



# WeatherMaster® Hybrid Heat 48QE\*\*17-28 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 safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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

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

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

**⚠ WARNING**

**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.

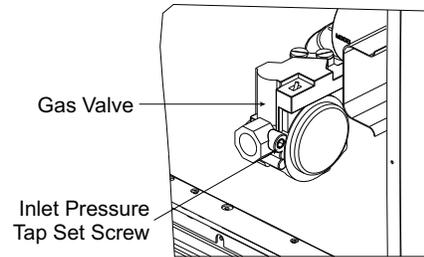
Veiller à ce que la ou les sorties de l'évent de l'appareil de chauffage (et la prise d'air) ne soient, en aucune façon, obstruées, quelle que soit la saison.

**⚠ 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.

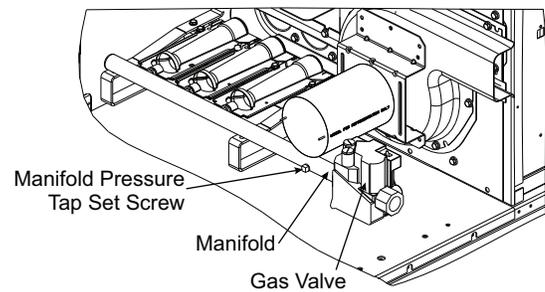


**⚠ WARNING**

**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.

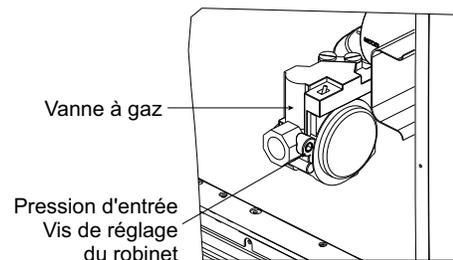


**⚠ ADVERTISSEMENT**

**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.

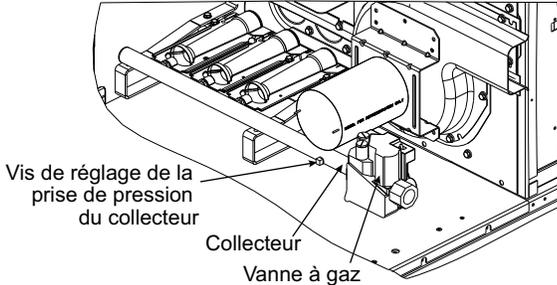


**⚠ ADVERTISSEMENT**

**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/X17	910	85
48QE*M/R/T/X24	1321	123
48QE*M/X28	1380	129
48QE*R/T28	1310	122
48QE*N/S/U/Y17	1177	110
48QE*N/S/U/Y24	1659	155
48QE*N/S/U/Y28	1650	154

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<sup>®1</sup> 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.

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## GENERAL

These installation instructions cover the 48QE units. Units are pre-wired and pre-charged with Puron Advance™ (R-454B) refrigerant at the factory. See Fig. 1 for model number nomenclature. See Fig. 2-11 for unit dimensions. See Fig. 5 and 10 for service clearances.

### Rated Indoor Airflow (cfm)

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

**Table 2 — Rated Indoor Airflow**

MODEL NUMBER	FULL LOAD AIRFLOW (cfm)	
	Cooling Mode	Heating Mode
48QE**17	6000	6000
48QE**24	8000	8000
48QE**28	9500	9500

NOTE: Unit is not designed to have overhead obstruction.

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	2	4	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 System 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 Code Relief Valve  
Y = Two Stage Cooling, Single Circuit with Humidi-MiZer System and Chicago Code Relief Valve

**Cooling Tons**  
17 = 15.0 tons  
24 = 20.0 tons  
28 = 25.0 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  
J = High Static Motor - Horizontal Supply  
L = High Static Motor - Horizontal 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)  
N = Phase Monitor/Protection (PMR)  
P = PMR + HACR  
Q = PMR + NFDC  
1 = HSCCR<sup>a</sup> (High Short Circuit Current Rating) Protection

**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

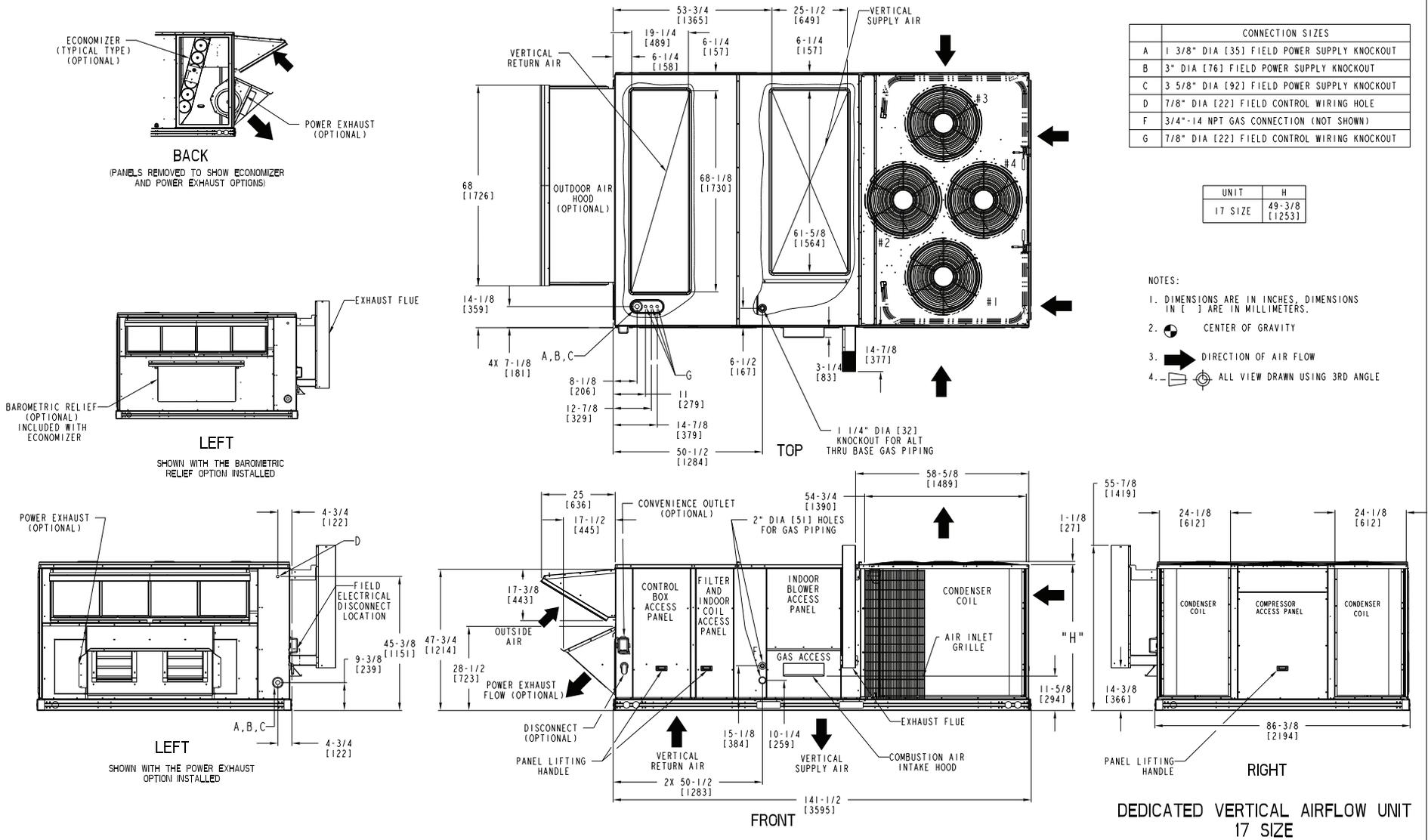
**Intake / Exhaust Options**  
A = None  
B = Temperature Economizer with Barometric Relief  
F = Enthalpy Economizer with Barometric Relief  
L = ULL (Ultra Low Leak) Temperature Economizer with Barometric Relief and CO<sub>2</sub> Sensor  
M = ULL Enthalpy Economizer with Barometric Relief and CO<sub>2</sub> Sensor  
N = ULL Temperature Economizer with Power Exhaust and CO<sub>2</sub> Sensor, Vertical Only  
P = ULL Enthalpy Economizer with Power Exhaust and CO<sub>2</sub> Sensor, Vertical Only  
U = ULL Temperature Economizer with Barometric Relief  
V = ULL Temperature Economizer with Power Exhaust, Vertical Only  
W = ULL Enthalpy Economizer with Barometric Relief  
X = ULL Enthalpy Economizer with Power Exhaust, Vertical Only

**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 – 48QE\*\*17-28 Model Number Nomenclature**



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48QE 17 SINGLE ZONE ELECTRICAL	50HE008200	REV
U.S. ECCN:NSR	1 OF 5	09/20/24	-	HEAT PUMP WITH GAS HEAT		-

**Fig. 2 — 48QE\*\*17 Vertical Airflow**



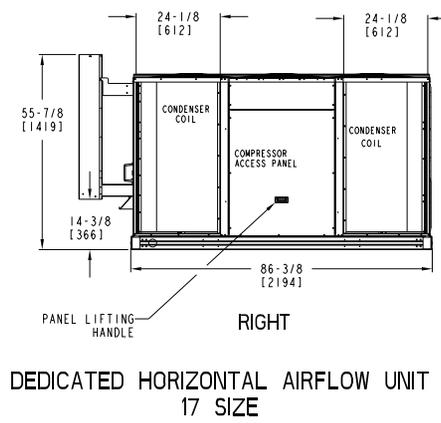
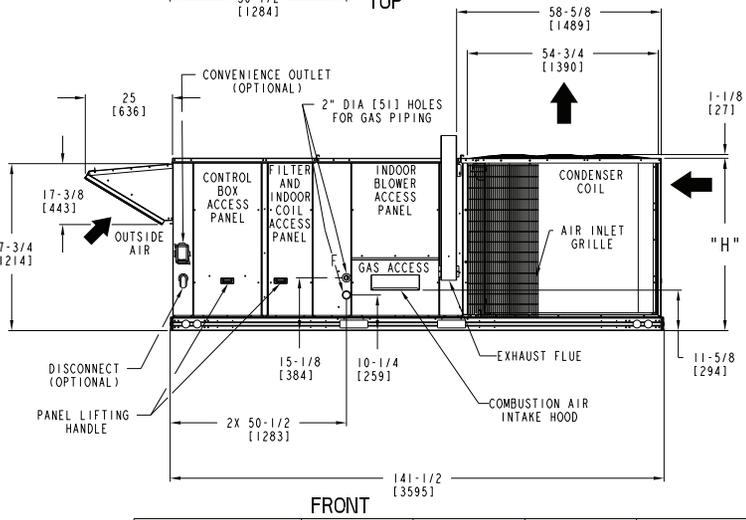
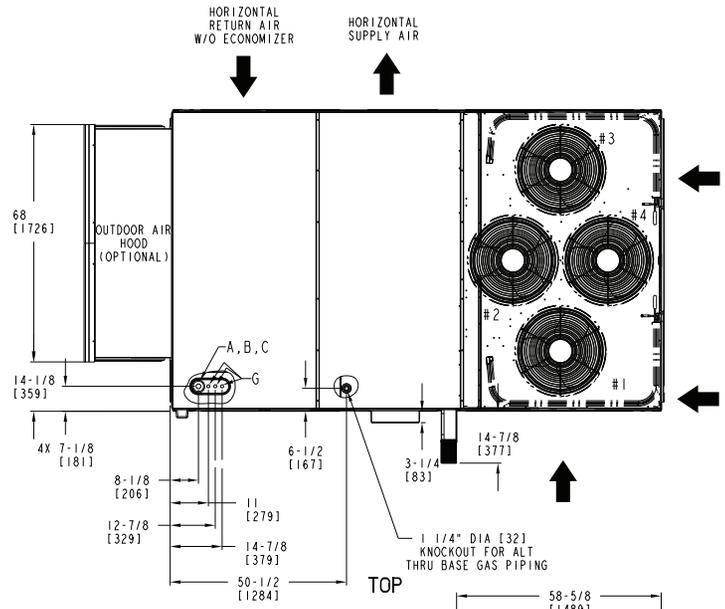
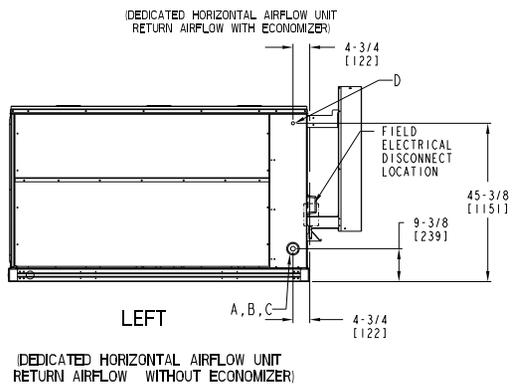
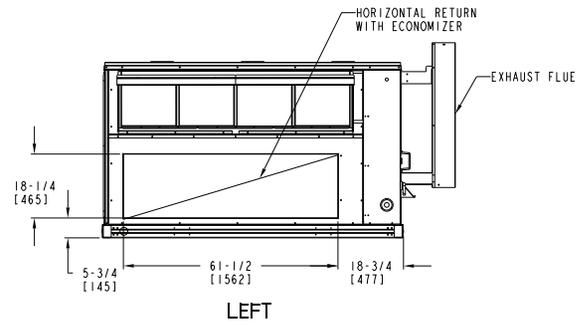
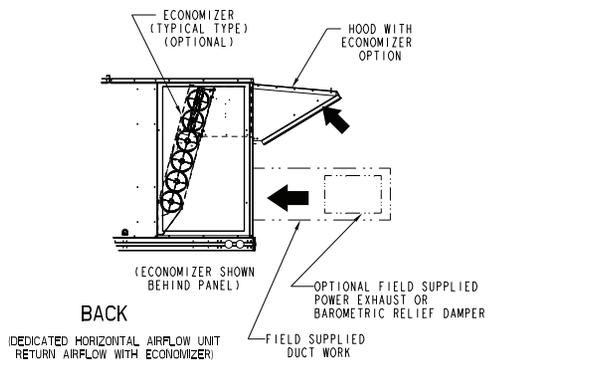
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CONNECTION SIZES	
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
F	3/4"-14 NPT GAS CONNECTION (NOT SHOWN)
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

UNIT	H
17 SIZE	49-3/8 [1253]

- NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  2. CENTER OF GRAVITY
  3. DIRECTION OF AIR FLOW
  4. ALL VIEW DRAWN USING 3RD ANGLE



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48QE 17 SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	50HE008200	REV
U.S. ECCN:NSR	2 OF 5	09/20/24	-			-

Fig. 3 — 48QE\*\*17 Horizontal Airflow

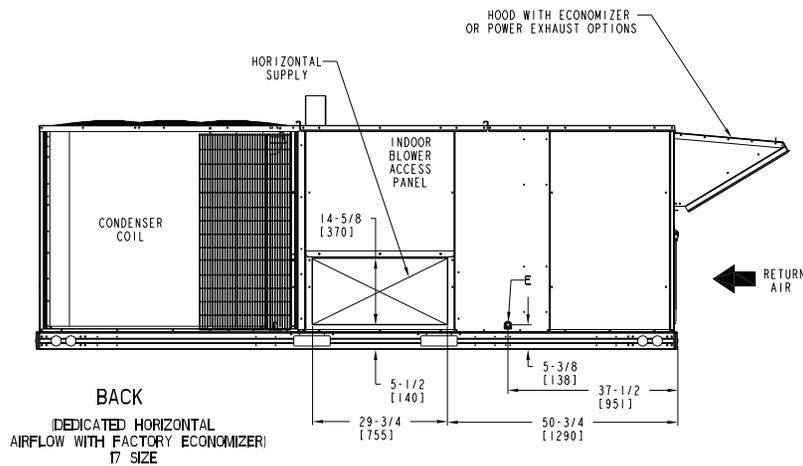
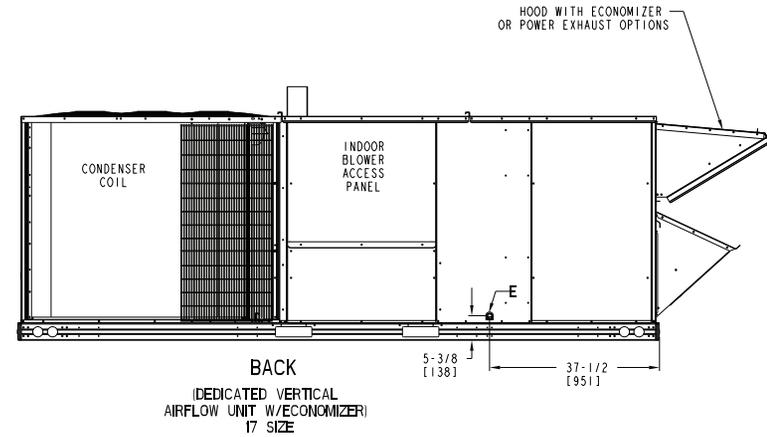
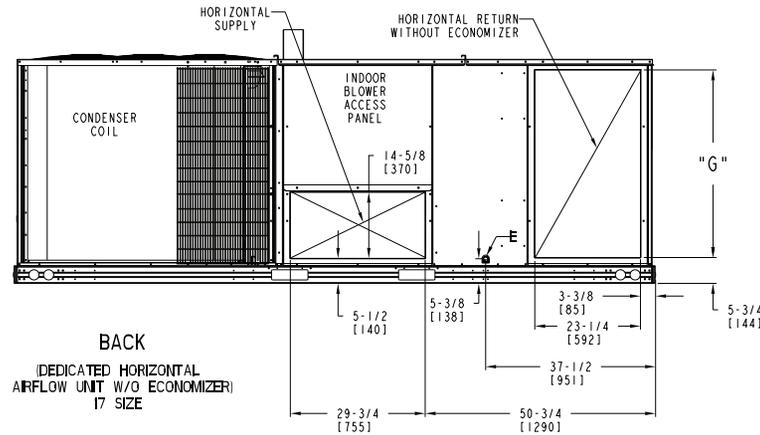
CONNECTION SIZES	
E	3/4"-14 NPT CONDENSATE DRAIN



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UNIT	G
17 SIZE	41-3/8 [1049]



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48QE SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	50HE008200	REV
U.S. ECCN:NSR	3 OF 5	09/20/23	-			-

Fig. 4 — 48QE\*\*17 Back View and Condensate Drain Location

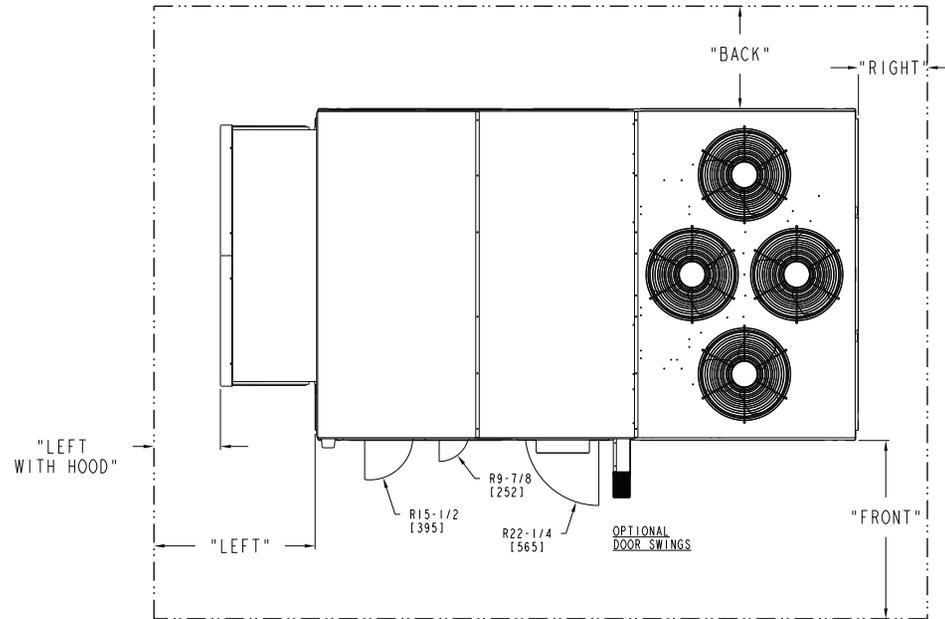
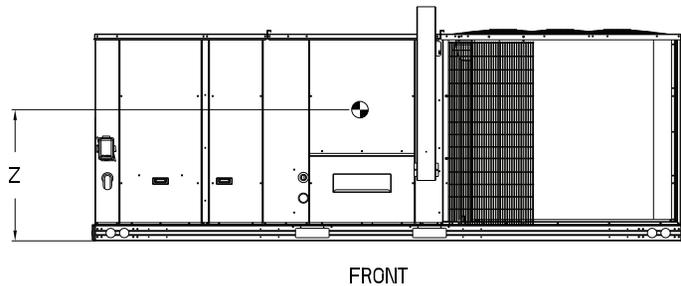
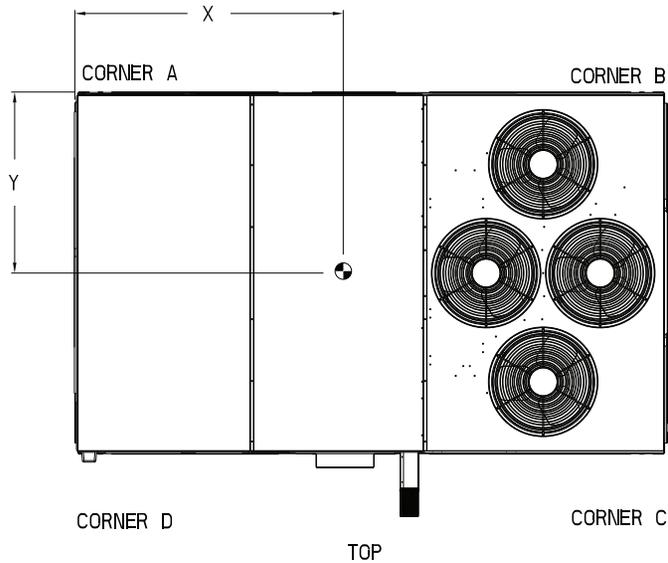


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UNIT	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.					
	LBS.	KG.	X	Y	Z											
48QE17	1990	903	445	202	531	241	552	250	462	210	77	[1956]	44	[1118]	16 1/2	[419]

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



NOTES:

- CLEARANCE ABOVE THE UNIT TO BE 72"
- FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	42 [1067mm]	36 [914mm]	18 [457mm]
LEFT WITH HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

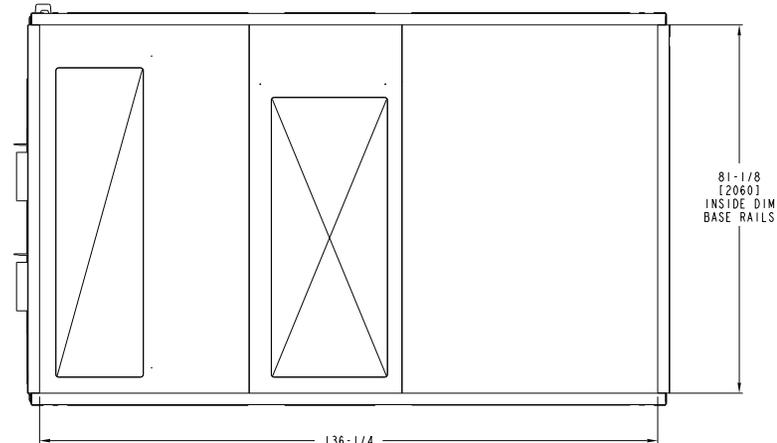
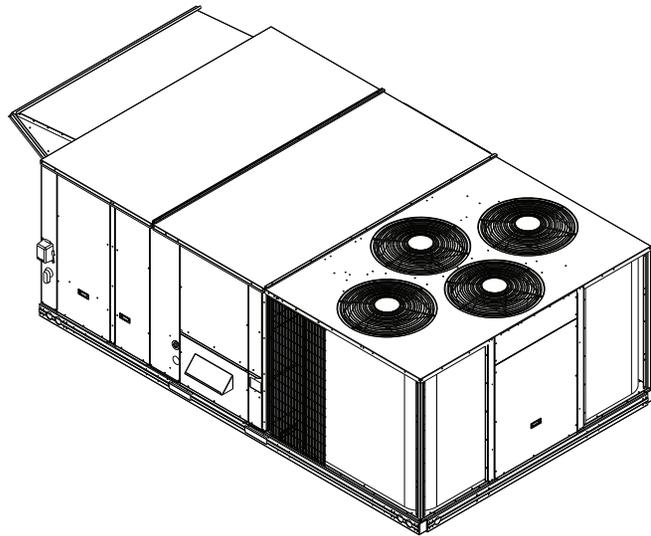
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48QE 17 SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	50HE008200	REV
U.S. ECCN:NSR	4 OF 5	09/20/24	-			-

