location

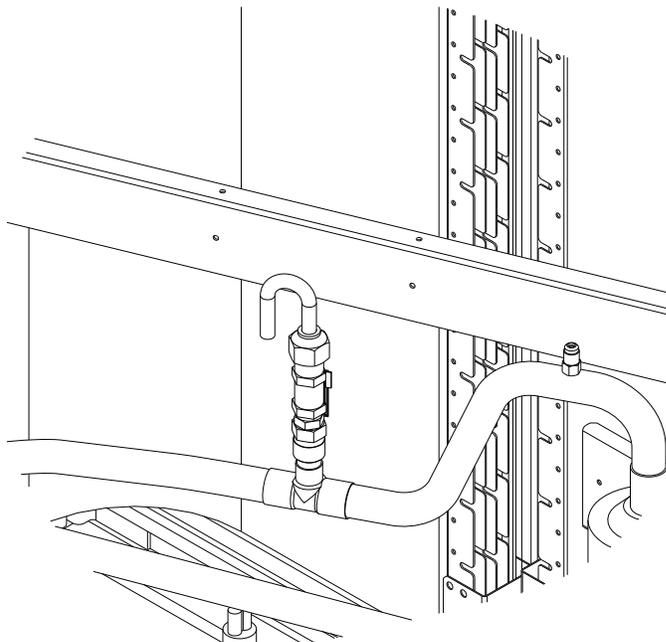


Fig. 68 — Pressure Relief Valve Detail

FASTENER TORQUE VALUES

Table 15 details the torque values for fasteners referenced in this installation instruction.

Table 15 — Fastener Torque Values

Stator motor mounting screws	50 in.-lb (5.7 Nm) \pm 5 in.-lb (0.6 Nm)
Fan rotor mounting screws (2.4 HP)	50 in.-lb (5.7 Nm) \pm 5 in.-lb (0.6 Nm)
Fan rotor mounting screws (3 and 5 HP)	30 in.-lb (3.4 Nm) \pm 2 in.-lb (0.2 Nm)
Fan deck bracket screws	50 in.-lb (5.7 Nm) \pm 5 in.-lb (0.6 Nm)
Fan casing screws	10 in.-lb (1.1 Nm) \pm 1 in.-lb (0.1 Nm)
Heat shield screws	30 in.-lb (3.4 Nm) \pm 2 in.-lb (0.2 Nm)
Condenser motor mounting screws	30 in.-lb (3.4 Nm) \pm 2 in.-lb (0.2 Nm)
Condenser hub set screw	84 in.-lb (9.5 Nm) \pm 12 in.-lb (1.5 Nm)
Compressor mounting bolts	12 ft-lb (16.2 Nm) \pm 2 ft-lb (2.7 Nm)
Tandem rail mounting bolts	8 ft-lb (10.8 Nm) \pm 0.5 ft-lb (0.6 Nm)
Crankcase heater	22.5 in.-lb (2.5 Nm) \pm 2.5 in.-lb (0.3 Nm)

TYPICAL UNIT PIPING

48QE**12 heat pump systems include two compressors, a reversing valve, dual-function outdoor and indoor coils, a common liquid line with bi-flow TXV, and dedicated cooling and heating TXVs. 48QE**12 unit indoor coils contain a vapor header check valve. See Fig. 69-70 and Tables 16-18 for typical unit piping schematic parallel coil circuits during evaporator-function operation and converging coil circuits during the condenser-function operation.