Fig. 5 — 48QE\*\*17 Corner Weights and Clearances



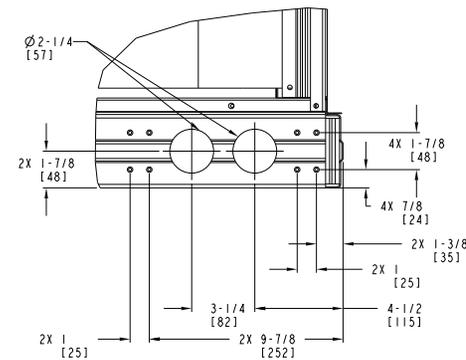
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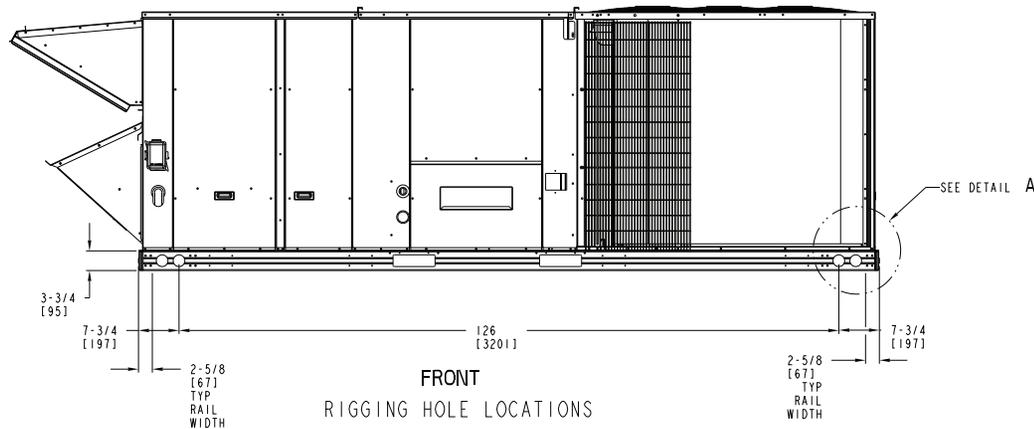


**BOTTOM**

INSIDE BASERAIL DIMENSIONS



**DETAIL A**  
TYP 4 PLCS



**FRONT**  
RIGGING HOLE LOCATIONS

12

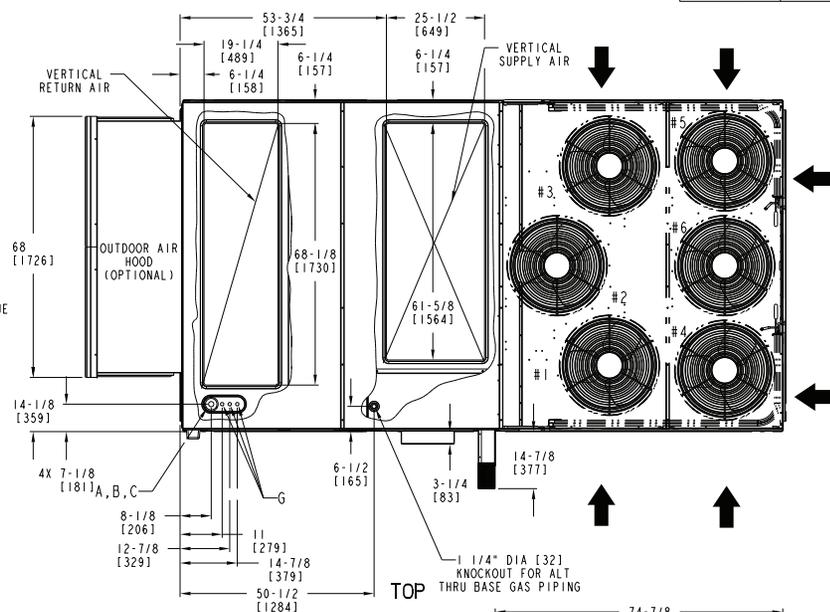
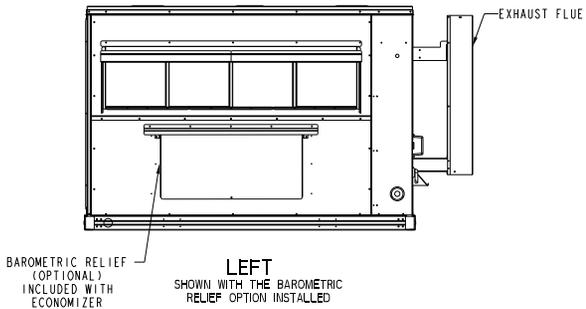
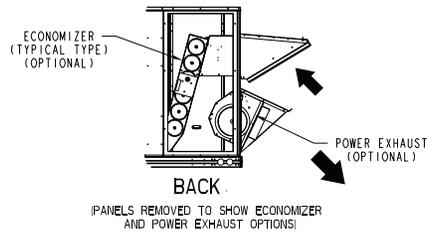
ITC CLASSIFICATION U.S. ECCN:NSR	SHEET 5 OF 5	DATE 09/20/24	SUPERCEDES -	48QE 17 SINGLE ZONE ELECTRICAL HEAT PUMP WITH GAS HEAT	50HE008200	REV -
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**Fig. 6 — 48QE\*\*17 Bottom View**



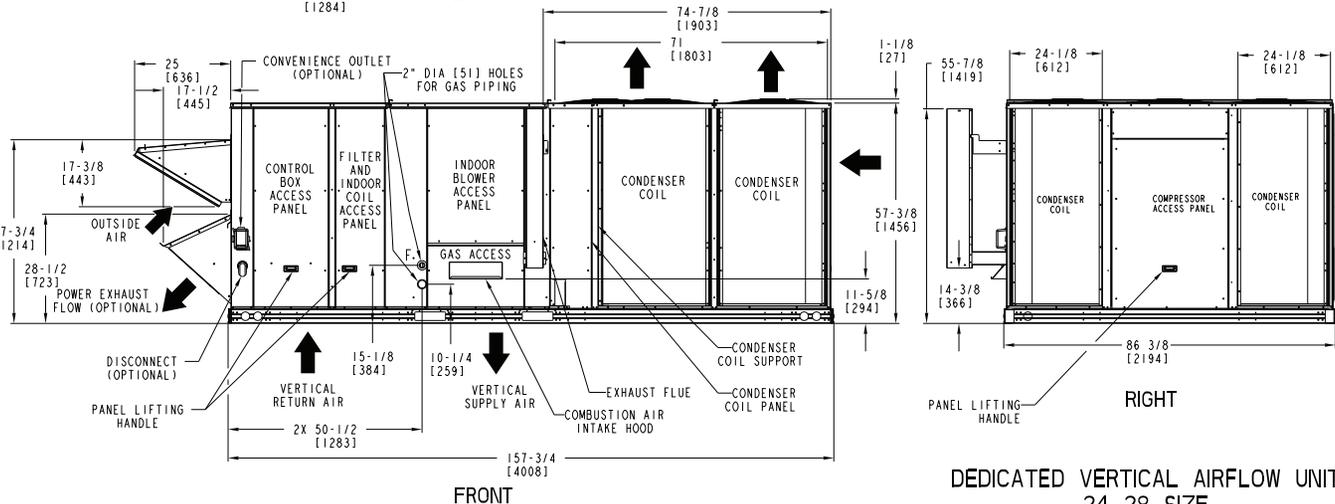
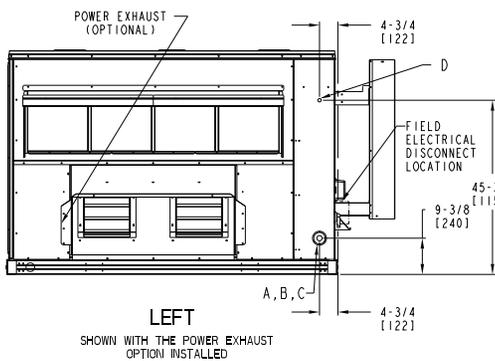
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CONNECTION SIZES	
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
F	3/4"-14 NPT GAS CONNECTION (NOT SHOWN)
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

- NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  2. CENTER OF GRAVITY
  3. DIRECTION OF AIR FLOW
  4. ALL VIEW DRAWN USING 3RD ANGLE



**RIGHT**

DEDICATED VERTICAL AIRFLOW UNIT  
24 28 SIZE

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U.S. ECCN:NSR	1 OF 5	09/20/24	-	HEAT PUMP WITH GAS HEAT		-

**Fig. 7 — 48QE\*\*24-28 Vertical Airflow**

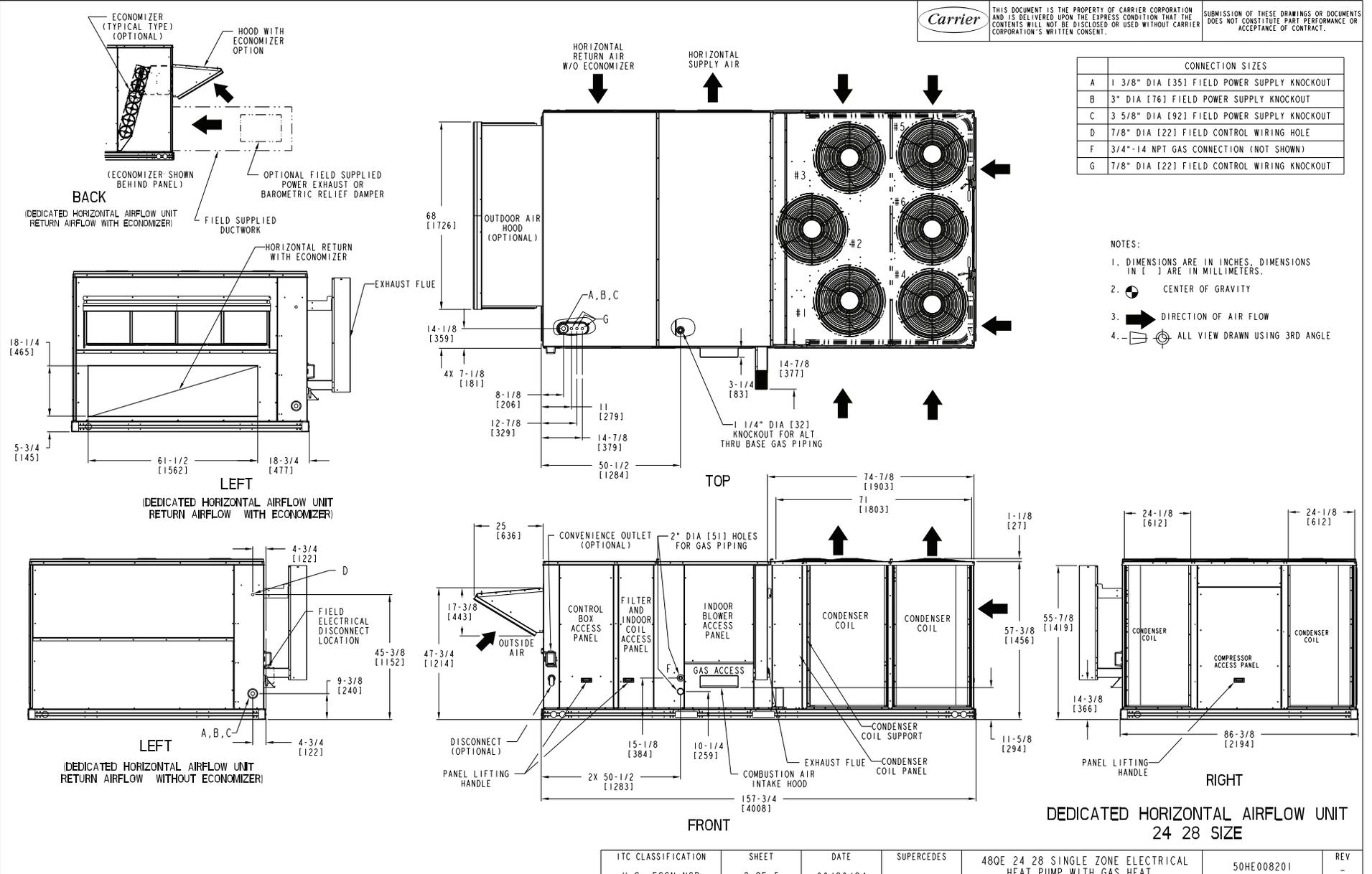


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CONNECTION SIZES	
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C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
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G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

- NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  2. CENTER OF GRAVITY
  3. DIRECTION OF AIR FLOW
  4. ALL VIEW DRAWN USING 3RD ANGLE



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U.S. ECCN:NSR	2 OF 5	09/20/24	-	HEAT PUMP WITH GAS HEAT		-

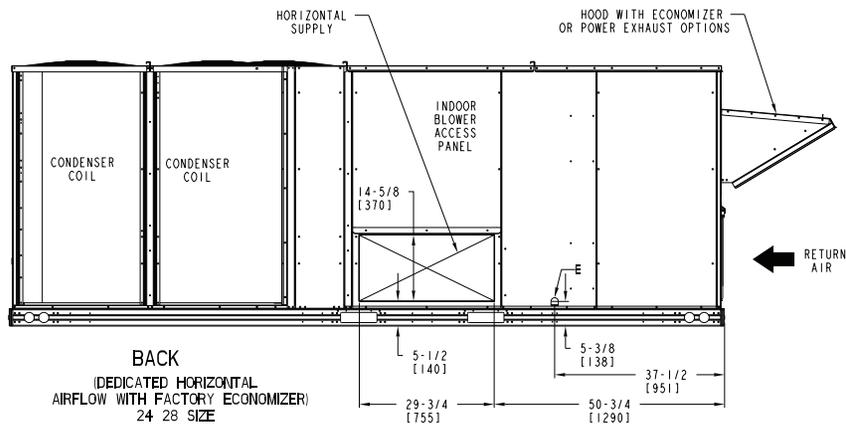
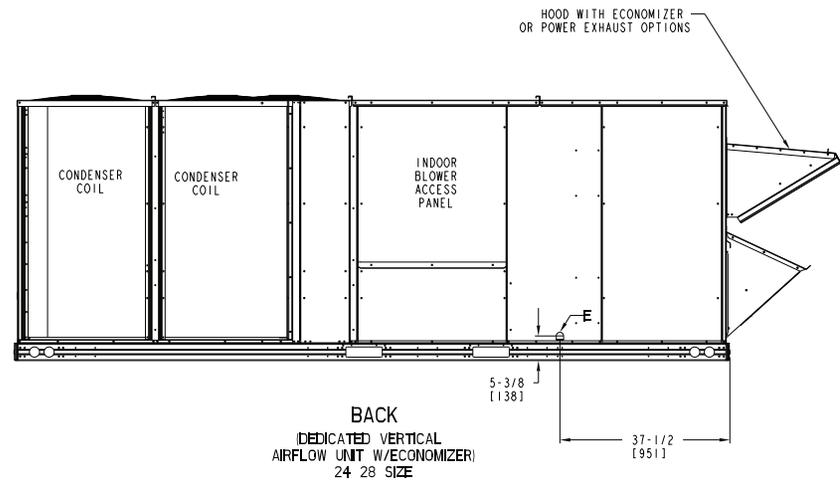
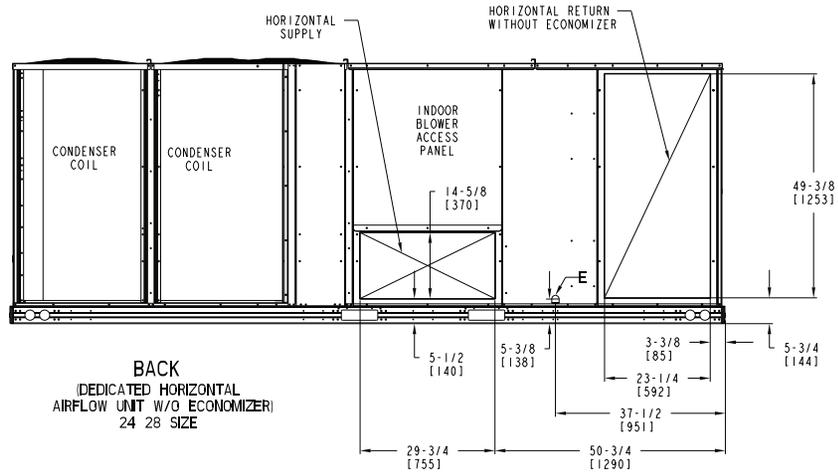
Fig. 8 — 48QE\*\*24-28 Horizontal Airflow

CONNECTION SIZES	
E	3/4" - 1/4 NPT CONDENSATE DRAIN



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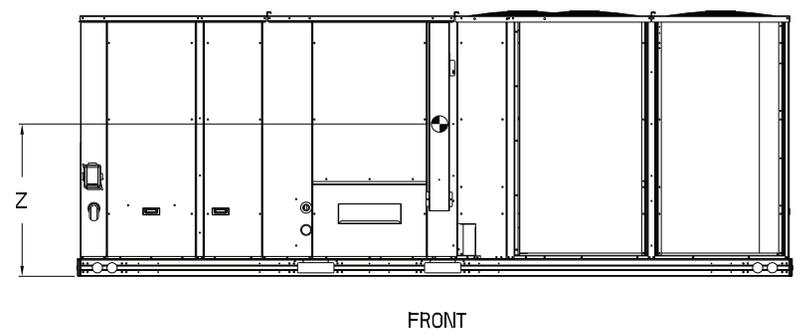
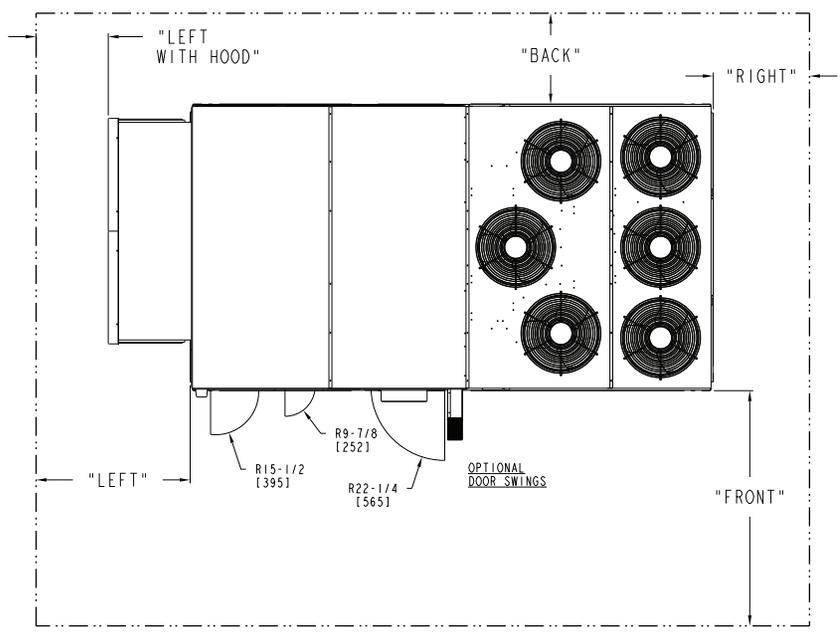
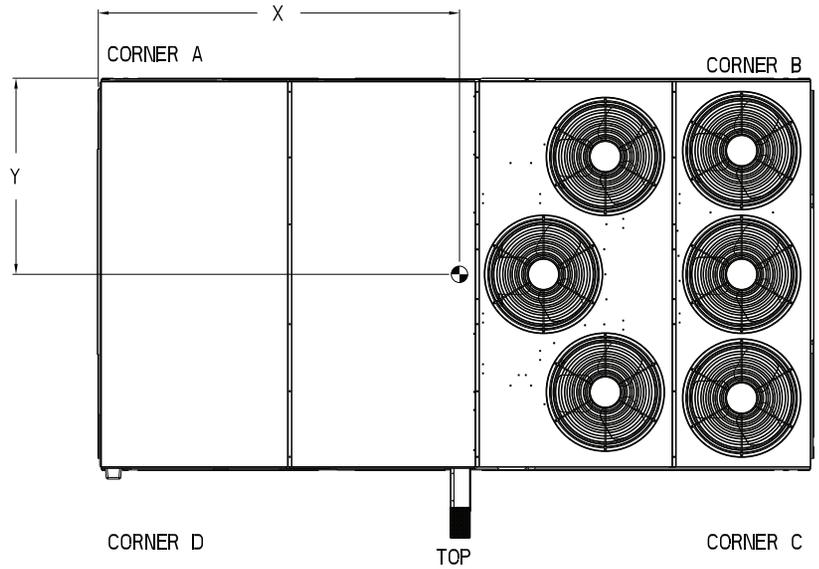
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Fig. 9 — 48QE\*\*24-28 Back View and Condensate Drain Location

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
48QE24	2382	1081	495	225	605	274	705	320	577	262	86 3/4 [2203]	46 1/2 [1181]	19 [483]
48QE28	2445	1109	503	228	626	284	730	331	586	266	87 1/2 [2223]	46 1/2 [1181]	19 [483]

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



- NOTES:
- CLEARANCE ABOVE THE UNIT TO BE 72"
  - FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	42 [1067mm]	36 [914mm]	18 [457mm]
LEFT WITH HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

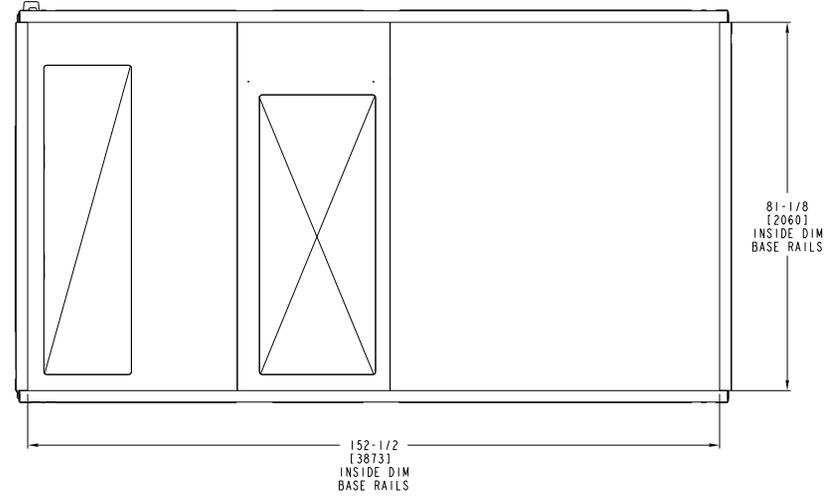
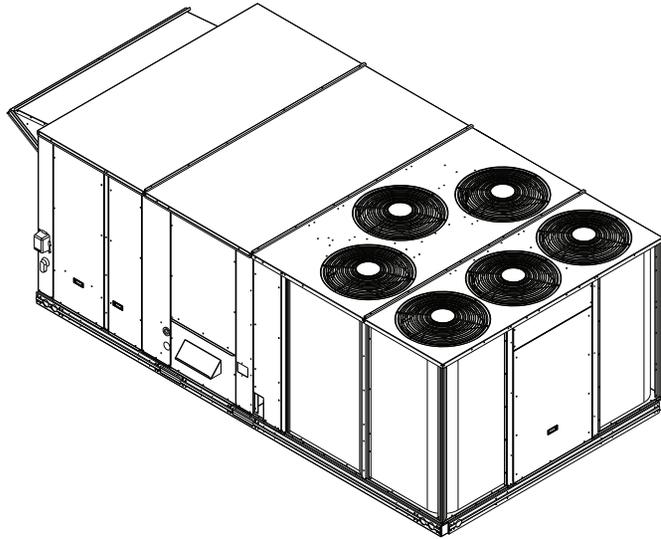
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U.S. ECCN:NSR	4 OF 5	09/20/24	-			-

Fig. 10 — 48QE\*\*24-28 Corner Weights and Clearances

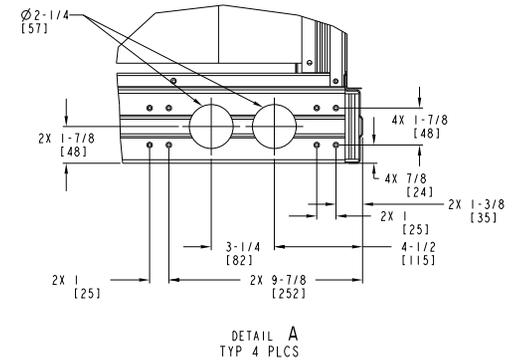
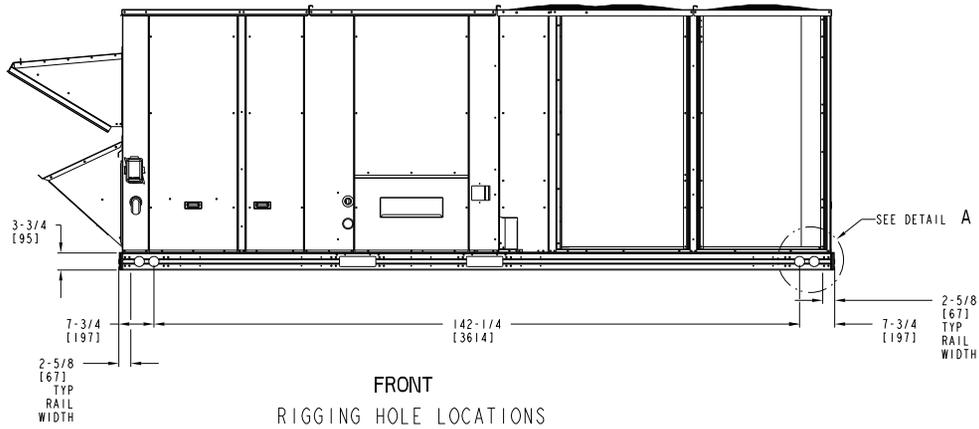


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**BOTTOM**  
INSIDE BASERAIL DIMENSIONS



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**Fig. 11 — 48QE\*\*24-28 Bottom View**

## INSTALLATION

### Job-Site Survey

Complete the following checks before installation.

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

### Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for at least the minimum clearances required for safety. This includes the clearance to combustible surfaces, unit performance and service access below, around and above unit as specified in unit drawings. See Fig. 5 and 10.

NOTE: Consider also the effect of adjacent units.

Be sure that the unit is installed such that snow will not block the combustion air intake or 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, relief valves, or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute) and NFPA (National Fire Protection Association) 54 TIA-54-84-1. In Canada, installation must be in accordance with the CAN1-B149 installation codes for gas burning appliances.

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

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Install External Condensate Trap and Line on page 30 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**	UNITS lb (kg)		
	17	24	28
<b>Base Unit</b>	1990 (903)	2382 (1081)	2445 (1109)
<b>Economizer</b>	246 (112)	246 (112)	246 (112)
<b>Powered Outlet<sup>a</sup></b>	36 (16)	36 (16)	36 (16)
<b>Humidi-MiZer<sup>®</sup> Coil</b>	82 (37)	90 (41)	90 (41)
<b>Curb</b>			
<b>14 in. (356 mm)</b>	240 (109)	255 (116)	255 (116)
<b>24 in. (610 mm)</b>	340 (154)	355 (161)	355 (161)

NOTE(S):

a. Includes transformer.

### 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)
4. Rig and place unit
5. Remove top skid
6. Install outside air hood
7. Install smoke detector tube
8. Install combustion air hood
9. Install flue discharge deflector
10. Install gas piping
11. Install condensate line trap and piping
12. Make electrical connections
13. Install other accessories

#### PAD-MOUNTED INSTALLATION

1. Prepare pad and unit supports
2. Rig and place unit
3. Remove duct covers and top skid
4. Install smoke detector return air sensor tube
5. Install field-fabricated ductwork at unit duct openings
6. Install outside air hood
7. Install combustion air hood
8. Install flue discharge deflector
9. Install gas piping
10. Install condensate line trap and piping
11. Make electrical connections
12. Install other accessories

#### FRAME-MOUNTED INSTALLATION

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

### Step 3 — Inspect Unit

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

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

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

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

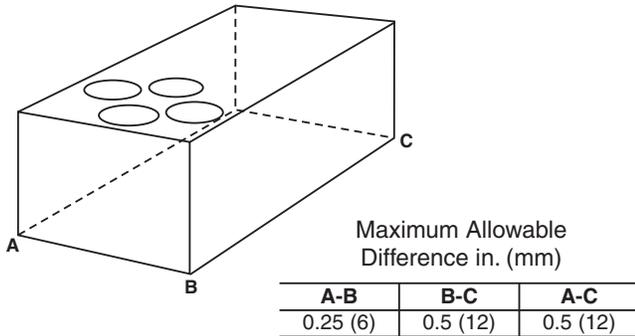
### Step 4 — Provide Unit Support

#### ROOF CURB MOUNT

Accessory roof curb details and dimensions are shown in Fig. 14 and 15. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

NOTE: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 14 and 15. Improperly applied gasket can also result in air leaks and poor unit performance.

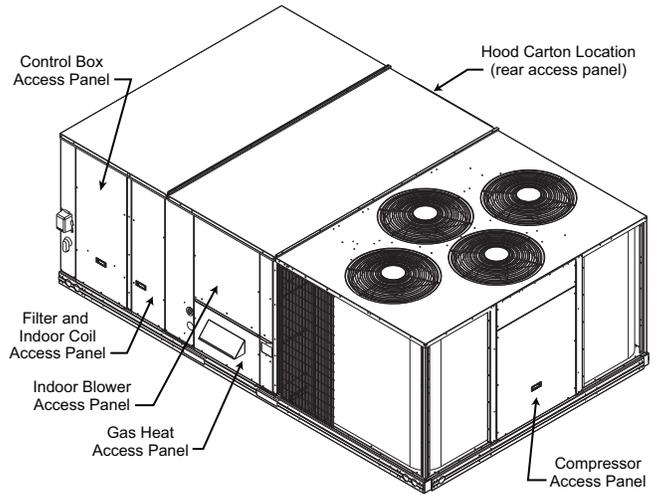
Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 12. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



**Fig. 12 – Unit Leveling Tolerances**

Install insulation, cant strips, roofing felt, and counter flashing as shown. Ductwork must be attached to curb and not to the unit. Thru-the-base power connection must be installed before the unit is set on the roof curb. If field-installed thru-the-roof curb gas connections are desired remove knockout in basepan located in the gas section, see Fig. 13 for location. Gas connections and power connections to the unit must be field installed after the unit is installed on the roof curb.

If electrical and control wiring is to be routed through the basepan, remove the knockouts in the basepan located in the control box access area (see Fig. 13). For basepan knockout locations for vertical airflow units see Fig. 2 or 7, for horizontal airflow units see Fig. 3 or 8.



**Fig. 13 – Typical Access Panel and Compressor Locations**

**SLAB MOUNT (HORIZONTAL UNITS ONLY)**

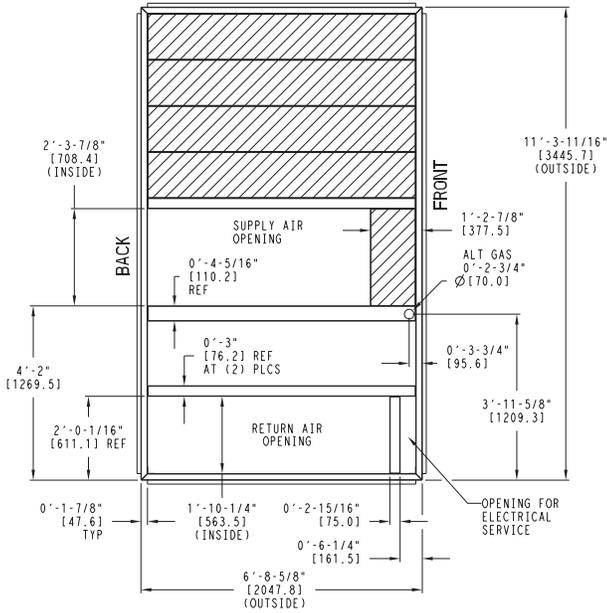
Provide a level concrete slab that extends a minimum of 6 in. (150 mm) beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

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

**ALTERNATE UNIT SUPPORT (IN LIEU OF CURB MOUNT)**

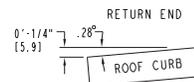
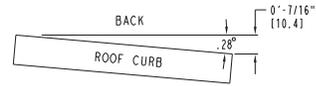
A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 4 equally spaced 4 in. x 4 in. (102 mm x 102 mm) pads on each side. Locate pads so that they support the rails. Make sure to avoid the fork openings.

"A"	ROOF CURB ACCESSORY
1'-2" [356.0]	CRRFCURB047A00
2'-0" [610.0]	CRRFCURB048A00



- NOTES:
- 1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
  - 2 DIMENSIONS IN [ ] ARE IN MILLIMETERS.
  - 3 ROOF CURB GALVANIZED STEEL.
  - 4 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
  - 5 SERVICE CLEARANCE 4 FT ON EACH SIDE

➔ DIRECTION OF AIR FLOW



MAX CURB LEVELING TOLERANCES

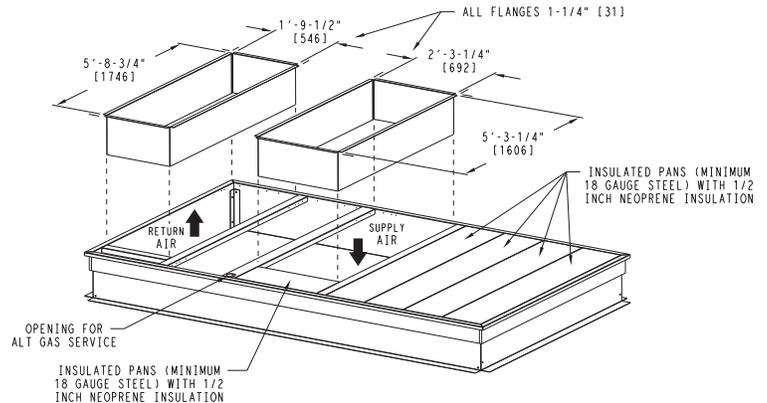
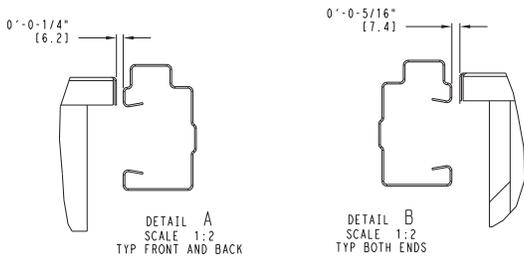
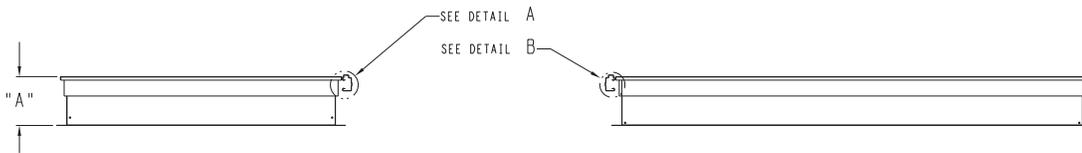
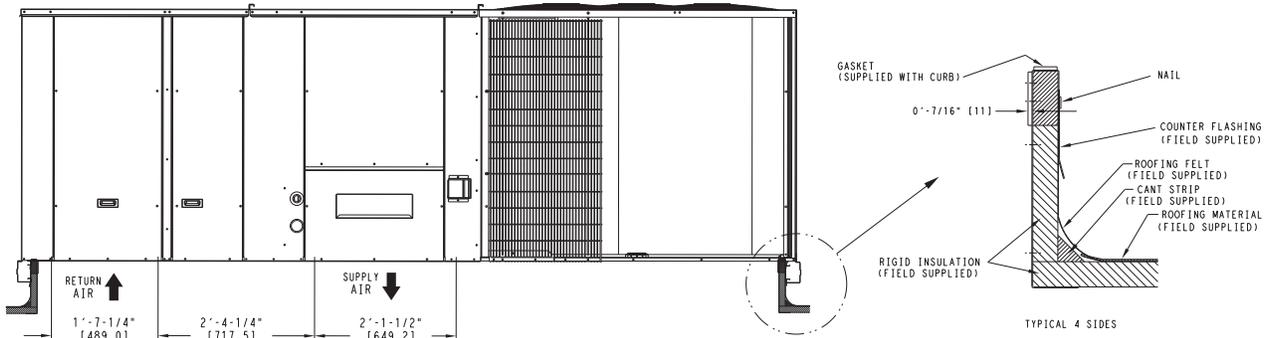
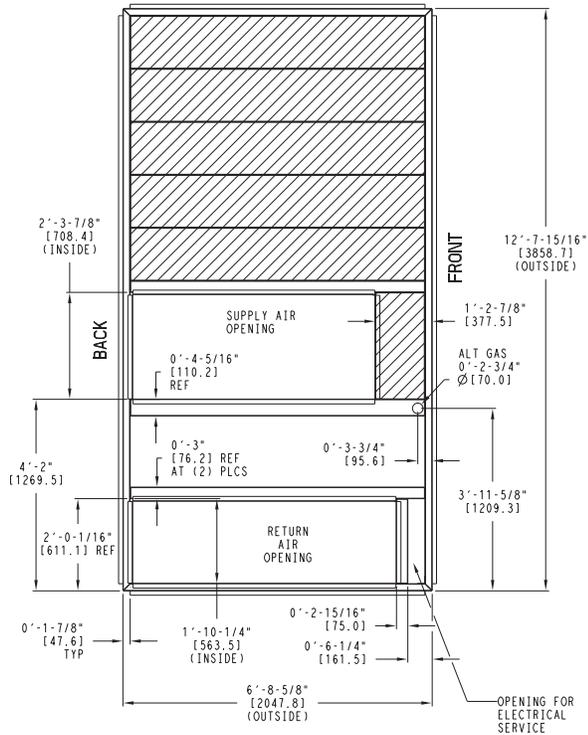


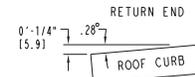
Fig. 14 – Roof Curb Details – Size 17 Units

"A"	ROOF CURB ACCESSORY
1'-2" [356.0]	CRRFCURB049A00
2'-0" [610.0]	CRRFCURB050A00



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

➔ DIRECTION OF AIR FLOW



MAX CURB LEVELING TOLERANCES

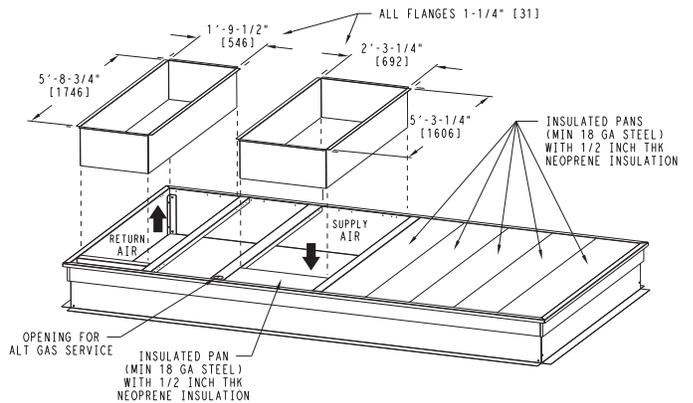
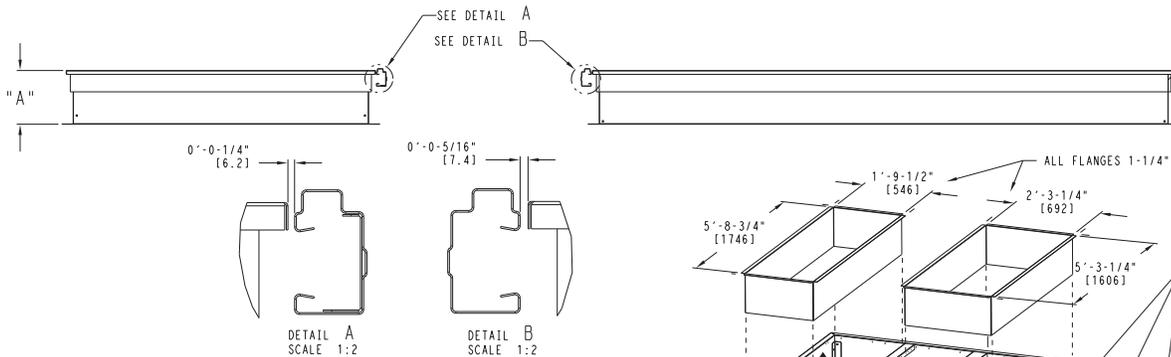
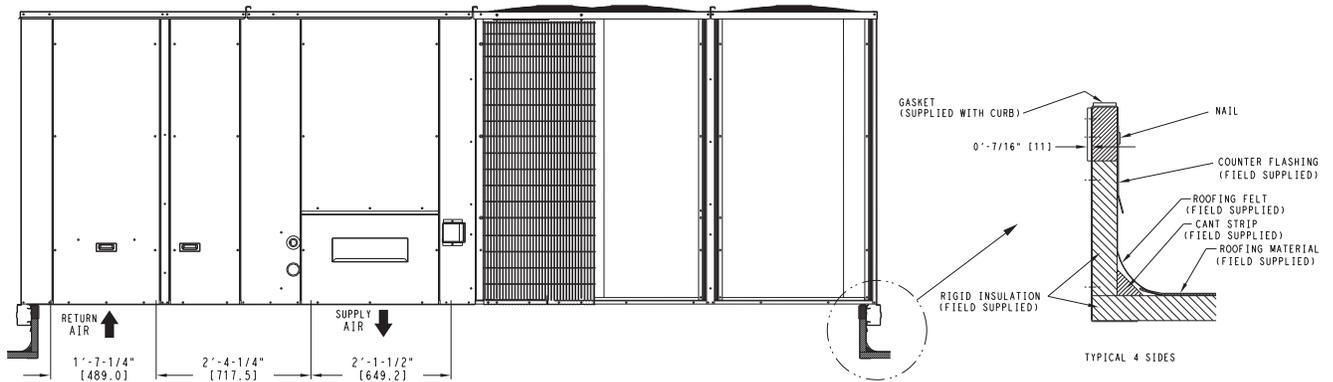


Fig. 15 — Roof Curb Details — Size 24 and 28 Units

## Step 5 – Field Fabricate Ductwork

Cabinet return-air static pressure (a negative condition) shall not exceed 0.5 in. wg (87 Pa) with economizer or without economizer.

For vertical ducted applications, secure all ducts to roof curb and building structure. Do not connect ductwork to unit.

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

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

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

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

### ⚠ 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.

### ⚠ 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.

## Step 6 – Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on the unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 3 and Fig. 16 for additional information.

Lifting holes are provided in base rails as shown in Fig. 16. Refer to rigging instructions on the unit.

### ⚠ CAUTION

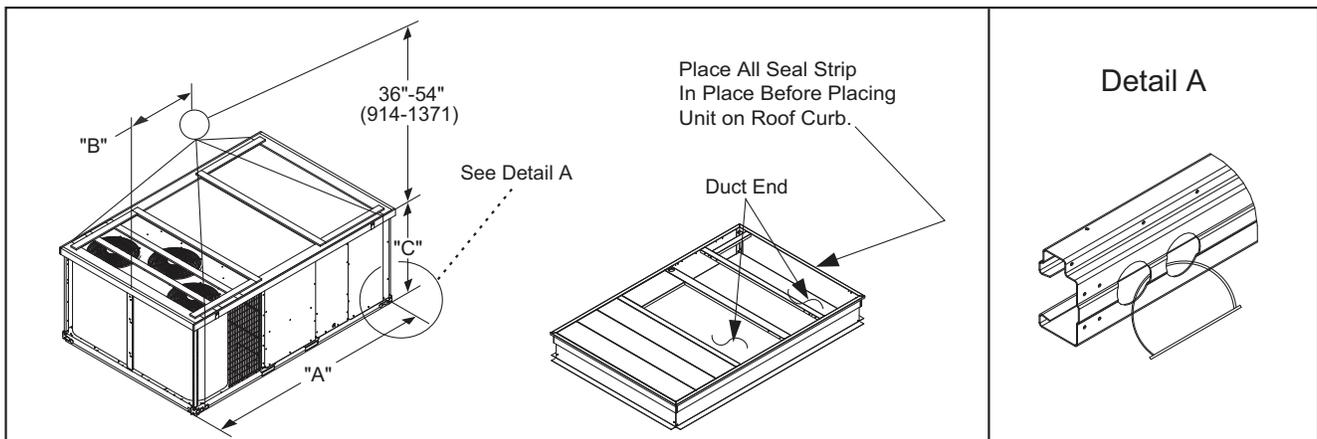
#### UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

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

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



UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
48QE**17	3299	1496	141.5	3595	77.0	1955	52.3	1330
48QE**24	3797	1722	157.8	4010	86.8	2205	60.3	1530
48QE**28	3860	1751	157.8	4010	87.5	2225	60.3	1530

#### NOTE(S):

- Dimensions in ( ) are in millimeters.
- 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. 16 – Rigging Details

## POSITIONING ON CURB

Position unit on roof curb so that the following clearances are maintained: 1/4 in. (6 mm) clearance between the roof curb and the base rail inside the front and back, 5/16 in. (8 mm) clearance between the roof curb and the base rail inside the left and right. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately equal to Details A and B in Fig. 14 and 15.

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

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

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

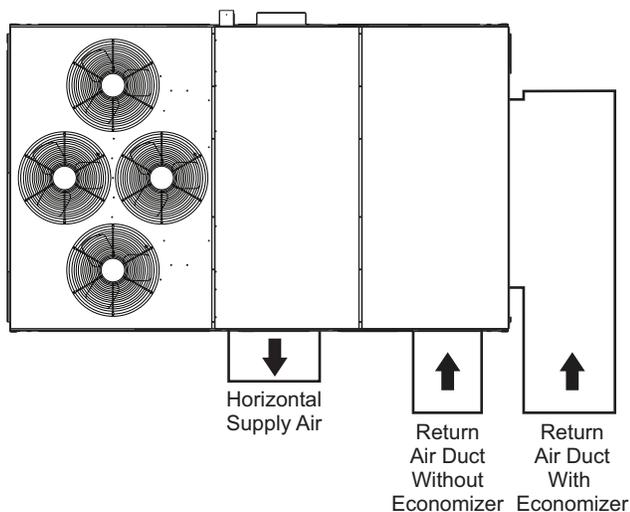
Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

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

## Step 7 – Horizontal Duct Connection

Depending on the unit size, see either Fig. 3 and 4 (size 17) or Fig. 8 and 9 (sizes 24 and 28) for locations and sizes of the horizontal duct connections. Note that there are 2 different return air duct connection locations – one for unit without an economizer (on back side of unit) and a different one for unit equipped with an economizer (on left end, under the economizer hood). The supply air duct connection is on the back side. See Fig. 17 for top view depicting typical horizontal duct arrangements.

NOTE: 48QE size 17 to 28 units are factory assembled as either dedicated horizontal or vertical units. These units cannot be field converted.



LOCATION	SUPPLY	RETURN WITHOUT ECONOMIZER	RETURN WITH ECONOMIZER
	Back	Back	Left End
Height - in. (mm)	14-5/8 (372)	41-3/8 (1051) <sup>a</sup> 49-3/8 (1253) <sup>b</sup>	18-3/8 (467)
Width - in. (mm)	29-3/4 (756)	23-3/8 (593)	61-5/8 (1564)

NOTE(S):

- Size 17 units only.
- Size 24 and 28 units only.

## Fig. 17 – Horizontal Duct Opening Dimensions

Field-supplied (3/4 in.) flanges should be attached to horizontal duct openings (see Fig. 17) 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.

## Step 8 – Install Outside Air Hood (Factory Option)

The outside air hood for factory-option economizer and two-position damper is shipped in knock-down form and requires field assembly. The panel for the hood top is shipped on the end of the unit (see Fig. 18). The remaining parts for the hood assembly (including side panels, filters and tracks) are shipped in a carton that is secured to the rear of the blower assembly. Access the carton location through rear panel (see Fig. 19).