Table 16 — 48QE12 — Cooling Mode**

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

Table 17 — 48QE12 — Heating Mode**

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

Table 18 — 48QE12 — Defrost Mode**

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

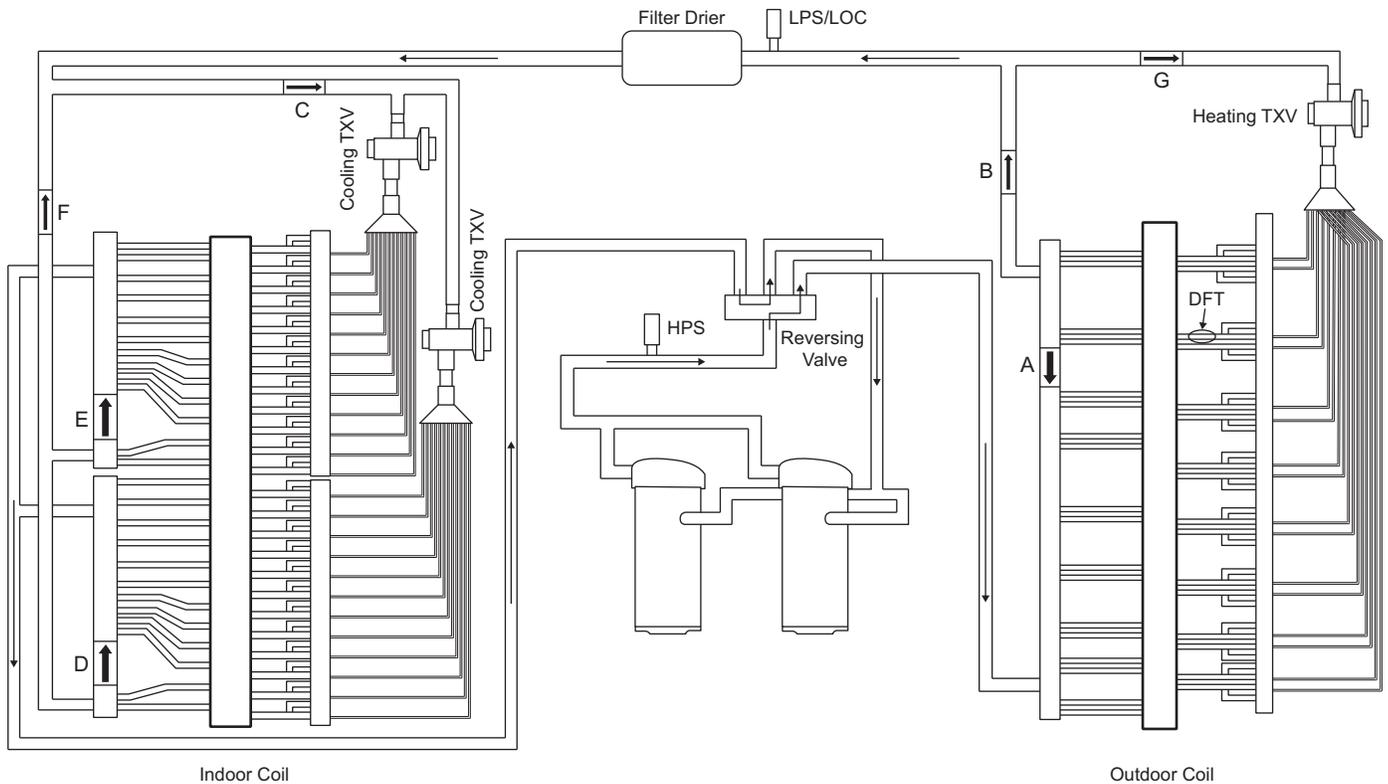


Fig. 69 — Piping Schematic — 48QE12 Cooling Mode**

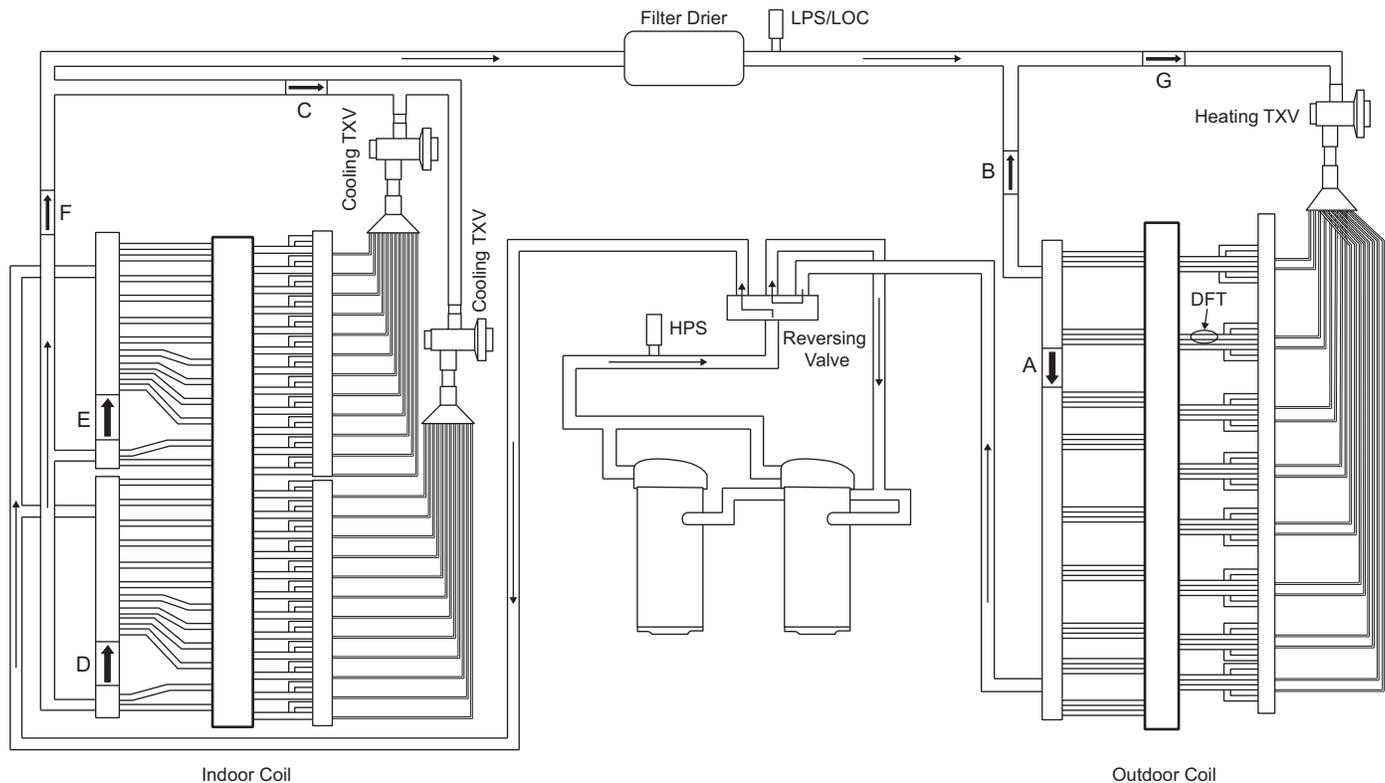


Fig. 70 — Piping Schematic — 48QE12 Heating Mode**

TEMPORARY FURNACE OPERATION DURING CONSTRUCTION

The furnace may be operated during the finishing stage of construction. To ensure proper operation follow the steps below.

1. Prior to the finishing stage of construction, ensure that return air and vent openings are covered to minimize penetration of dust and construction debris into the unit.
2. Interior drywall installation shall be completed and covered with paint or primer prior to unit operation.
3. Premises shall be substantially free of debris and dust.
4. Ensure all return and vent coverings have been removed.
5. Verify the return ducts and supply ducts are connected, are free from obstructions, are clean, and are properly sealed.
6. Ensure proper vent installation per installation instructions.
7. Ensure gas piping has been connection per installation instructions.
8. Verify that the gas piping is free of leaks.
9. Furnace to be set to operate under appropriate control to ensure proper operation.
10. Minimum MERV 11 air filters to be installed during the finishing stages of construction.
11. Set furnace input rate and temperature rise per rating plate marking.
12. Ensure means for providing combustion air in accordance with the manufacturer's shipped installation instructions.
13. Return air temperature to be maintained between 55°F (13°C) and 80°F (27°C).
14. Furnace shall be set up to operate in accordance with installation instructions and shall be verified for operating conditions including ignition, input rate, temperature rise, and venting.
15. Install new filters as per installation instructions prior to final occupancy.

START-UP CHECKLIST

48QE**12 Packaged Rooftop Units Hybrid Heat Unit
(Remove and use for job file)

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

I. PRELIMINARY INFORMATION

MODEL NO. _____
JOB NAME _____
SERIAL NO. _____
ADDRESS _____
START-UP DATE _____
TECHNICIAN NAME _____
ADDITIONAL ACCESSORIES _____

II. PRE-START-UP

Verify that all packaging materials have been removed from unit. (Y/N) _____
Verify installation of outdoor air hood. (Y/N) _____
Verify installation of flue exhaust and inlet hood. (Y/N) _____
Verify that condensate connection is installed per instructions. (Y/N) _____
Verify gas pressure to unit gas valve is within specified range. (Y/N) _____
Check gas piping for leaks. (Y/N) _____
Verify that all electrical connections and terminals are tight. (Y/N) _____
Verify ground integrity with a continuity test. (Y/N) _____
Check that indoor-air filters are clean and in place. (Y/N) _____
Check that outdoor air inlet screens are in place. (Y/N) _____
Verify that unit is level. (Y/N) _____
Verify that fan assembly is free of obstructions and rotor spins freely. (Y/N) _____
Verify that scroll compressors are rotating in the correct direction. (Y/N) _____
Verify yellow LED light on dissipation board is steady. (Y/N) _____
Verify the dissipation board test button will operate the indoor fan for 1 minute. (Y/N) _____
Verify installation of thermostat. (Y/N) _____

III. START-UP

ELECTRICAL

Supply Voltage	L1-L2 _____	L2-L3 _____	L3-L1 _____
Supply Voltage to Ground	L1 to Ground _____	L2 to Ground _____	L3 to Ground _____
Compressor Amps 1	L1 _____	L2 _____	L3 _____
Compressor Amps 2	L1 _____	L2 _____	L3 _____
Supply Fan Amps	L1 _____	L2 _____	L3 _____