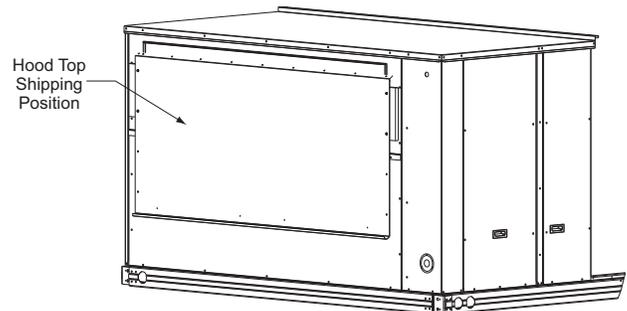


Fig. 18 – Hood Top – Shipping Position

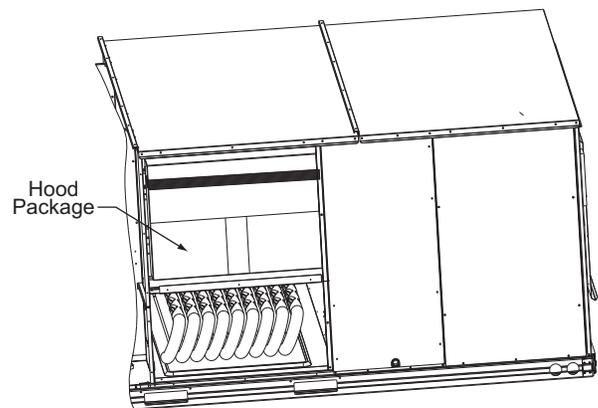


Fig. 19 – Hood Package – Shipping Location

To remove the hood parts package:

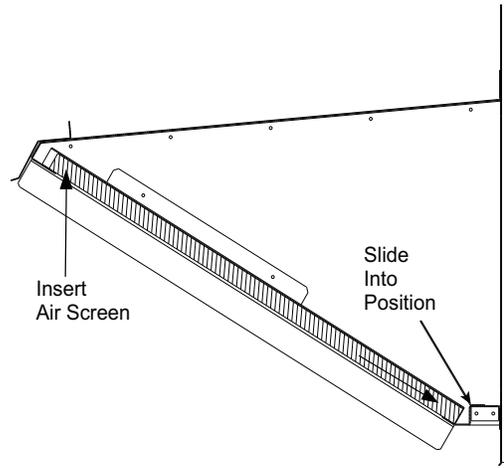
- Remove the back blower access panel.
- Locate and cut the strap, being careful to not damage any wiring.
- Carefully lift the hood package carton through the back blower access opening.

To assemble the outside air hood (see Fig. 20 for hood component locations):

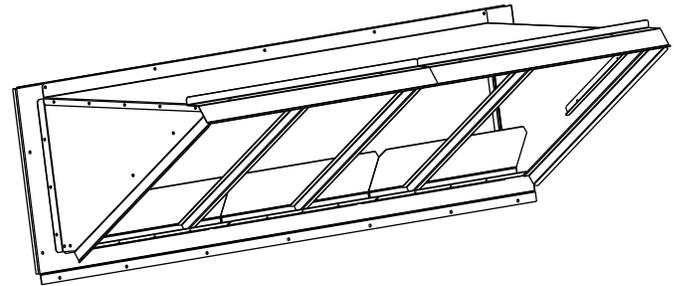
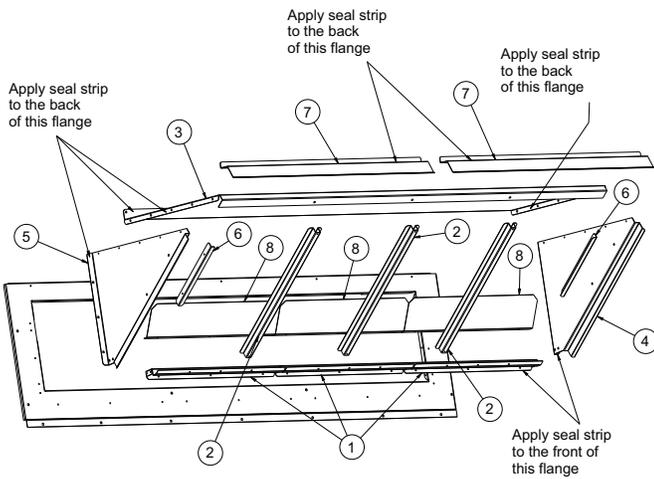
- Remove hood top panel from shipping position on unit end.
- Install filters supports (Item 1) to the upper end panel using the screws provided.
- Install each deflector (Item 8) on to each filter support (Item 1) using the screws provided.
- Apply seal strip to mating flanges on side panels of hood (Items 4 and 5).
- Secure side panels (Items 4 and 5) to upper panel using the screws provided.
- Apply seal strip to mating flange of the hood (see Fig. 20).
- Secure hood top (Item 3) to upper panel using the screws provided. (On 44-in. chassis, remove the screws from across top

cover of unit. The rear flange of hood top will slide behind unit top over flange.)

8. Secure side retainers (Item 6) to side panels (Items 4 and 5) using the screws provided, screwing from outside of the hood.
9. Secure each central retainer (Item 2) to the hood top (Item 3). Then align central retainers to holes located on filter support (Item 1), so central retainer is perpendicular to hood and each filter support. Secure using screws provided.
10. Apply seal strip to top diverters (Item 7).
11. Secure top diverters (Item 7) to hood top (Item 3).
12. Install outdoor air screens by sliding them into each of the four spaces created by the hood, filter support and central retainers. To do so, first insert the air screens into pocket created at the end of hood (Item 3), then fully put the air screen into place, and then slide them back into pocket created in the filter support (Item 1). Repeat this for each air screen (see Fig. 21). See Fig. 22 for completed hood assembly.



**Fig. 21 – Outdoor Air Screen Installation**

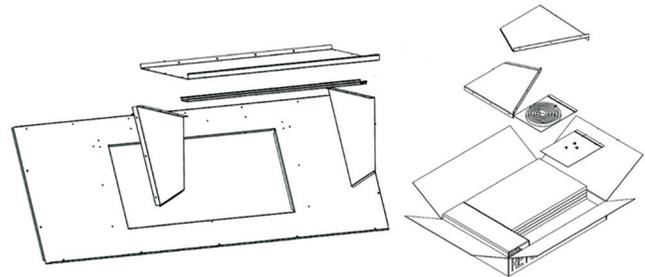


**Fig. 22 – Completed Hood Assembly**

**Step 9 – Assemble Barometric Hood**

The barometric hood can be assembled in vertical or horizontal configuration. Figure 23 illustrates the barometric hood parts.

ITEM	DESCRIPTION	QTY
1	Filter Supports	3
2	Central Retainer	3
3	Hood Top	1
4	Left Hood Side	1
5	Right Hood Side	1
6	Side Retainer	2
7	Top Diverters	2
8	Deflector	3

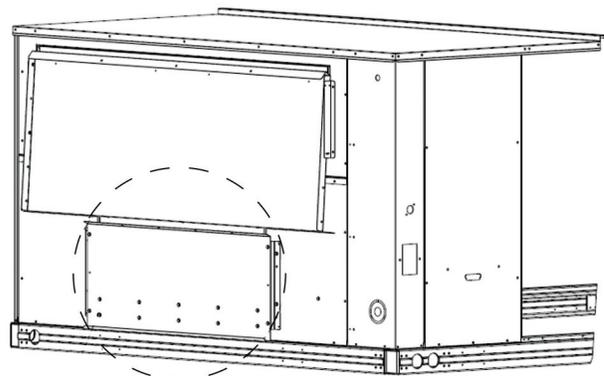


**Fig. 23 – Barometric Hood Parts**

**Fig. 20 – Hood Part Identification and Seal Strip Application Areas**

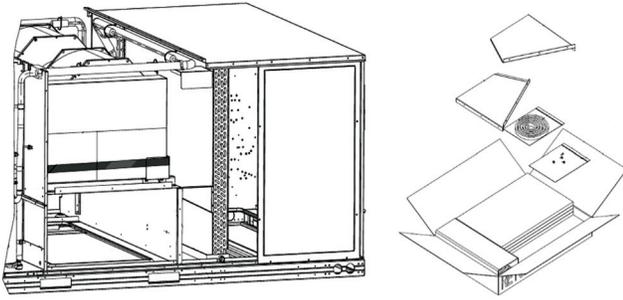
**BAROMETRIC HOOD (VERTICAL CONFIGURATION)**

1. Remove the hood top panel from its shipping position on the unit end (see Fig. 24).



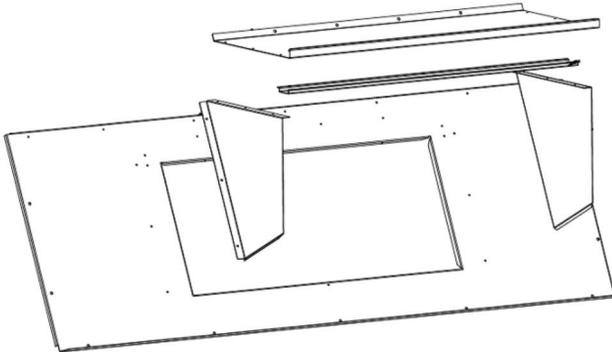
**Fig. 24 – Shipping Location, Vertical Units**

- Remove the side panels located in the hood parts box (see Fig. 25).



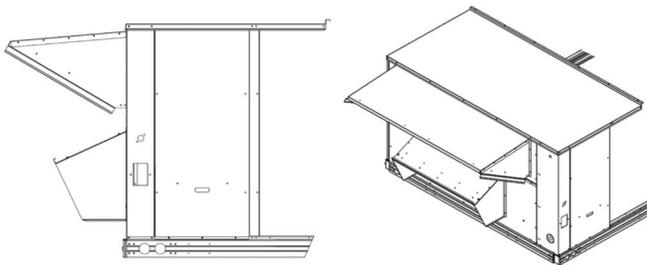
**Fig. 25 — Barometric Hood Box Parts Location**

- Install parts as shown in the following exploded view (see Fig. 26) using the seal strip and screws provided in the parts box.



**Fig. 26 — Barometric Hood Exploded View**

Figure 27 illustrates the installed barometric hood parts.

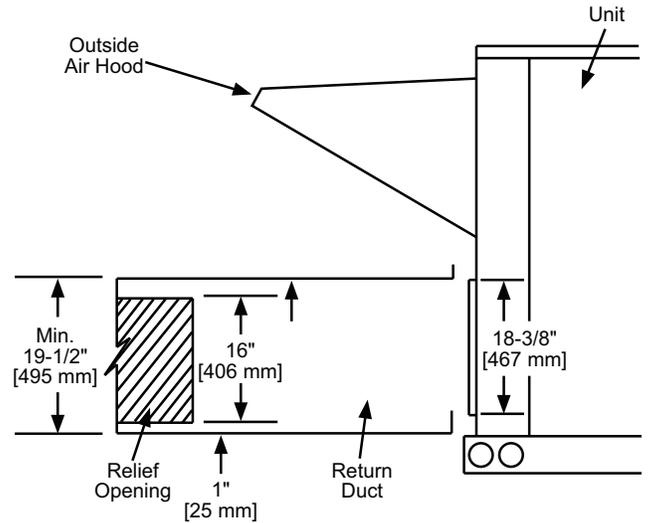


**Fig. 27 — Installed Barometric Hood Side View and Isometric View**

#### BAROMETRIC HOOD (HORIZONTAL CONFIGURATION)

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

- Install the field provided horizontal ductwork onto the unit. Duct height must be at least 19-1/2 in. (495 mm) high, however the duct can be no taller than the top of the relief opening in the bottom panel, or airflow into the outside air hood will be restricted. See Fig. 28.
- Cut a 16 in. x 36 in. (406 mm x 914 mm) opening in the return duct for the relief damper (see Fig. 28).

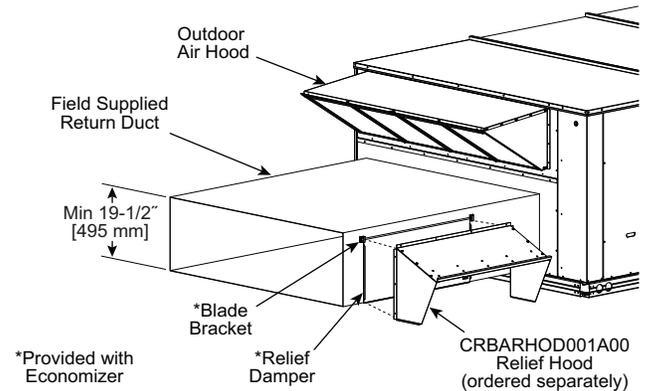


**Fig. 28 — Relief Damper**

- On the field installed economizer (CRECOMZR0\*\*A00), a birdscreen or hardware cloth is shipped attached to the bottom panel used for vertical applications.

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

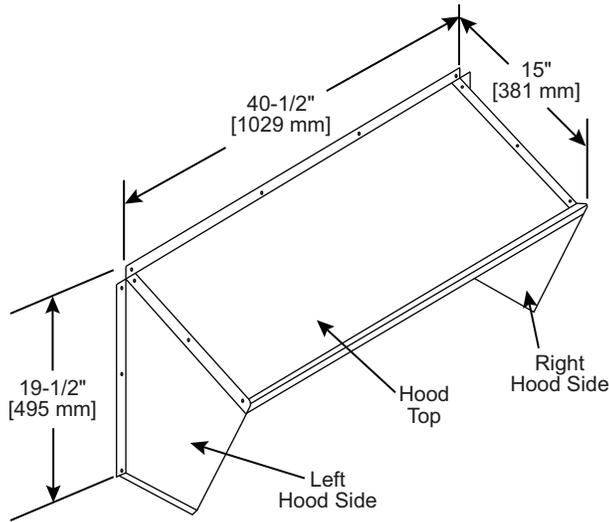
- Using the blade brackets, install the relief damper onto the side of the return duct (see Fig. 29). The two brackets and relief damper are provided with the economizer.



**Fig. 29 — Installing CRBARHOD001A00 Over Relief Damper**

- Using the provided hardware, screw the CRBARHOD001A00 hood sides and top together (see Fig. 30).

NOTE: CRBARHOD001A00 is a separate accessory that must be ordered with the unit and ships in a separate box.

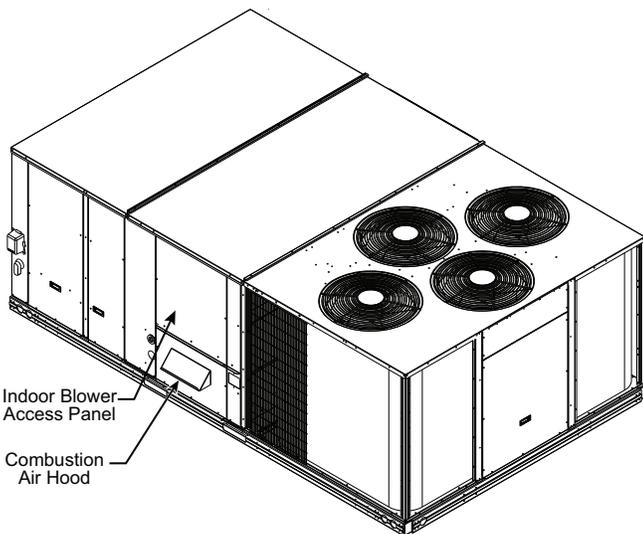


**Fig. 30 — CRBARHOD001A00 Hood Sides and Top**

Caulk the backside of the mating flanges to ensure a watertight seal. Install the CRBARHOD001A00 over the relief damper and screw to the return duct, as illustrated in Fig. 29.

### Step 10 — Install Combustion Air Hood

The combustion air hood is attached to the back of the burner access panel. Remove the 2 screws securing the hood to the back of the burner access panel. Using the 2 screws, re-attach the hood to the front of the burner access panel as shown in Fig. 31.



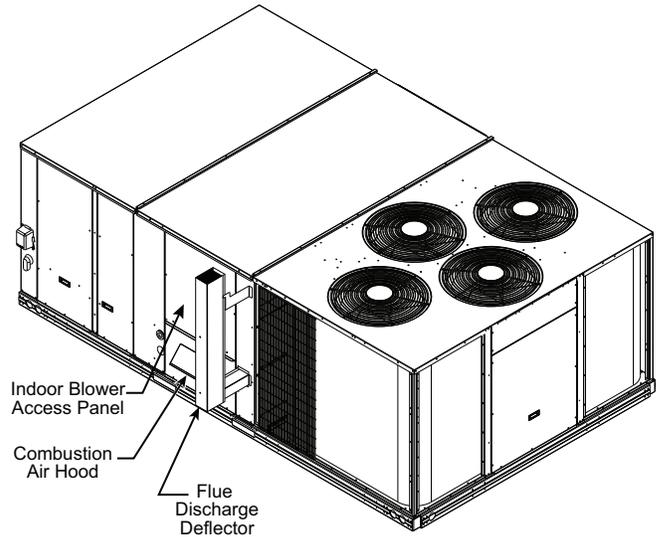
**Fig. 31 — Combustion Air Hood Details**

### Step 11 — Install Flue Discharge Deflector

The flue discharge deflector directs unit flue exhaust vertically instead of horizontally. This allows for smaller unit clearance due to flue exhaust. See Fig. 32.

Installation of the flue discharge deflector can be hazardous due to system pressures, electrical components, and equipment location (such as a roof or elevated structure). Only trained, qualified installers and service technicians should install, start-up and service this equipment.

**IMPORTANT:** Refer to the SAFETY CONSIDERATIONS section at the beginning of this manual before installing the flue discharge deflector.



**Fig. 32 — Flue Discharge Deflector Details**

### ⚠ WARNING

#### ELECTRICAL SHOCK HAZARD

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

Before beginning any modification, be certain that the main-line electrical disconnect switch is in the OFF position. Close the main gas supply shutoff valve. Tag disconnect switch and gas valve with suitable warning labels.

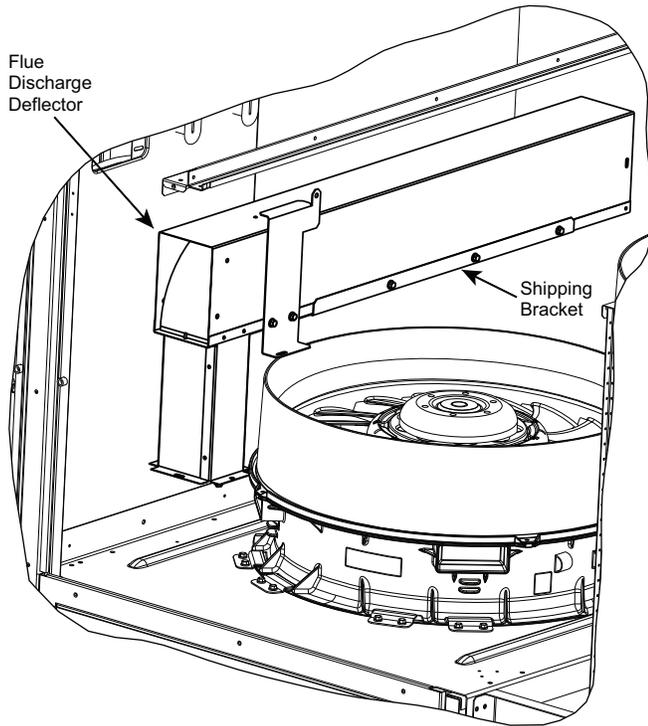
The flue deflector is shipped inside the unit in the indoor fan section in an assembly with a shipping bracket. The shipping bracket is intended to remain in the unit and only the flue deflector is removed to install on the unit. See Fig. 33. Do not remove the shipping bracket.

#### INSTALLATION

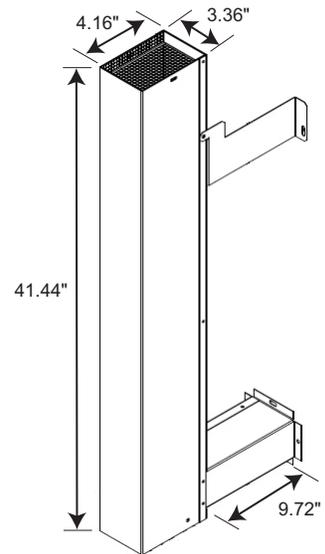
1. Close the manual shutoff valve on the gas supply piping.
2. Shut off power to the unit and install lockout tag.
3. Access the indoor fan section and remove the 3 screws that attach the flue deflector to the shipping bracket. Save the screws. (See Fig. 33.)
4. Reattach screws from Step 3 to the flue deflector.
5. Remove the 2 screws that attach the upper bracket to the flue deflector and position the upper bracket in the correct position on the flue deflector and reattach screws. (See Fig. 34.)
6. Align deflector assembly (Fig. 34.) with outlet and remove screw in center post that lines up with upper bracket. Save screw.
7. Fasten deflector assembly inlet with the screws in installation packet bag to unit flue outlet (see Fig. 35.)
8. Align upper bracket with empty screw hole in center post. Secure with screw removed in Step 6. (See Fig. 35.)
9. Return power to unit and remove lockout tag.
10. Open the manual shutoff valve on the gas supply piping.

#### SERVICE

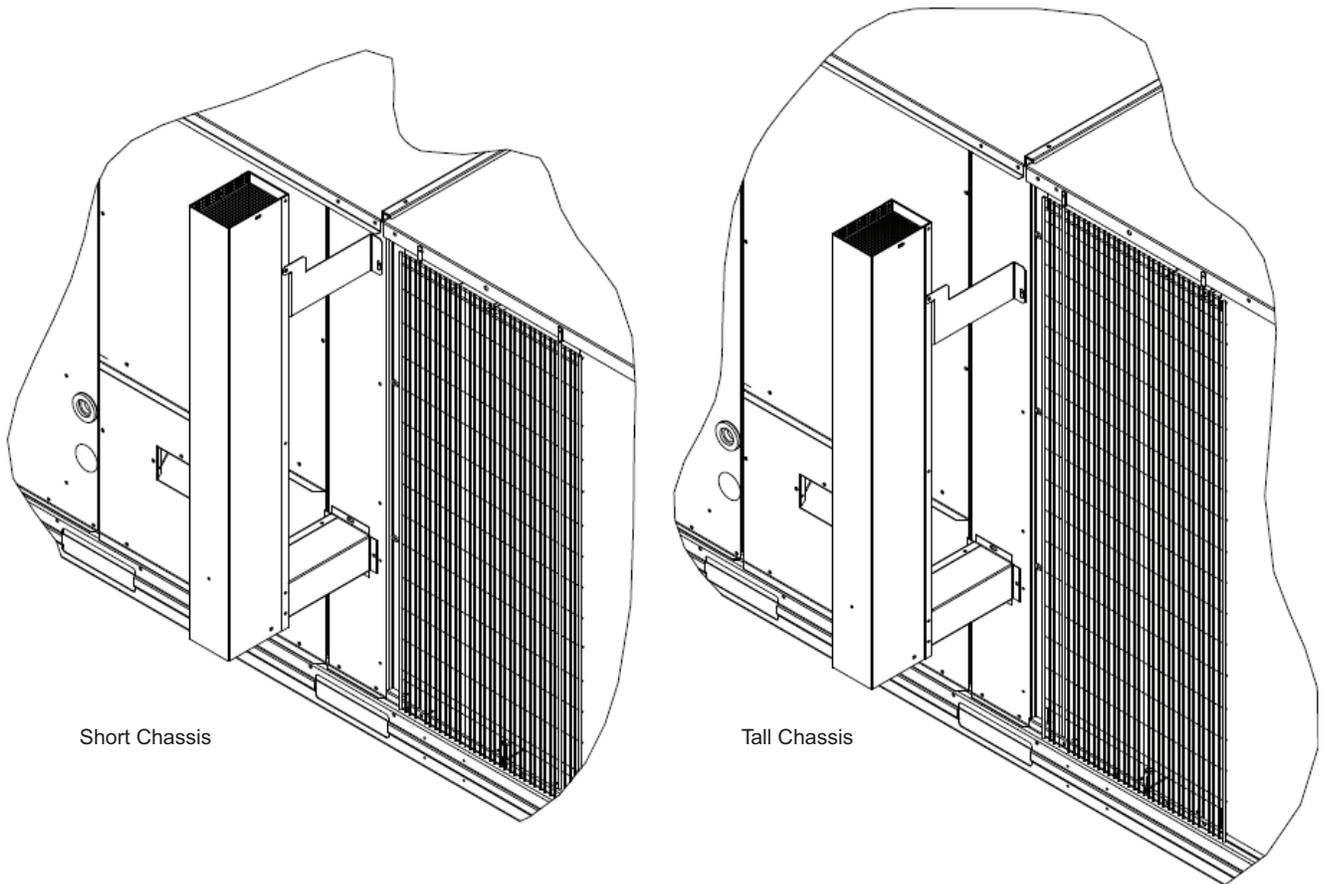
Remove and clean the screen periodically to ensure proper airflow and heating efficiency. Inspect full length of flue stack for any blockages which could impair flue performance. Inspect every fall, and periodically during heating season.



**Fig. 33 – Flue Discharge Deflector and Shipping Bracket Assembly in Indoor Fan Section.**



**Fig. 34 – Flue Deflector Assembly**



**Fig. 35 – Flue Discharge Deflector Installed on Unit**

## Step 12 — Install Gas Piping

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

NOTE: Furnace gas input rate on rating plate is for installation up to 2000 ft (610 m) above sea level. 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.

For natural gas applications, gas pressure at unit gas connection must not be less than 5 in. wg (1246 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating (see Table 4). For liquefied petroleum applications, the gas pressure must not be less than 11 in. wg (2740 Pa) or greater than 13 in. wg (3240 Pa) at the unit connection (see Table 5).

**Table 4 — Natural Gas Supply Line Pressure Ranges**

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

**Table 5 — Liquid Propane Supply Line Pressure Ranges**

UNIT MODEL	UNIT SIZE	MIN.	MAX.
48QE**	17, 24, 28	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
48QE**	17, 24, 28	3.0 in. wg (748 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
48QE**	17, 24, 28	11.0 in. wg (2740 Pa)	7.3 in. wg (1819 Pa)

### GAS SUPPLY LINE

The gas supply pipe enters the unit adjacent to the burner access panel on the front side of the unit, through the grommeted hole. The gas connection to the unit is made to the 3/4 in. FPT gas inlet port on the unit gas valve.

Table 8 lists typical 3/4 in. NPT (National Pipe Thread) field supplied pipe fittings required for Thru-Base gas supply, starting from the unit gas valve (see Fig. 36).

Pipe gas supply into 90 degree elbow item 15 (see Table 8) through the hole in the unit basepan.

For typical 3/4 in. NPT field-supplied fittings without Thru-Base gas supply, requirements starting from the unit gas valve, omit items 14 and 15 from Table 8 and pipe gas supply into the tee. See Fig. 37.

**Table 8 — Typical 3/4 in. NPT Field Supplied Piping Parts**

ITEM	QTY	CPN	DESCRIPTION
1	1	CA15RA201	90 Deg Street Elbow
2	1	CA01CA226	5 in. Long Nipple
3	1	CA85RA201	Ground Joint Union
4	1	CA01CA218	3 in. Long Nipple
5	1	CA05RA201	90 Deg Elbow
6	1	CA01CA250	12 in. Long Nipple
7	1	CA05RA201	90 Deg Elbow
8	1	CA01CA218	3 in. Long Nipple
9	1	CA20RA201	TEE
10	1	CA01CN222	4 in. Long Nipple (Sediment Trap)
11	1	CA38RA201	Cap
12	1	CA01CA220	3 1/2 in. Long Nipple
13	1	GB30	NIBCO Ball Valve
14	1	CA01CA238	8 in. Long Nipple
15	1	CA05RA201	90 Deg Elbow

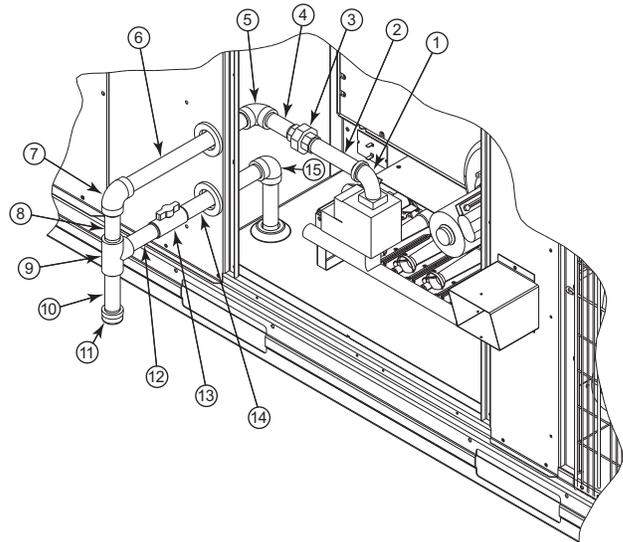
### ⚠ CAUTION

#### EQUIPMENT DAMAGE

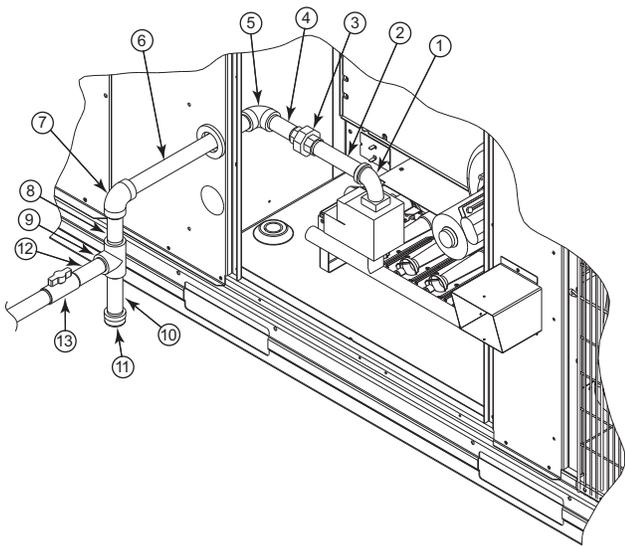
Failure to follow this caution may result in equipment damage. When connecting the gas line to the unit gas valve, the installer **MUST** use a backup wrench to prevent damage to the valve.

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 smaller than the size specified. Size the gas supply line to allow for a maximum pressure drop of 0.5 in. wg (124 Pa) between gas regulator source and unit gas valve connection when unit is operating at high-fire flow rate.

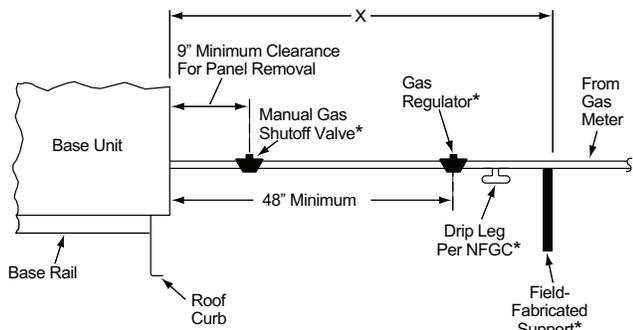
The gas supply line can approach the unit in 2 ways: horizontally from outside the unit (across the roof), or through unit basepan. Observe clearance to gas line components per Fig. 38.



**Fig. 36 — Gas Supply Line Piping with Thru-Base**



**Fig. 37 – Gas Supply Line Piping**



**LEGEND**  
**NFGC** — National Fuel Gas Code  
 \* Field supplied.  
 NOTE: Follow all local codes.

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. 38 – Gas Piping Guide**

**FACTORY OPTION THRU-BASE CONNECTIONS**

**Electrical Connections**

Knockouts are located in the control box area. Remove the appropriate size knockout for high voltage connection. Use the field supplied connector depending on wiring or conduit being utilized. Remove the 7/8 in. (22 mm) knockout and appropriate connector for low voltage wiring. If non-unit powered convenience outlet is being utilized, remove the 7/8 in. (22 mm) knockout and utilize appropriate connector for 115 volt line. See “Install External Condensate Trap and Line” on page 30 for details.

**Gas Connections**

Remove the knockout in the base pan and route 3/4 in. gas line up through the opening. Install an elbow and route gas line through opening in panel after first removing plastic bushing. Install a gas shut off followed by a drip leg and ground-joint union. Route gas line into gas section through the grommet (Part #: KA56SL112) at the gas inlet and into the gas valve. See Fig. 36 and Table 8. If a regulator is installed, it must be located 4 ft (1.22 meters) from the flue outlet.

Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 37 for typical piping arrangements for gas piping that has been routed through the side-wall of the base pan.

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

1. Avoid low spots in long runs of pipe. Grade all pipe 1/4 in. 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<sup>®</sup>) 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).

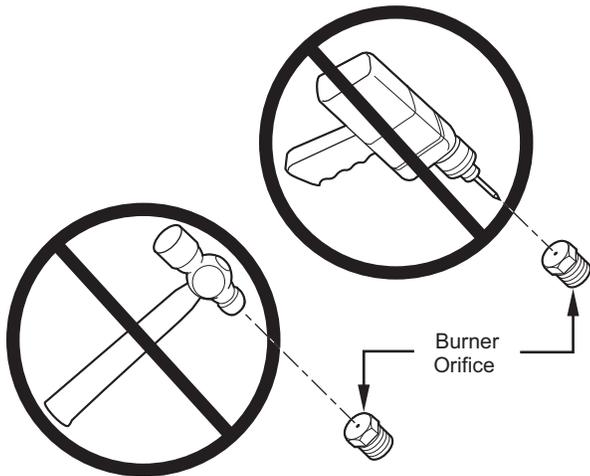
**⚠ WARNING**

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.

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. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics. See Fig. 39.

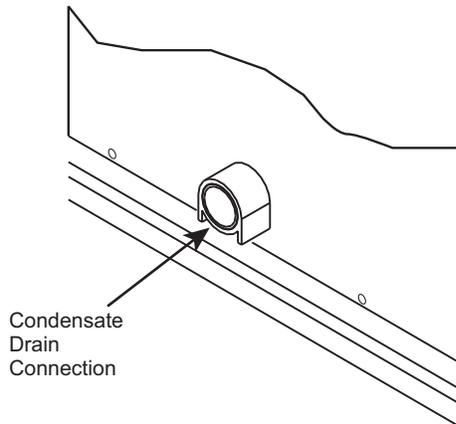
1. Third-party trademarks and logos are the property of their respective owners.



**Fig. 39 – Orifice Hole**

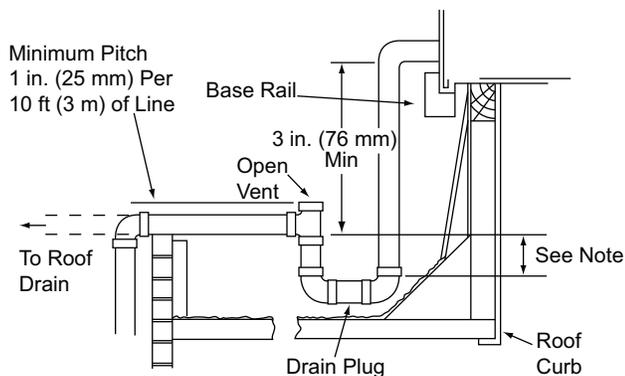
**Step 13 – Install External Condensate Trap and Line**

The unit has one 3/4 in. condensate drain connection on the end of the condensate pan (see Fig. 40). See Fig. 4 and 9 for the location of the condensate drain connection.



**Fig. 40 – Condensate Drain Pan Connection**

The piping for the condensate drain and external trap can be completed after the unit is in place. Hand tighten fittings to the drain pan fitting. Provide adequate support for the drain line. Failure to do so can result in damage to the drain pan. See Fig. 41.



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

**Fig. 41 – 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 14 – Make Electrical Connections**

**⚠ WARNING**

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

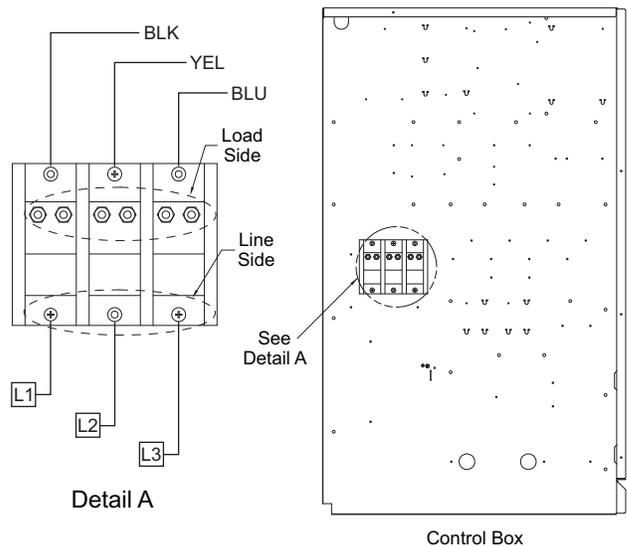
Do not use gas piping as an electrical ground.

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

**FIELD POWER SUPPLY**

If equipped with optional powered convenience outlet: the power source leads to the convenience outlet's transformer primary are not factory connected. Installer must connect these leads according to required operation of the convenience outlet. If an always-energized convenience outlet operation is desired, connect the source leads to the line side of the unit-mounted disconnect. (Check with local codes to ensure this method is acceptable in your area.) If a de-energize via unit disconnect switch operation of the convenience outlet is desired, connect the source leads to the load side of the unit disconnect. On a unit without a unit-mounted disconnect, connect the source leads to the line side with unit field power leads. See Fig. 42.



**Fig. 42 – Location of TB1**

Field power wires are connected to the unit at line-side pressure lugs on the terminal block (see wiring diagram label for control box component arrangement) or at factory-installed option non-fused disconnect switch. Use copper conductors only. See Fig. 43.

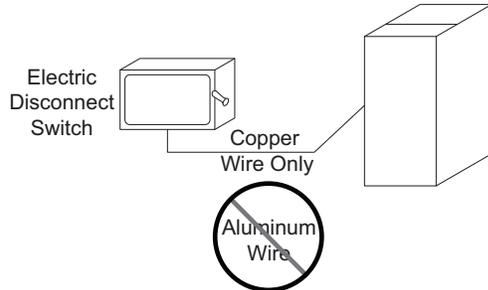
NOTE: Make field power connections directly to line connection pressure lugs only.

**⚠ WARNING**

**FIRE HAZARD**

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

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



**Fig. 43 — Disconnect Switch and Unit**

**UNITS WITHOUT FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR**

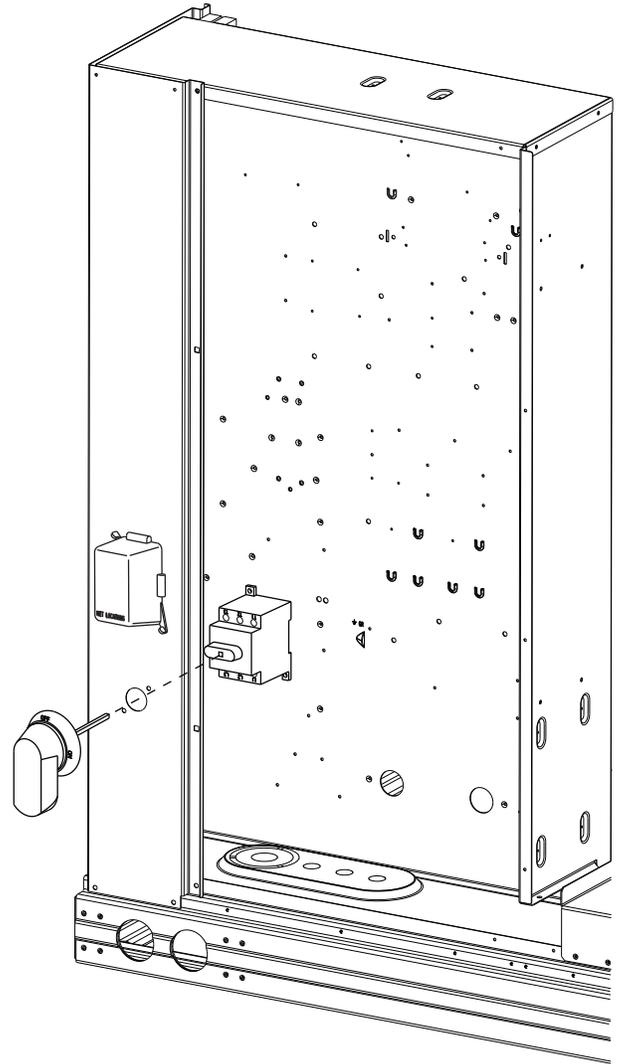
When installing units, provide a disconnect switch of adequate size per NEC (National Electrical Code). Disconnect sizing data is provided on the unit informative plate. Locate on unit cabinet or within sight of the unit per national or local codes. Do not cover unit informative plate if mounting the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

**UNITS WITH FACTORY-INSTALLED NON-FUSED DISCONNECT OR HACR**

The factory-installed option non-fused disconnect switch (NFD) or HACR is located in the main control box. The manual switch handle and shaft are shipped in the control box and must be mounted on the corner post adjacent to the control box (see Fig. 44 or 45). Note that the tape covering the hole for the shaft in the corner post must be removed prior to handle and shaft installation.

**To field install the NFD shaft and handle:**

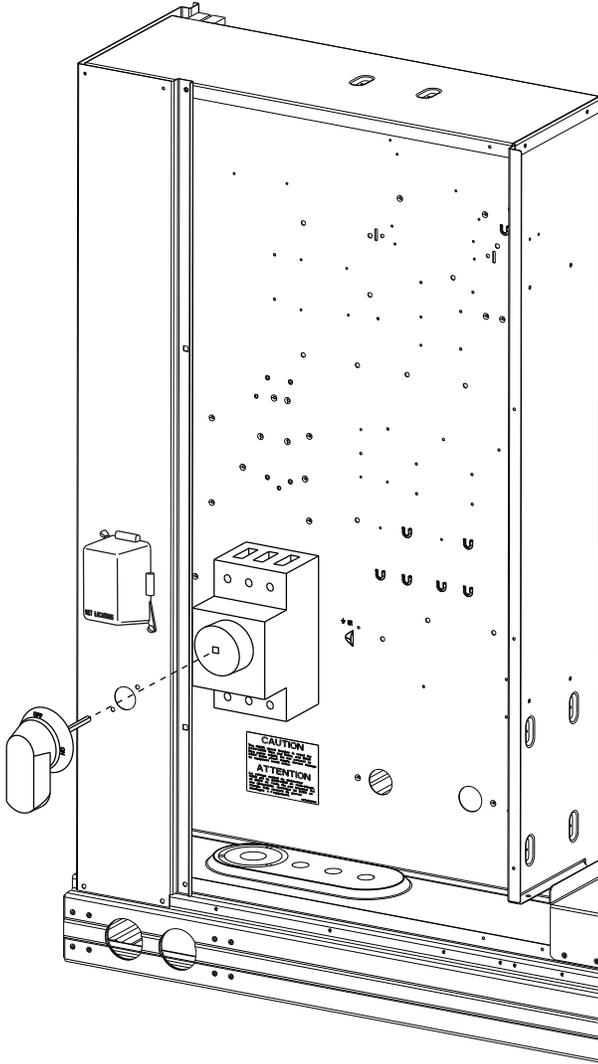
1. Open the control box panel.
2. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob or on the silver metal collar is at OFF).
3. Insert the shaft with the cross pin on the top of the shaft in the horizontal position (see Fig. 44).
4. Measure the tip of the shaft to the outside surface of the corner post to be 0.88 inches.
5. Tighten the locking screw to secure the shaft to the NFD.
6. Turn the handle to the OFF position with red arrow pointing at OFF.
7. Install the handle on to the corner post vertically with the red arrow pointing up.
8. Secure the handle to the corner post with (2) screws and lock washers supplied.



**Fig. 44 — Handle and Shaft Assembly for NFD**

**To field install the HACR shaft and handle:**

1. Open the control box panel.
2. Make sure the HACR shipped from the factory is at OFF position (the white arrow pointing at OFF).
3. Insert the shaft all the way with the cross pin on the top of the shaft in the horizontal position (see Fig. 45).
4. Measure the tip of the shaft to the outside surface of the corner post to be 0.88 inches.
5. Tighten the locking screw to secure the shaft to the HACR.
6. Turn the handle to the OFF position with red arrow pointing at OFF.
7. Install the handle on to the corner post vertically with the red arrow pointing up.
8. Secure the handle to the corner post with (2) screws and lock washers supplied.



**Fig. 45 — Handle and Shaft Assembly for HACR**

**ALL UNITS**

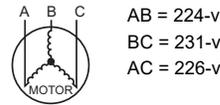
All field wiring must comply with NEC and all local code requirements.

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 46 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is 2/0 AWG per pole. Provide a ground-fault and short-circuit over-current protection device (fuse or breaker) per NEC Article 440 (or local codes). Refer to unit informative data plate for MOCP (Maximum Over-current Protection) device size.

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

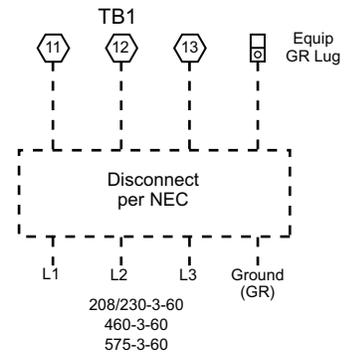
Determine percent of voltage imbalance.

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

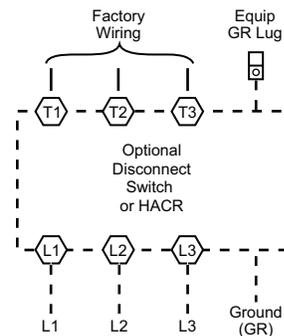
This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

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

**Units Without Disconnect or HACR Option**



**Units With Disconnect or HACR Option**



**Fig. 46 — Power Wiring Connections**

**⚠ 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.

**CONVENIENCE OUTLETS**

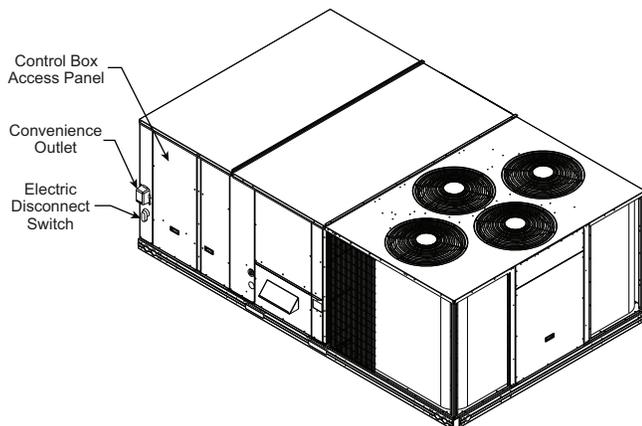
**⚠ WARNING**

**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-unit powered and unit-powered. Both types provide a 125-v GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged access cover, located on the corner panel of the unit. See Fig. 47.



**Fig. 47 — Convenience Outlet Location**

**Installing Weatherproof Cover**

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

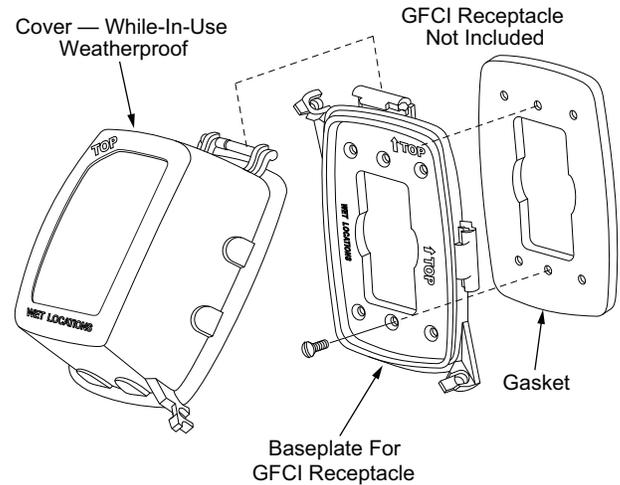
The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

Disconnect all power to unit and convenience outlet. Lock-out and tag-out all power.

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

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

Mount the weatherproof cover to the backing plate as shown in Fig. 48. 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. 48 — Weatherproof Cover Installation**

**Non unit-powered type**

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

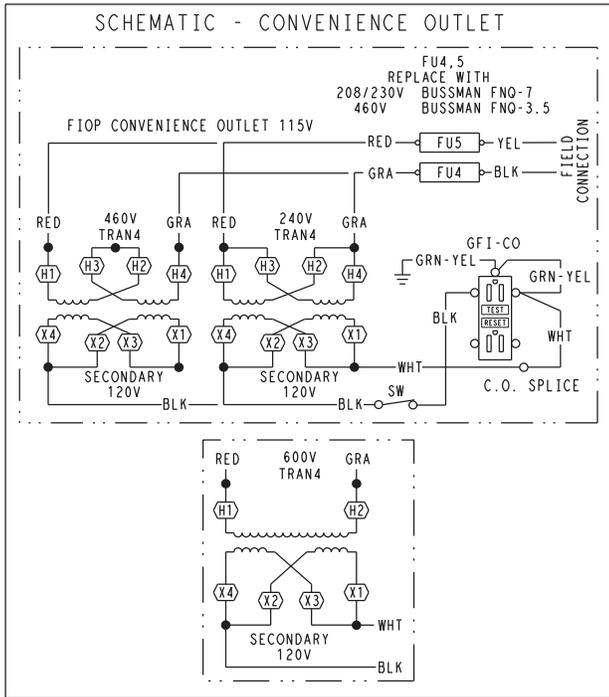
**Unit-powered type**

A unit-mounted transformer which is factory-installed to step-down the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 49.

The primary leads to the convenience outlet transformer are not factory-connected. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect switch; this will provide service power to the unit when the unit disconnect switch is open. See Fig. 49. See Fig. 50 for convenience outlet utilization precautions.

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

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



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

Fig. 49 — Powered Convenience Outlet Wiring

**NOTICE/AVIS**

**Convenience Outlet Utilization**  
 Maximum Intermittent Use 15 - Amps  
 Maximum Continuous Use 8 - Amps  
 Observe a 50% limit on the circuit  
 Loading above 8 - Amps

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**Utilisation de la prise utilitaire**  
 Usage intermittent maximum 15 - Amps  
 Usage continu maximum 8 - Amps  
 Observez une limite de 50% sur le circuit  
 Chargement au-dessus de 8 - Amps

50HE501288 2.0

Fig. 50 — Convenience Outlet Utilization Notice

#### FACTORY-OPTION THRU-BASE CONNECTIONS

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

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

The electrical entrance is located in the control box area and can be accessed through the control box access panel. An embossed area is provided with three knock outs. High voltage is brought through the multi knock out by removing the appropriate size for the size of the fitting required. A 7/8 in. knock out is provided for low voltage. An additional 7/8 in. knock out is provided for a

115-v line which is used when the unit is equipped with the non-unit powered convenience outlet option.

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

#### Units Without Thru-Base Connections

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 46.

#### FIELD CONTROL WIRING

48QE units are equipped with the SystemVu™ controller. All field added wire must comply with UL and local NEC standards. See Unit Without Thru-Base Connection Kit on page 35 and use routing path shown in Fig. 51 to help with compliance as needed.

All low-voltage wiring should be routed through the provided wire ties (see Fig. 51) down the left side of the control box or secured to the unit control box with an electrical conduit in order to provide UL-required clearance between high-voltage and low voltage wiring.

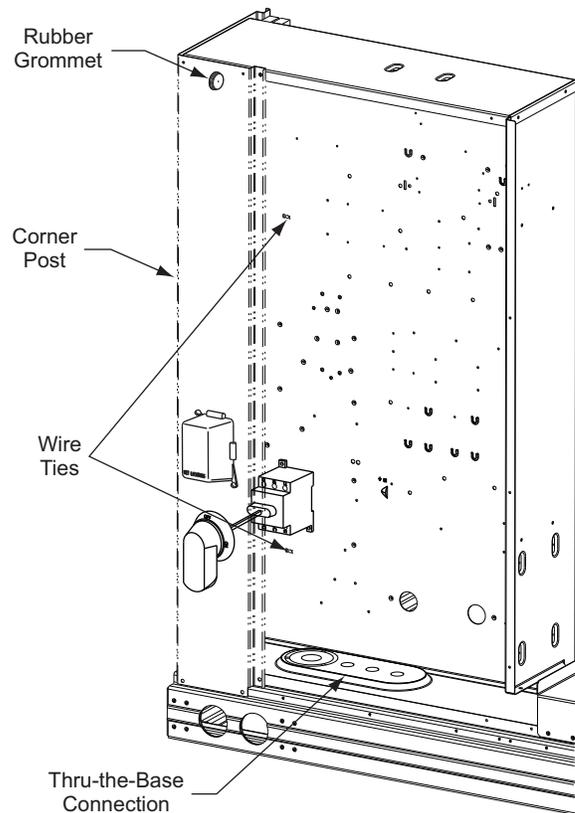
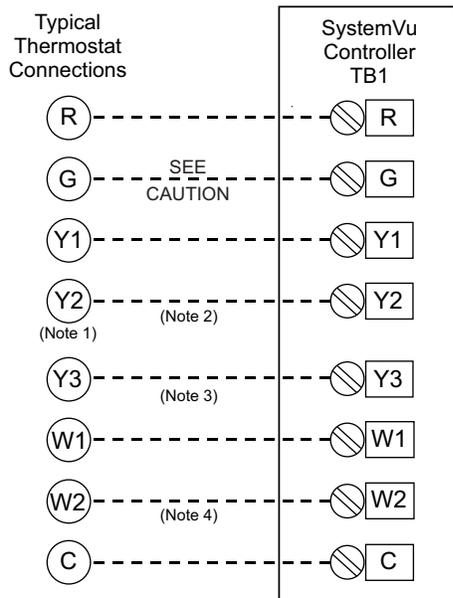


Fig. 51 — Field Control Wiring Raceway

#### THERMOSTAT

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

See Fig. 52 for typical low voltage control connections.



**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. 52 — 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.

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. Check the thermostat installation instructions for additional features which might require additional conductors in the cable.

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

**Unit Without Thru-Base Connection Kit**

Correctly rated low voltage wire can be routed through the rubber grommet located on the corner post adjacent to the control box access panel. Route wire through the grommet and then route the wire behind the corner post utilizing the factory provided wire ties secured to the control box. This will ensure separation of the field low voltage wire and the high voltage circuit. Route the low voltage wire to the unit control board. See Fig. 51.

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

**Transformer Connection for 208-v Power Supply**

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

**ZS SPACE SENSOR**

The ZS Standard, Plus, or Pro can be wired into J20 or J24 of the SystemVu controller (see Fig. 57), 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® SYSTEM CONTROL CONNECTIONS**

**Humidi-MiZer Space RH Controller**

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

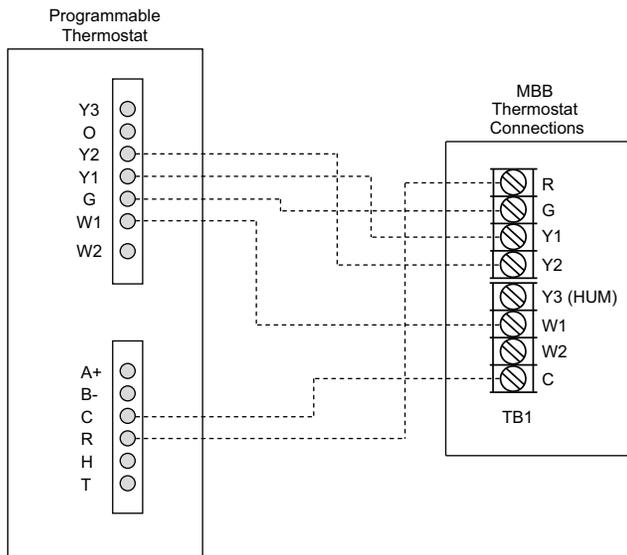
The Humidi-MiZer dehumidification system requires a field-supplied and field-installed space relative humidity control device such as Carrier's Connect Plus thermostat with isolated contact set for dehumidification control. See Fig. 53.



**Fig. 53 — Field-Installed Connect Plus Thermostat**

**Connecting the Carrier Connect Plus (33TCSPL-4)**

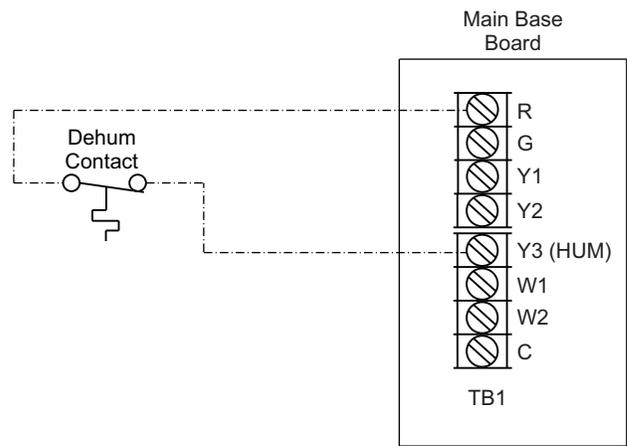
1. Route the multi-conductor thermostat cable (field-supplied) through hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 51) to the 24 v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Use 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.
4. For connections to the SystemVu controller MBB (Main Base Board) see Fig. 54. Refer to the installation instructions included with the Carrier Connect Plus thermostat for more information.



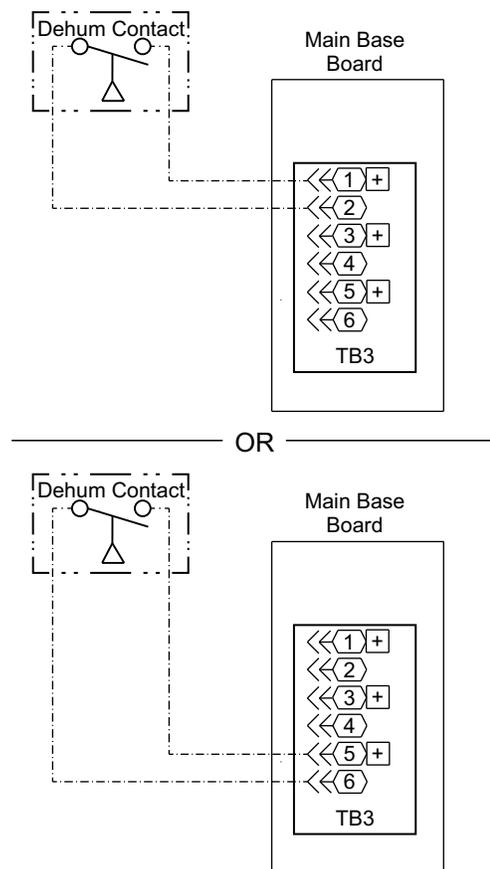
**Fig. 54 — Typical Thermostat Connections — SystemVu Controller MBB**

**Humidi-MiZer Connections to Connect Plus Thermostat**

1. Route the humidistat 2-conductor cable (field-supplied) through hole provided in the unit corner post.
2. Feed wires through the raceway built into the corner post (see Fig. 51) to the 24 v barrier located on the left side of the control box. The raceway provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Use 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.
4. 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. 55.
5. 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. 56.). 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.



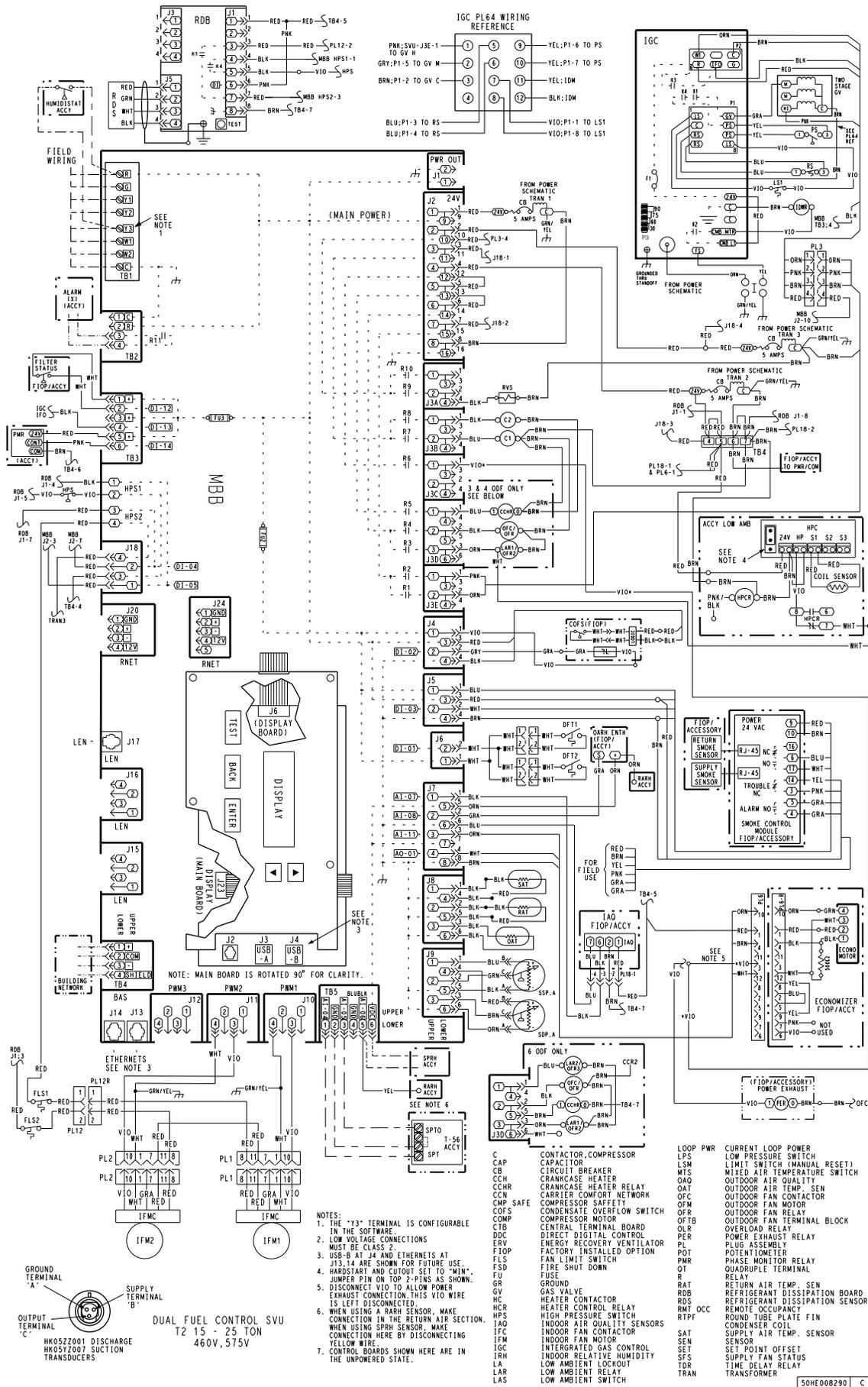
**Fig. 55 — Humidistat Connections to MBB (2-Stage SystemVu Units)**



**Fig. 56 — Humidistat Connections to MBB (3-Stage SystemVu Units)**

**TYPICAL UNIT WIRING DIAGRAMS**

See Fig. 57-64 for examples of typical unit 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.



**Fig. 57 — Typical 2-Stage 48QE\*\*17-28 Control Wiring Diagram, SystemVu™ Controller, 460, 575-3-60 Unit Shown**







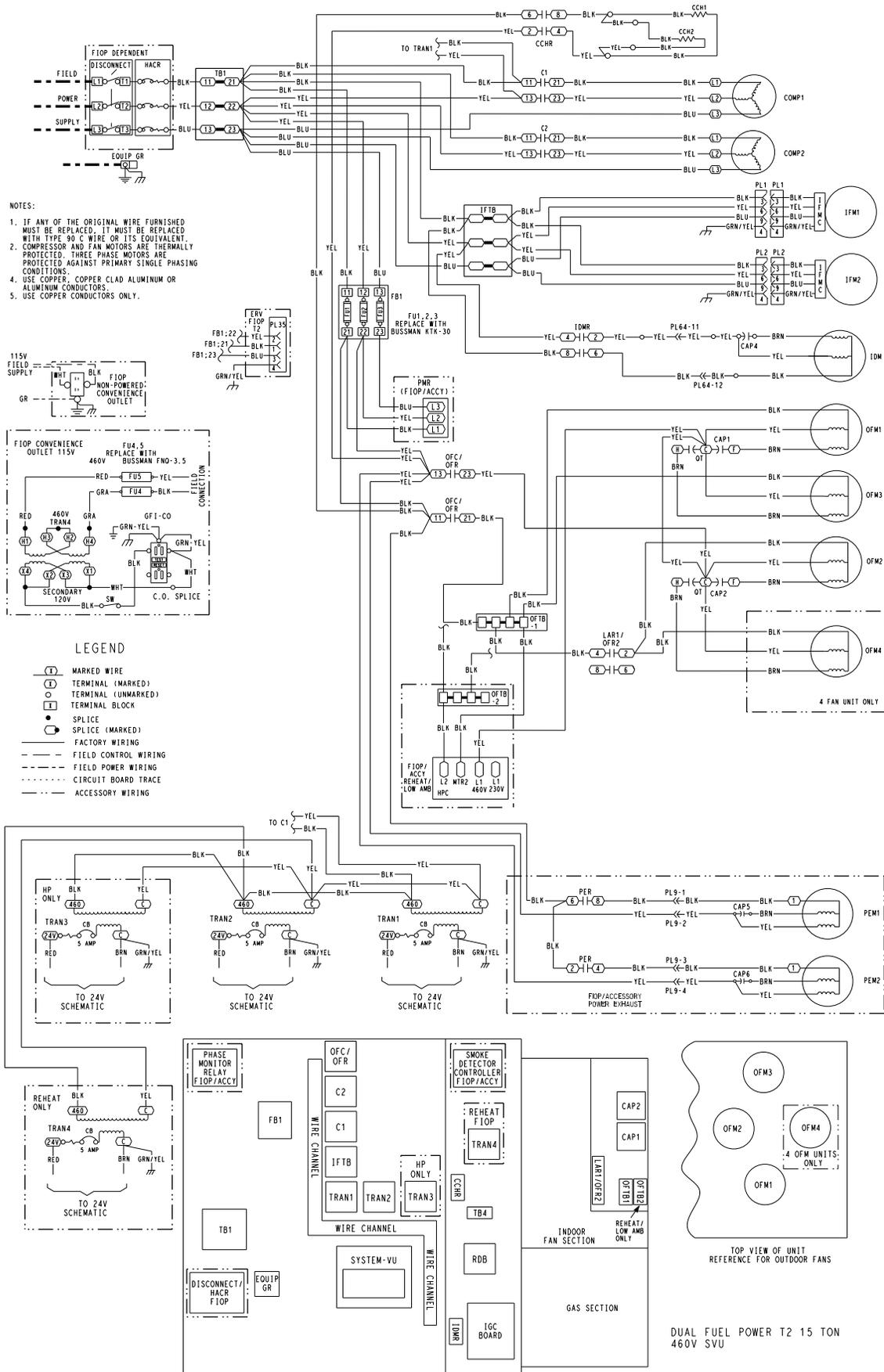


Fig. 61 — Typical 2-Stage 48QE\*\*17 Power Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown

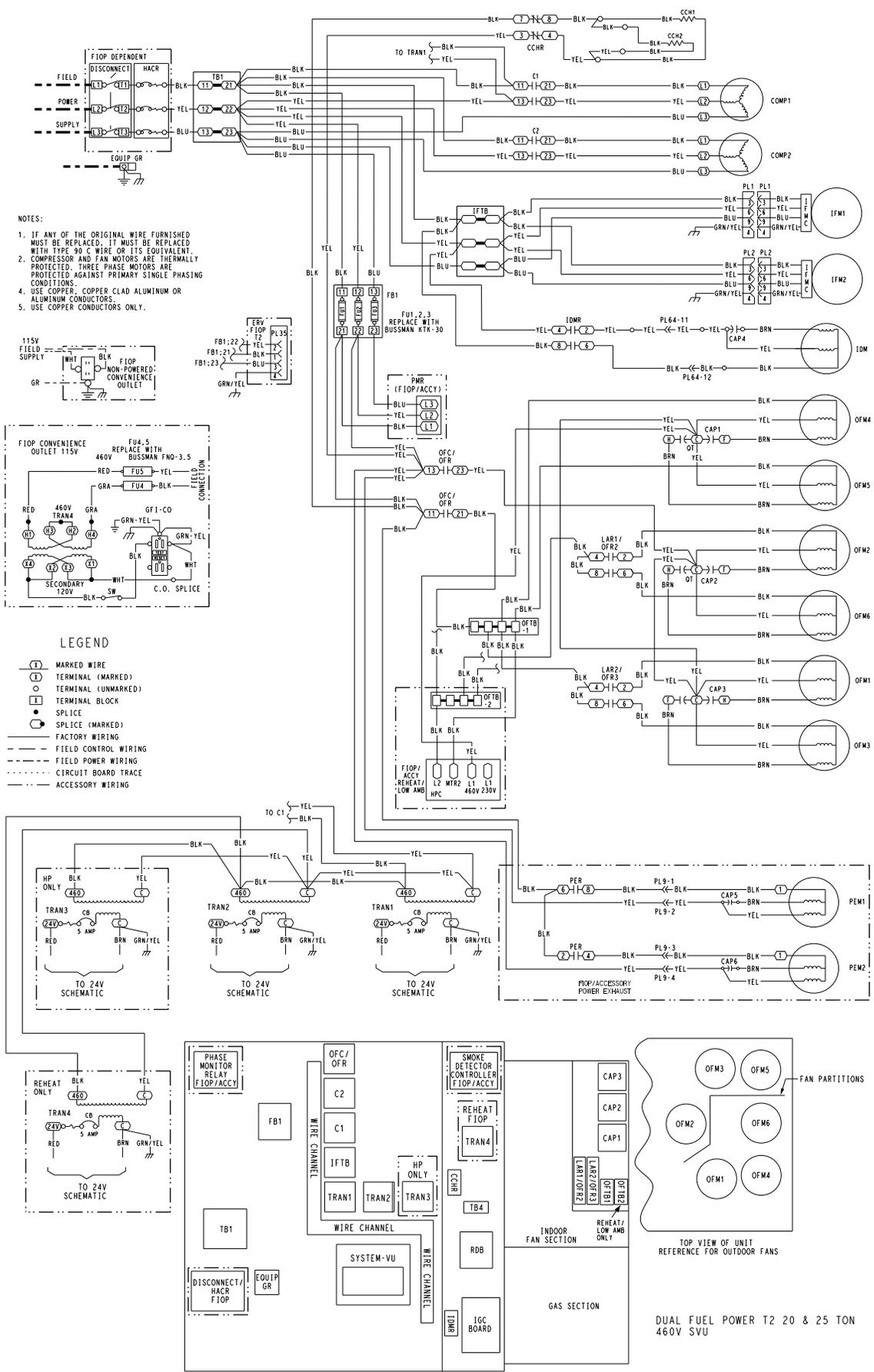


Fig. 62 — Typical 2-Stage 48QE\*\*24-28 Power Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown

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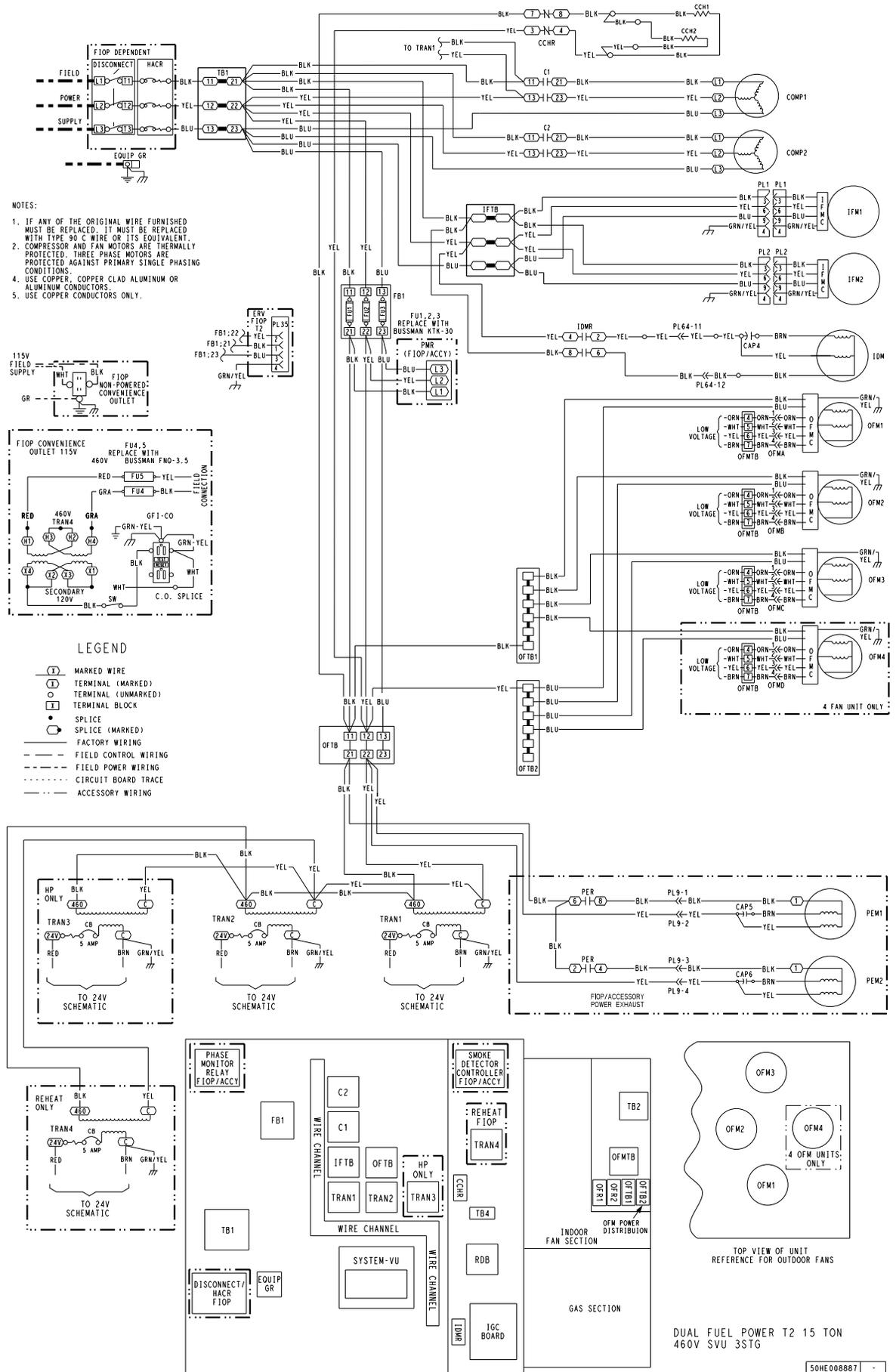


Fig. 63 — Typical 3-Stage 48QE\*\*17 Power Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown

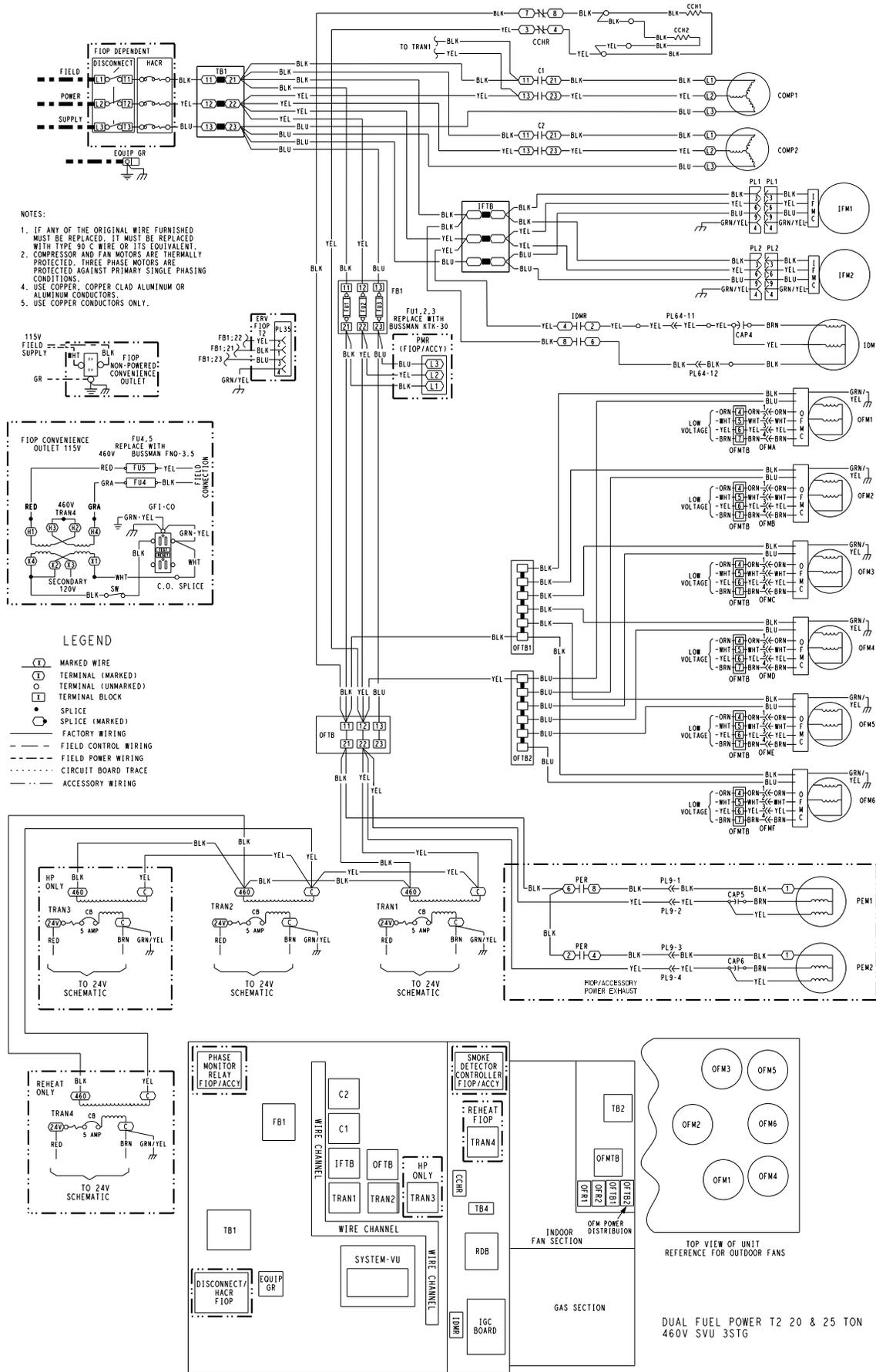


Fig. 64 — Typical 3-Stage 48QE\*\*24-28 Power Wiring Diagram, SystemVu™ Controller, 460-3-60 Unit Shown

## 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.

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. 66 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. 65 for IGC board component layout. See Fig. 57 for typical IGC control wiring connections to the SystemVu controller. Table 9 lists the IGC Board LED Alarm Codes.

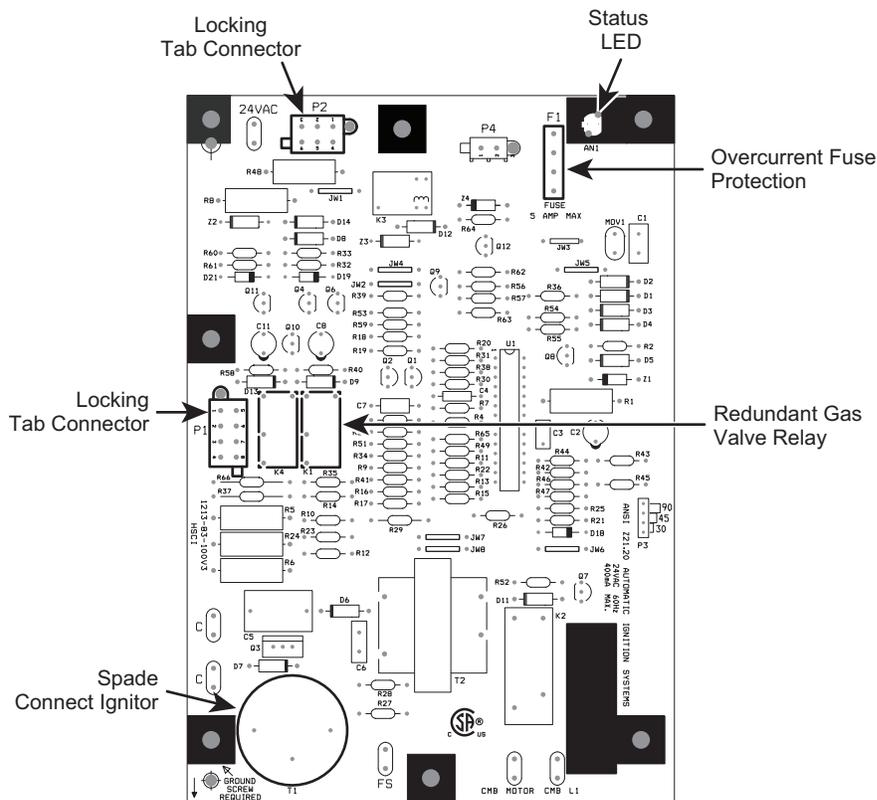


Fig. 65 — IGC Board Component Layout

**Table 9 – IGC Board LED Alarm Codes<sup>a,b,c,d</sup>**

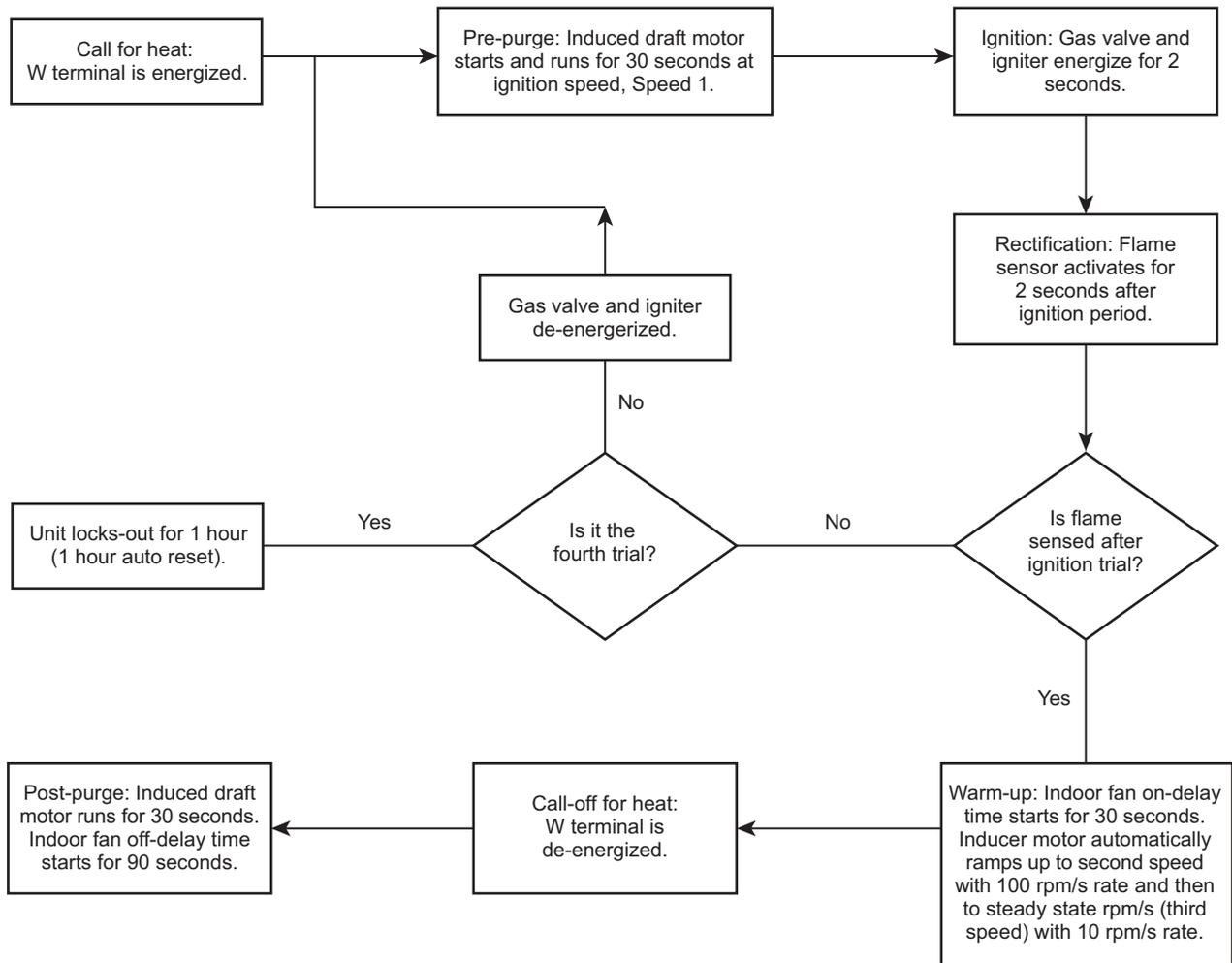
LED FLASH CODE	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
<b>On</b>	Normal Operation	—	—	—
<b>Off</b>	Hardware Failure	No gas heating.	—	Loss of power to the IGC. Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, transformer, and wiring to the IGC.
<b>1 Flash</b>	Indoor 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.
<b>2 Flashes</b>	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.
<b>3 Flashes</b>	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.
<b>4 Flashes</b>	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.
<b>5 Flashes</b>	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.
<b>6 Flashes</b>	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.
<b>7 Flashes</b>	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.
<b>8 Flashes</b>	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.
<b>9 Flashes</b>	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

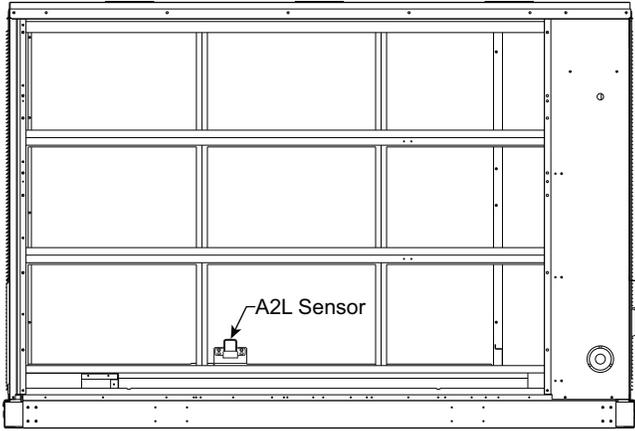
- IGC** — Integrated Gas Unit Control
- LED** — Light-Emitting Diode



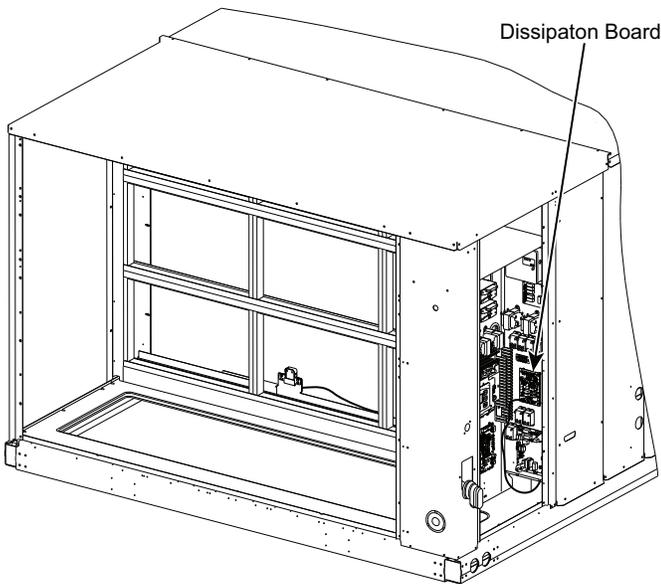
**Fig. 66 – IGC Operating Sequence**

## 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. 67) and the dissipation control board (see Fig. 68) which are located in the indoor coil section of the unit (see the Control Box Access Panel section in the view labeled “FRONT” in Fig. 2, 3, 7, 8). The A2L sensor is located between the indoor coil and the air filters.



**Fig. 67 — Location of A2L Sensor**



**Fig. 68 — Location of Dissipation Control Board (Shown with Control Box 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 through the pass-through at the bottom of the control box and connects to 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 R-454B 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. 69) indicating the sensor that detected the refrigerant. See Fig. 71 — on page 50 for the full text on the Dissipation Control Status label.

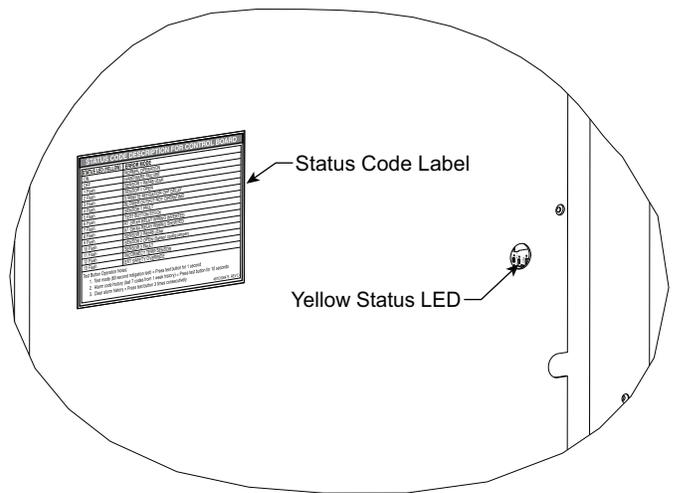
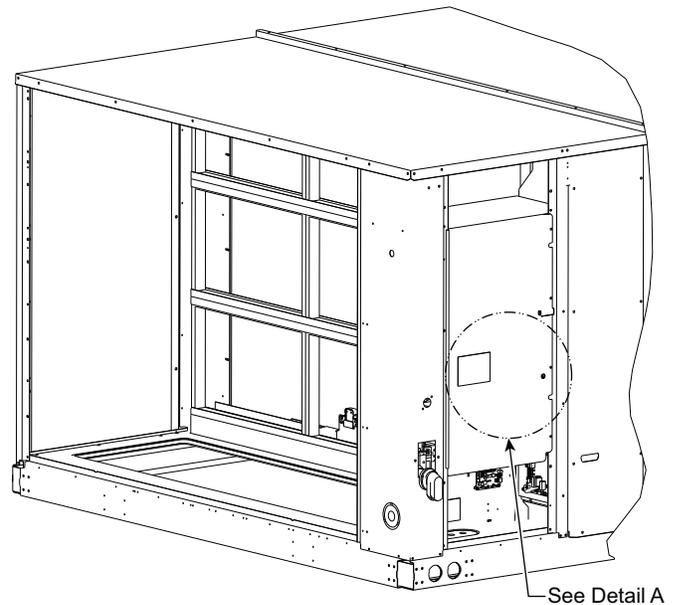
When the sensor signal indicates the refrigerant has dissipated, the dissipation board yellow status LED will display a flash code 3 and return to its normal state and allow unit operations after a 5 minute delay.

### 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. 69). If flash codes are present, see Troubleshooting on page 50.

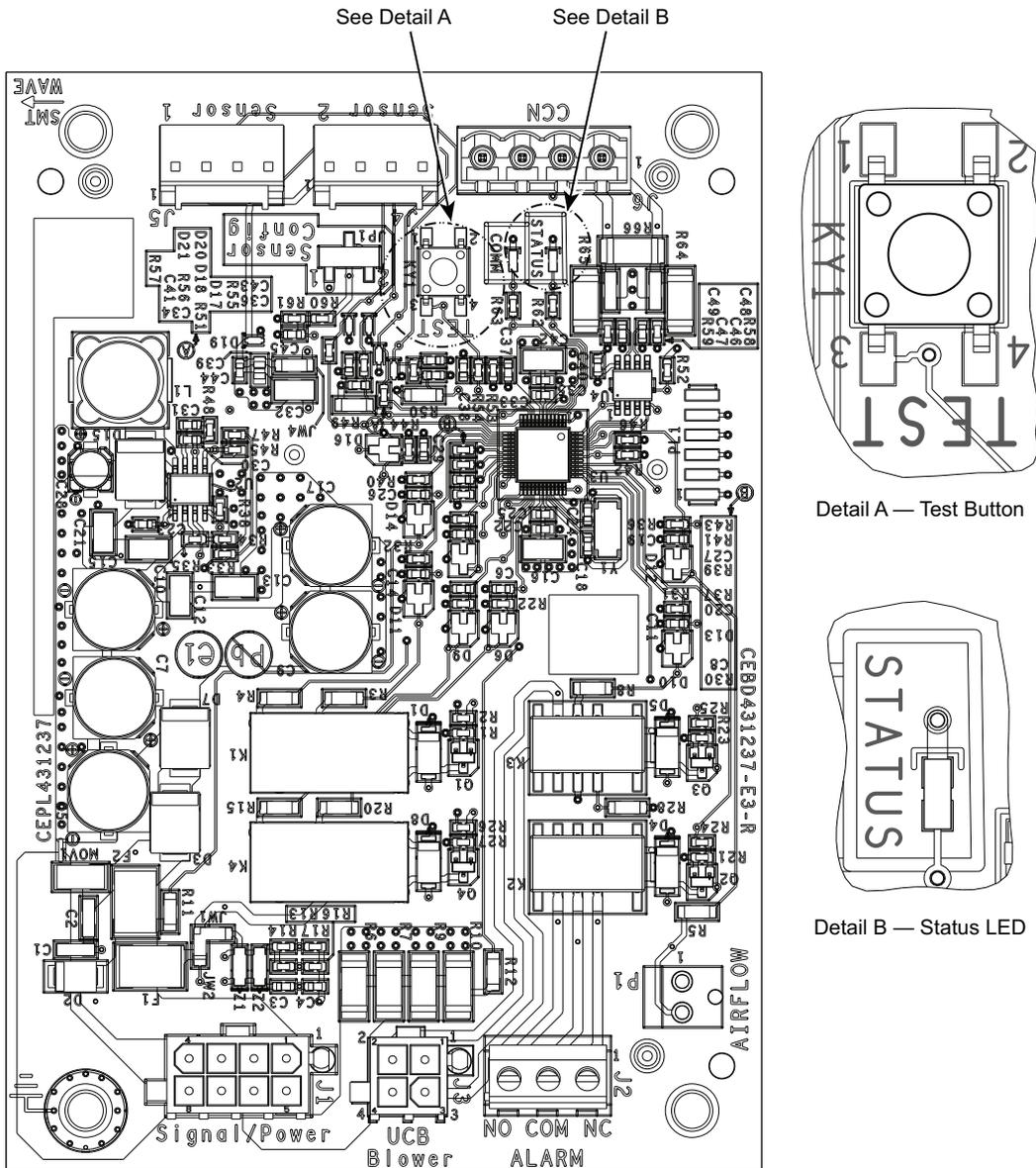
**NOTE:** Operation of the Test Mode is only possible if no faults exist on the dissipation board.

Remove the control box access panel to access the dissipation board and Test button (see Fig. 70). The Test button is located above the COMM LED.



Detail A

**Fig. 69 — Yellow STATUS LED**



**Fig. 70 — 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 period 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/X17	840
48QE*M/R/T/X24	1220
48QE*M/X28	1270
48QE*R/T28	1210
48QE*N/S/U/Y17	1090
48QE*N/S/U/Y24	1530
48QE*N/S/U/Y28	1520

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 71 shows the flash codes displayed on the Dissipation Control board.

**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.

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

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**Fig. 71 – Dissipation Control Status Label**

**Table 13 – Status LED Troubleshooting Table**

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

NOTE(S):

- a. 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 72-74 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 17-28 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. 72.)

### 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 17-28 units, refrigerant flows from the outdoor condenser, through the energized 3-Way Liquid Diverter Valve (LDV) and through the reheat condenser coil to the expansion device. The Reheat Discharge Valve (RDV) is closed. (See Fig. 73.)

### 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.

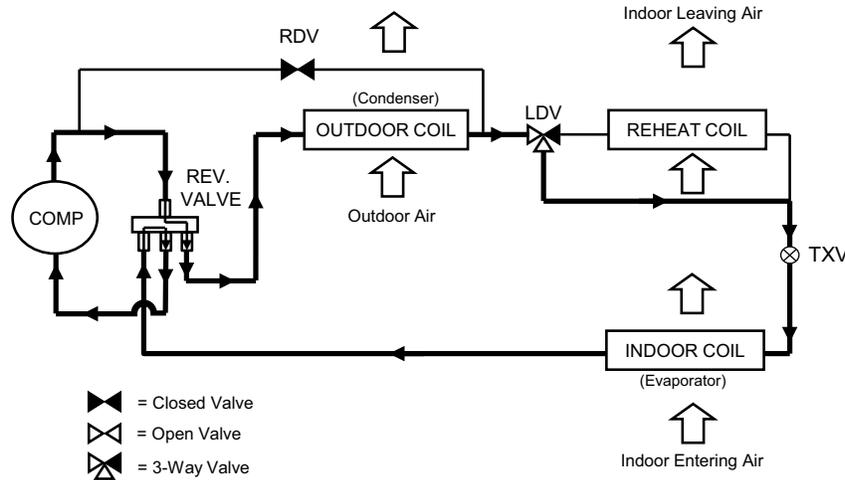
For 48QE 17-28 units, this is the same as the Subcooling mode but the RDV is open, which provides some compressor discharge gas to the reheat condenser to further increase the reheat of the evaporator air stream. (See Fig. 74.)

### REHEAT CONTROL

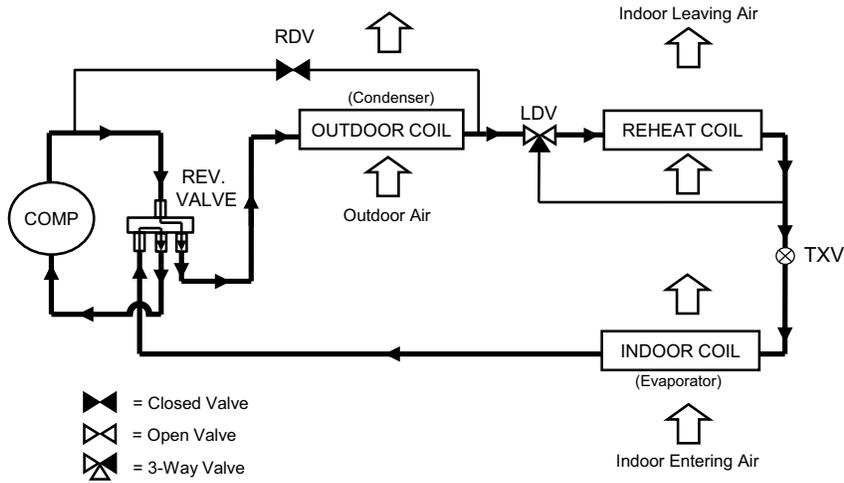
When there is only a cooling demand, the unit will operate in normal cooling mode. When there is only dehumidification demand, the unit will operate in Dehumidification mode (Hot Gas Reheat). When there is both cooling demand and dehumidification demand, the unit will operate in Dehum/Mech Cooling mode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

**Table 14 — Humidi-MiZer System Control Modes (Sizes 17-28)**

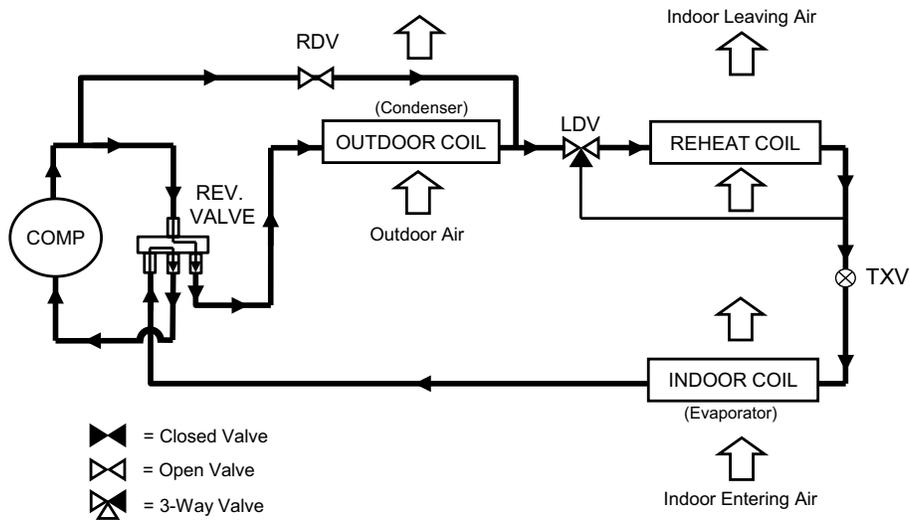
DEMAND AND MODE			OUTPUTS		LDV Valve	RDV Valve
Space Humidity	Circuit Cooling Demand	Circuit Mode	Circuit Compressor		3-way	2-way
—	—	No power	Off		Off	Off (closed)
Low	No	Off	Off		Off	Off (closed)
	Yes	Cool	On		Off	Off (closed)
High	Yes	Dehum/Mech Cooling	On		On	Off (closed)
	No	Dehum	On		On	On (open)



**Fig. 72 — Normal Cooling Mode – Humidi-MiZer System for 48QE 17-28**



**Fig. 73 – Subcooling Mode – Humidi-MiZer System for 48QE 17-28**



**Fig. 74 – Hot Gas Reheat Mode – Humidi-MiZer System for 48QE 17-28**

## 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.

### Step 15 — Adjust Factory-Installed Options

#### 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. Return-air smoke detectors are arranged for vertical return configurations only. 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.

#### *Additional Application Data*

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

### Step 16 — 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
- CO<sub>2</sub> sensor
- Louvered hail guard
- Phase monitor control

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

### Step 17 — Fan Speed Set Up

NOTE: The indoor fan motors are equipped with internal protection relays designed to disable unit operation when a problem is detected. See Typical Wiring Diagram (Fig. 57) for the red wires in the Indoor fan plug.

Units with two fan motors are wired to connect the motor protection relays in series. If one motor detects a problem, both motors shut down and unit operation is disabled.

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. 75), 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. 75). 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 ↓

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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	
<b>UNIT MODEL NUMBER</b>	<b>CFM</b>	6000	1250	1348	1441	1528	1610	1688	1762	1832	1899	1963
		6500	1336	1428	1515	1598	1677	1753	1824	1893	1959	2021
		7000	1423	1509	1591	1670	1746	1819	1888	1955	2020	2081
		7500	1510	1591	1669	1744	1817	1887	1954	2019	2082	2143
		8000	1598	1675	1749	1820	1890	1957	2022	2085	2146	
		8500	1687	1759	1829	1898	1964	2029	2092	2153		
		9000	1776	1845	1912	1977	2041	2103	2163			
		9500	1866	1931	1995	2057	2118	2178				
		10000	1955	2018	2079	2138	2197					
	<b>Field Accessories:</b>											
	<b>Economizer</b>	89	89	89	89	89	89	89	89	89	89	

NOTE(S): Values in the Field Accessories section are VDC address.

**Fig. 75 — 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:

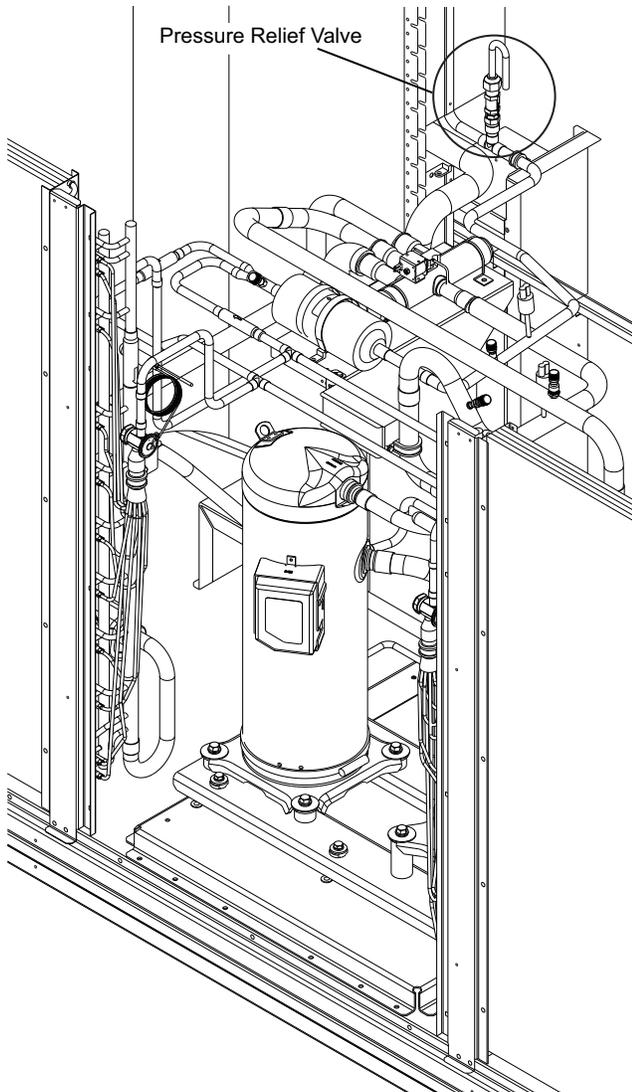
1. Connect service gauges to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.
4. Turn off power to the unit.
5. Reverse any two of the three unit power leads.
6. Reapply electrical 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.

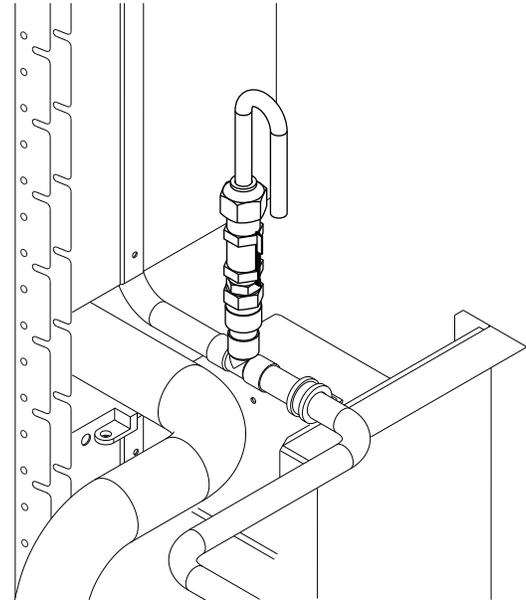
## PRESSURE RELIEF VALVES

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. 76 and Fig. 77 for example location details.



**Fig. 76 — Pressure Relief Valve Location**



**Fig. 77 — 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**

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

## TYPICAL UNIT PIPING

Each heat pump system includes 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\*\*17-28 unit indoor coils contain a vapor header check valve. See Fig. 78-81 and Tables 16-24 for typical unit piping schematic parallel coil circuits during evaporator-function operation and converging coil circuits during the condenser-function operation.

**Table 16 – 48QE\*\*17 – Cooling Mode**

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

**Table 17 – 48QE\*17 – Heating Mode**

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

**Table 18 – 48QE\*\*17 – Defrost Mode**

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

**Table 19 – 48QE\*\*24 – Cooling Mode**

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

**Table 20 – 48QE\*\*24 – Heating Mode**

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

**Table 21 – 48QE\*\*24 – Defrost Mode**

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

**Table 22 – 48QE\*\*28 – Cooling Mode**

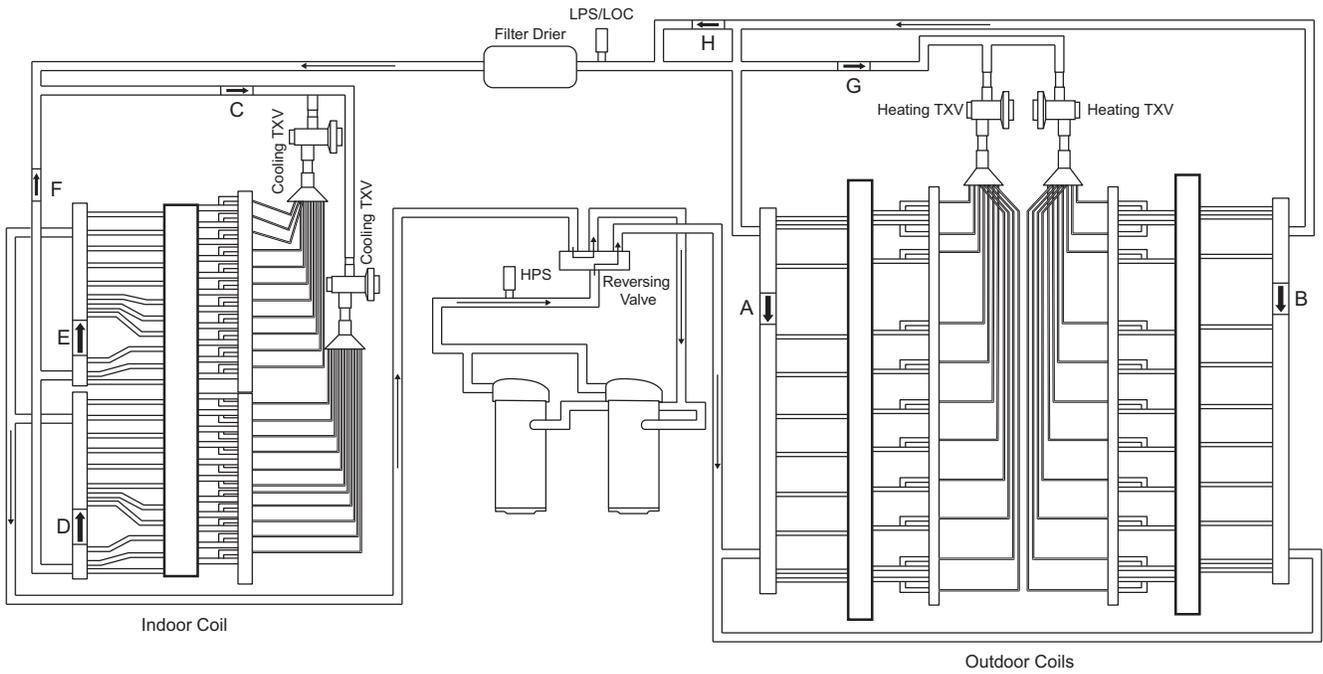
COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Closed
Check Valve C	Open
Check Valve D	Open
Check Valve E	Open
Check Valve F	Closed
Check Valve G	Closed
Check Valve H	Open

**Table 23 – 48QE\*\*28 – Heating Mode**

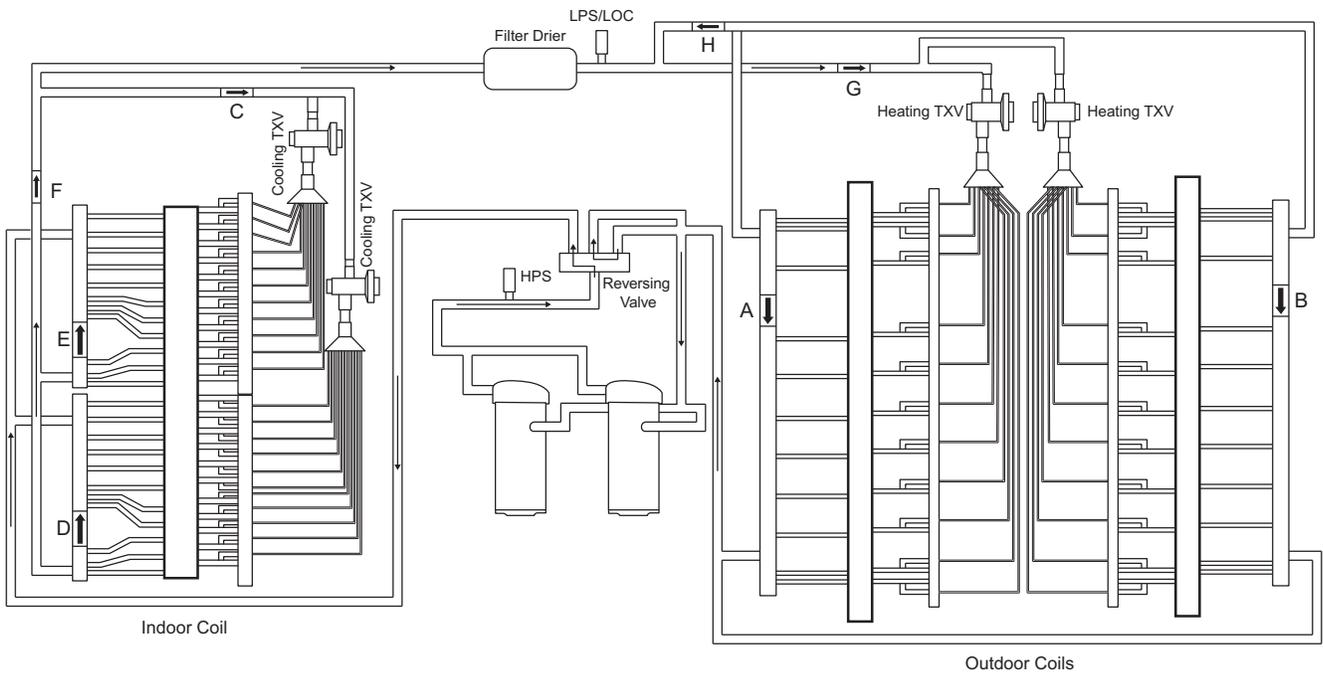
COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	Open
Check Valve B	Open
Check Valve C	Closed
Check Valve D	Closed
Check Valve E	Closed
Check Valve F	Open
Check Valve G	Open
Check Valve H	Closed

**Table 24 – 48QE\*\*28 – Defrost Mode**

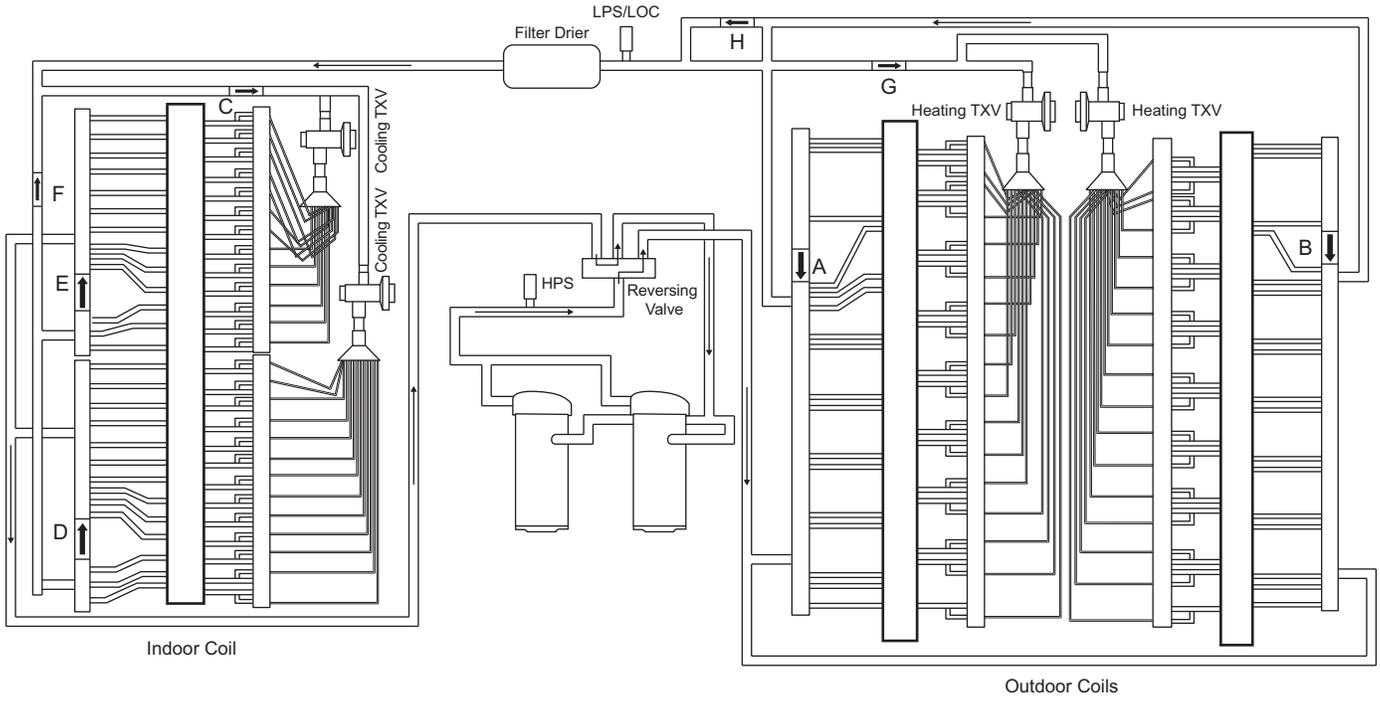
COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Closed
Check Valve C	Open
Check Valve D	Open
Check Valve E	Open
Check Valve F	Closed
Check Valve G	Closed
Check Valve H	Open



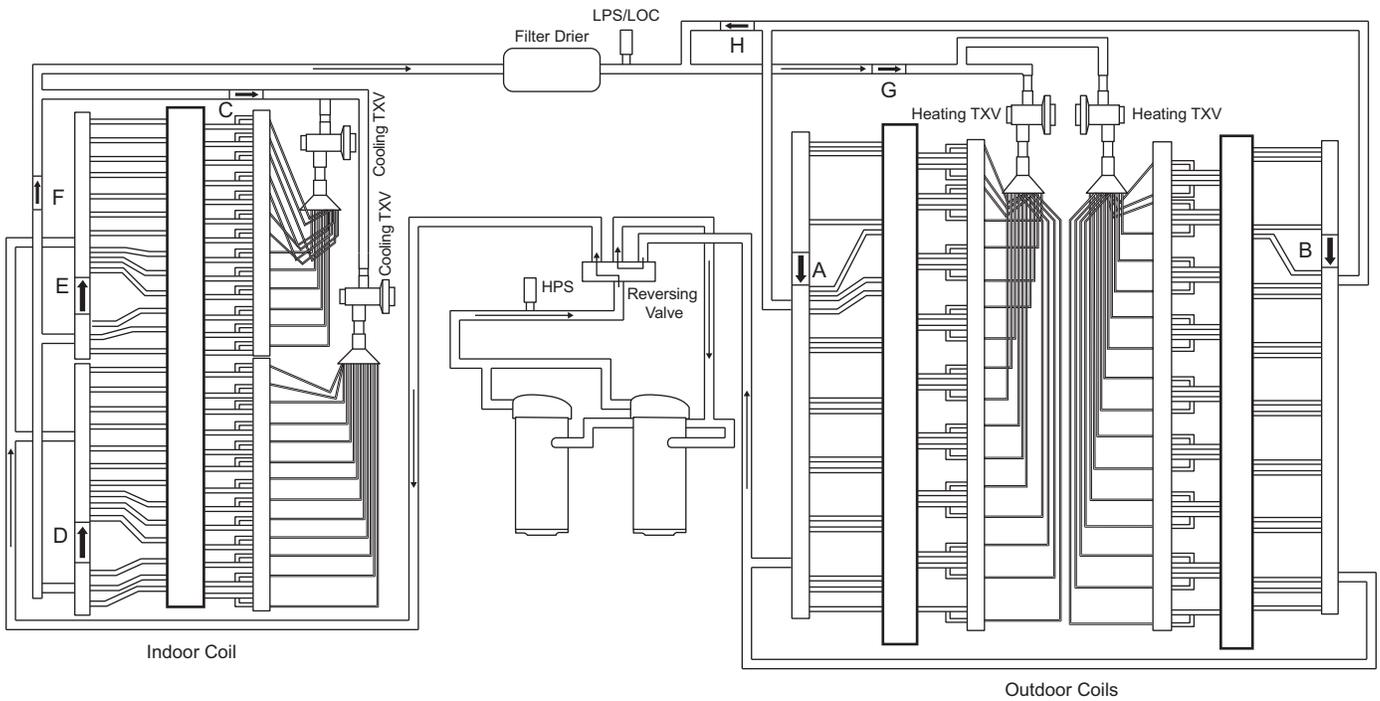
**Fig. 78 – Piping Schematic – 48QE\*\*17 Cooling Mode**



**Fig. 79 – Piping Schematic – 48QE\*\*17 Heating Mode**



**Fig. 80 — Piping Schematic — 48QE\*\*24/28 Cooling Mode**



**Fig. 81 — Piping Schematic — 48QE\*\*24/28 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 17-28 Single Packaged Rooftop Units with Gas Heat

(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 that all electrical connections and terminals are tight. (Y/N) \_\_\_\_\_  
Verify gas pressure to unit gas valve is within specified range. (Y/N) \_\_\_\_\_  
Check gas piping for leaks. (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) \_\_\_\_\_  
Verify that crankcase heaters have been energized for at least 24 hours. (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. (Y/N) \_\_\_\_\_
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 instruction. (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