TEMPERATURES

Outdoor-air Temperature _____ °F DB (Dry Bulb)
Return-air Temperature _____ °F DB _____ °F WB (Wet Bulb)
Cooling Supply Air Temperature _____ °F
Gas Heat Supply Air _____ °F

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

PRESSURES

Gas Inlet Pressure _____ in. wg
Gas Manifold Pressure STAGE 1 _____ in. wg
STAGE 2 _____ in. wg
Refrigerant Suction STAGE 1 _____ PSIG
STAGE 2 _____ PSIG
STAGE 3 _____ PSIG
Refrigerant Discharge STAGE 1 _____ PSIG
STAGE 2 _____ PSIG
STAGE 3 _____ PSIG
Verify Refrigerant Charge using Charging Charts (Y/N) _____

GENERAL

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

IV. HUMIDI-MIZER® SYSTEM START-UP

STEPS

1. Use Service Test mode to turn on maximum cooling.
 - a. Turn on Cool A1 test under Cool Test menu (Y/N) _____
 - b. Turn on Cool A2 Test under Cool Test Menu (Y/N) _____

OBSERVE AND RECORD

- a. Suction pressure _____ PSIG _____ PSIG
 - b. Discharge pressure _____ PSIG _____ PSIG
 - c. Entering air temperature _____ °F _____ °F
 - d. Liquid temperature at outlet or reheat coil _____ °F _____ °F
 - e. Confirm correct rotation for compressor (Y/N) _____
 - f. Check for correct ramp-up of outdoor fan motor as condenser coil warms (Y/N) _____
2. Check unit charge per charging chart. (Y/N) _____
 3. Switch unit to HIGH-LATENT mode (SUBCOOL) by turning Humidimizer test to SUBCOOL under the COOL TEST menu. (Y/N) _____

OBSERVE

- a. Reduction in suction pressure (5 to 7 psi expected) (Y/N) _____
 - b. Discharge pressure unchanged (Y/N) _____
 - c. Liquid temperature drops to 50 to 55°F range (Y/N) _____
 - d. LDV solenoid energized (valve switches to reheat coil flow) (Y/N) _____
4. Switch unit to DEHUMID (REHEAT) by turning Humidimizer test to REHEAT under the COOL TEST menu. (Y/N) _____

OBSERVE

- a. Suction pressure increases to normal cooling level (Y/N) _____
 - b. Discharge pressure decreases 30 to 50 PSI (Y/N) _____
 - c. Liquid temperature returns to normal cooling level (Y/N) _____
 - d. LDV solenoid energized (valve switches to reheat coil flow) (Y/N) _____
 - e. RDV solenoid energized, valve opens for flow (Y/N) _____
5. Switch unit to OFF by turning Humidimizer test to OFF under the COOL TEST menu. Compressor and outdoor fan stop, RDV or LDV solenoids de-energized. (Y/N) _____

V. TEMPORARY FURNACE OPERATION DURING CONSTRUCTION

The furnace may be operated during the finishing stage of construction. To ensure proper operation follow checklist below:

1. Prior to the finishing stage of construction, ensure that return air and vent openings are covered to minimize penetration of dust and construction debris into the unit. (Y/N) _____
2. Interior drywall installation shall be completed and covered with paint or primer prior to unit operation. (Y/N) _____
3. Premises shall be substantially free of debris and dust. (Y/N) _____
4. Ensure all return and vent coverings have been removed. (Y/N) _____
5. Verify the return ducts and supply ducts are connected, are free from obstructions, are clean, and are properly sealed. (Y/N) _____
6. Ensure proper vent installation per installation instructions. (Y/N) _____
7. Ensure gas piping has been connection per installation instructions. (Y/N) _____
8. Verify that the gas piping is free of leaks. (Y/N) _____
9. Furnace to be set to operate under appropriate control to ensure proper operation. (Y/N) _____
10. Minimum MERV 11 air filters to be installed during the finishing stages of construction. (Y/N) _____
11. Set furnace input rate and temperature rise per rating plate marking. (Y/N) _____
12. Ensure means for providing combustion air in accordance with the manufacturer's shipped installation instructions. (Y/N) _____
13. Return air temperature to be maintained between 55°F (13°C) and 80°F (27°C). (Y/N) _____
14. Furnace shall be set up to operate in accordance with installation instructions and shall be verified for operating conditions including ignition, input rate, temperature rise, and venting. (Y/N) _____
15. Install new filters as per installation instructions prior to final occupancy. (Y/N) _____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE