Carrier

WeatherMaker® 48GC**17-28 Single Package Rooftop with Gas Heat/Electric Cooling and EcoBlue™ Fan Technology

Installation Instructions

CONTENTS

SAFETY CONSIDERATIONS

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

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

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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

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

⚠ WARNING

FIRE, EXPLOSION HAZARD

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

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

⚠ DANGER

ELECTRICAL SHOCK HAZARD

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

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

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

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

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

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

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

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

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

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

⚠ 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.

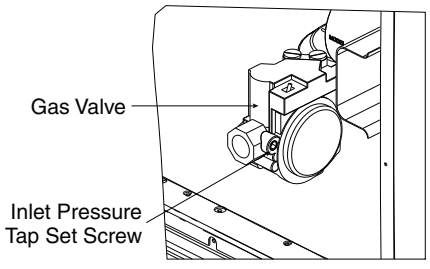
Veiller à ce que la ou les sorties de l'évent de l'appareil de chauffage (et la prise d'air) ne soient, en aucune façon, obstruées, quelle que soit la saison.

⚠ 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.

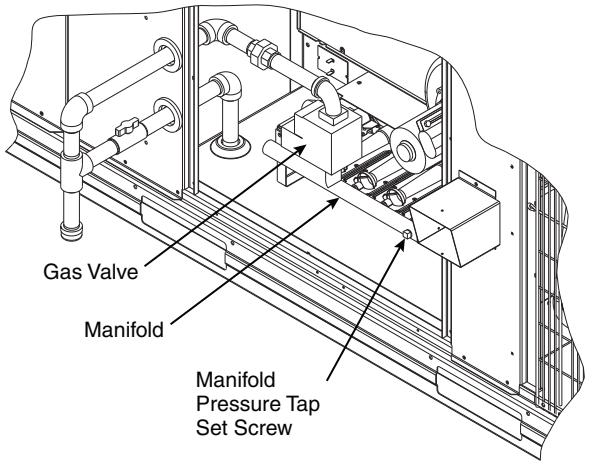


⚠ WARNING

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.



GENERAL

See Fig. 1-16 for unit options and dimensions.

Rated Indoor Airflow (cfm)

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

Table 1 — Rated Indoor Airflow

MODEL NUMBER	FULL LOAD AIRFLOW (cfm)
48GC17**	6000
48GC20**	7000
48GC24**	7500
48GC28**	10000

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

Unit Heat Type
48 - Gas Heat Packaged Rooftop

Model Series - WeatherMaster®
GC - High Efficiency Packaged RTU withEcoBlue™ Technology

Heat Options
D = Low Heat
E = Medium Heat
F = High Heat
S = Low Heat w/ Stainless Steel Heat Exchanger
R = Medium Heat w/ Stainless Steel Heat Exchanger
T = High Heat w/ Stainless Steel Heat Exchanger

Refrig. Systems Options
M = Two Stage Cooling/Single Circuit Models
N = Two Stage Cooling/Single Circuit Models with Humidi-MiZer® System

Cooling Tons
20 = 17.5 tons
24 = 20.0 tons
28 = 25.0 tons
30 = 27.5 tons

Sensor Options
A = None
B = Return Air Smoke Detector (RA)
C = Supply Air Smoke Detector (SA)
D = RA + SA Smoke Detector
E = CO_2 Sensor
F = RA Smoke Detector and CO_2
G = SA Smoke Detector and CO_2
H = RA + SA Smoke Detector and CO_2
J = Condensate Overflow Switch
K = Condensate Overflow Switch + RA Smoke Detectors
L = Condensate Overflow Switch + RA and SA Smoke Detectors
M = Condensate Overflow Switch + SA Smoke Detector
N = Condensate Overflow Switch + CO_2
P = Condensate Overflow Switch + RA Smoke Detector and CO_2
Q = Condensate Overflow Switch + SA Smoke Detector and CO_2
R = Condensate Overflow Switch + RA and SA Smoke Detector and CO_2

Indoor Fan Options - Vane Axial EcoBlue Fan System
2 = Standard/Medium Static Motor - Vertical Supply
3 = High Static Static Motor - Vertical Supply
5 = Standard/Medium Static Motor - Vertical Supply and Filter Status Switch
6 = High Static Motor - Vertical Supply and Filter Status Switch
J = High Static 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
E = Cu/Cu – Al/Cu
F = Cu/Cu – Cu/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 Guard
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

Design Revision
- = Factory Design Revision

Base Unit Controls
0 = Electro-mechanical Controller - Can be used with field-installed W7212 EcononMi$er IV (Non - Fault Detection and Diagnostic)
3 = SystemVu™ Controller
6 = Electro-mechanical Controller - Can be used with W7220 EcononMi$er X (with Fault Detection and Diagnostic)

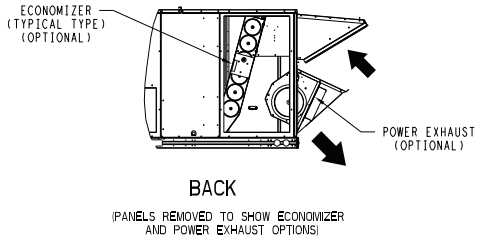
Intake / Exhaust Options
A = None
B = Low Leak Temp Economizer w/ Baro Relief (Electro-Mechanical Controls Only)
D = Low Leak Temp Economizer w/ PE (cent) Vert Only (EM Only)
F = Low Leak Enthalpy Economizer w/ Baro Relief (EM Only)
H = Low Leak Enthalpy Economizer w/ PE (cent) Vert Only (EM Only)
U = ULTRA Low Leak Temp Economizer w/ Baro Relief
V = ULTRA Low Leak Temp Economizer w/ PE (cent) Vert Only
W = ULTRA Low Leak Enthalpy Economizer w/ Baro Relief
X = ULTRA Low Leak Enthalpy Economizer w/ PE (cent) Vert Only

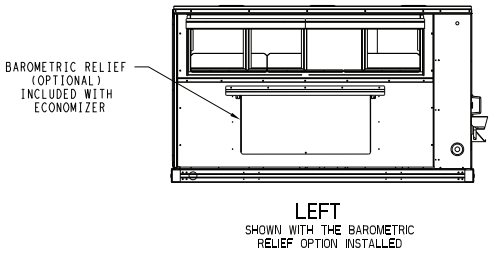
Service Options
0 = None
1 = Unpowered Convenience Outlet (UCO)
2 = Powered Convenience Outlet (PCO)
3 = Hinged Panels
4 = Hinged Panels and UCO
5 = Hinged Panels and PCO
6 = 4" MERV 13 Hi-Eff Filter Track
7 = UCO and 4" MERV 13 Hi-Eff Filter Track
8 = PCO and 4" MERV 13 Hi-Eff Filter Track
9 = Hinged Panels and 4" MERV 13 Hi-Eff Filter Track
A = Hinged Panels, UCO and 4" MERV 13 Hi-Eff Filter Track
B = Hinged Panels, PCO and 4" MERV 13 Hi-Eff Filter Track
C = Foil Faced Insulation
D = Foil Faced Insulation and UCO
E = Foil Faced Insulation and PCO
F = Foil Faced Insulation and Higned Panels
G = Foil Faced Insulation, Hinged Panels and UCO
H = Foil Faced Insulation, Hinged Panels and PCO
J = Foil Faced Insulation and 4" MERV 13 Hi-Eff Filter Track
K = Foil Faced Insulation, UCO and 4" MERV 13 Hi-Eff Filter Track
L = Foil Faced Insulation, PCO and 4" MERV 13 Hi-Eff Filter Track
M = Foil Faced Insulation, Hinged Panels and 4" MERV 13 Hi-Eff Filter Track
N = Foil Faced Insulation, Hinged Panels. UCO and 4" MERV 13 Hi-Eff Filter Track
P = Foil Faced Insulation, Hinged Panels. PCO and 4" MERV 13 Hi-Eff Filter Track

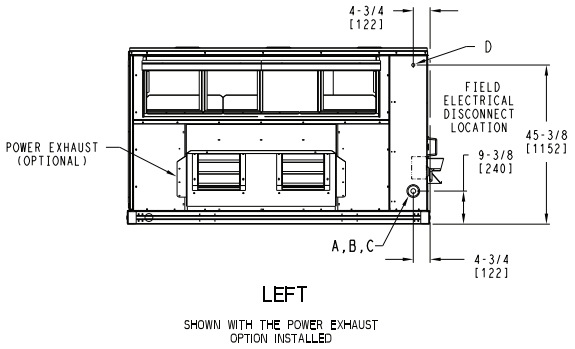
Electrical Options
A = None
B = HACR
C = Non-Fused Disconnect
D = Thru-The-Base (TTB) Connections
E = HACR and TTB
F = Non-Fused Disconnect (NFD) and TTB
N = Phase Monitor/Protection
P = Phase Monitor/Protection and HACR
Q = Phase Monitor/Protection and NFD
R = Phase Monitor/Protection and TTB
S = Phase Monitor/Protection, HACR and TTB
T = Phase Monitor/Protection with NFD and TTB
1 = HSCCR Protection
2 = HSCCR Protection and TTB

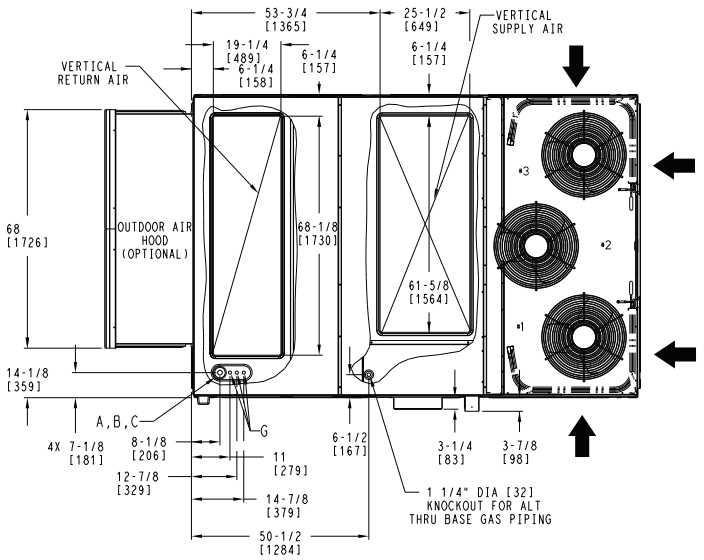
Packaging Compliance
0 = Standard

Fig. 1 — 48GC 17-28 Model Number Nomenclature (Example)





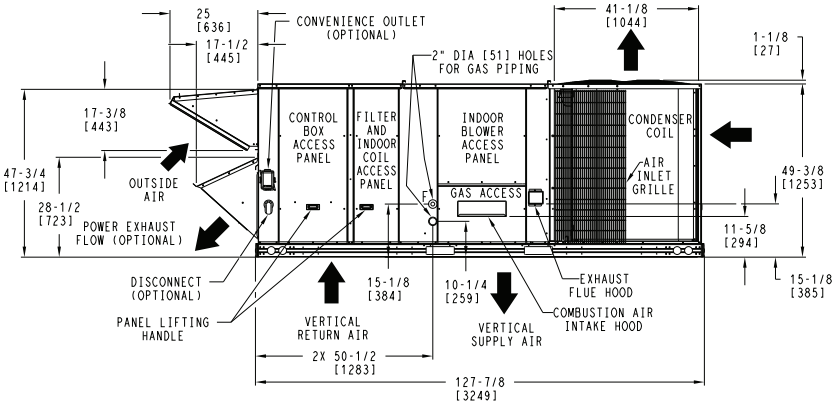


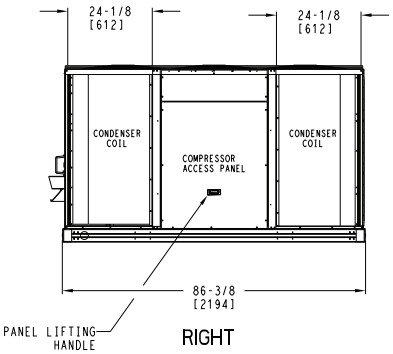


	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
F	3/4"-14 NPT GAS CONNECTION (NOT SHOWN)
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

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





DEDICATED VERTICAL AIRFLOW UNIT
17 SIZE

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 5	04/20/23	-	48GC 17 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006820	-

Fig. 2 — 48GC17 Vertical Airflow**

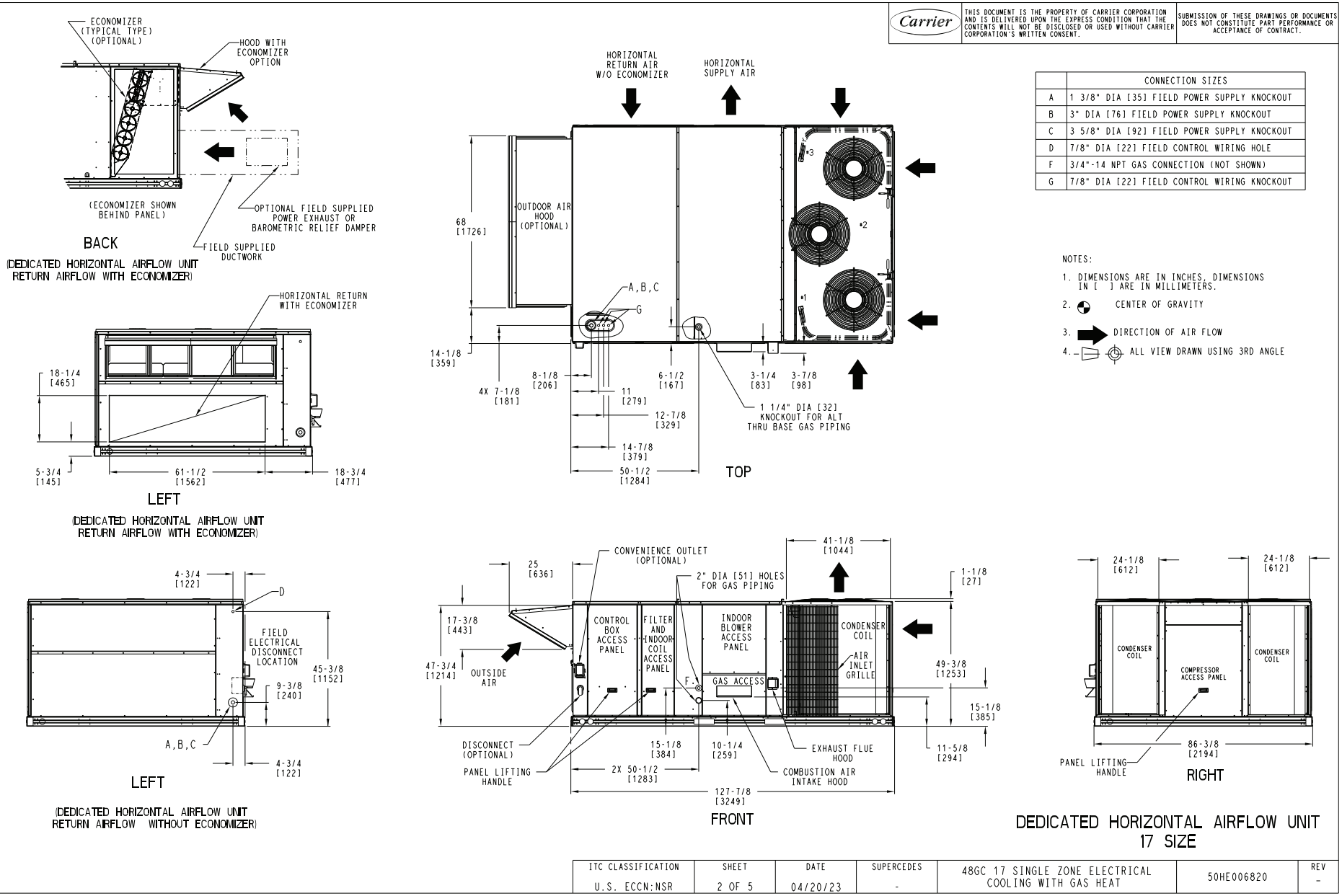
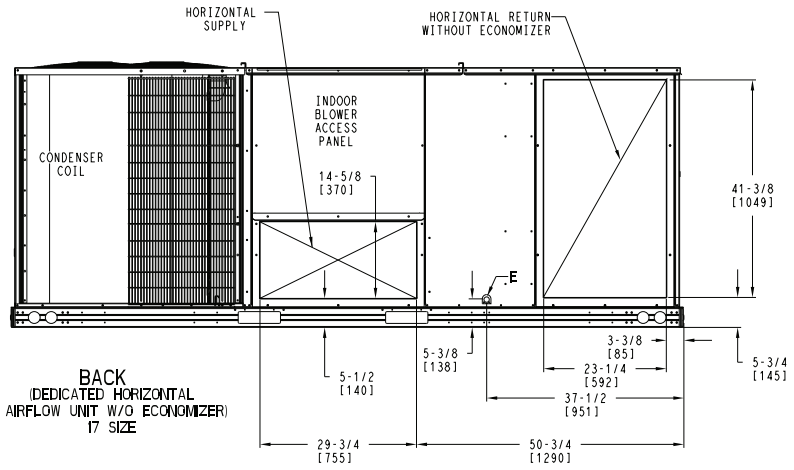
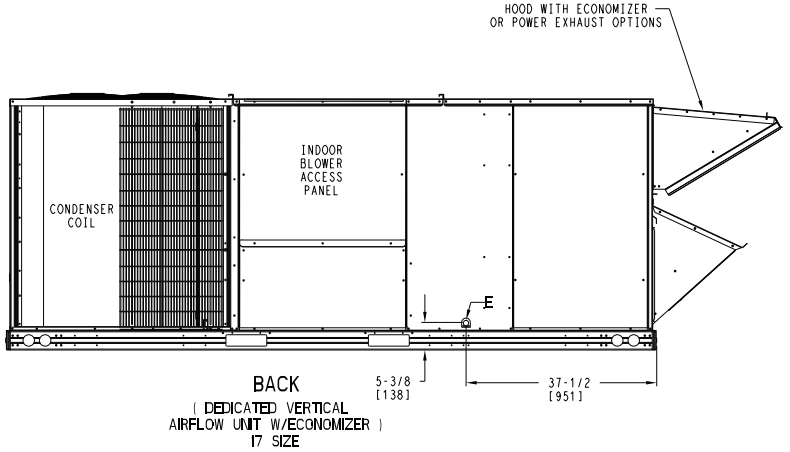
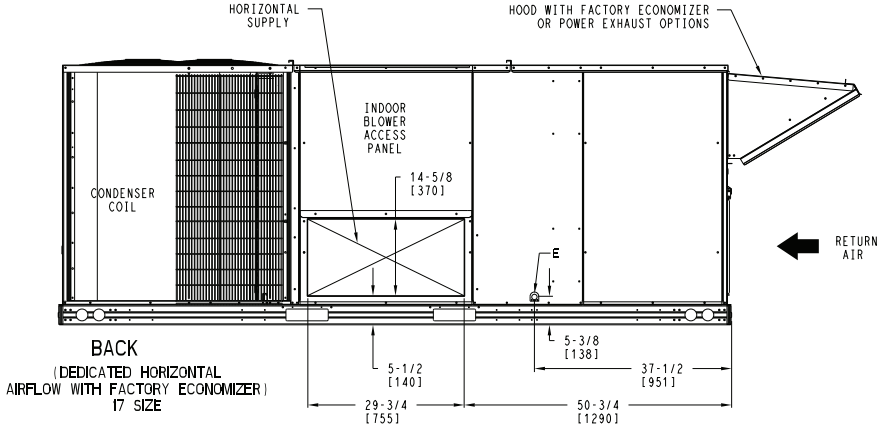


Fig. 3 — 48GC17 Horizontal Airflow**

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





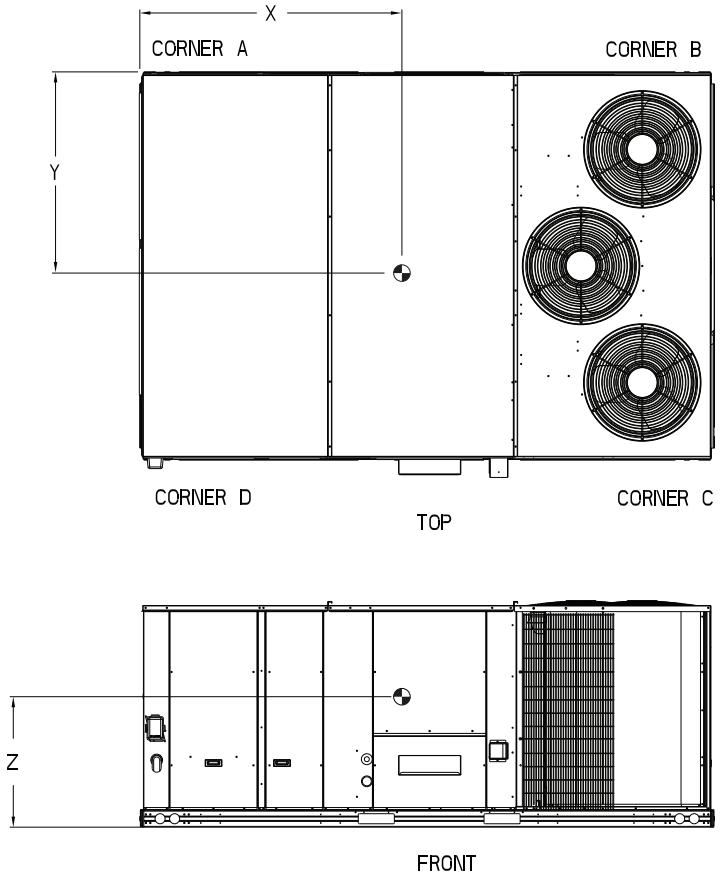


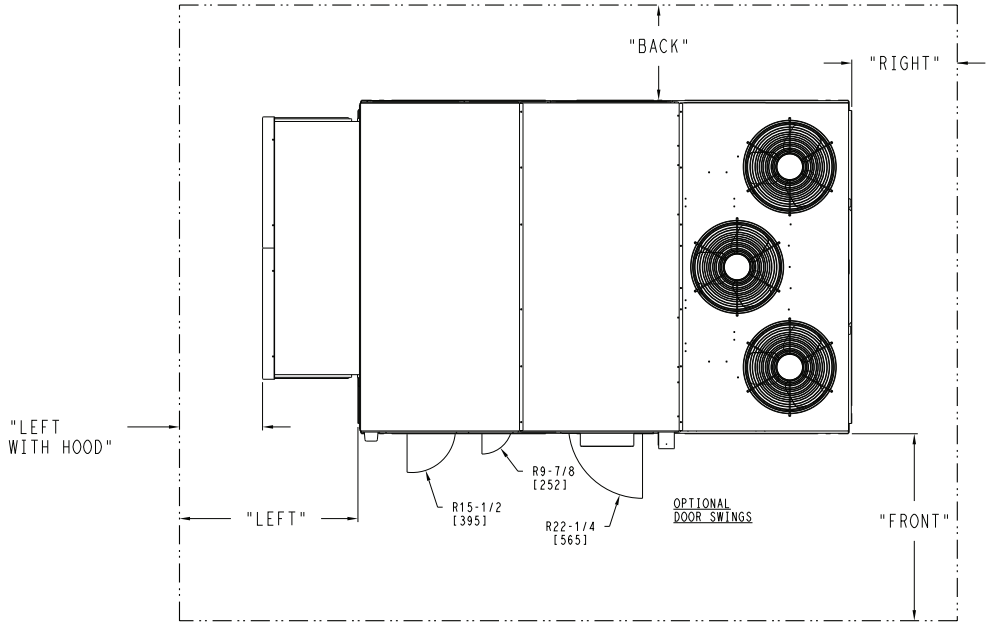
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 5	04/20/2023	-	48GC 17 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006820	-

Fig. 4 — 48GC17 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
48GC17	1771	804	377	171	471	214	512	232	410	186	71 [1803]	45 [1143]	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.





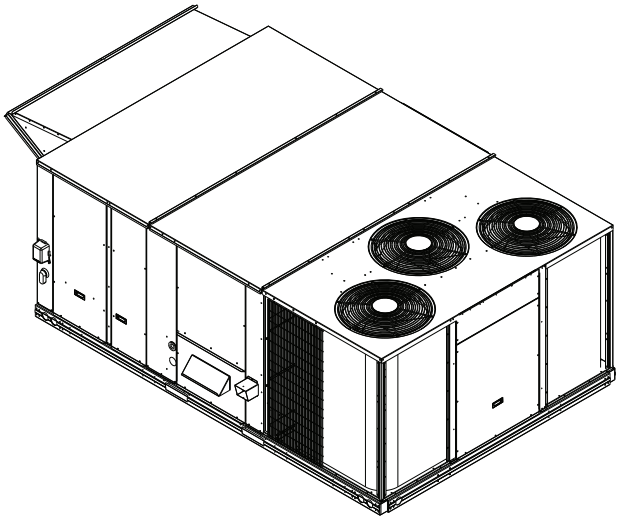
NOTES:

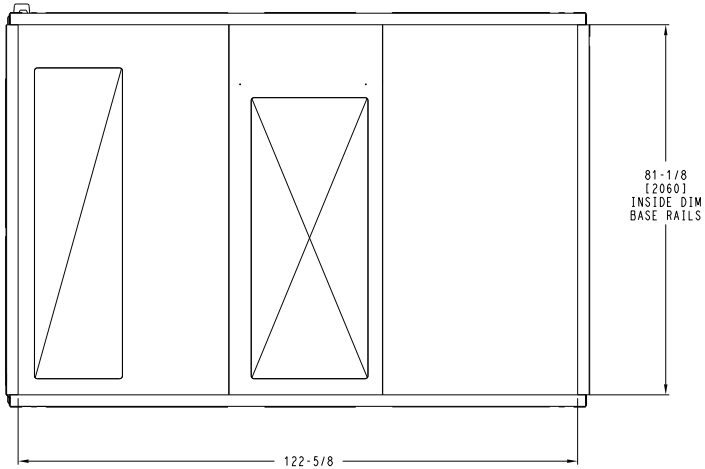
1. CLEARANCE ABOVE THE UNIT TO BE 72"
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
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			REV
U.S. ECCN:NSR	4 OF 5	04/20/23	-	48GC 17 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006820	-

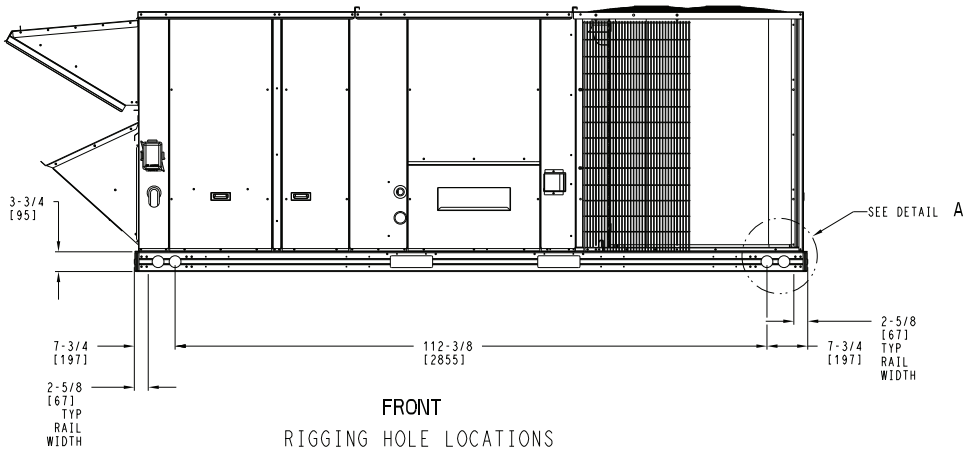
Fig. 5 — 48GC17 Corner Weights and Clearances**





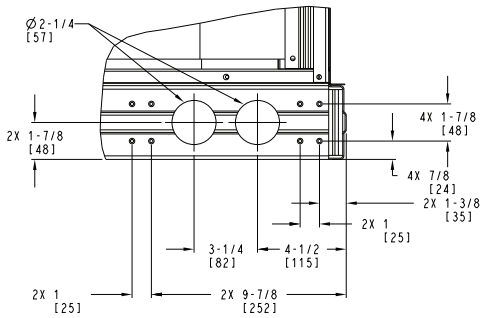
BOTTOM

INSIDE BASERAIL DIMENSIONS



FRONT

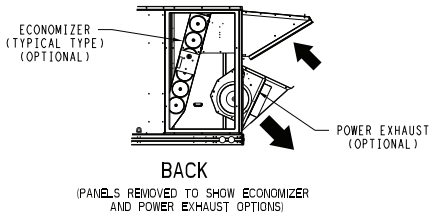
RIGGING HOLE LOCATIONS

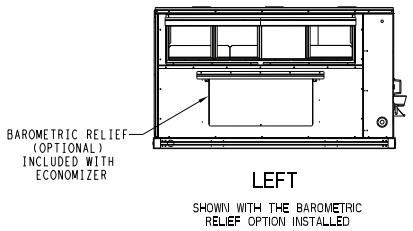


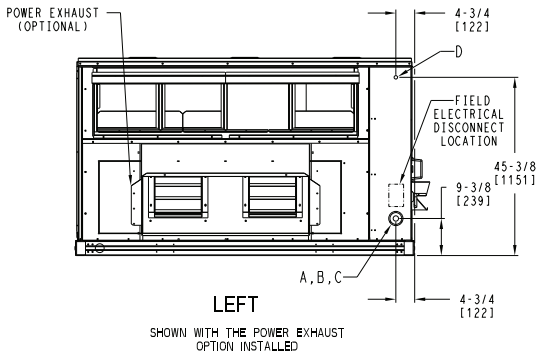
DETAIL A
TYP 4 PLCS

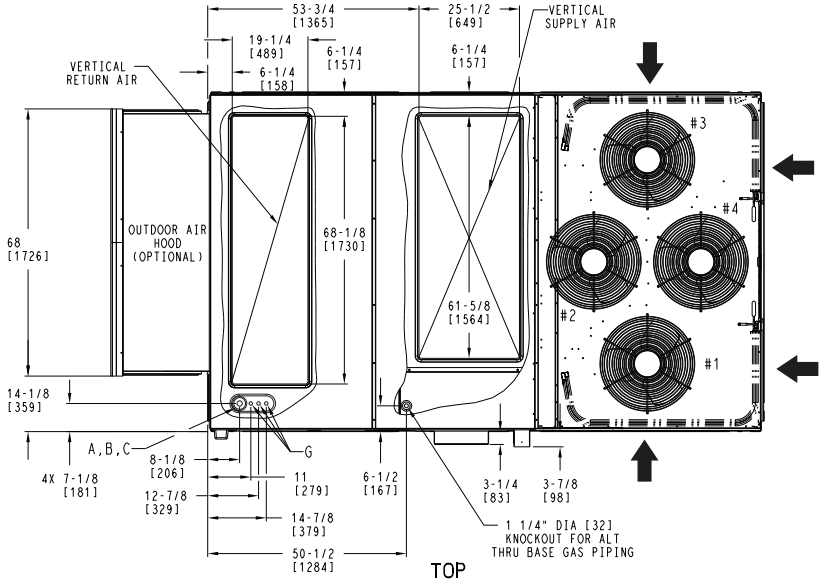
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	5 OF 5	04/20/23	-	48GC 17 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006820	-

Fig. 6 — 48GC17 Bottom View**







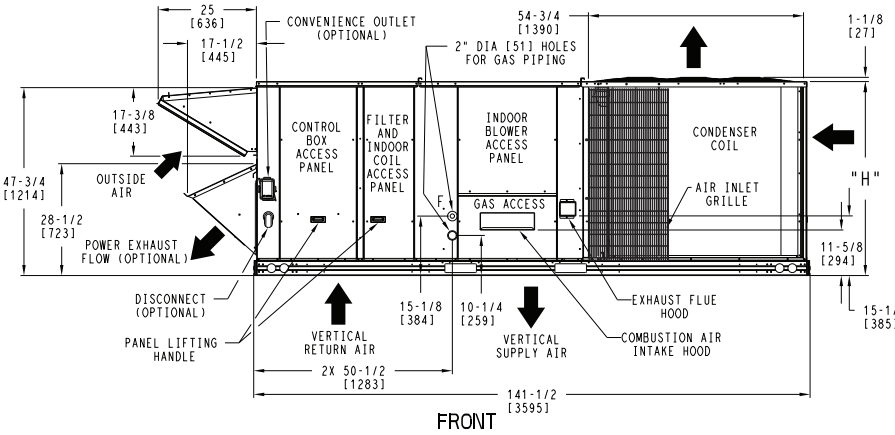


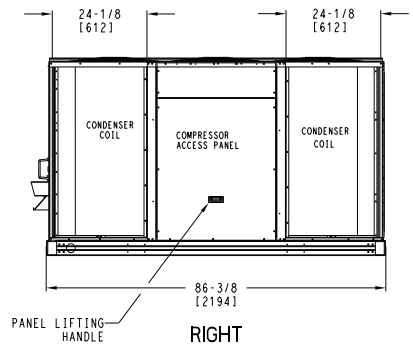
	CONNECTION SIZES
A	1 3/8" DIA [35] FIELD POWER SUPPLY KNOCKOUT
B	3" DIA [76] FIELD POWER SUPPLY KNOCKOUT
C	3 5/8" DIA [92] FIELD POWER SUPPLY KNOCKOUT
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
F	3/4"-14 NPT GAS CONNECTION (NOT SHOWN)
G	7/8" DIA [22] FIELD CONTROL WIRING KNOCKOUT

UNIT	H
20 SIZE	49-3/8 [1253]
24 SIZE	57-3/8 [1456]

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





DEDICATED VERTICAL AIRFLOW UNIT
20,24 SIZE

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 5	04/20/23	-	48GC 20,24 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006821	-

Fig. 7 — 48GC20, 24 Vertical Airflow**

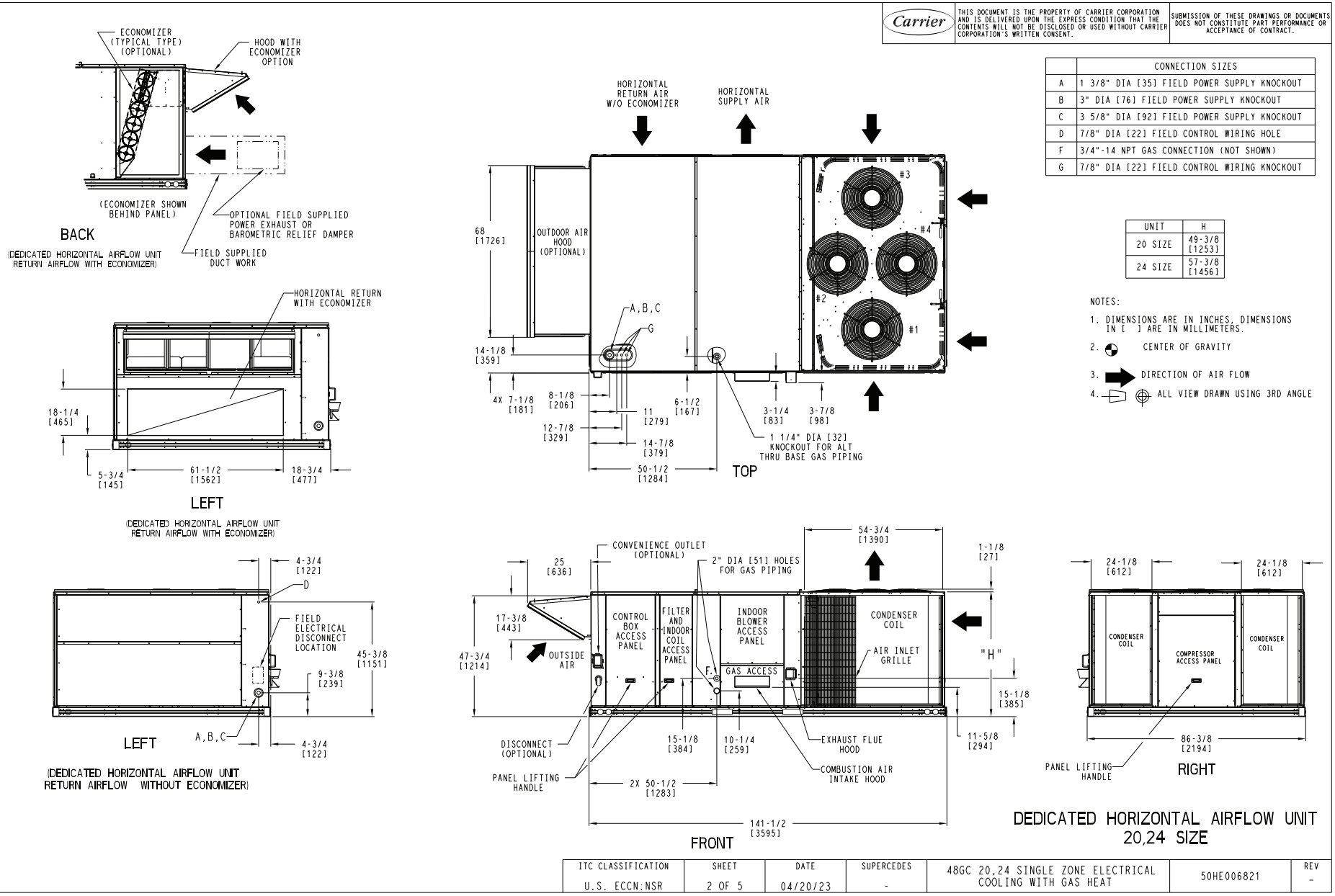
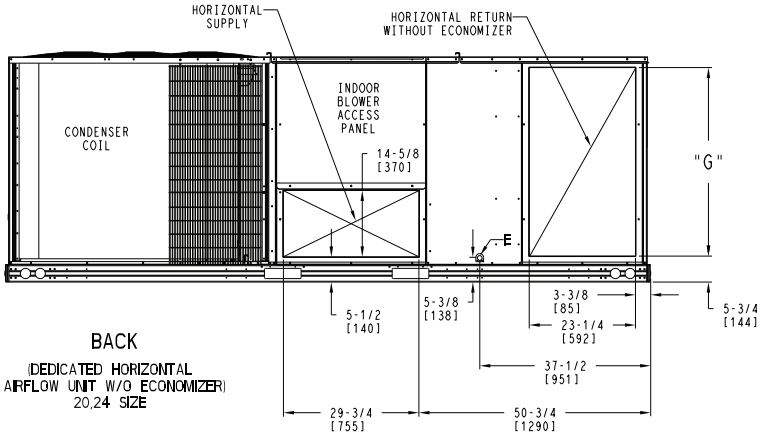
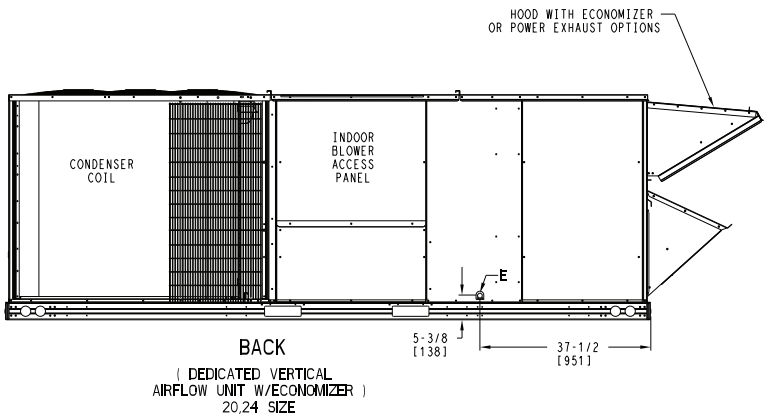


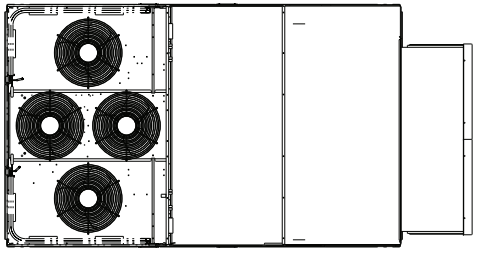
Fig. 8 — 48GC20, 24 Horizontal Airflow**

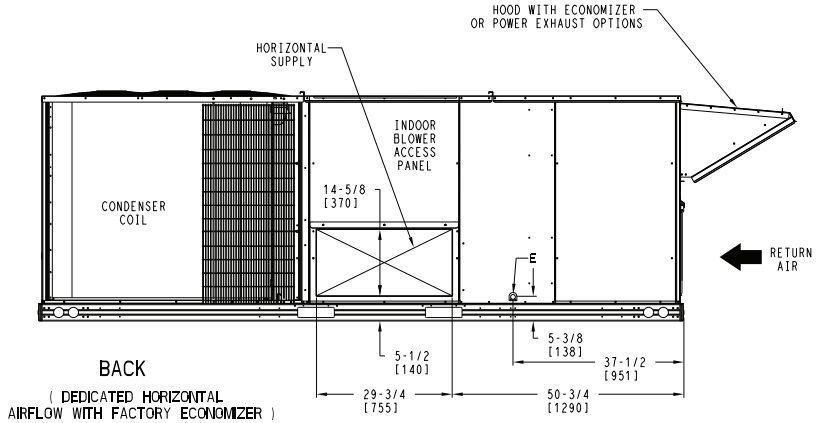
	CONNECTION SIZES
E	3/4"-14 NPT CONDENSATE DRAIN

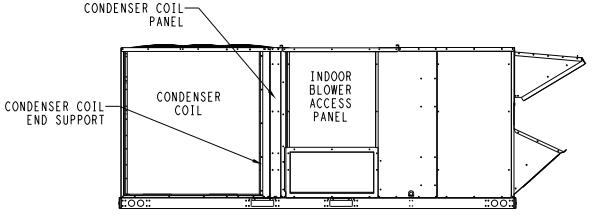
UNIT	G
20 SIZE	41-3/8 [1049]
24 SIZE	49-1/4 [1251]









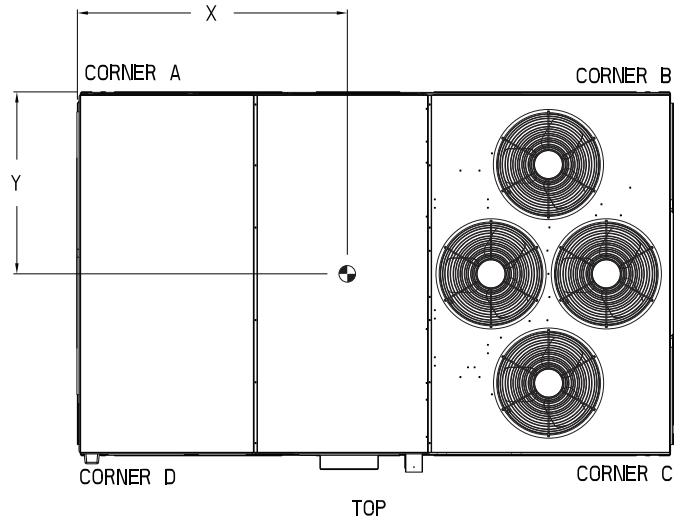


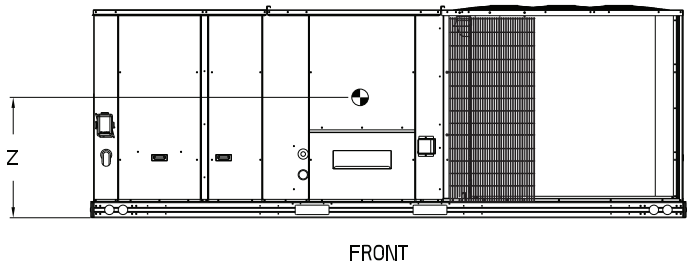
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48GC 20,24 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006821	REV
U.S. ECCN:NSR	3 OF 5	04/20/23	-			-

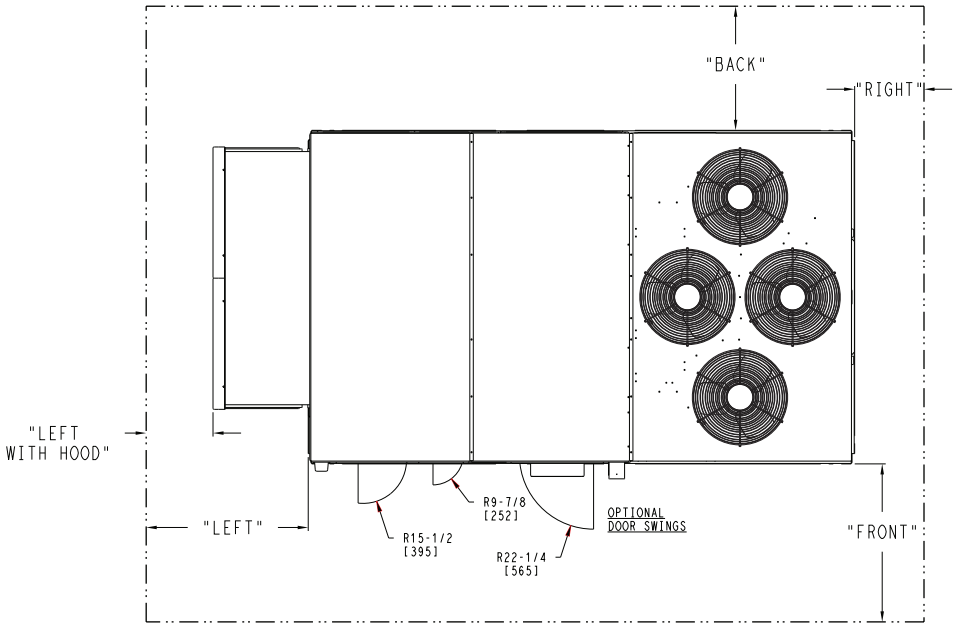
Fig. 9 — 48GC20, 24 Back View and Condensate Drain Location**

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
48GC20	2008	911	449	204	536	243	557	252	466	211	77 [1956]	44 [1118]	16 1/2 [419]
48GC24	2240	1016	530	240	530	240	590	268	590	268	70 3/4 [1797]	45 1/2 [1156]	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.







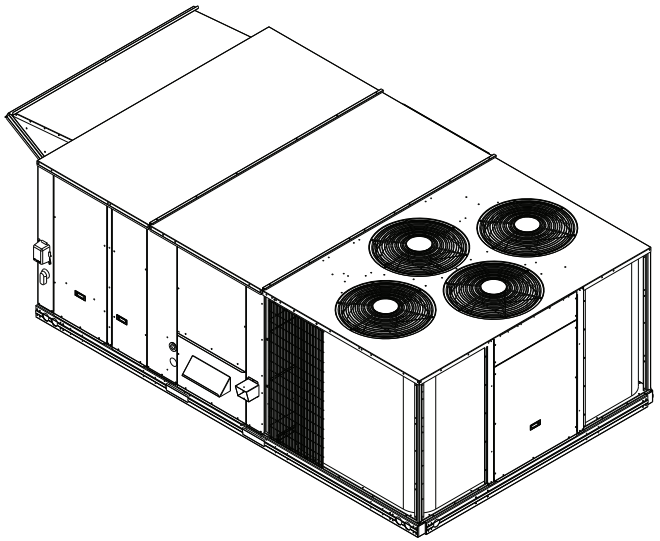
NOTES:

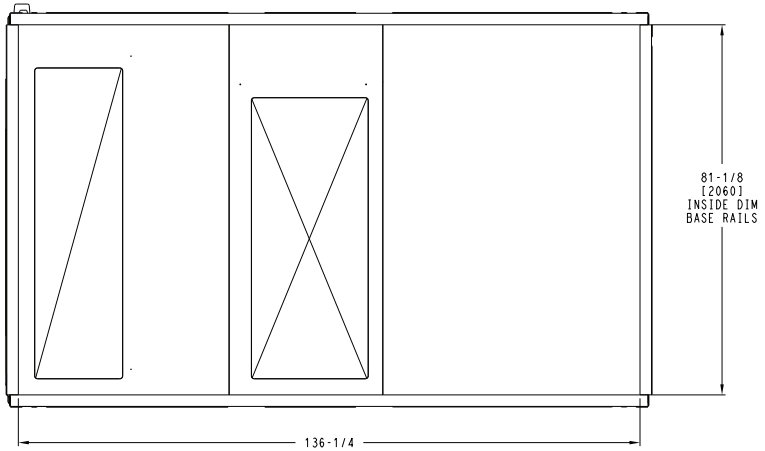
1. CLEARANCE ABOVE THE UNIT TO BE 72"
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
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			REV
U.S. ECCN:NSR	4 OF 5	04/20/23	-	48GC 20,24 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006821	-

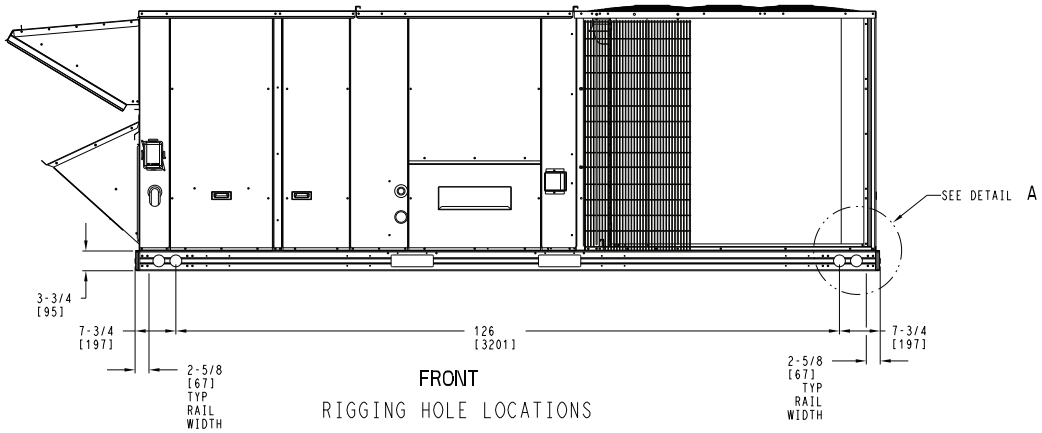
Fig. 10 — 48GC20, 24 Corner Weights and Clearances**





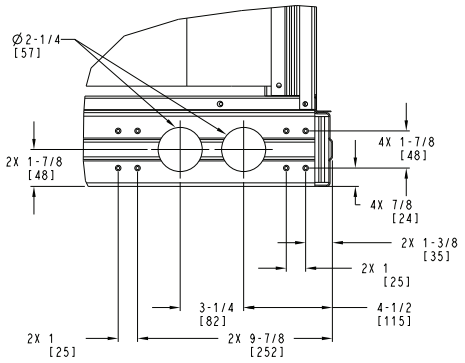
BOTTOM

INSIDE BASERAIL DIMENSIONS



FRONT

RIGGING HOLE LOCATIONS



DETAIL A
TYP 4 PLCS

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	5 OF 5	04/20/23	-	48GC 20,24 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006821	-

Fig. 11 — 48GC20, 24 Bottom View**

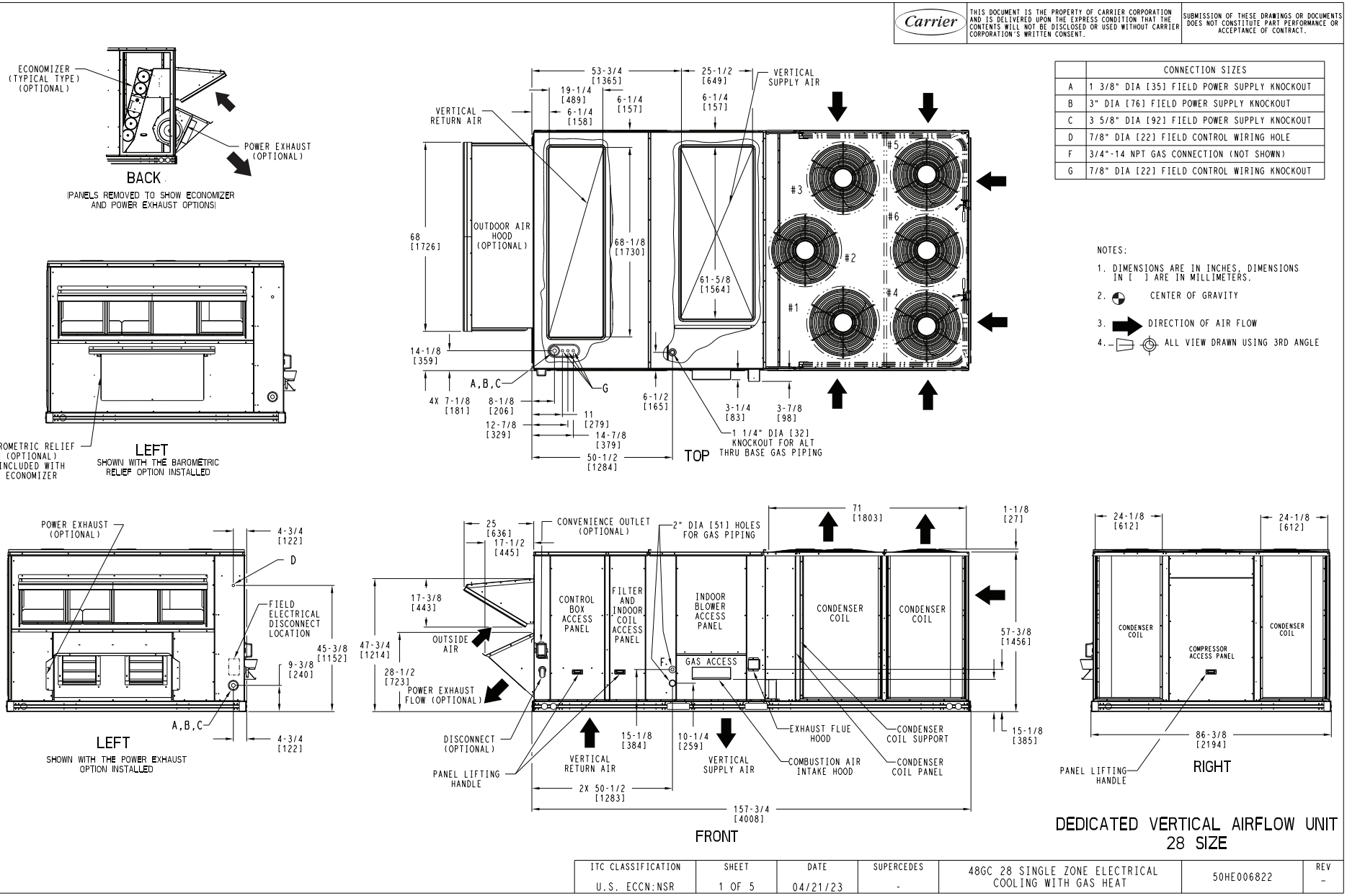


Fig. 12 — 48GC28 Vertical Airflow**

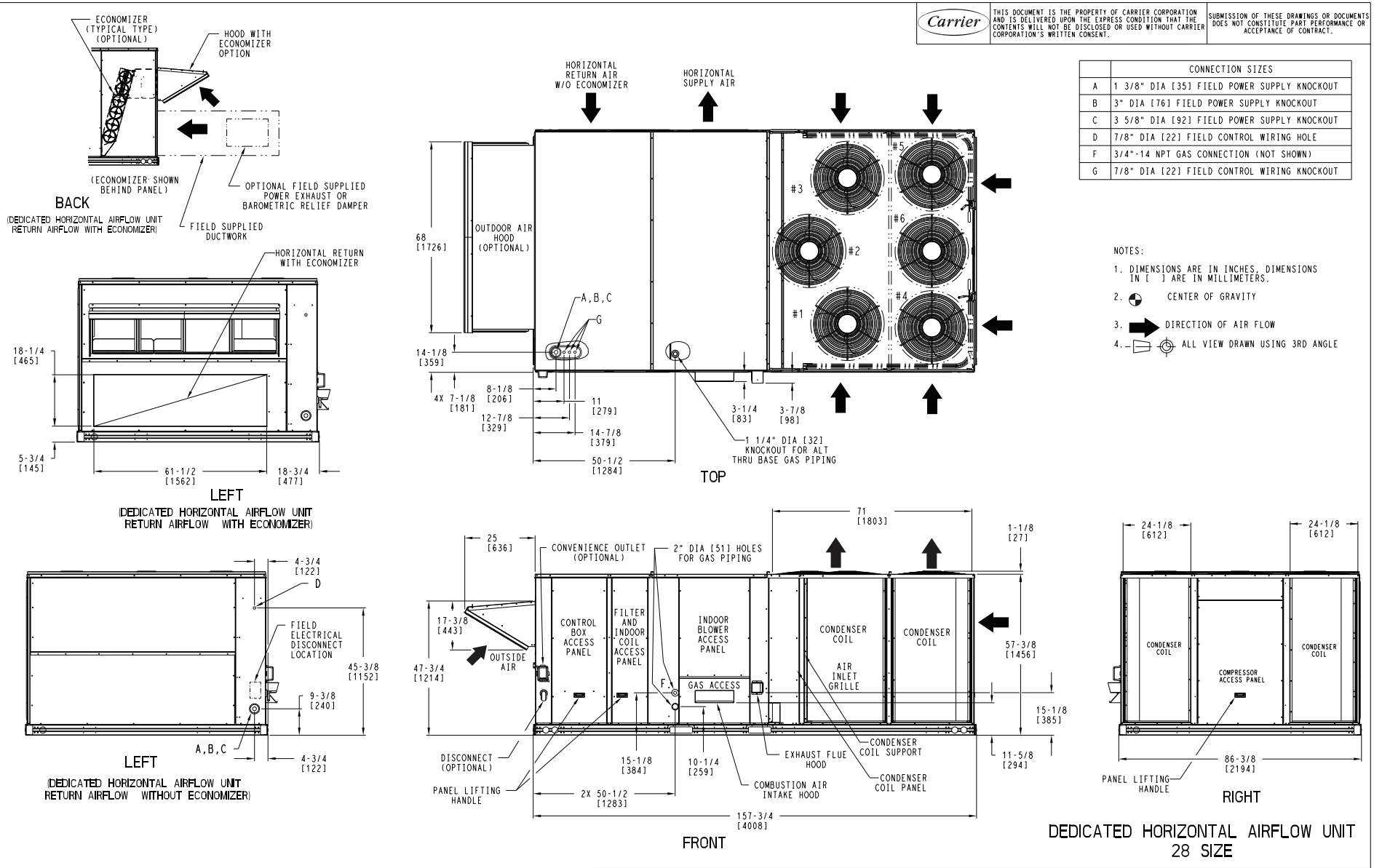
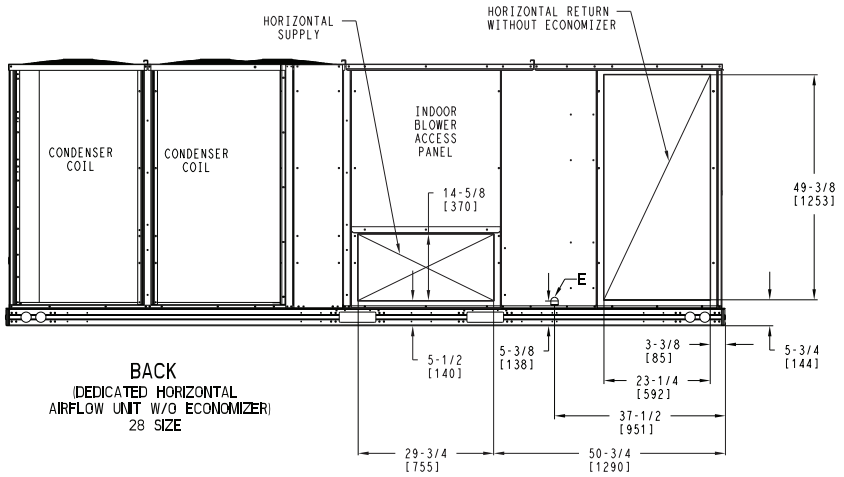
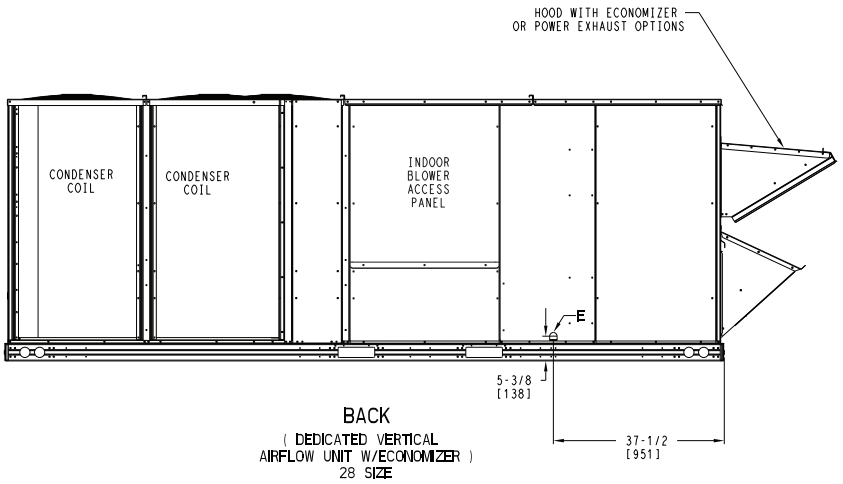
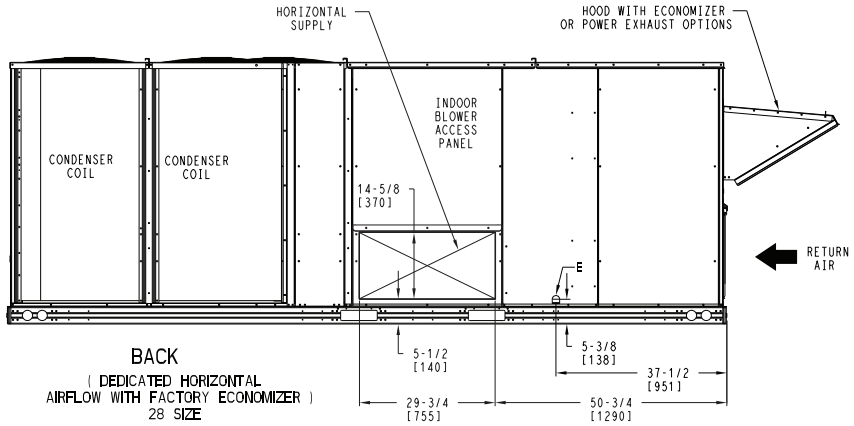


Fig. 13 — 48GC28 Horizontal Airflow**

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





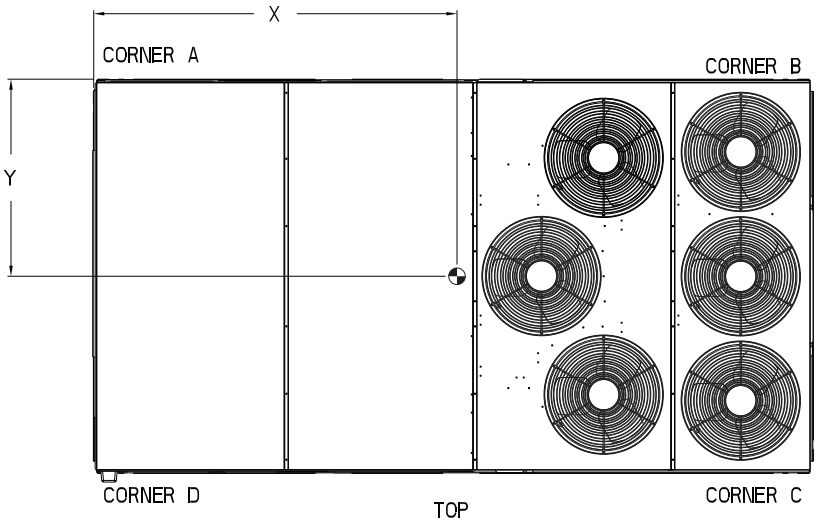


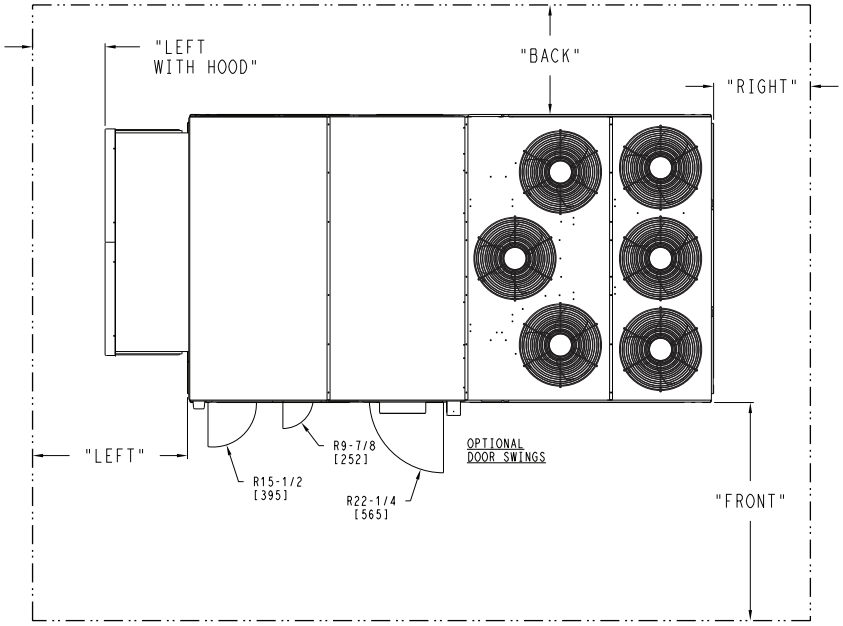
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 5	04/21/23	-	48GC 28 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006822	-

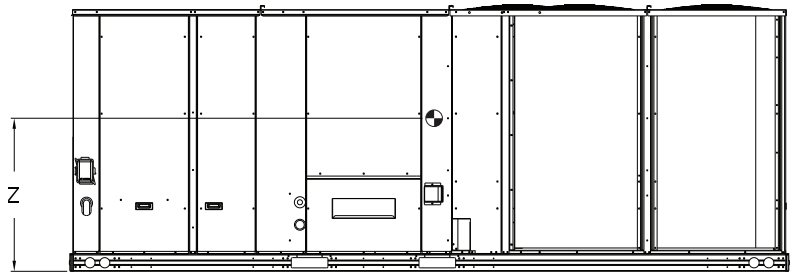
Fig. 14 — 48GC28 Back View and Condensate Drain Location**

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
48GC28	2423	1099	503	228	615	279	717	325	587	266	86 3/4 [2203]	46 1/2 [1181]	19 [483]

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







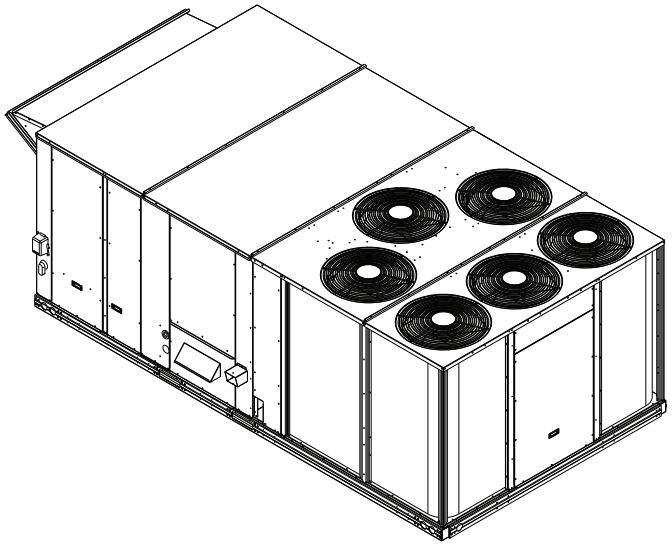
NOTES:

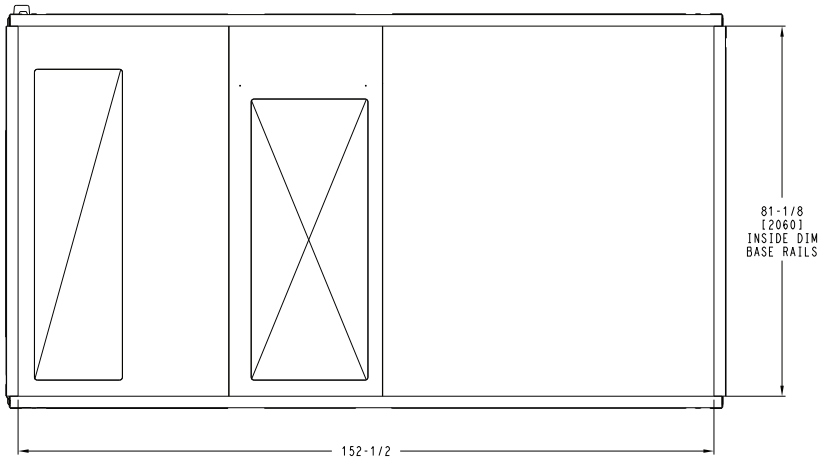
1. CLEARANCE ABOVE THE UNIT TO BE 72"
2. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
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			REV
U.S. ECCN:NSR	4 OF 5	04/21/23	-	48GC 28 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006822	-

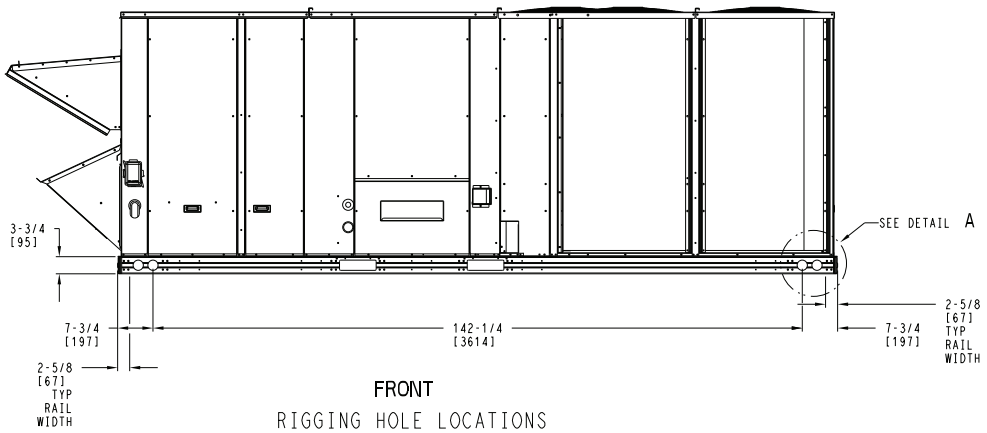
Fig. 15 — 48GC28 Corner Weights and Clearances**





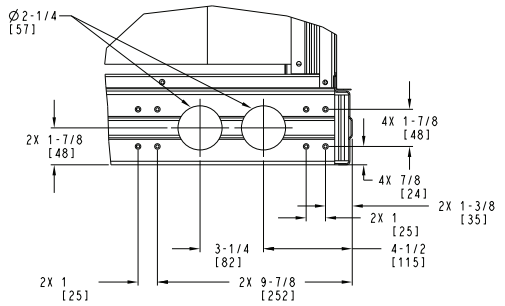
BOTTOM

INSIDE BASERAIL DIMENSIONS



FRONT

RIGGING HOLE LOCATIONS



DETAIL A
TYP 4 PLCS

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	5 OF 5	04/21/23	-	48GC 28 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE006822	-

Fig. 16 — 48GC28 Bottom View**

INSTALLATION

Jobsite Survey

Complete the following checks before installation.

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

Step 1 — Plan for Unit Location

Select a location for the unit and its support system (curb or other) that provides for 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, 10, and 15.

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. See "Install External Condensate Trap and Line" on page 31 for required trap dimensions.

ROOF MOUNT

Check building codes for weight distribution requirements. Unit operating weight is shown in Table 2.

Step 2 — Plan for Sequence of Unit Installation

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

CURB-MOUNTED INSTALLATION

1. Install curb
2. Install field-fabricated ductwork inside curb
3. Install accessory thru-base service connection package (affects curb and unit)
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 hood
10. Install gas piping
11. Install condensate line trap and piping
12. Make electrical connections
13. Install other accessories

PAD-MOUNTED INSTALLATION

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

FRAME-MOUNTED INSTALLATION

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

Table 2 — Operating Weights

48GC**	UNITS LB (KG)			
	17	20	24	28
Base Unit	1771 (804)	2008 (911)	2240 (1016)	2423 (1099)
Economizer	246 (112)	246 (112)	246 (112)	246 (112)
Powered Outlet	35 (16)	35 (16)	35 (16)	35 (16)
Humidi-MiZer System	110 (50)	120 (54)	120 (54)	120 (54)
Curb				
14 in. (356 mm)	240 (109)	255 (116)	255 (116)	273 (124)
24 in. (610 mm)	340 (154)	355 (161)	355 (161)	355 (161)

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; see Fig. 18 and 24. Do not remove carton until unit has been rigged and located in final position.

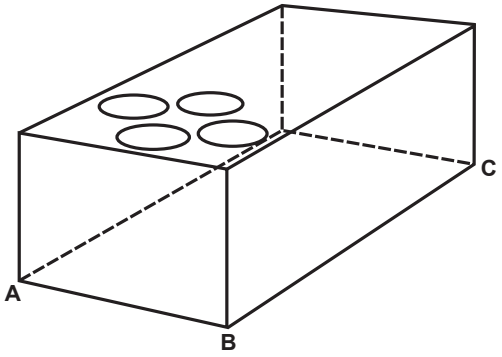
Step 4 — Provide Unit Support

ROOF CURB MOUNT

Accessory roof curb details and dimensions are shown in Fig. 19-21. 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. 19-21. 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. 17. Refer to Accessory Roof Curb Installation Instructions for additional information as required.



MAXIMUM ALLOWABLE DIFFERENCE in. (mm)

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

Fig. 17 — 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. 18 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. 18). For basepan knockout locations for vertical airflow units see Fig. 2, 7, or 12; for horizontal airflow units see Fig. 3, 8, or 13.

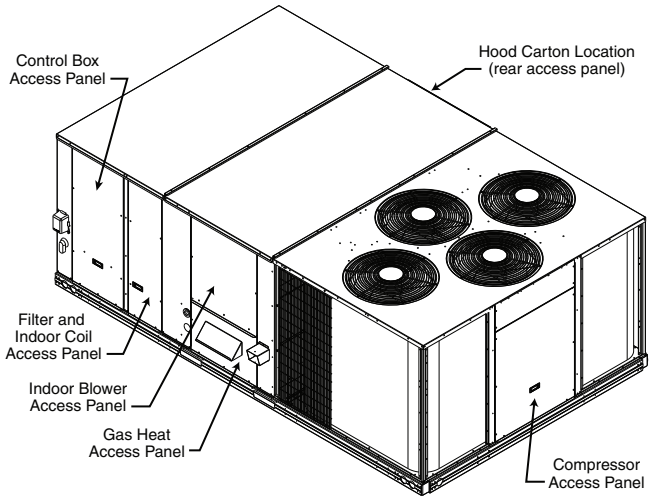


Fig. 18 — Typical Access Panel and Compressor Locations

SLAB MOUNT (HORIZONTAL UNITS ONLY)

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

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

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

A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 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.

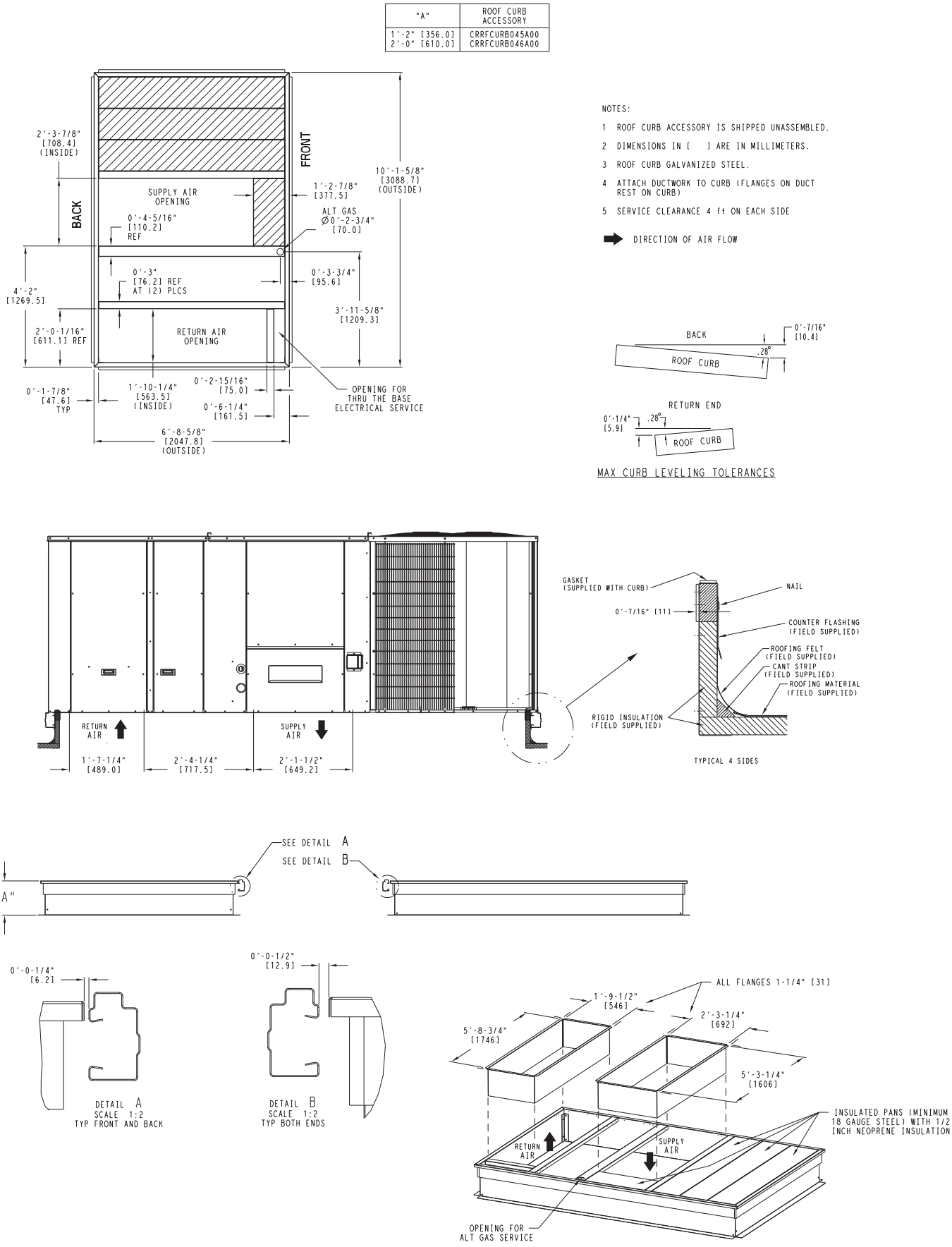


Fig. 19 — Roof Curb Details — Size 17 Unit

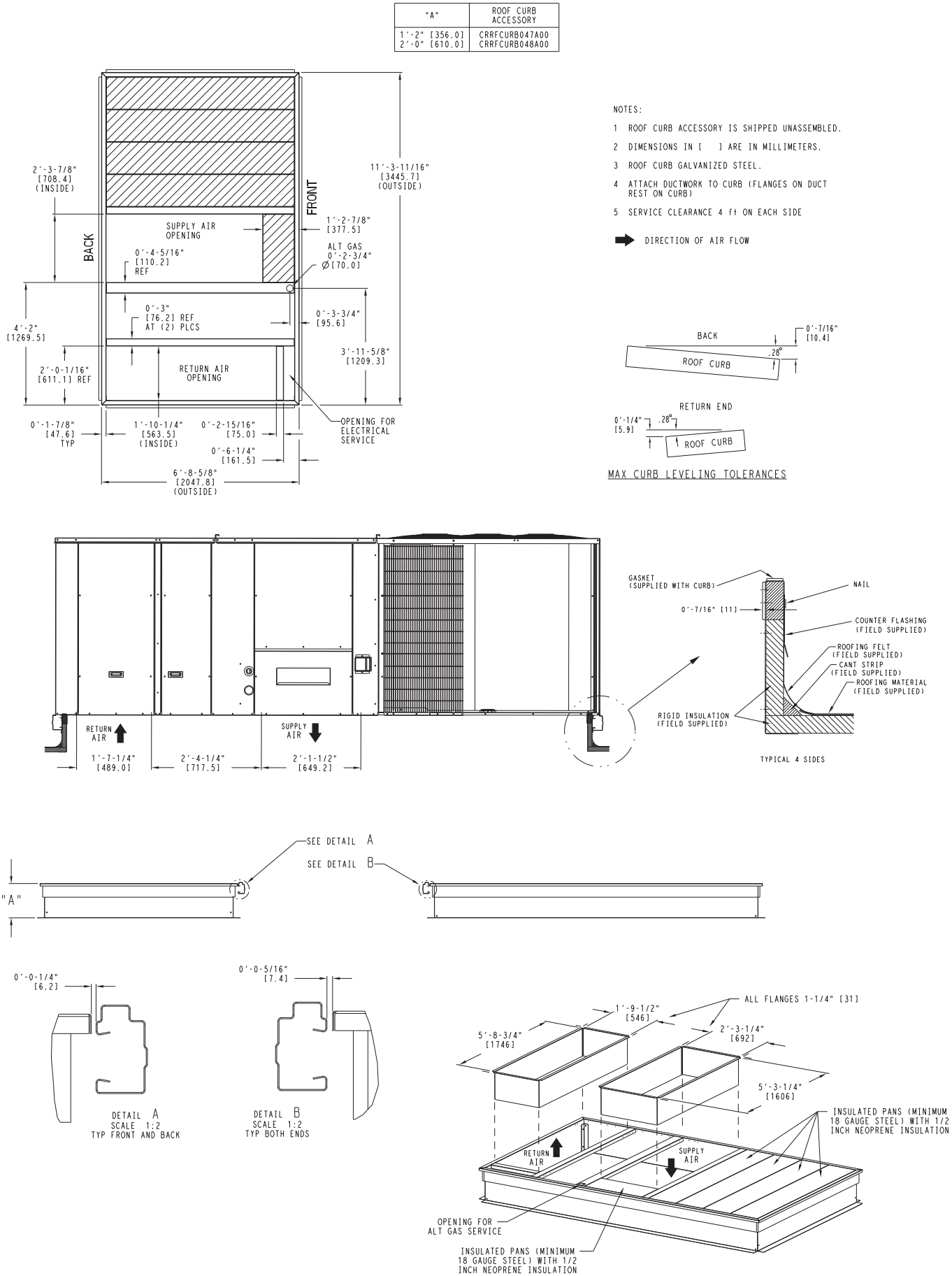
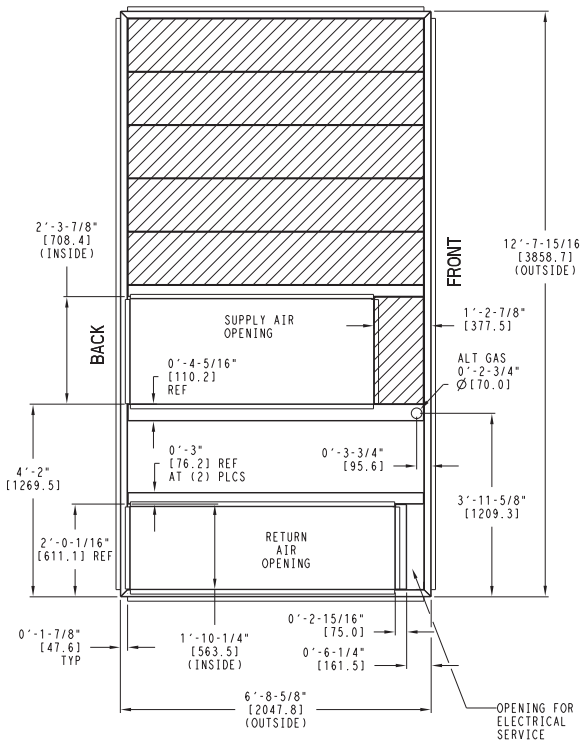


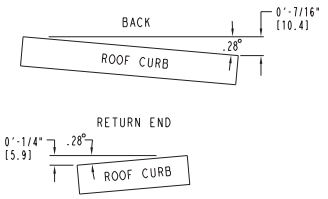
Fig. 20 — Roof Curb Details — Size 20 and 24 Units

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

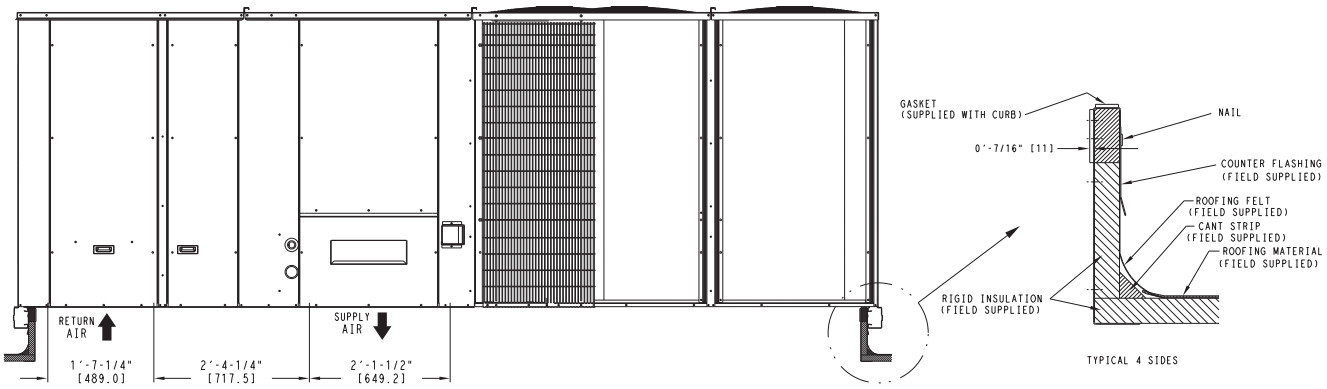


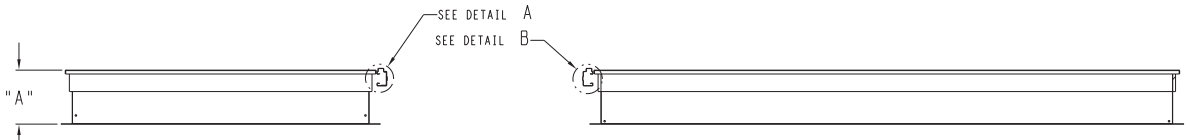
NOTES:
1 ROOF CURB ACCESSORY IS SHIPPED UNASSEMBLED.
2 BOLT HEADS TO BE ON INSIDE OF FLANGE. CLEARANCE IS [11] 0-0-7/16" TYP ALL CORNERS.
3 DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4 ROOF CURB GALVANIZED STEEL.
5 ATTACH DUCTWORK TO CURB (FLANGES ON DUCT REST ON CURB)
6 SERVICE CLEARANCE 4 ft ON EACH SIDE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

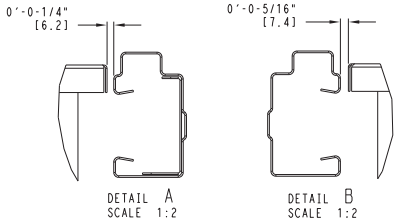
➡ DIRECTION OF AIR FLOW



MAX CURB LEVELING TOLERANCES







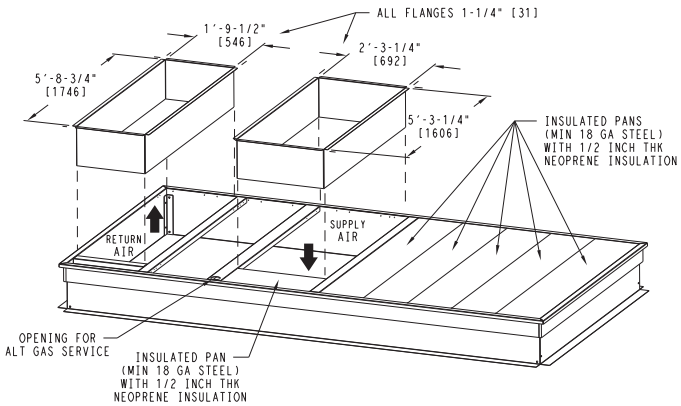


Fig. 21 — Roof Curb Details — Size 28 Unit

Step 5 — Field Fabricate Ductwork

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

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

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

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

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

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

A minimum clearance is not required around ductwork.

⚠ 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.

Step 6 — Rig and Place Unit

Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 2 (on page 20) and Fig. 22 for additional information.

Lifting holes are provided in base rails as shown in Fig. 19-21. Refer to rigging instructions on unit.

⚠ CAUTION

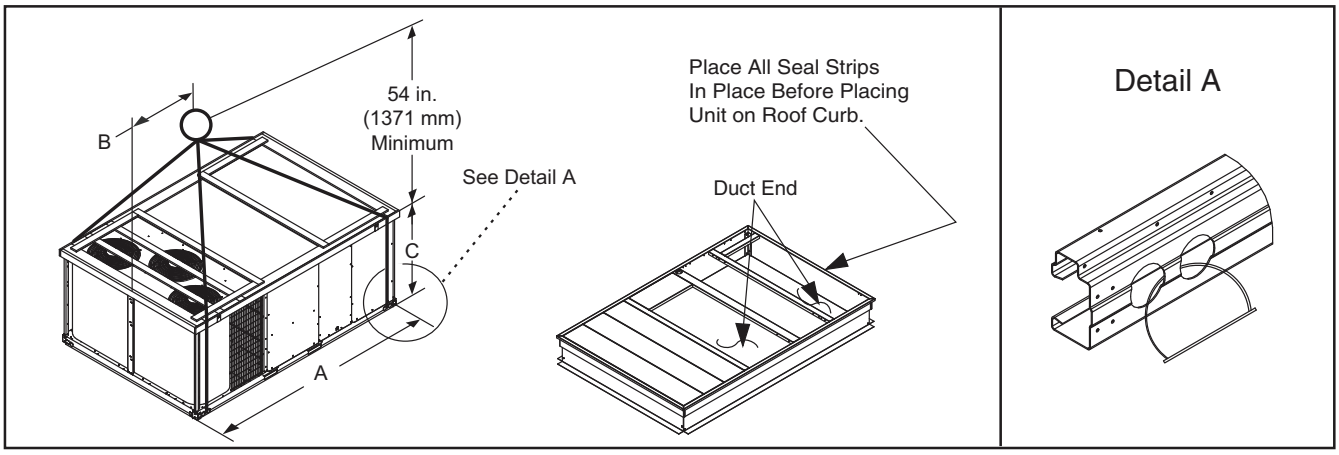
UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

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

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



UNIT	MAX WEIGHT		DIMENSIONS					
			A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
48GC17**	2900	1315	127.8	3245	71.0	1805	52.3	1330
48GC20**	3211	1456	141.5	3595	76.5	1945	52.3	1330
48GC24**	3582	1625	141.5	3595	79.5	2020	60.3	1530
48GC28**	3688	1673	157.8	4010	87.0	2210	60.3	1530

NOTES:

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

Fig. 22 — Rigging Details

POSITIONING ON CURB

Position unit on roof curb so that the following clearances are maintained: 1/4 in. (6 mm) clearance between the roof curb and the base rail inside the right and left, 1/2 in. (12 mm) clearance between the roof curb and the base rail inside the front and back. This will result in the distance between the roof curb and the base rail inside on the condenser end of the unit being approximately equal to Details A and B in Fig. 19-21.

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).

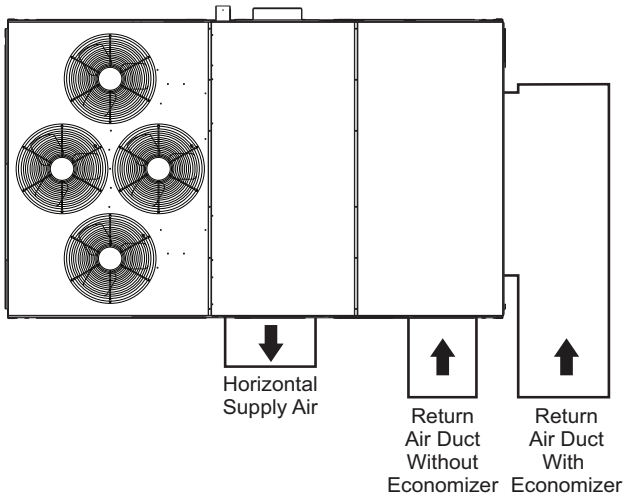
Flue gas can deteriorate building materials. Orient unit such that flue gas will not affect building materials. Locate mechanical draft system flue assembly at least 48 in. (1220 mm) from an adjacent building or combustible material.

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), Fig. 8 and 9 (sizes 20 and 24), or Fig. 13 and 14 (size 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. 23 for top view depicting typical horizontal duct arrangements.

NOTE: 48GC 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)	15-7/8 (402)	49-3/8 (1253)	18-3/8 (467)
Width - in. (mm)	29-3/4 (756)	23-3/8 (593)	61-5/8 (1564)

Fig. 23 — Horizontal Duct Opening Dimensions

Field-supplied (3/4 in.) flanges should be attached to horizontal duct openings (see Fig. 23) 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 2-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. 24). 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. 25).

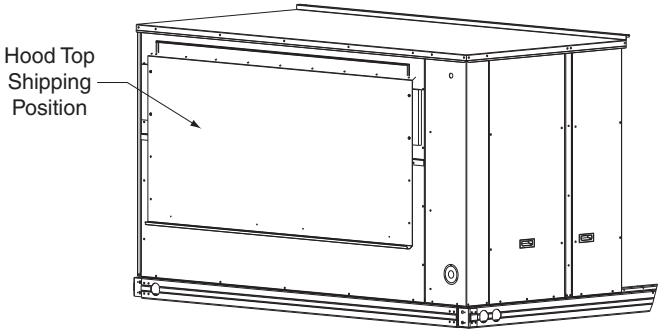


Fig. 24 — Hood Top — Shipping Position

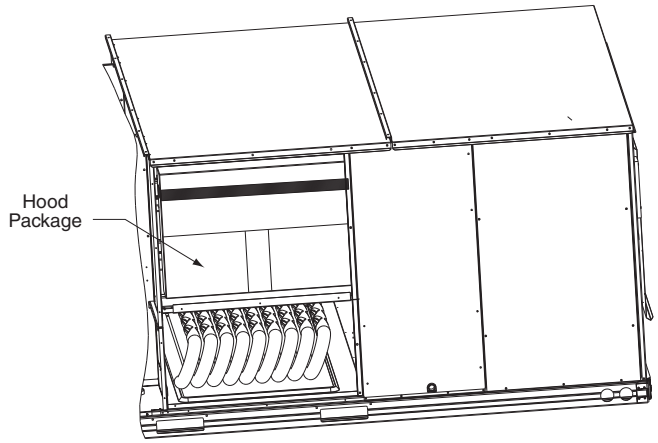


Fig. 25 — Hood Package — Shipping Location

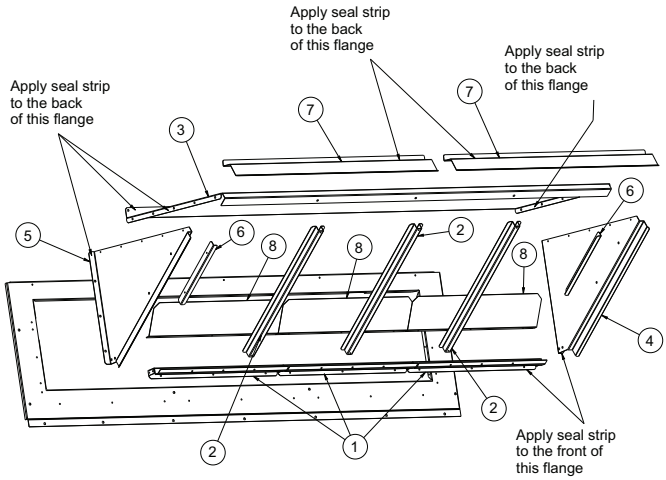
To remove the hood parts package:

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

To assemble the outside air hood (see Fig. 26 for hood component locations):

1. Remove hood top panel from shipping position on unit end.
2. Install filters supports (Item 1) to the upper end panel using the screws provided.
3. Install each deflector (Item 8) on to each filter support (Item 1) using the screws provided.
4. Apply seal strip to mating flanges on side panels of hood (Items 4 and 5).
5. Secure side panels (Items 4 and 5) to upper panel using the screws provided.
6. Apply seal strip to mating flange of the hood (see Fig. 26).
7. 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. 27). See Fig. 28 for completed hood assembly.



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. 26 — Hood Part Identification and Seal Strip Application Areas

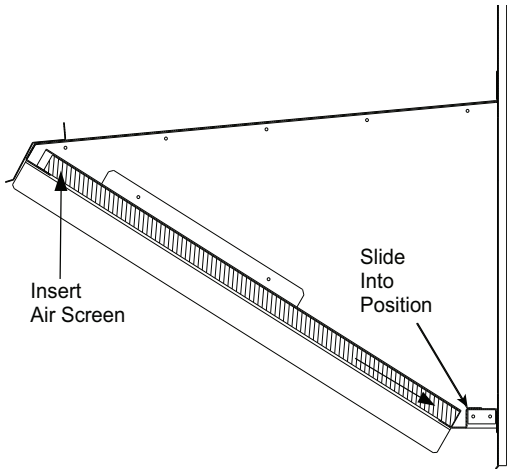


Fig. 27 — Outdoor Air Screen Installation

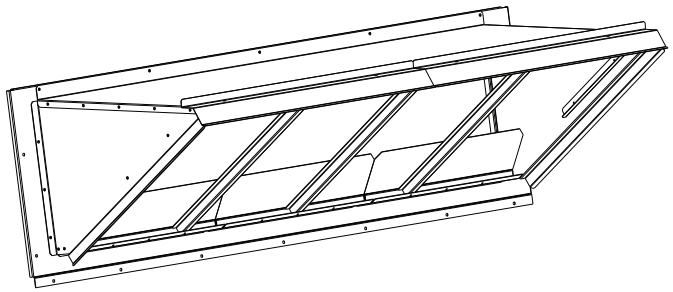


Fig. 28 — Completed Hood Assembly

Step 9 — Assemble Barometric Hood

The barometric hood can be assembled in vertical or horizontal configuration. Figure 29 illustrates the barometric hood parts.

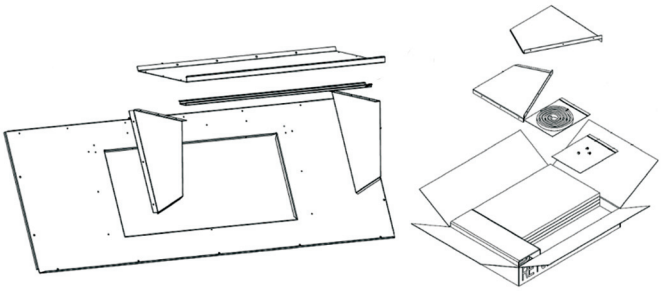


Fig. 29 — Barometric Hood Parts

BAROMETRIC HOOD (VERTICAL CONFIGURATION)

1. Remove the hood top panel from its shipping position on the unit end (see Fig. 30).

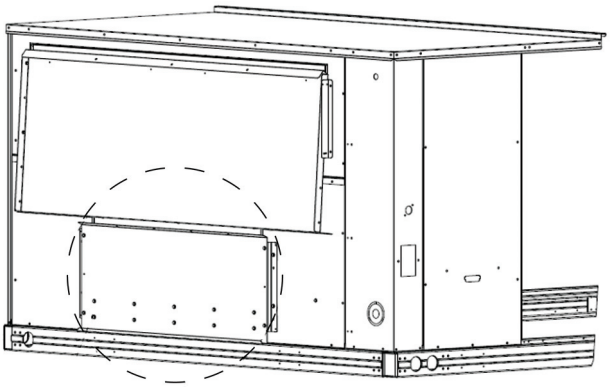


Fig. 30 — Shipping Location, Vertical Units

2. Remove the side panels located in the hood parts box (see Fig. 31).

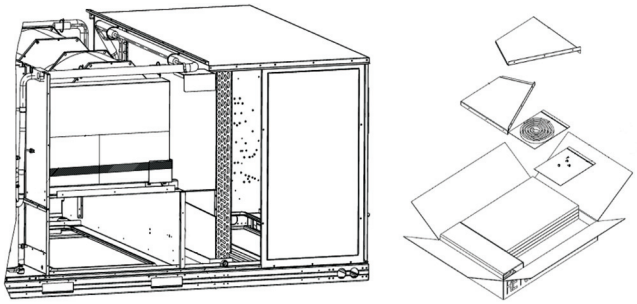


Fig. 31 — Barometric Hood Box Parts Location

3. Install parts as shown in the following exploded view (see Fig. 32) using the seal strip and screws provided in the parts box.

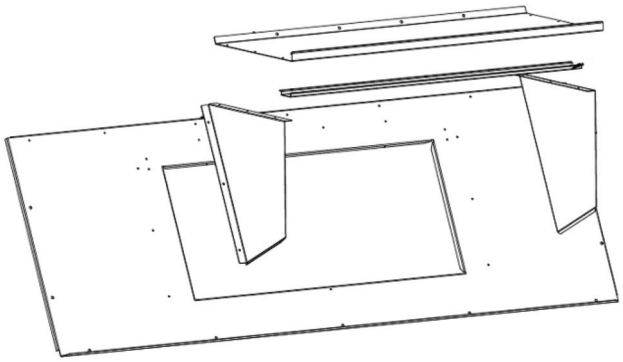


Fig. 32 — Barometric Hood Exploded View

Figure 33 illustrates the installed barometric hood parts.

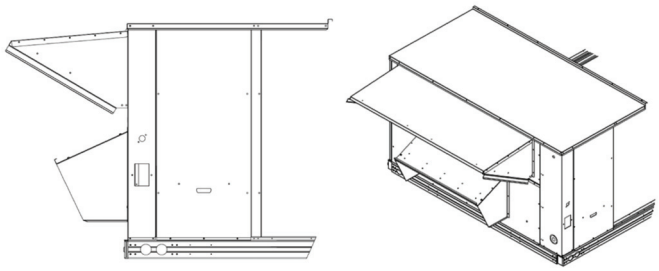


Fig. 33 — Installed Barometric Hood Side View and Isometric View

BAROMETRIC HOOD (HORIZONTAL CONFIGURATION)

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

1. Install the field provided horizontal ductwork onto the unit. Duct height must be at least 19-1/2 in. high, however the duct can be no taller than the top of the relief opening in the bottom panel, or airflow into the outside air hood will be restricted. See Fig. 34.

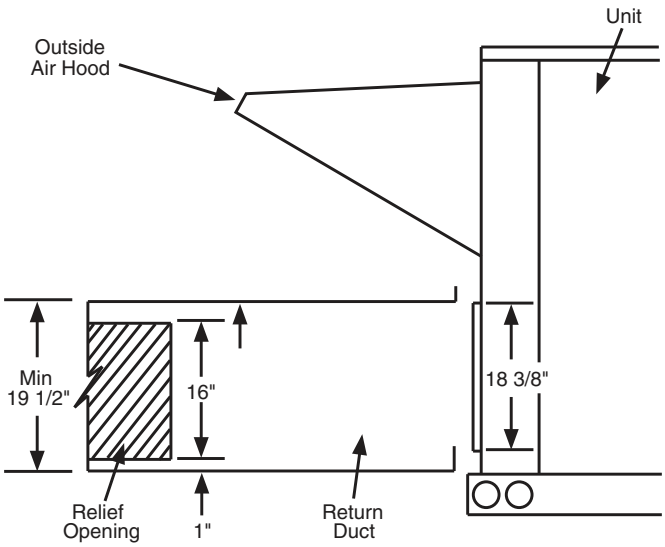


Fig. 34 — Relief Damper

2. Cut a 16 in. x 36 in. opening in the return duct for the relief damper (see Fig. 34).
3. On the field installed economizer (CRECOMZR0**A00), a birdscreen or hardware cloth is shipped attached to the bottom panel used for vertical applications.

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

4. Using the blade brackets, install the relief damper onto the side of the return duct (see Fig. 35). The two brackets and relief damper are provided with the economizer.

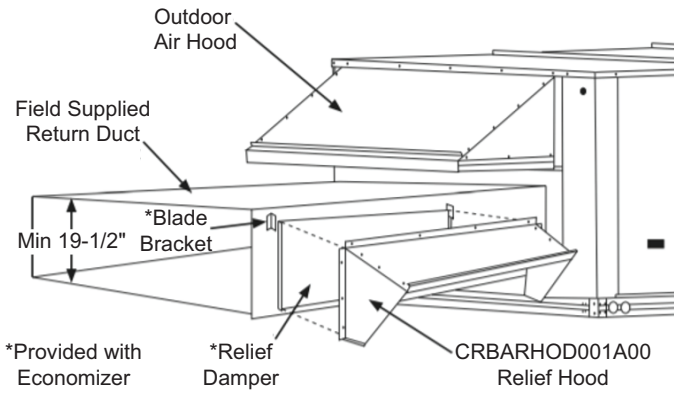


Fig. 35 — Installing CRBARHOD001A00 Over Relief Damper

5. Using the provided hardware, screw the CRBARHOD001A00 hood sides and top together (see Fig. 36).

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

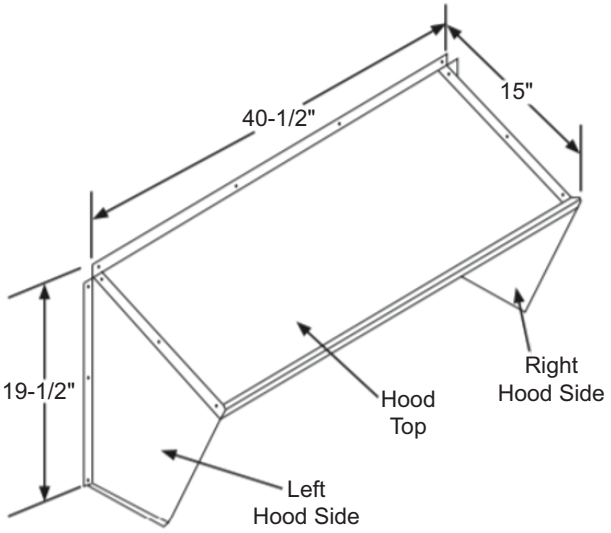


Fig. 36 — CRBARHOD001A00 Hood Sides and Top

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. 35.

Step 10 — Install Flue Hood and Combustion Air Hood

The flue hood is shipped screwed to the fan deck inside the burner compartment. Remove the burner access panel and then remove the flue hood from its shipping location. Using the screws provided, install flue hood and screen in location shown in Fig. 37.

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. 18.

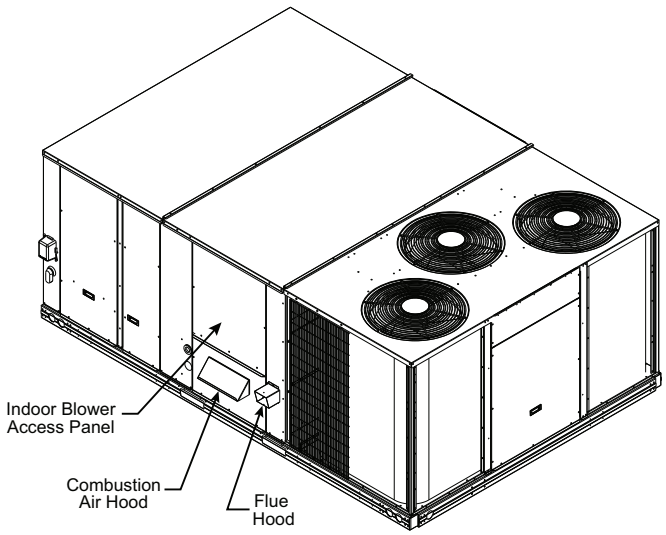


Fig. 37 — Flue Hood and Combustion Air Hood Details

Step 11 — 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 3). 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 4).

Table 3 — Natural Gas Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
48GC**	17, 20, 24, 28	5.0 in. wg (1246 Pa)	13.0 in. wg (3240 Pa)

Table 4 — Liquid Propane Supply Line Pressure Ranges

UNIT MODEL	UNIT SIZE	MIN.	MAX.
48GC**	17, 20, 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 5).

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

Table 5 — Natural Gas Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48GC**	17, 20, 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 6). Follow instructions in the accessory kit to make initial readjustment.

Table 6 — Liquid Propane Manifold Pressure Ranges

UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
48GC**	17, 20, 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 7 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. 38).

Pipe gas supply into 90 degree elbow item 15 (see Table 7) 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 7 and pipe gas supply into the tee. See Fig. 39.

Table 7 — 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. 40.

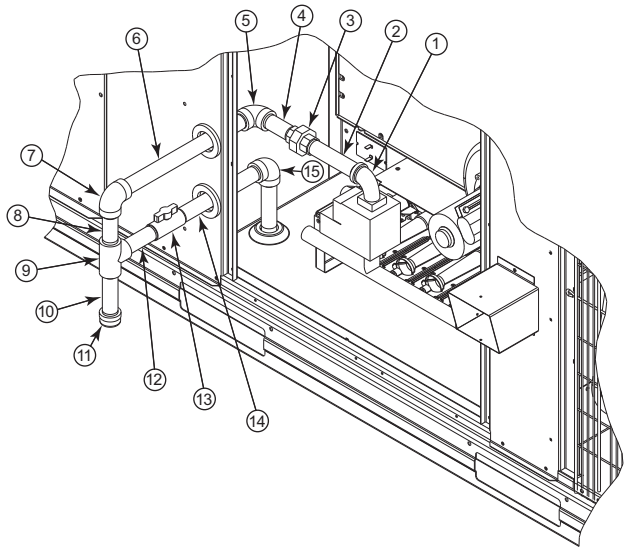


Fig. 38 — Gas Supply Line Piping with Thru-Base

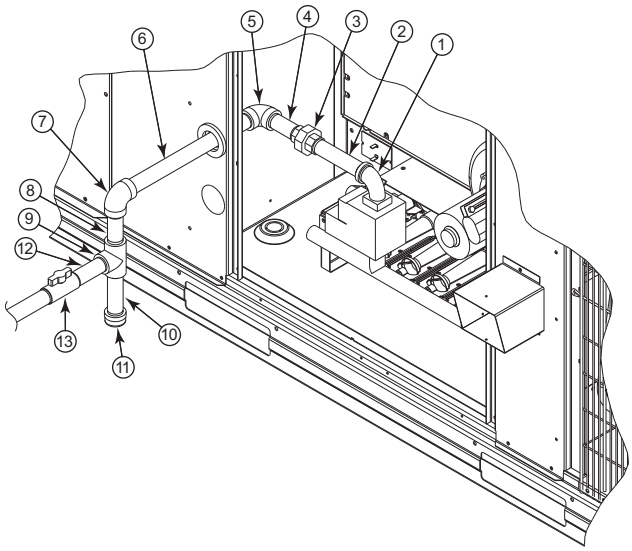
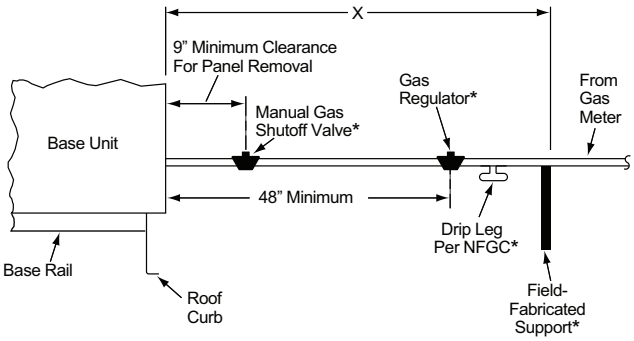


Fig. 39 — Gas Supply Line Piping



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. 40 — 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 "Step 13 — Make Electrical Connections" 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 No.: KA56SL112) at the gas inlet and into the gas valve. See Fig. 38 and Table 7. 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. 39 for typical piping arrangements for gas piping that has been routed through the sidewall of the base pan.

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

1. Avoid low spots in long runs of pipe. Grade all pipe 1/4 in. 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®[1]) 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).

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⚠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. 41.

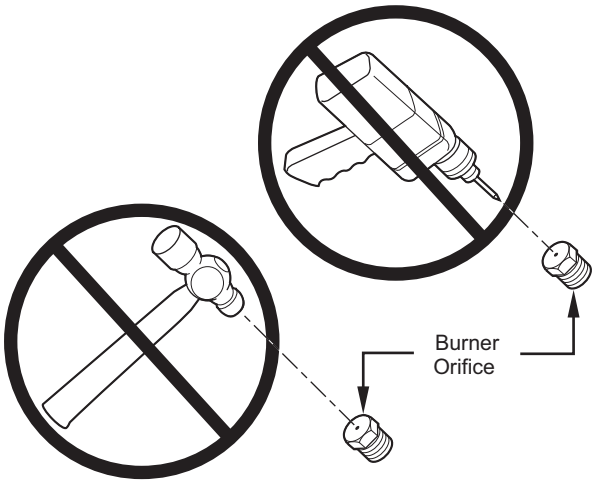


Fig. 41 — Orifice Hole

Step 12 — 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. 42). See Fig. 4, 9, and 14 for the location of the condensate drain connection.

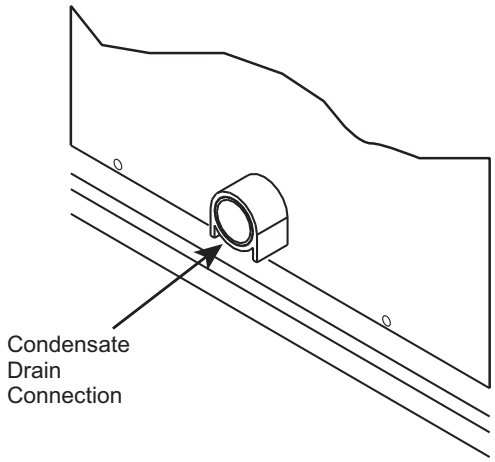
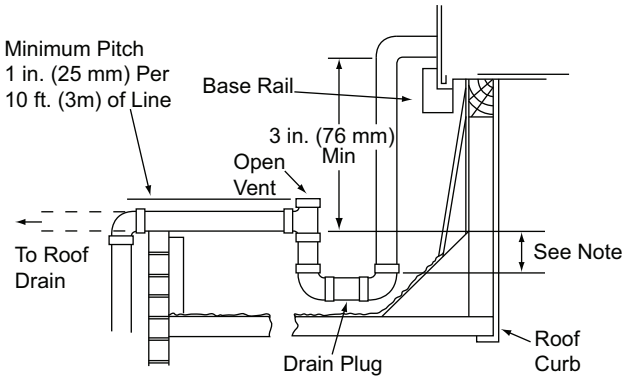


Fig. 42 — Condensate Drain Pan Connection

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. 43.



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

Fig. 43 — 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 13 — 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 (3°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 terminal block with unit field power leads. See Fig. 44.

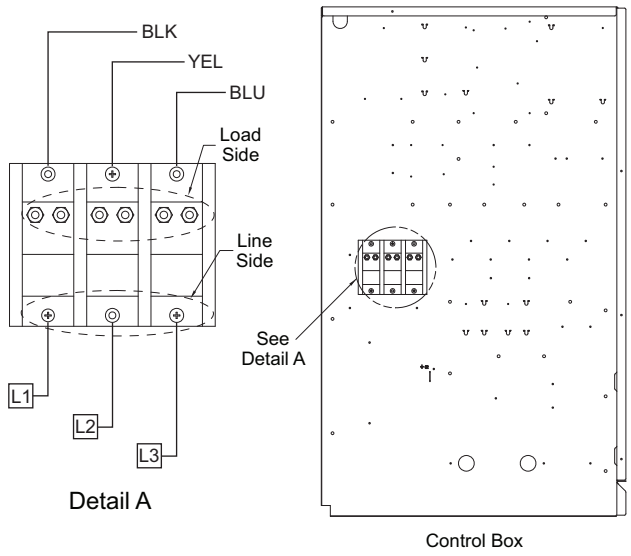


Fig. 44 — Location of TB1

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. 45.

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.

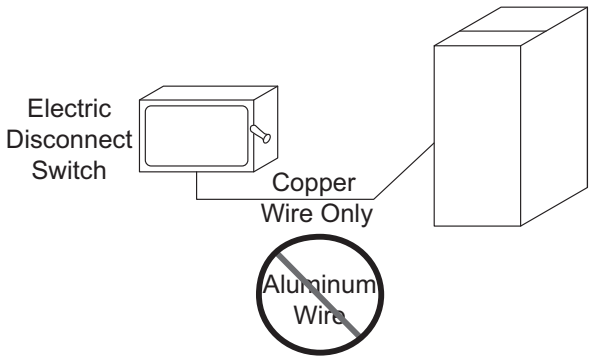


Fig. 45 — Disconnect Switch and Unit

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. 46 or 47). Note that the tape covering the hole for the shaft in the corner post must be removed prior to handle and shaft installation.

To field install the NFD shaft and handle:

1. Open the control box panel.
2. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob or on the silver metal collar is at OFF).
3. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
4. Measure the tip of the shaft to the outside surface of the corner post to be 0.88 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.

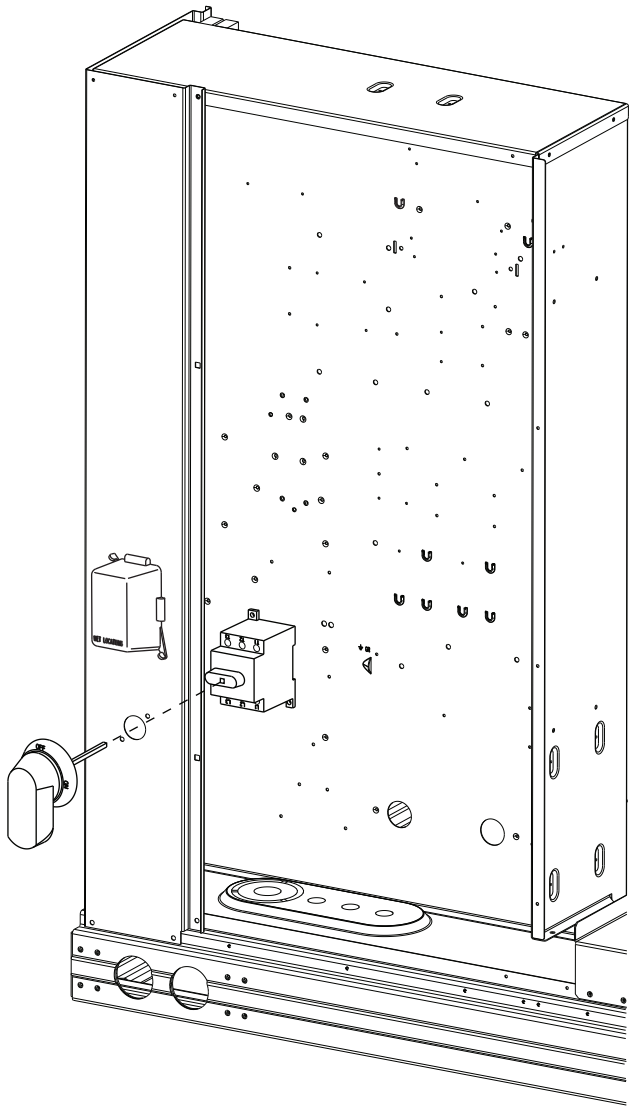


Fig. 46 — Handle and Shaft Assembly for NFD

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.
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.

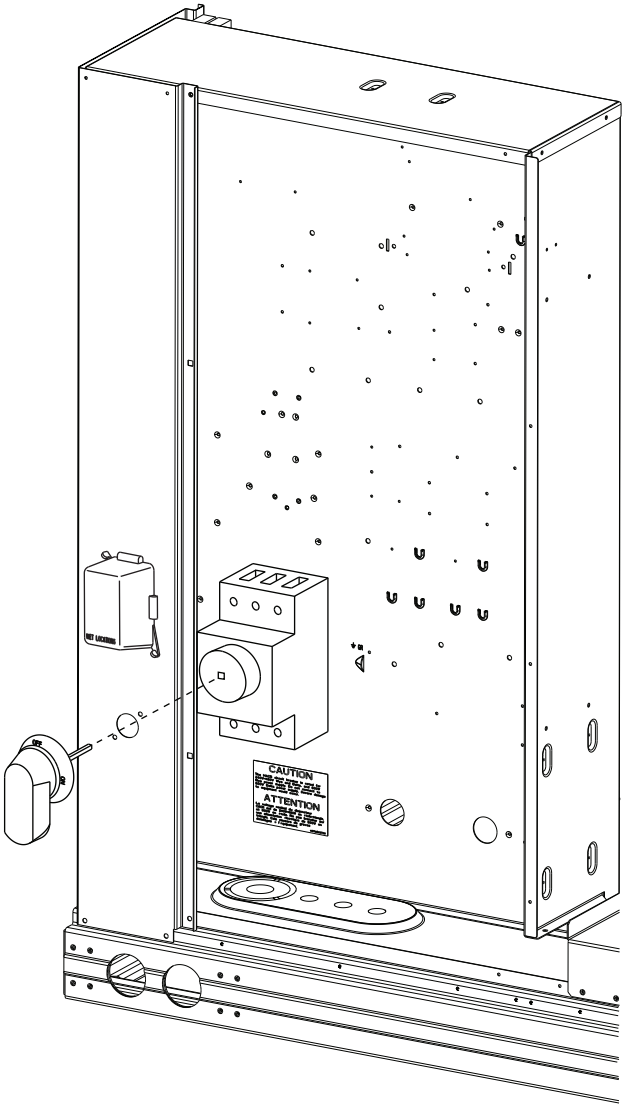


Fig. 47 — Handle and Shaft Assembly for HACR

ALL UNITS

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

Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. See Fig. 48 for power wiring connections to the unit power terminal blocks and equipment ground. Maximum wire size is 2/0 AWG per pole.

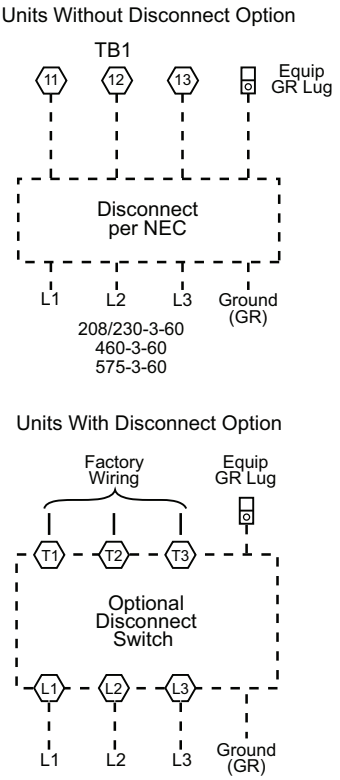


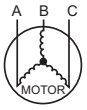
Fig. 48 — Power Wiring Connections

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



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

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

Determine maximum deviation from average voltage.

(AB) 227-224 = 3-v

(BC) 231-227 = 4-v

(AC) 227-226 = 1-v

Maximum deviation is 4-v.

Determine percent of voltage imbalance.

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

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

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

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable 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 48GC models: non-powered and unit-powered. Both types provide a 125 volt GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the panel beneath the control box. See Fig. 49.

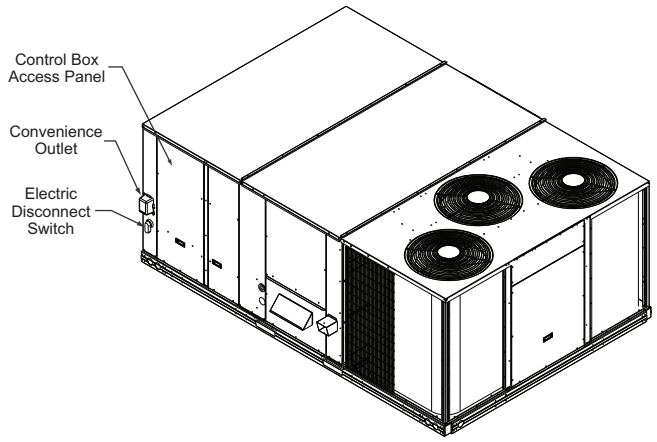


Fig. 49 — Convenience Outlet Location

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 2 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 2 screws until snug (do not over-tighten).

Mount the weatherproof cover to the backing plate as shown in Fig. 50. Remove 2 slot fillers in the bottom of the cover to permit service tool cords to exit the cover. Check for full closing and latching.

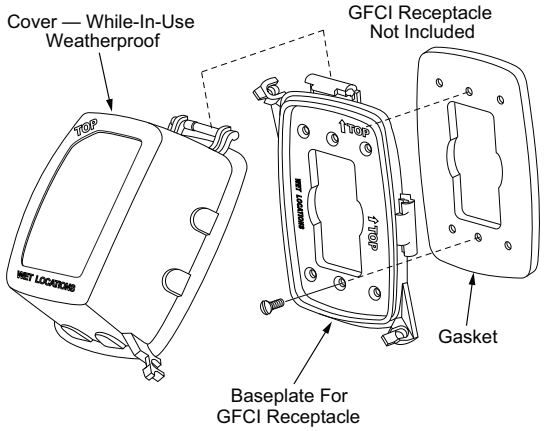


Fig. 50 — Weatherproof Cover Installation

Non-powered type

This 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 and conduit requirements, fuse or breaker requirements, and disconnect switch size and location. Route 125-v power supply conductors into the bottom of the utility box containing the duplex receptacle.

Unit-powered type

A unit-mounted transformer is factory-installed to stepdown the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 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. 51.

See Fig. 52 for convenience outlet utilization notice.

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

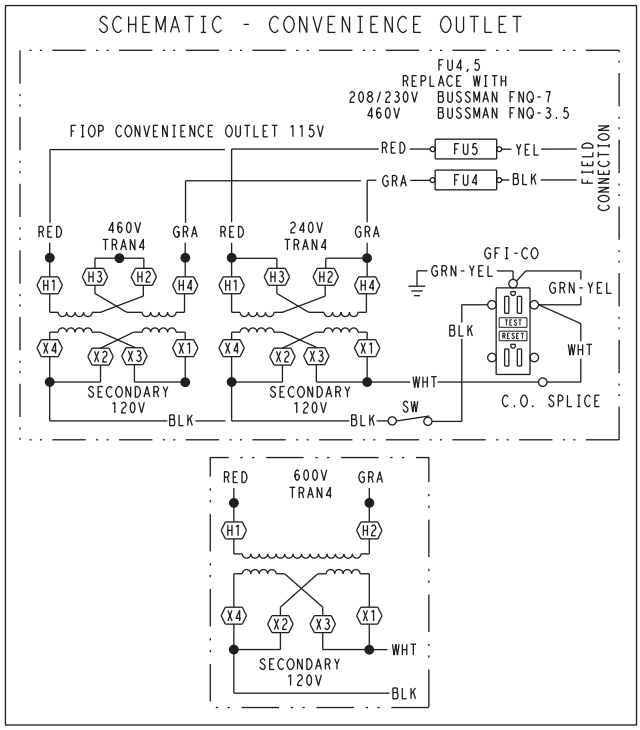
Using unit-mounted convenience outlets

Units with unit-mounted convenience outlet circuits will often require that 2 disconnects be opened to de-energize all power to the unit. Treat all units as electrically energized until the convenience outlet power is also checked and de-energization is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

FACTORY OPTION THRU-BASE CONNECTIONS

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

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.



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. 51 — Powered Convenience Outlet Wiring

Fig. 52 — Convenience Utilization Notice

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 3 knock outs. High voltage is brought through the multi knock out by removing the appropriate size for the size of the fitting required. A 7/8 in. knock out is provided for low voltage. An additional 7/8 in. knock out is provided for a 115 volt line which is used when the unit is equipped with the non-unit powered convenience outlet option.

All required fittings are field supplied. Install fittings when access to both top and bottom of the base pan is available. See electrical and gas connections for routing and connection information.

UNITS WITHOUT THRU-BASE CONNECTIONS

1. Install liquid tight conduit between disconnect and control box.
2. Pull correctly rated high voltage wires through the conduit.
3. Install power lines to terminal connections as shown in Fig. 48.

FIELD CONTROL WIRING

The 48GC unit requires an external temperature control device. This device can be a thermostat (field-supplied) or a SystemVu™ controller (available as factory-installed option for use on a Carrier Comfort Network® or as a stand-alone control).

All low-voltage wiring should be routed through the provided wire ties (see Fig. 53) 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.

THERMOSTAT

Install a Carrier-approved accessory 2-stage thermostat according to installation instructions included with the accessory. Locate the thermostat accessory on a solid wall in the conditioned space to sense average temperature in accordance with the thermostat installation instructions.

If the thermostat contains a logic circuit requiring 24 v power, use a thermostat cable or equivalent single leads of different colors with minimum of 7 leads. If the thermostat does not require a 24 v source (no "C" connection required), use a thermostat cable or equivalent with minimum of 6 leads. Check the thermostat installation instructions for additional features which might require additional conductors in the cable.

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

UNITS 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 (see Fig. 53). 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. 54.

⚠ 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.

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

HEAT ANTICIPATOR SETTINGS

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

TRANSFORMER CONNECTION FOR 208-V POWER SUPPLY

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

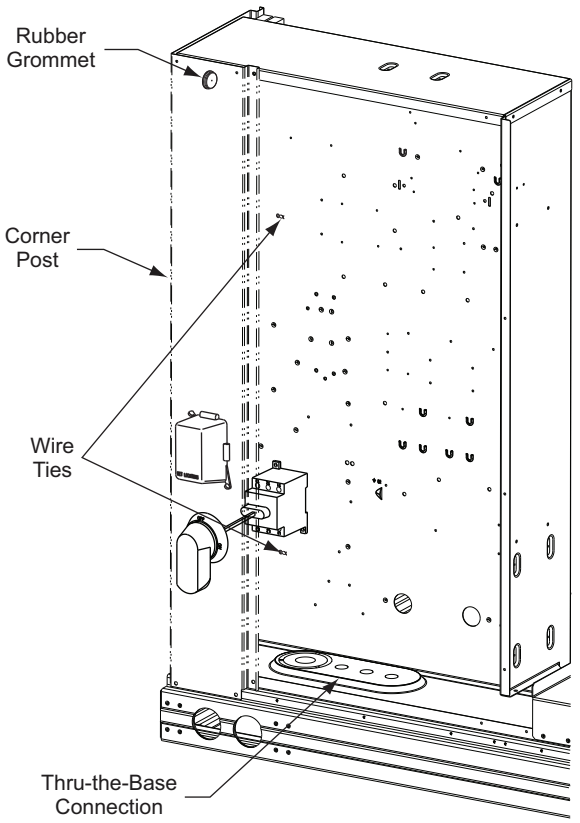
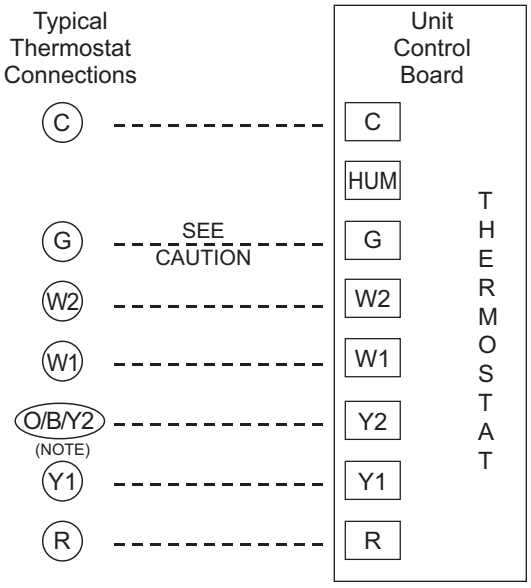


Fig. 53 — Wire Ties for Low Voltage Wiring



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

Field Wiring

Fig. 54 — Typical Low-Voltage Control Connections

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 installed space relative humidity control device. This device may be a separate humidistat control (contact closes on rise in space RH above control setpoint, see Fig. 55) or a combination thermostat-humidistat control device such as Carrier's Edge® Pro Thermidistat™ device with isolated contact set for dehumidification control (see Fig. 56). The humidistat is normally used in applications where a temperature control is already provided (units with SystemVu™ control).

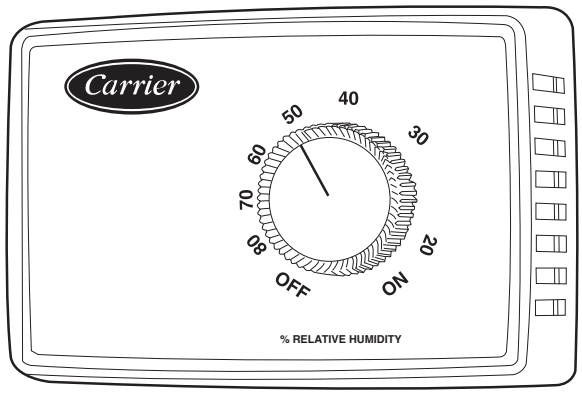


Fig. 55 — Accessory Field-Installed Humidistat

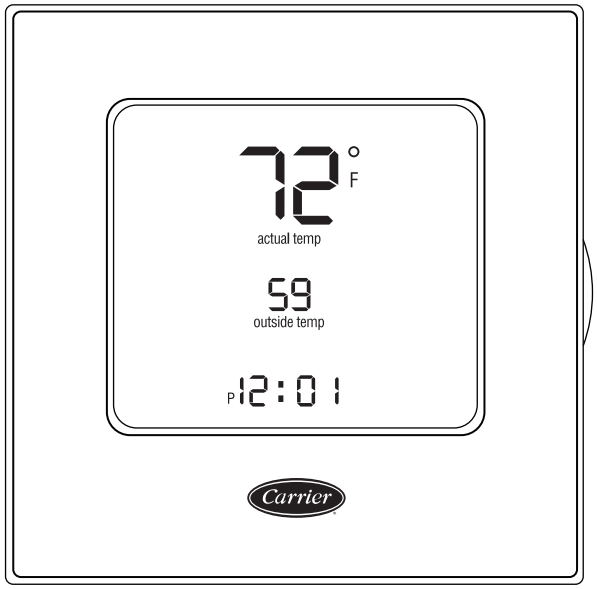


Fig. 56 — Edge® Pro Thermidistat

To connect the Carrier humidistat (HL38MG029):

1. Route the humidistat 2-conductor cable (field-supplied) through hole provided in the unit corner post.
2. Feed wires through the wire ties down the left side of the control box (see Fig. 53) to the 24-v barrier located on the left side of the control box. This provides the UL-required clearance between high-voltage and low-voltage wiring.
3. Connect one of the leads from the 2-conductor cable to the HUM terminal on the UCB (Unit Control Board). Connect the other lead to the R terminal on the UCB. See Fig. 57.

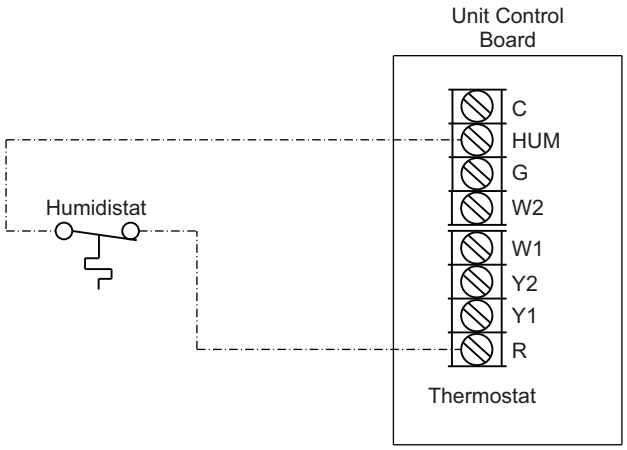


Fig. 57 — Humidistat Connections to UCB

To connect the Thermidistat device (33CS2PPRH-01):

1. Route the Thermidistat multi-conductor thermostat cable (field-supplied) through hole provided in the unit corner post.
2. Feed wires through the wire ties down the left side of the control box (see Fig. 53) to the 24-v barrier located on the left side of the control box. This provides the UL-required clearance between high-voltage and low-voltage wiring.
3. The Thermidistat has dry contacts at terminals D1 and D2 for dehumidification operation (see Fig. 58). Connect D1 to the R terminal on the UCB. Connect D2 to the HUM terminal on the UCB. Refer to the installation instructions included with the Carrier Edge® Pro Thermidistat device for more information.

TYPICAL UNIT WIRING DIAGRAMS

See Fig. 59-64 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.

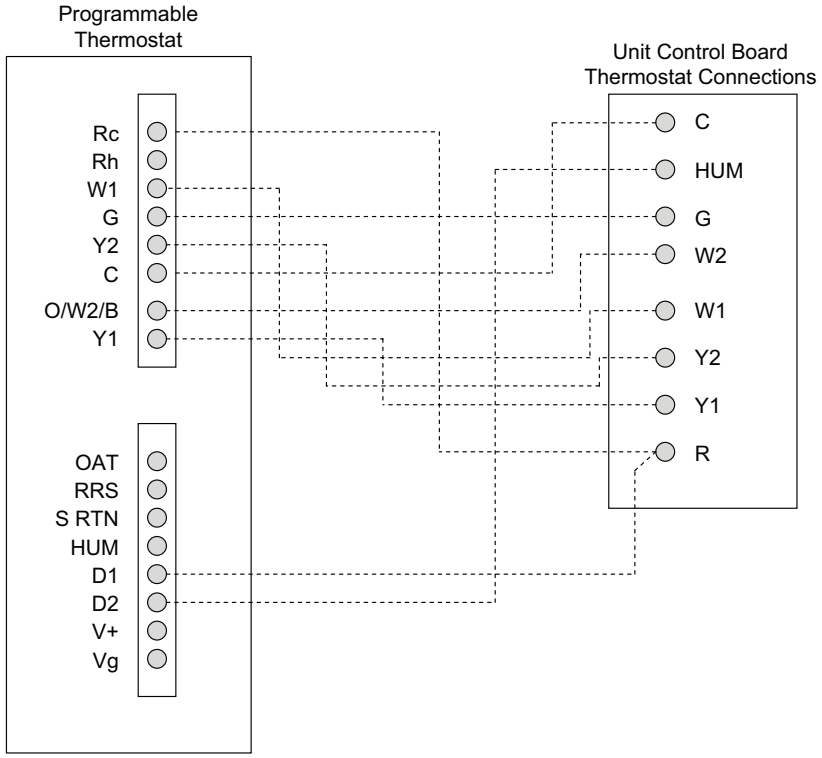
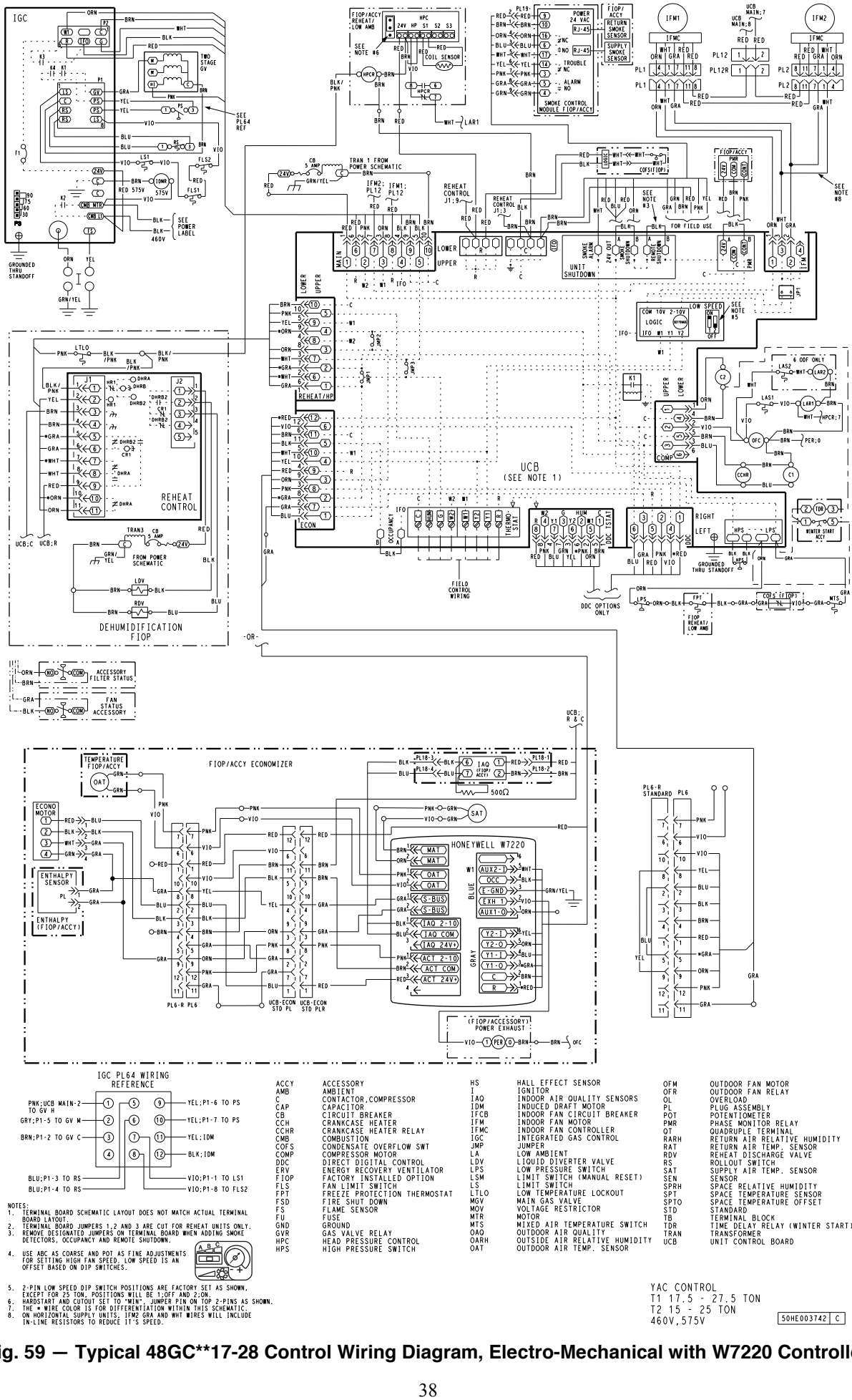


Fig. 58 — 48GC17-28 Unit with Humidi-MiZer Adaptive Dehumidification System with Edge® Pro Thermidistat Device**



ACCY	ACCESSORY
AMB	AMBIENT
C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
CMB	COMBUSTION
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
DDC	DIRECT DIGITAL CONTROL
ERV	ENERGY RECOVERY VENTILATOR
FIOP	FACTORY INSTALLED OPTION
FLS	FAN LIMIT SWITCH
FPT	FREEZE PROTECTION THERMOSTAT
FSD	FIRE SHUT DOWN
FS	FLAME SENSOR
FU	FUSE
GND	GROUND
GVR	GAS VALVE RELAY
HPC	HEAD PRESSURE CONTROL
HPS	HIGH PRESSURE SWITCH
HS	HALL EFFECT SENSOR
I	IGNITOR
IAQ	INDOOR AIR QUALITY SENSORS
IDM	INDUCED DRAFT MOTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFMC	INDOOR FAN CONTROLLER
IGC	INTEGRATED GAS CONTROL
JMP	JUMPER
LA	LOW AMBIENT
LDV	LIQUID DIVERTER VALVE
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
LS	LIMIT SWITCH
LTLO	LOW TEMPERATURE LOCKOUT
MGV	MAIN GAS VALVE
MOV	VOLTAGE RESTRICTOR
MTR	MOTOR
MTS	MIXED AIR TEMPERATURE SWITCH
OAQ	OUTDOOR AIR QUALITY
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTDOOR AIR TEMP. SENSOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
RARH	RETURN AIR RELATIVE HUMIDITY
RAT	RETURN AIR TEMP. SENSOR
RDV	REHEAT DISCHARGE VALVE
RS	ROLLOUT SWITCH
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SPRH	SPACE RELATIVE HUMIDITY
SPT	SPACE TEMPERATURE SENSOR
SPTO	SPACE TEMPERATURE OFFSET
STD	STANDARD
TB	TERMINAL BLOCK
TDR	TIME DELAY RELAY (WINTER START)
TRAN	TRANSFORMER
UCB	UNIT CONTROL BOARD

NOTES:
1. TERMINAL BOARD SCHEMATIC LAYOUT DOES NOT MATCH ACTUAL TERMINAL BOARD LAYOUT.
2. TERMINAL BOARD JUMPERS 1,2 AND 3 ARE CUT FOR REHEAT UNITS ONLY.
3. REMOVE DESIGNATED JUMPERS ON TERMINAL BOARD WHEN ADDING SMOKE DETECTORS, OCCUPANCY AND REMOTE SHUTDOWN.
4. USE ABC AS COARSE AND POT AS FINE ADJUSTMENTS FOR SETTING HIGH FAN SPEED. LOW SPEED IS AN OFFSET BASED ON DIP SWITCHES.
5. 2-PIN LOW SPEED DIP SWITCH POSITIONS ARE FACTORY SET AS SHOWN, EXCEPT FOR 25 TON. POSITIONS WILL BE 1:OFF AND 2:ON.
6. HARDSTART AND CUTOUT SET TO "MIN". JUMPER PIN ON TOP 2-PINS AS SHOWN.
7. THE * WIRE COLOR IS FOR DIFFERENTIATION WITHIN THIS SCHEMATIC.
8. ON HORIZONTAL SUPPLY UNITS, IFM2 GRA AND WHT WIRES WILL INCLUDE IN-LINE RESISTORS TO REDUCE IT'S SPEED.

Fig. 59 — Typical 48GC17-28 Control Wiring Diagram, Electro-Mechanical with W7220 Controller**

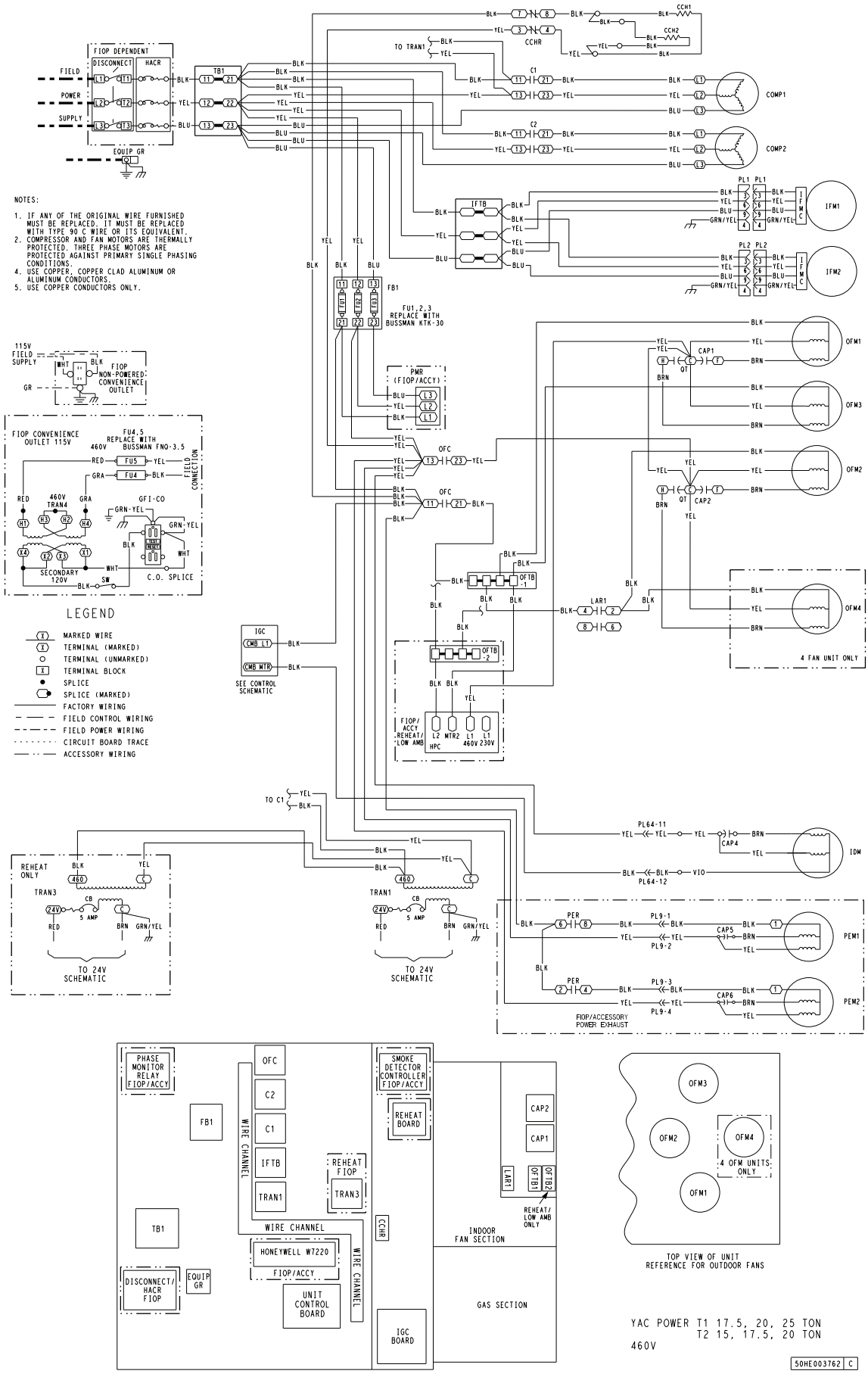


Fig. 60 — Typical 48GC17-24 Power Wiring Diagram, Electro-Mechanical Controller**

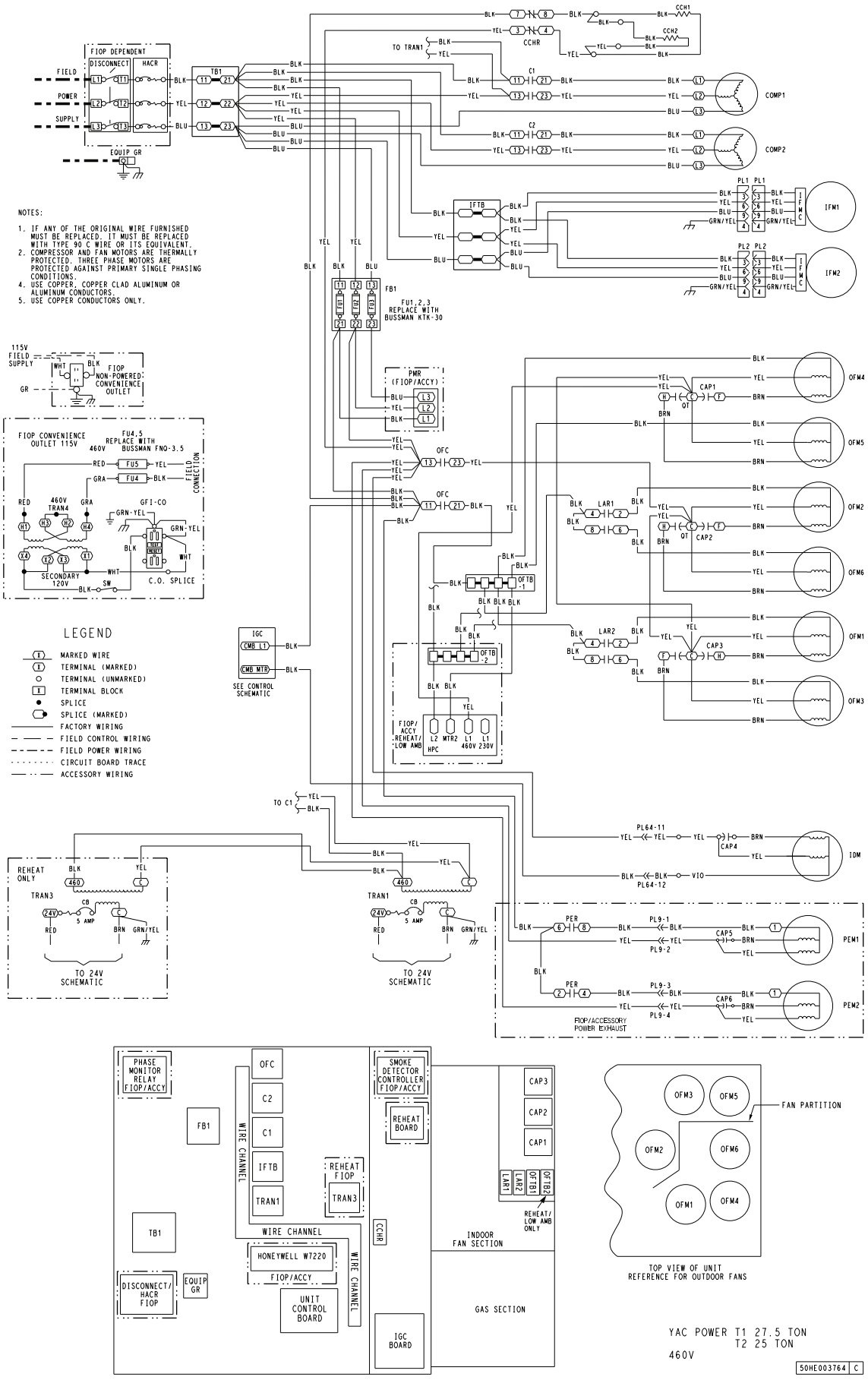


Fig. 61 — Typical 48GC28 Power Wiring Diagram, Electro-Mechanical Controller**

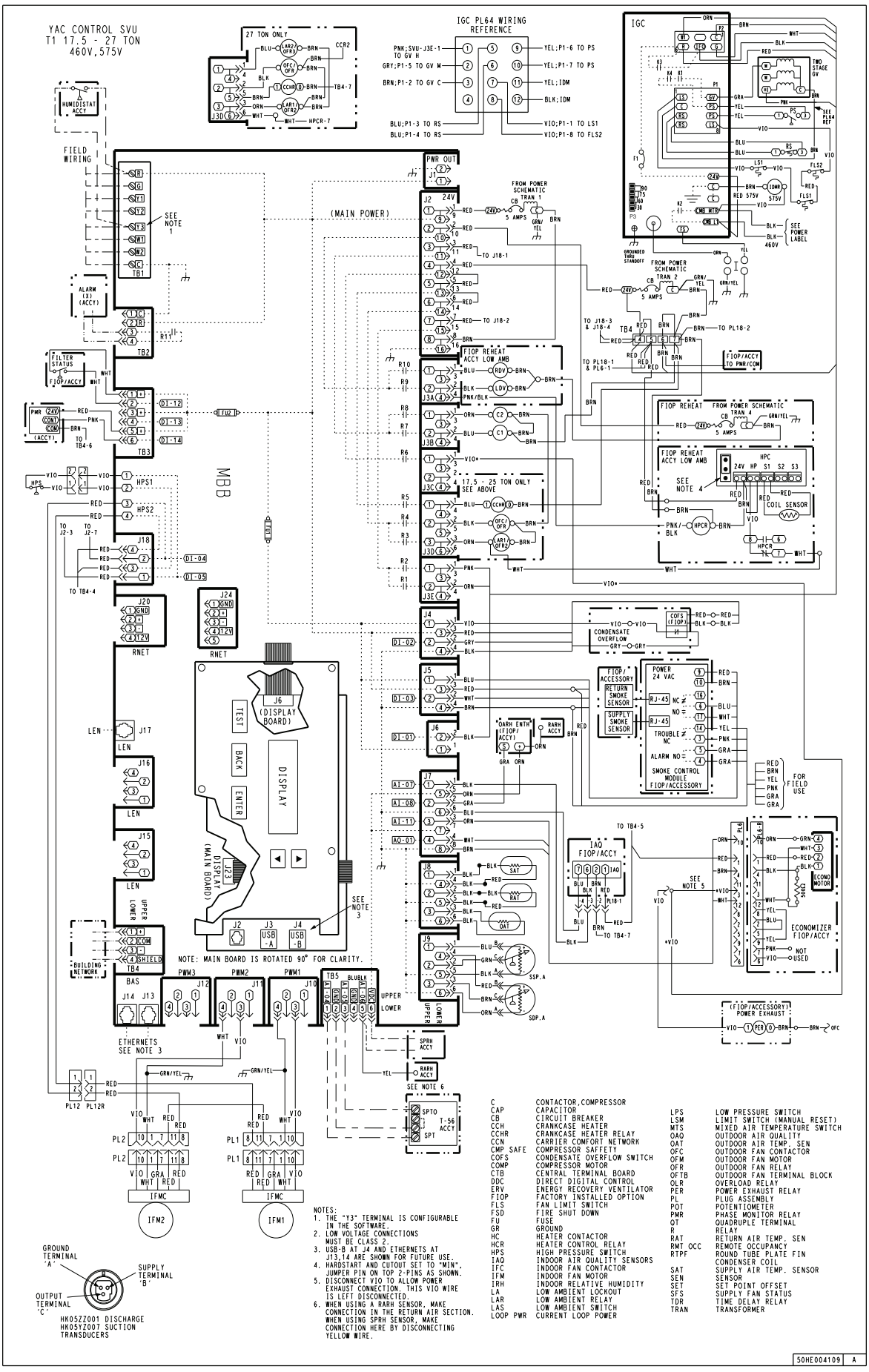


Fig. 62 — Typical 48GC17-28 Control Wiring Diagram, SystemVu™ Controller**

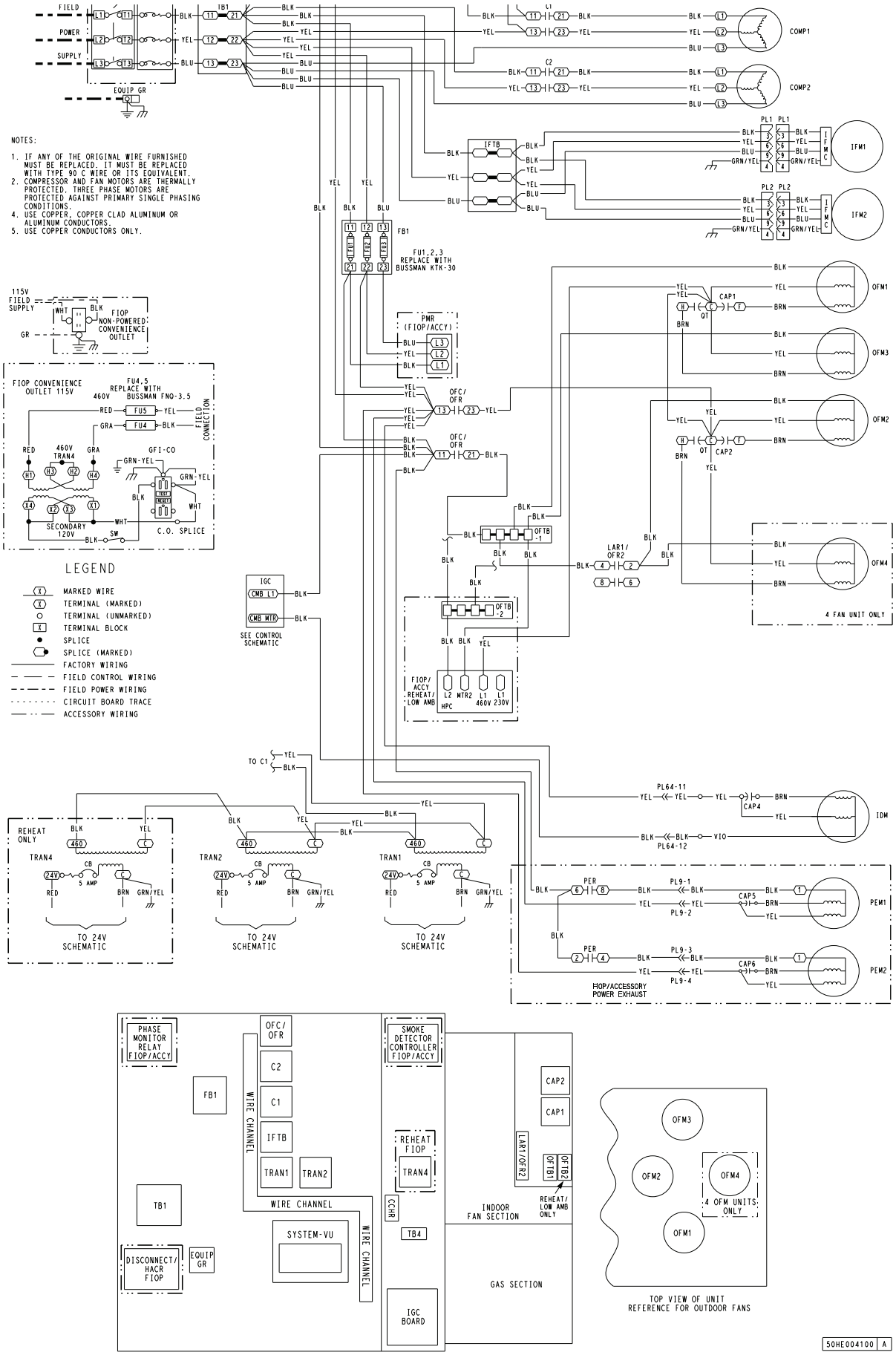


Fig. 63 — Typical 48GC17-24 Power Wiring Diagram, SystemVu™ Controller**

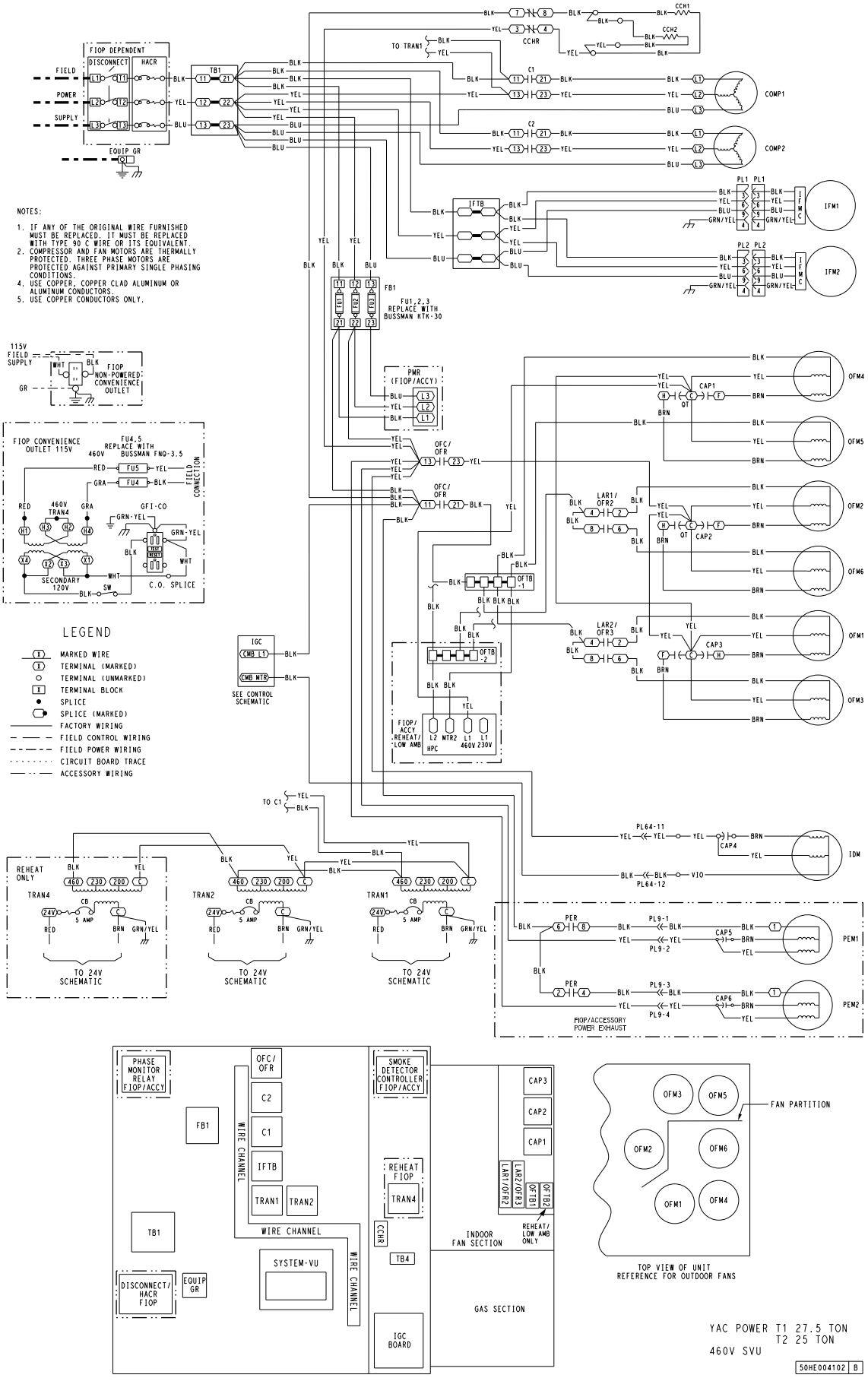


Fig. 64 — 48GC28 Power Wiring Diagram, SystemVu™ Controller**

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. Assuming the unit is controlled through a room thermostat set for "fan auto," 45 seconds after ignition occurs, the indoor fan motor will energize, 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. 65 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 8 for details on the IGC board LED alarm codes.

See Fig. 66 for IGC board component layout. Fig. 67 is a typical IGC control wiring diagram.

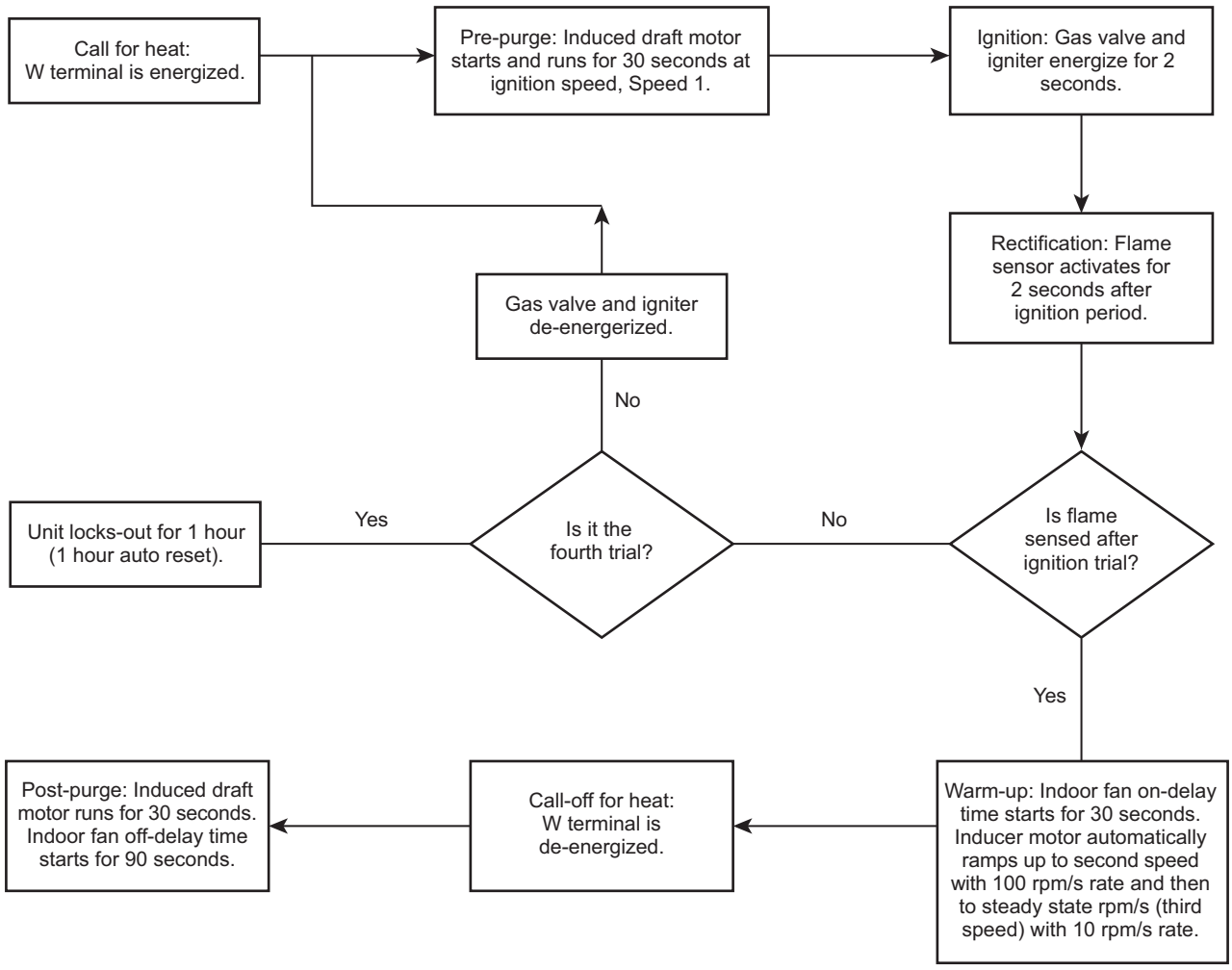


Fig. 65 — IGC Operating Sequence

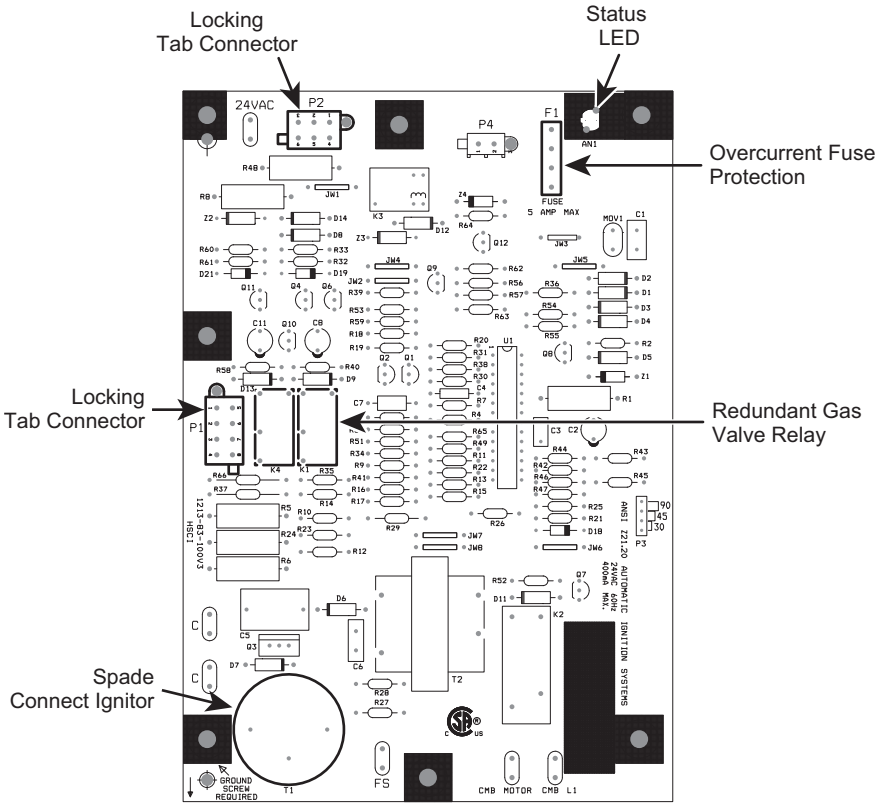


Fig. 66 — IGC Board Component Layout

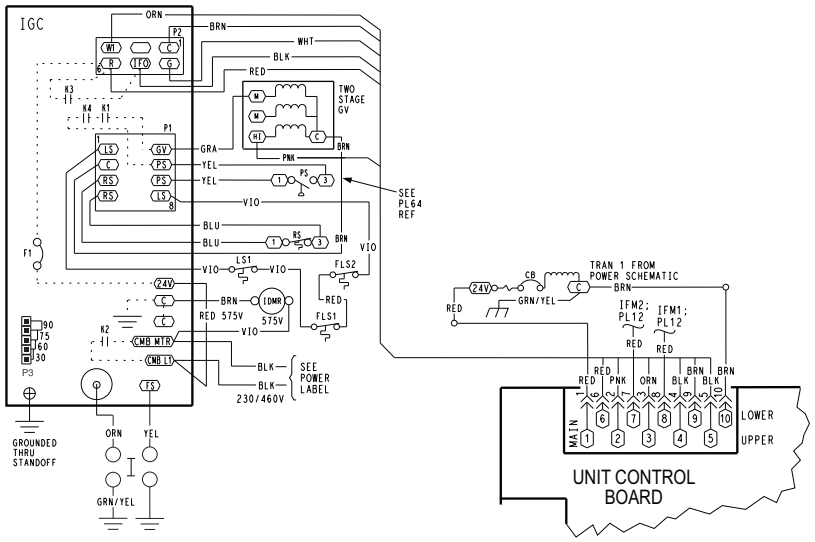


Fig. 67 — Typical IGC Control Wiring Diagram

Table 8 — IGC Board LED Alarm Codes[a, b, c, d]

LED FLASH CODE	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
On	Normal Operation	—	—	—
Off	Hardware Failure	No gas heating.	—	Loss of power to the IGC. Check 5 amp fuse on IGC, power to unit, 24-v circuit breaker, transformer, and wiring to the IGC.
1 Flash	Indoor Fan On Delay Modified	5 seconds subtracted from On delay.	Power reset.	High temperature limit switch opens during heat exchanger warm-up period before fan-on delay expires.
2 Flashes	Limit Switch Fault	Gas valve and igniter Off. Indoor fan and inducer On.	Limit switch closed, or heat call (W) Off.	High temperature limit switch is open. Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is within the range on the unit nameplate. Check wiring and limit switch operation.
3 Flashes	Flame Sense Fault	Indoor fan and inducer On.	Flame sense normal. Power reset for LED reset.	The IGC sensed a flame when the gas valve should be closed. Check wiring, flame sensor, and gas valve operation.
4 Flashes	Four Consecutive Limit Switch Fault	No gas heating.	Heat call (W) Off. Power reset for LED reset.	4 consecutive limit switch faults within a single call for heat. See Limit Switch Fault.
5 Flashes	Ignition Fault	No gas heating.	Heat call (W) Off. Power reset for LED reset.	Unit unsuccessfully attempted ignition for 15 minutes. Check igniter and flame sensor electrode spacing, gaps, etc. Check flame sense and igniter wiring. Check gas valve operation and gas supply.
6 Flashes	Induced Draft Motor 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 speed sensor wiring to IGC.
7 Flashes	Rollout Switch Lockout	Gas valve and igniter Off. Indoor fan and inducer On.	Power reset.	Rollout switch has opened. Check gas valve operation. Check induced-draft blower wheel is properly secured to motor shaft.
8 Flashes	Internal Control Lockout	No gas heating.	Power reset.	IGC has sensed internal hardware or software error. If fault is not cleared by resetting 24-v power, replace the IGC.
9 Flashes	Temporary Software Lockout	No gas heating.	1 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, 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 inducer pressure switch is stuck closed when a W1 call is made the unit will sit idle with no fault codes.

LEGEND

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

EconoMi$er® X (Factory-Installed Option)

PRODUCT DESCRIPTION

The EconoMi$er X system is an expandable economizer control system, which includes a W7220 economizer module (controller) with an LCD and keypad (see Fig. 68). The W7220 module can be configured with optional sensors.

Fig. 68 — W7220 Economizer Module

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

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

The W7220 economizer module automatically detects sensors by polling to determine which sensors are present. If a sensor loses communications after it has been detected, the W7220 economizer controller indicates a device fail error on its LCD.

SYSTEM COMPONENTS

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

Economizer Module

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

S-Bus Enthalpy Control Sensors

The sensor is a combination temperature and humidity sensor which is powered by and communicates on the S-Bus. Up to three sensors may be configured with the W7220 economizer module.

CO_2 Sensor (optional)

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

SPECIFICATIONS

W7220 Economizer Module

The module is designed for use with 2 to 10 vdc or bus communicating actuator. The module includes terminals for CO_2 sensor, Mixed Air sensor, and an Outdoor Dry Bulb sensor. Enthalpy and other options are available with bus sensors.

User Interface

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

Electrical

Rated Voltage — 20 to 30 vac RMS, 50/60 Hz

Transformer — 100 va maximum system input

Nominal Power Consumption (at 24 vac, 60 Hz) — 11.5 VA without sensors or actuators

Relay Digital Output Rating at 30 vac (maximum power from Class 2 input only) — 1.5A run:

3.5A inrush at 0.45PF (200,000 cycles) or

7.5A inrush at 0.45PF (100,000 cycles)

External Sensors Power Output — 21 vdc ± 5% at 48mA

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

INPUTS

Sensors

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

Dry Bulb Temperature (optional) and Mixed Air (required), 20k NTC

2-wire (18 to 22 AWG);

Temperature range –40°F to 150°F (–40°C to 65°C)

Temperature accuracy –0°F/+2°F

Temperature and Humidity, C7400S1000 (optional)

S-Bus; 2-wire (18 to 22 AWG)

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

Temperature accuracy –0°F/+2°F

Humidity: range 0 to 100% RH with 5% accuracy.

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

4 Binary Inputs

1-wire 24 vac + common GND (see page 49 for wiring details).

24 vac power supply

20 to 30 vac 50/60Hz; 100 VA Class 2 transformer.

OUTPUTS

Actuator Signal:

2-10 vdc; minimum actuator impedance is 2k ohm; bus two-wire output for bus communicating actuators.

Exhaust fan, Y1, Y2 and AUX1 O:

All Relay Outputs (at 30 vac):

Running: 1.5A maximum

Inrush: 7.5A maximum

ENVIRONMENTAL

Operating Temperature:

–40°F to 150°F (–40°C to 65°C)

Exception of display operation down to –4°F (–20°C) with full recovery at –4°F (–20°C) from exposure to –40°F (–40°C)

Storage Temperature:

–40°F to 150°F (–40°C to 65°C)

Shipping Temperature:

–40°F to 150°F (–40°C to 65°C)

Relative Humidity:

5% to 95% RH non-condensing

ECONOMIZER MODULE WIRING DETAILS

Use Fig. 69 and Tables 9 and 10 to locate the wiring terminals for the Economizer module.

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

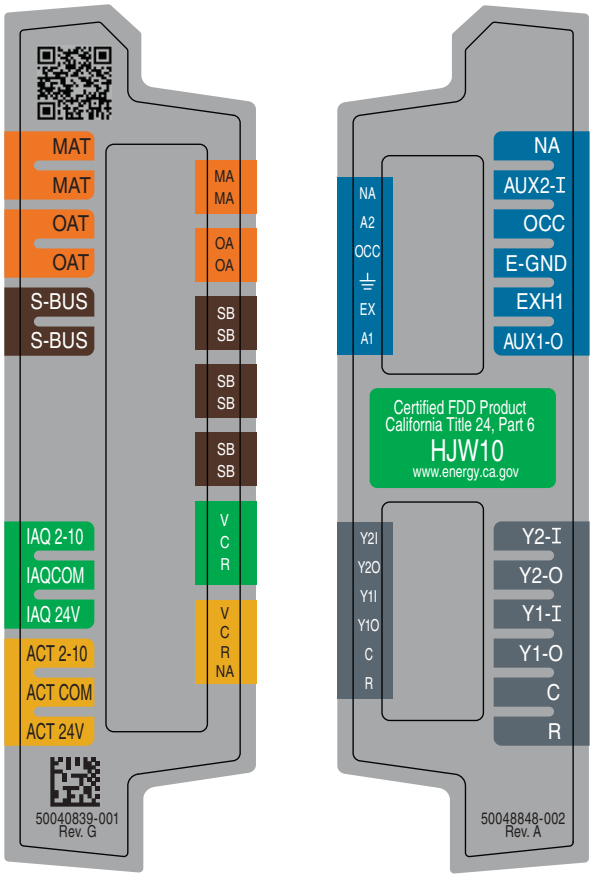


Fig. 69 — W7220 Wiring Terminals

Table 9 — Economizer Module - Left Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Left Terminal Block		
MAT **MAT**	20k NTC and COM	Mixed Air Temperature Sensor (Polarity Insensitive Connection)
OAT **OAT**	20k NTC and COM	Outdoor Air Temperature Sensor (Polarity Insensitive Connection)
S-BUS **S-BUS**	S-BUS (Sylk™[a] Bus)	Enthalpy Control Sensor (Polarity Insensitive Connection)
Bottom Left Terminal Block		
IAQ 2-10	2-10 vdc	Air Quality Sensor Input (e.g. CO_2 sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24V	24 vac	Air Quality Sensor 24 vac Source
ACT 2-10	2-10 vdc	Damper Actuator Output (2-10 vdc)
ACT COM	COM	Damper Actuator Output Common
ACT 24V	24 vac	Damper Actuator 24 vac Source

NOTE(S):

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

Table 10 — Economizer Module - Right Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Right Terminal Blocks		
AUX2 I	24 vac IN	The first terminal is not used.
OCC	24 vac IN	Shut Down (SD) or HEAT (W) Conventional only and Heat Pump Changeover (O-B) in Heat Pump mode.
E-GND	E-GND	Occupied/Unoccupied Input
EXH1	24 vac OUT	Exhaust Fan 1 Output
AUX1 O	24 vac OUT	Programmable: Exhaust fan 2 output or ERV or System alarm output
Bottom Right Terminal Blocks		
Y2-I	24 vac IN	Y2 in - Cooling Stage 2 Input from space thermostat
Y2-O	24 vac OUT	Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling
Y1-I	24 vac IN	Y1 in - Cooling Stage 2 Input from space thermostat
Y1-O	24 vac OUT	Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling
C	COM	24 vac Common
R	24 vac	24 vac Power (hot)

S-BUS SENSOR WIRING

The labels on the sensors and controller are color coded for ease of installation. Orange labeled sensors can only be wired to orange terminals on the controller. Brown labeled sensors can only be wired to S-bus (brown) terminals. Use Fig. 70 and Table 9 to locate the wiring terminals for each S-Bus sensor.

Use Fig. 70 and Table 11 to locate the wiring terminals for each enthalpy control sensor.

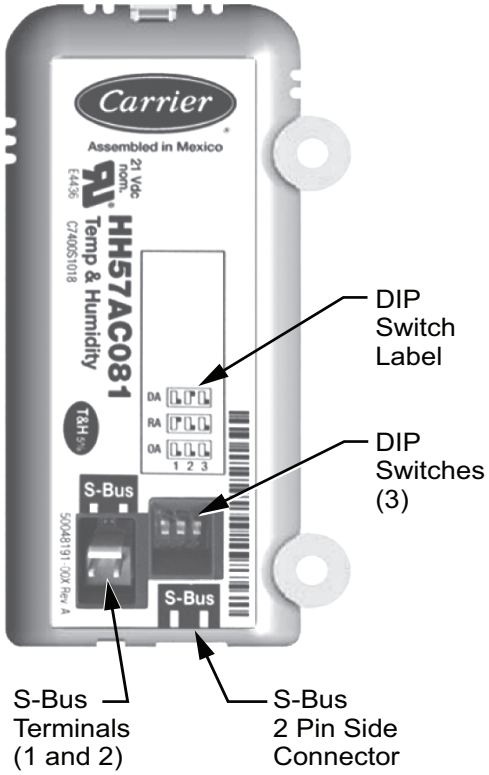


Fig. 70 — S-Bus Sensor DIP Switches

Table 11 — HH57AC081 Sensor Wiring Terminations

TERMINAL		TYPE	DESCRIPTION
NUMBER	LABEL		
1	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)
2	S-BUS	S-BUS	S-BUS Communications (Enthalpy Control Sensor Bus)

Use Fig. 70 and Table 12 to set the DIP switches for the desired use of the sensor.

Table 12 — HH57AC081 Sensor DIP Switch

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

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

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

CO_2 SENSOR WIRING

When using a CO_2 sensor, the black and brown common wires are internally connected and only one is connected to "IAQ COM" on the W7220. Use the power from the W7220 to power the CO_2 sensor OR make sure the ground for the power supplies are common. See Fig. 71 for CO_2 sensor wiring.

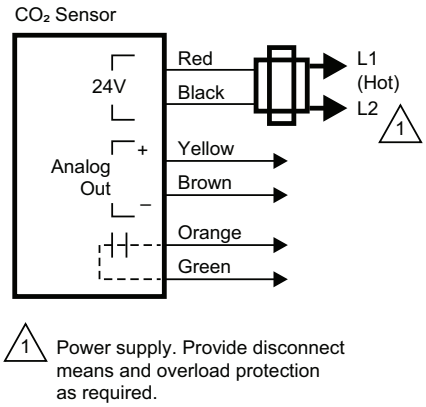


Fig. 71 — CO_2 Sensor Wiring

INTERFACE OVERVIEW

This section describes how to use the EconoMi$er X user interface for:

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

USER INTERFACE

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

KEYPAD

The four navigation buttons (see Fig. 72) are used to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.

To use the keypad when working with menus:

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

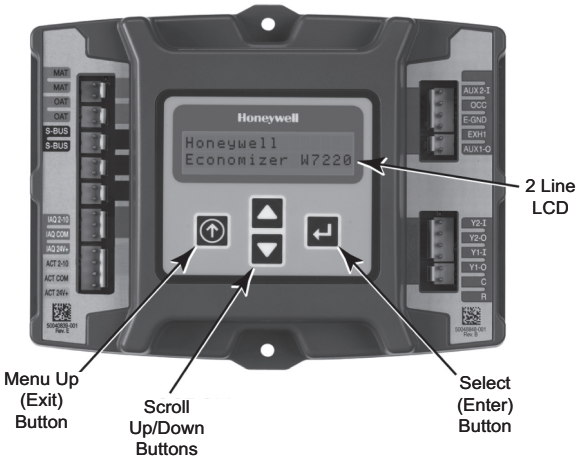


Fig. 72 — W7220 Controller Navigation Buttons

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

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

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

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

MENU STRUCTURE

Table 13 illustrates the complete hierarchy of menus and parameters for the EconoMi$er X system.

The Menus in display order are:

- STATUS
- SET POINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

IMPORTANT: Table 13 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration.

For example, if you do not have a DCV (CO_2) sensor, then none of the DCV parameters appear and only MIN POS will display. If you have a CO_2 sensor, the DCV MIN and DCV MAX will appear AND if you have 2 speed fan DCV MIN (high and low speed) and DCV MAX (high and low speed will appear).

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

SETUP AND CONFIGURATION

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

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

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

TIME-OUT AND SCREENSAVER

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

Table 13 — W7220 Menu Structure[a]

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT[b]	NOTES
STATUS	ECONO AVAIL	NO	YES/NO	FIRST STAGE COOLING DEMAND (Y1–IN) YES = economizing available; the system can use outside air for free cooling when required.
	ECONOMIZING	NO	YES/NO	FIRST STAGE COOLING RELAY OUTPUT YES = outside air being used for 1 stage cooling
	OCCUPIED[c]	NO	YES/NO	OCCUPIED YES = OCC signal received from space thermostat or unitary controller YES = 24 vac on terminal OCC NO = 0 vac on terminal OCC
	HEAT PUMP	N/A	COOL HEAT	HEAT PUMP MODE Displays COOL or HEAT when system is set to heat pump (Non-conventional).
	COOL Y1—IN	OFF	ON/OFF	FIRST STAGE COOLING DEMAND (Y1-IN) Y1–I signal from space thermostat or unitary controller for cooling stage 1. ON = 24 vac on terminal Y1–I OFF = 0 vac on terminal Y1–I
	COOL Y1—OUT	OFF	ON/OFF	FIRST STAGE COOLING RELAY OUTPUT Cool stage 1 Relay Output to stage 1 mechanical cooling (Y1–OUT terminal).
	COOL Y2—IN	OFF	ON/OFF	SECOND STAGE COOLING DEMAND (Y2–IN) Y2–I signal from space thermostat our unitary controller for second stage cooling. ON = 24 vac on terminal Y2–I OFF = 0 vac on terminal Y2–I
	COOL Y2—OUT	OFF	ON/OFF	SECOND STAGE COOLING RELAY OUTPUT Cool Stage 2 Relay Output to mechanical cooling (Y2–OUT terminal).
	MA TEMP[d]	_ _ . _ F	0°F to 140°F (–17°C to 60°C)	SUPPLY AIR TEMPERATURE, Cooling Mode displays value of measured mixed air from MAT sensor. Displays _ _ . _ F if not connected, short or out-of-range.
	DA TEMP	_ _ . _ F	0°F to 140°F (–17°C to 60°C)	DISCHARGE AIR TEMPERATURE, after Heating section displays when Discharge Air sensor is connected and displays measured discharge temperature. Displays _ _ . _F if sensor sends invalid value, if not connected, short or out-of-range.
	OA TEMP	_ _ . _ F	–40°F to 140°F (–40°C to 60°C)	OUTSIDE AIR TEMP Displays measured value of outdoor air temperature. Displays _ _ . _F if sensor sends invalid value, short or out-of-range.
	OA HUM	_ _ %	0 to 100%	OUTSIDE AIR RELATIVE HUMIDITY Displays measured value of outdoor humidity from OA sensor. Displays _ _% if not connected short, or out-of-range.
	RA TEMP	_ _ . _ F	0°F to 140°F (–17°C to 60°C)	RETURN AIR TEMPERATURE Displays measured value of return air temperature from RAT sensor. Displays _ _ . _ F if sensor sends invalid value, if not connected, short or out-of-range.
	RA HUM	_ _ %	0 to 100%	RETURN AIR RELATIVE HUMIDITY Displays measured value of return air humidity from RA sensor. Displays _ _% if sensor sends invalid value, if not connected, short or out-of-range.
	IN CO2	_ _ _ ppm	0 to 2000 ppm	SPACE/RETURN AIR CO_2 Displays value of measured CO_2 from CO_2 sensor. Invalid if not connected, short or out-of-range.
	DCV STATUS	N/A	ON/OFF	DEMAND CONTROLLED VENTILATION STATUS Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO_2 sensor is connected.
	DAMPER OUT	2.0v	2.0 to 10.0v	Displays voltage output to the damper actuator.
	ACT POS	N/A	0 to 100%	Displays actual position of outdoor air damper actuator.
	ACT COUNT	N/A	1 to 65535	Displays number of times actuator has cycled. 1 cycle equals 180 deg. of actuator movement in any direction.
	ACTUATOR	N/A	OK/Alarm (on Alarm menu)	Displays ERROR if voltage or torque is below actuator range.
	EXH1 OUT	OFF	ON/OFF	EXHAUST STAGE 1 RELAY OUTPUT Output of EXH1 terminal: ON = relay closed OFF = relay open
	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT Output of AUX terminal; displays only if AUX = EXH2
	ERV	OFF	ON/OFF	ENERGY RECOVERY VENTILATOR Output of AUX terminal; displays only if AUX = ERV

Table 13 — W7220 Menu Structure[a] (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT[b]	NOTES
STATUS (cont)	MECH COOL ON or HEAT STAGES ON	0	0, 1, or 2	Displays stage of mechanical cooling that is active. Displays the stage of heat pump heating that is active.
	FAN SPEED	N/A	LOW or HIGH	SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT ON)	N/A	ON/OFF	HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.
SETPOINTS	MAT SET[d]	53°F	38°F to 70°F (3°C to 21°C); increment by 1°F	MIXED AIR SETPOINT Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.
	LOW T LOCK	32°F	–45°F to 80°F (–43°C to 27°C); increment by 1°F	COMPRESSOR LOW TEMPERATURE LOCKOUT Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout.
	DRYBLB SET[e]	63°F	48°F to 80°F (9°C to 27°C); increment by 1°F	OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63°F unit will economize at 62°F and below and not economize at 64°F and above. There is a 2°F deadband. DRYBULB SET is only displayed if the economizer has a single dry bulb sensor.
	DRYBLB DIFF	0°F	0°F to 6°F Increment by 2°F	Drybulb Differential will only show if using dual drybulb - i.e. when an outdoor air temperature sensor C7250 is attached to OAT terminals and C7400S sensor is wired to S-Bus and configured for RAT (return air). Free cooling will be assumed whenever OA temp is at or below RAT minus this drybulb setting.
	ENTH CURVE	ES3	ES1,ES2,ES3, ES4, or ES5	ENTHALPY CHANGEOVER CURVE (Requires enthalpy sensor option) Enthalpy boundary “curves” for economizing using single enthalpy.
	DCV SET	1100ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROLLED VENTILATION SETPOINT Displays only if CO_2 sensor is connected. Setpoint for Demand Controlled Ventilation of space. Above the setpoint, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the setpoint.
	MIN POS	4.4-v	2 to 10 vdc	VENTILATION MINIMUM POSITION Only displayed if controller is set for single speed unit under FAN TYPE, and if DCV is NOT used.
	MIN POS L	6.0-v	2 to 10 vdc	VENTILATION MINIMUM POSITION AT LOW SPEED Only displays if unit is set for 2 or 3 speed and CO_2 is not used. If using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING ventilation.
	MIN POS M	5.4-v	2 to 10 vdc	VENTILATION MINIMUM POSITION AT MEDIUM SPEED Only displays if unit is set for 3 speed with 1 heat and 2 cool, and CO_2 is not used. Set for HEATING ventilation.
	MIN POS H	4.4-v	2 to 10 vdc	VENTILATION MINIMUM POSITION AT HIGH SPEED Only displays if unit is set for 2 or 3 speed and CO_2 is not used. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.
	VENTMAX L	6.0-v	2 to 10 vdc	DCV MAXIMUM DAMPER POSITION AT LOW SPEED Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING.
	VENTMAX M	5.4-v	2 to 10 vdc	DCV MAXIMUM DAMPER POSITION AT MEDIUM SPEED Only displays if unit is set for 3 speed with 1 heat and 2 cool. Set for HEATING ventilation.
	VENTMAX H	4.4-v	2 to 10 vdc	DCV MAXIMUM DAMPER POSITION AT HIGH SPEED Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.
	VENTMIN L	3.7-v	2 to 10 vdc	DCV MINIMUM DAMPER POSITION AT LOW SPEED Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING.
	VENTMIN M	3.4-v	2 to 10 vdc	DCV MINIMUM DAMPER POSITION AT MEDIUM SPEED Only displays if unit is set for 3 speed with 1 heat and 2 cool. Set for HEATING ventilation.
	VENTMIN H	2.8-v	2 to 10 vdc	DCV MINIMUM DAMPER POSITION AT HIGH SPEED Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.

Table 13 — W7220 Menu Structure[a] (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT[b]	NOTES
SETPOINTS (cont)	ERV OAT SP[f]	32°F	0°F to 50°F (–18°C to 10°C); increment by 1°F	ENERGY RECOVERY VENTILATOR UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only displayed when AUX1 O = ERV.
	EXH1 SET	50%	0 to 100%	Exhaust fan set point for single speed units. Based on OA Damper position to activate power exhaust.
	EXH1 L SET	65%	0 to 100%	EXHAUST FAN 1 SETPOINT AT LOW SPEED on 2 speed or 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
	EXH1 M SET	60%	0 to 100%	EXHAUST POINT 1 SETPOINT AT MEDIUM SPEED. Only displays if unit is set for 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
	EXH1 H SET	50%	0 to 100%	EXHAUST FAN 1 SETPOINT AT HIGH SPEED on 2 speed or 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
	EXH2 L SET	80%	0 to 100%	EXHAUST FAN 2 SETPOINT AT LOW SPEED on 2 speed or 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
	EXH2 M SET	77%	0 to 100%	EXHAUST FAN 2 SETPOINT AT MEDIUM SPEED. Only displays if unit is set for 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
	EXH2 H SET	75%	0 to 100%	EXHAUST FAN 2 SETPOINT AT HIGH SPEED on 2 speed or 3 speed with 1 heat and 2 cool. Based on economizer OA damper position to activate power exhaust.
SYSTEM SETUP	INSTALL	01/01/17	N/A	Display order = MM/DD/YY. Setting order = DD, MM, then YY.
	UNITS DEG	°F	°F or °C	Sets economizer controller in degrees Fahrenheit or Celsius.
	EQUIPMENT	CONV	Conventional or HP	CONV = conventional; HP O/B = Enable Heat Pump mode. Use AUX2 I for Heat Pump input from thermostat or controller.[g]
	AUX2 IN	W	SD/W or HP(O)/HP(B)	In CONV mode: SD + Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. NOTE: If using 2-speed fan mode, you must program CONV mode for W. Shutdown is not available in 2-speed fan mode.[g] In HP O/B mode: HP(O) = energize heat pump on Cool (default); HP(B) = energize heat pump on Heat.
	FAN SPEED	2 speed	1 speed 2 speed 2SP H/C 3 speed	Sets the economizer controller operation based on 1 speed, 2 speed, 2 speed heat/cool (2SP H/C), or 3 speed supply fan. NOTE: Multi-speed fan options also need Heat (W1) programmed in AUX 2 In.[g]
	FAN CFM	5000 cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter only if using DCVAL ENA = AUTO The value is found on the nameplate label for the specific unit.
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 O relay • NONE = not configured (output is not used) • ERV = Energy Recovery Ventilator[f] • EXH2 = second damper position relay closure for second exhaust fan • SYS = use output as an alarm signal
	OCC	INPUT	INPUT or ALWAYS	OCCUPIED MODE BY EXTERNAL SIGNAL When using a setback thermostat with occupancy out (24 vac), the 24 vac is input “INPUT” to the OCC terminal. If no occupancy output from the thermostat then change program to “ALWAYS” OR add a jumper from terminal R to OCC terminal.
	FACTORY DEFAULT	NO	NO or YES	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to the factory default values. NOTE: RECHECK AUX2 IN and FANTYPE for required 2-speed values.
ADVANCED SETUP	MA LO SET	45°F	35°F to 55°F (2°C to 13°C); Incremented by 10°F	SUPPLY AIR TEMPERATURE LOW LIMIT Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value).
	FREEZE POS	CLO	CLO or MIN	FREEZE PROTECTION DAMPER POSITION Damper position when freeze protection is active (closed or MIN POS).
	CO2 ZERO	0 ppm	0 to 500 ppm; Increment by 10	CO_2 ppm level to match CO_2 sensor start level.
	CO2 SPAN	2000 ppm	1000 to 3000 ppm; Increment by 10	CO_2 ppm span to match CO_2 sensor.

Table 13 — W7220 Menu Structure[a] (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT[b]	NOTES
ADVANCED SETUP (cont)	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 hrs or OFF	COOLING STAGE 3 DELAY Delay after stage 2 cool has been active. Turns on second stage of cooling when economizer is first stage and mechanical cooling is second stage. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling.
	SD DMPR POS	CLO	CLO or OPN	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., fans, etc. will shut off.
	DA LO ALM	45°F (7°C)	35°F to 65°F (2°C to 18°C); Incremented by 5°F.	Used for alarm for when the DA air temperature is too low. Set lower range of alarm, below this temperature the alarm will show on the display.
	DA HI ALM	80°F (27°C)	70°F to 180°F (21°C to 82°C); Incremented by 5°F	Used for alarm for when the DA air temperature is too high. Set upper range of alarm, above this temperature the alarm will show on the display.
	DCVCAL ENA	MAN	MAN (manual) AUTO	Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA, and MA sensor conditions. Requires all 3 RA, OA, and MA sensors.
	MAT T CAL	0.0°F	±2.5°F	SUPPLY AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OAS T CAL	0.0°F	±2.5°F	OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	OA H CAL	0% RH	±10% RH	OUTSIDE AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	RA T CAL	0.0°F	±2.5°F	RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	RA H CAL	0% RH	±10% RH	RETURN AIR HUMIDITY CALIBRATION Allows for operator to adjust for an out of calibration humidity sensor.
	DA T CAL	0.0°F	±2.5°F	DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration temperature sensor.
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON SECOND STAGE ECONOMIZING When in economizing mode this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.
CHECKOUT	DAMPER MINIMUM POSITION	N/A	N/A	The checkout for the damper minimum position is based on the system.
	DAMPER OPEN	N/A	N/A	Position damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure you pause in the mode to allow exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE	N/A	N/A	Positions damper to the fully closed position.
	CONNECT Y1–O	N/A	N/A	Closes the Y1-O relay (Y1-O).
	CONNECT Y2–O	N/A	N/A	Closes the Y2-O relay (Y2-O).
	CONNECT AUX1-O	N/A	N/A	Energizes the AUX output. If Aux setting is: • NONE — not action taken • ERV — 24 vac out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation.[f] • SYS — 24 vac out. Issues a system alarm.
	CONNECT EXH1	N/A	N/A	Closes the power exhaust fan 2 relay (EXH1).
ALARMS	Alarms display only when they are active. The menu title “ALARMS(#)” includes the number of active alarms in parenthesis ( ). When using SYLK bus sensors, “SYLK” will appear on the screen, and when using 20k OA temperature sensors, “SENS T” will appear on the screen.			
	MA T SENS ERR	N/A	N/A	SUPPLY AIR TEMPERATURE SENSOR ERROR Mixed air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	CO2 SENS ERR	N/A	N/A	CO_2 SENSOR ERROR CO_2 sensor has failed, gone out of range or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK T ERR	N/A	N/A	OUTSIDE AIR S-BUS SENSOR ERROR Outdoor air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SYLK H ERR	N/A	N/A	
	RA SYLK T ERR	N/A	N/A	RETURN AIR S-BUS SENSOR ERROR Return air enthalpy sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	RA SYLK H ERR	N/A	N/A	

Table 13 — W7220 Menu Structure[a] (cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT[b]	NOTES
ALARMS (cont)	DA SYLK T ERR	N/A	N/A	DISCHARGE AIR S-BUS SENSOR ERROR Discharge air sensor has failed or become disconnected - check wiring then replace sensor if the alarm continues.
	OA SENS T ERR	N/A	N/A	OUTSIDE AIR TEMPERATURE SENSOR ERROR Outdoor air temperature sensor has failed or become disconnected - check wiring then replace if the alarm continues.
	ACT ERROR	N/A	N/A	ACTUATOR ERROR Actuator has failed or become disconnected - check for stall, over voltage, under voltage, and actuator count. Replace actuator if damper is movable and supply voltage is between 21.6-v and 26.4-v. Check actuator count on STATUS menu.
	FREEZE ALARM	N/A	N/A	Check if outdoor temperature is below the LOW Temp Lockout on setpoint menu. Check if Mixed air temperature on STATUS menu is below the Lo Setpoint on Advanced menu. When conditions are back in normal range then the alarm will go away.
	SHUTDOWN ACTIVE	N/A	N/A	AUX2 IN is programmed for SHUTDOWN and 24-v has been applied to AUX2 IN terminal.
	DMP CAL RUNNING	N/A	N/A	DAMPER CALIBRATION ROUTINE RUNNING If DCV Auto enable has been programmed, when the W7220 is completing a calibration on the dampers, this alarm will display. Wait until the calibration is completed and the alarm will go away. Must have OA, MA, and RA sensors for DCV calibration; set up in the Advanced setup menu.
	DA SENS ALM	N/A	N/A	DISCHARGE AIR TEMPERATURE SENSOR ALARM Discharge air temperature is out of the range set in the ADVANCED SETUP Menu. Check the temperature of the discharge air.
	SYS ALARM	N/A	N/A	When AUX1-O is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1-O terminal has 24 vac out.
	ACT UNDER V	N/A	N/A	ACTUATOR VOLTAGE LOW Voltage received by actuator is above expected range.
	ACT OVER V	N/A	N/A	ACTUATOR VOLTAGE HIGH Voltage received by actuator is below expected range.
	ACT STALLED	N/A	N/A	ACTUATOR STALLED Actuator stopped before achieving commanded position.

NOTE(S):

a. Table 13 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration. For example if you do not have a DCV (CO_2) sensor, then none of the DCV parameters appear.
b. When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.
c. STATUS —> OCCUPIED — The factory-standard Occupancy signal originates with a thermostat or other controller call for indoor fan operation at UCB terminal G. This signal passes through the Unit Control Board's OCCUPIED jumper JMP1 to the ECONO connector and to the W7220's OCC input terminal. An external timeclock or relay is required to implement an Occupancy schedule on the economizer damper position.
d. STATUS —> MA TEMP, SETPOINTS —> MAT SET — The W7220 menu parameters and labels include designations MA, MAT, and Mixed Air for the economizer cooling control sensor. On these rooftop units, the economizer control sensor is located downstream of the evaporator/indoor coil in the supply fan section where this sensor is designated as Supply Air Temperature (SAT) sensor.
e. SETPOINTS —> DRYBLB SET — This point is not displayed if a Return Air (differential) temperature sensor or an Outdoor Air enthalpy sensor is connected.
f. ERV Operation: When in cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode, the ERV terminal will be energized when the OA is below the ERV OAT set point in the set point menu.
g. SYSTEM SETUP parameters must be configured as noted for Multi-Speed unit operation:
EQUIPMENT = CONV
AUX2 IN = W
FAN SPEED = 2SPEED

LEGEND

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

STANDARD OR SINGLE SPEED FAN OPERATION

FAN TYPE = 1 SPEED is not used on 48GC**17-28 units.

2 SPEED FAN OPERATION

The W7220 controller has the capability to work with a system using a 2-speed supply fan. The W7220 does not control the supply directly but uses the following input status to determine the speed of the supply fan and controls the OA damper to the required position, see Table 14.

Table 14 — Fan Speed

STATE	FAN SPEED
OCC	Low
Y1	Low
Y2	High
W	High

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

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

After the delay, one of two actions will happen:

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

OR

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

Refer to Table 15 for economizer operation.

Table 15 — Economizer Operation - FAN TYPE = 2SPEED

INPUTS					OUTPUTS				
DEMAND CONTROLLED VENTILATION (DCV)	OUTSIDE AIR GOOD TO ECONOMIZE	W (HEAT ON)	COOL Y1-IN	COOL Y2-IN	COOL Y1-OUT	COOL Y2-OUT	FAN SPEED (reference only)	DAMPER POSITION	
								OCCUPIED	UNOCCUPIED
NONE	NO	ON	N/A	N/A	OFF	OFF	HIGH	MIN POS H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	MIN POS L	Closed
		OFF	ON	OFF	ON	OFF	LOW	MIN POS L	Closed
		OFF	ON	ON	ON	ON	HIGH	MIN POS H	Closed
	YES	ON	N/A	N/A	OFF	OFF	HIGH	MIN POS H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	MIN POS L	Closed
		OFF	ON	OFF	OFF	OFF	LOW	MIN POS L to Full Open	Closed to Full Open
		OFF	ON	ON	ON	OFF[a]	HIGH	MIN POS H to Full Open	Closed to Full Open
Below CO_2 Set	NO	ON	N/A	N/A	OFF	OFF	HIGH	VENTMIN H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	VENTMIN L	Closed
		OFF	ON	OFF	ON	OFF	LOW	VENTMIN L	Closed
		OFF	ON	ON	ON	ON	HIGH	VENTMIN H	Closed
	YES	ON	N/A	N/A	OFF	OFF	HIGH	VENTMIN H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	VENTMIN L	Closed
		OFF	ON	OFF	OFF	OFF	LOW	VENTMIN L to Full Open	Closed to Full Open
		OFF	ON	ON	ON	OFF[a]	HIGH	VENTMIN H to Full Open	Closed to Full Open
Above CO_2 Set	NO	ON	N/A	N/A	OFF	OFF	HIGH	VENTMIN H to VENTMAX H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	VENTMIN L to VENTMAX L	Closed
		OFF	ON	OFF	ON	OFF	LOW	VENTMIN L to VENTMAX L	Closed
		OFF	ON	ON	ON	ON	HIGH	VENTMAX H to VENTMAX H	Closed
	YES	ON	N/A	N/A	OFF	OFF	HIGH	VENTMIN H to VENTMAX H	Closed
		OFF	OFF	OFF	OFF	OFF	LOW	VENTMIN L to VENTMAX L	Closed
		OFF	ON	OFF	OFF	OFF[a]	LOW	VENTMIN L to Full Open	Closed to Full Open
		OFF	ON	ON	ON	OFF[a]	HIGH	VENTMIN H to Full Open	Closed to Full Open

NOTE(S):

a. With stage 3 delay (STG3 DLY) in Advanced setup, COOL Y2-OUT will be turned ON after the delay time specified.

LEGEND

N/A — Not Applicable

2SP H/C (2 SPEED HEAT/COOL) SPEED FAN OPERATION

FAN TYPE = 2SP H/C is not used on 48GC**17-28 units

3 SPEED FAN OPERATION

FAN TYPE = 3SPEED is not used on 48GC**17-28 units

ENTHALPY SETTINGS

When the OA temperature, enthalpy and dew point are below the respective set points, the Outdoor Air can be used for economizing. Figure 73 shows the new single enthalpy boundaries in the W7220. There are 5 boundaries (set points ES1 through ES5), which are defined by dry bulb temperature, enthalpy and dew point.

Refer to Table 16 for ENTH CURVE set point values.

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

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

Figure 73 shows the 5 current boundaries. There is also a high limit boundary for differential enthalpy. The high limit boundary is ES1 when there are no stages of mechanical cooling energized and HL (high limit) when a compressor stage is energized.

Table 16 provides the values for each boundary limit.

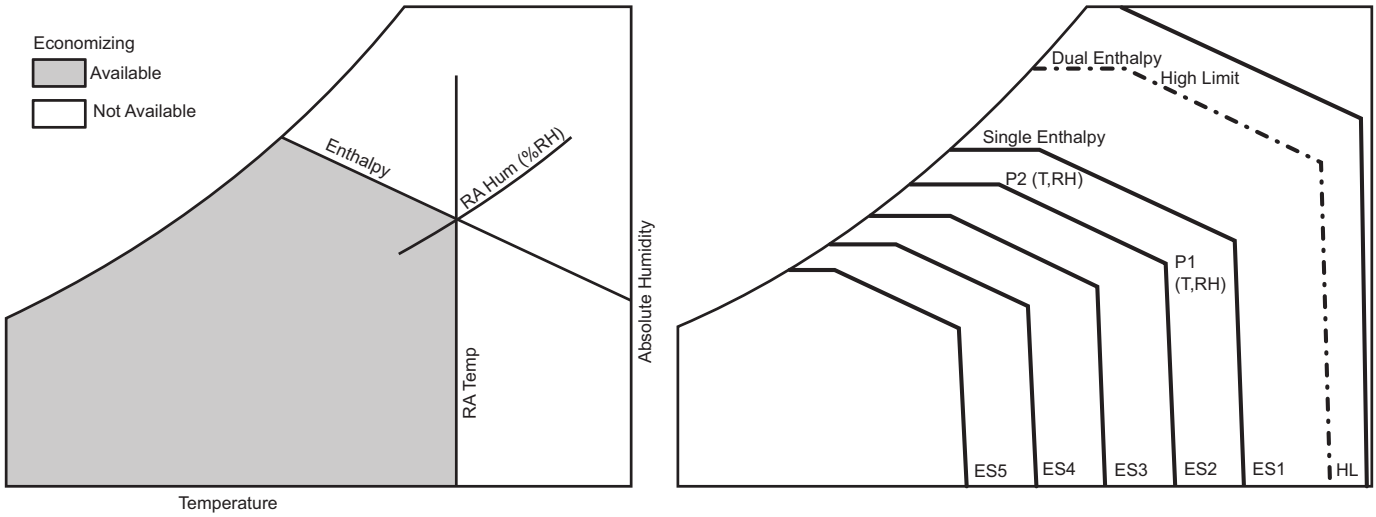


Fig. 73 — Single Enthalpy Curve Boundaries

Table 16 — Single Enthalpy and Dual Enthalpy High Limit Curves

ENTHALPY CURVE	TEMP. DRY BULB (°F)	TEMP. DEWPOINT (°F)	ENTHALPY (btu/lb/da)	POINT P1		POINT P2	
				TEMP. (°F)	HUMIDITY (%RH)	TEMP. (°F)	HUMIDITY (%RH)
ES1	80	60	28.0	80	36.8	66.3	80.1
ES2	75	57	26.0	75	39.6	63.3	80.0
ES3	70	54	24.0	70	42.3	59.7	81.4
ES4	65	51	22.0	65	44.8	55.7	84.2
ES5	60	48	20.0	60	46.9	51.3	88.5
HL	86	66	32.4	86	38.9	72.4	80.3

CHECKOUT

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

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

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 49.

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

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

If any wiring changes are required, first be sure to remove power from the economizer module before starting work. Pay particular attention to verifying the power connection (24 vac).

Power Up

After the W7220 module is mounted and wired, apply power.

Initial Menu Display

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

Power Loss (Outage or Brownout)

All set points and advanced settings are restored after any power loss or interruption.

NOTE: All settings are stored in non-volatile flash memory.

Status

Use the Status menu (see Table 13) to check the parameter values for the various devices and sensors configured.

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 49.

Checkout Tests

Use the Checkout menu (on page 54) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

NOTE: For information about menu navigation and use of the keypad, see Interface Overview on page 49.

To perform a Checkout test:

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

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

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

TROUBLESHOOTING

Alarms

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

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

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

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

Clearing Alarms

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

To clear an alarm, perform the following:

1. Navigate to the desired alarm.
2. Press the ↵ (Enter) button. ERASE? displays.
3. Press the ↵ (Enter) button. ALARM ERASED displays.
4. Press the ⓘ (Menu up/Exit) button to complete the action and return to the previous menu.

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

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

SystemVu™ Controller (Factory Option)

For details on operating 48GC**17-28 units equipped with the factory-installed SystemVu controller option, refer to the *FC/GC Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting* manual.

Smoke Detectors

Smoke detectors are available as factory-installed options on 48GC 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 unit terminal board 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.

EconoMi$er X Occupancy Switch

If external occupancy control is desired, connect a time clock or remotely controlled switch (closed for Occupied, open for Unoccupied sequence) at terminals marked OCCUPANCY. Detach the jumper covering the "Occupancy" terminals on the UCB and then attach the required connections.

Step 14 — Install Accessories

Available accessories include:

- Roof curb
- Thru-base connection kit (must be installed before unit is set on curb)
- LP conversion kit
- Flue discharge deflector
- Manual outside air damper
- Two-position motorized outside air damper
- EconoMi$er2 (without control/for external signal)
- Power exhaust
- Outdoor enthalpy sensor
- Differential enthalpy sensor
- CO_2 sensor
- Louvered hail guard
- Low ambient kit
- Phase monitor control

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

Step 15 — Fan Speed Set Up

These units contain two vane axial fan assemblies. Both fans operate from the same 0-10 vdc signal. Units in the downshot supply (vertical) duct configuration will operate both fans at the same speed setting. In units with a horizontal duct configuration the fans will operate at two different speeds. The fan closest to the control box will operate the user defined speed setting. The fan closest to the supply duct opening will operate at a lower speed that is a predetermined and non-configurable offset from the user speed setting.

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. 59) 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.

UNITS WITH ELECTRO-MECHANICAL CONTROLS

The fan speed set up controls are located on the lower section of the Unit Control Board (UCB). See Fig. 74.

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 vdc from the CFM and ESP for the base unit. Then add vdc for any accessories installed per the "Field Accessories" section of the label.

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

3. Connect a multimeter to the Vdc terminals on the UCB.
4. Set the Range Switch to either A, B, or C per the Switch Range table.
5. Using a straight blade screwdriver, turn the vdc control dial to fine tune the vdc reading.
6. Record the reading in the Field Setting field.

NOTE: Fan set-up vdc is not affected by the operating stage of the unit.

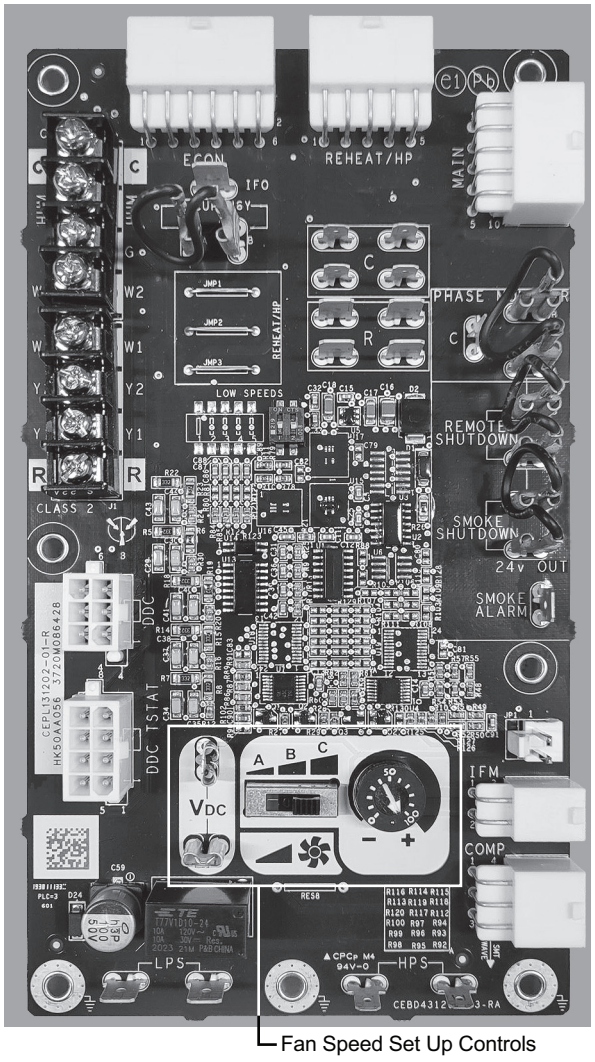
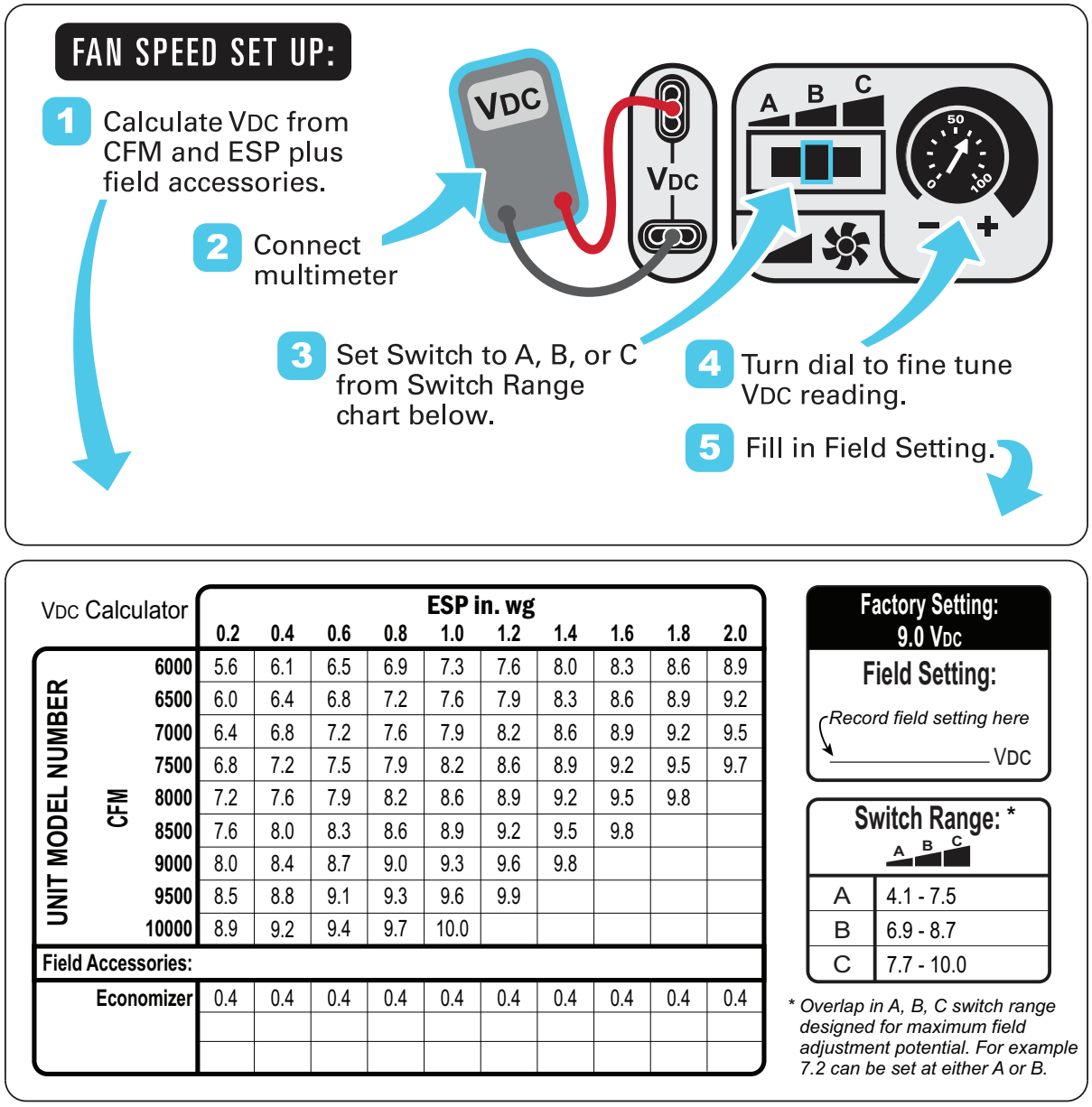


Fig. 74 — UCB Fan Speed Controls



VDC Calculator

UNIT MODEL NUMBER CFM	ESP in. wg 0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
6000	5.6	6.1	6.5	6.9	7.3	7.6	8.0	8.3	8.6	8.9
6500	6.0	6.4	6.8	7.2	7.6	7.9	8.3	8.6	8.9	9.2
7000	6.4	6.8	7.2	7.6	7.9	8.2	8.6	8.9	9.2	9.5
7500	6.8	7.2	7.5	7.9	8.2	8.6	8.9	9.2	9.5	9.7
8000	7.2	7.6	7.9	8.2	8.6	8.9	9.2	9.5	9.8	
8500	7.6	8.0	8.3	8.6	8.9	9.2	9.5	9.8		
9000	8.0	8.4	8.7	9.0	9.3	9.6	9.8			
9500	8.5	8.8	9.1	9.3	9.6	9.9				
10000	8.9	9.2	9.4	9.7	10.0					
Field Accessories:										
Economizer	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

Factory Setting: 9.0 VDC

Field Setting:

Record field setting here

_____ VDC

Switch Range: *

A	4.1 - 7.5
B	6.9 - 8.7
C	7.7 - 10.0

** Overlap in A, B, C switch range designed for maximum field adjustment potential. For example 7.2 can be set at either A or B.*

Fig. 75 — Example of Fan Speed Set Up Labels for Electro-Mechanical Controls

UNITS WITH SYSTEMVU™ CONTROLS

On units equipped with the factory-installed SystemVu controller, the Fan Speed settings are accessed through the SystemVu interface.

1. Check the job specifications for the CFM (cubic feet per minute) and ESP (external static pressure) required.
2. Using the chart on the Fan Speed Set Up labels (see Fig. 76), calculate the RPM from the CFM and ESP for the base unit plus any field accessories (as listed on the label).

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

3. Press any key on the SystemVu interface to activate the display backlight and then press the MENU key.
4. Using the UP and DOWN arrow keys highlight SETTINGS and then press ENTER.
5. Use the DOWN arrow key highlight the UNIT CONFIGURATIONS menu then press ENTER.
6. Highlight UNIT CONFIGURATIONS then press ENTER.
7. Highlight INDOOR FAN and then press ENTER.
8. Refer to the job specifications to set the following, determining the values per the RPM Calculator label (see Fig. 76). 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 *FC/GC Series Single Package Rooftop Units with SystemVu Controller Controls, Start-up, Operation and Troubleshooting* manual.

SystemVu™

FAN SPEED SETUP (RPM)

MAIN MENU:

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

UNIT MODEL NUMBER / CFM	ESP in. wg 0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
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					
Field Accessories:										
Economizer	89	89	89	89	89	89	89	89	89	89

Fig. 76 — Example of Fan Speed Set Up Labels for SystemVu™ Controls

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

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START-UP CHECKLIST
48GC PACKAGED ROOFTOP UNITS WITH GAS HEATAND ELECTRIC COOLING

(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 verify that all electrical	(Y/N) _____
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) _____
Check fan wheels and propeller for location in housing/orifice and verify setscrew is tight	(Y/N) _____
Verify that fan sheaves are aligned and belts are properly tensioned	(Y/N) _____
Verify that scroll compressors are rotating in the correct direction	(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)	_____ °F WB (Wet Bulb)
Return-air Temperature	_____ °F DB	_____ °F WB (Wet Bulb)
Cooling Supply Air Temperature	_____ °F	
Gas Heat Supply Air	_____ °F	

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
Refrigerant Discharge	STAGE 1	_____	PSIG
	STAGE 2	_____	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® START-UP

STEPS

1. UCB (Unit Control Board) for jumper 1, 2, 3 (Jumper 1, 2, 3 must be cut and open) (Y/N) _____
2. Open humidistat contacts (Y/N) _____
3. Start unit In cooling (Close Y1) (Y/N) _____

OBSERVE AND RECORD

- A. Suction pressure _____ PSIG
- B. Discharge pressure _____ PSIG
- C. Entering air temperature _____ ° F
- D. Liquid line temperature at outlet or reheat coil _____ ° F
- E. Confirm correct rotation for compressor (Y/N) _____
- F. Check for correct ramp-up of outdoor fan motor as condenser coil warms (Y/N) _____

4. Check unit charge per charging chart (Y/N) _____
5. Switch unit to high-latent mode (sub-cooler) by closing humidistat with Y1 closed (Y/N) _____

OBSERVE

- A. Reduction in suction pressure (5 to 7 psi expected) (Y/N) _____
- B. Discharge pressure unchanged (Y/N) _____
- C. Liquid temperature drops to 50°F to 55°F range (Y/N) _____
- D. LDV solenoid energized (valve closes) (Y/N) _____

6. Switch unit to dehumid (reheat) by opening Y1 (Y/N) _____

OBSERVE

- A. Suction pressure increases to normal cooling level (Y/N) _____
- B. Discharge pressure decreases (35 to 50 psi) (Limited by low ambient control) (Y/N) _____
- C. Liquid temperature returns to normal cooling level (Y/N) _____
- D. LDV solenoid energized (valve closes) (Y/N) _____
- E. RDV solenoid energized, valve opens (Y/N) _____

7. With unit in dehumid mode close W1 compressor and outdoor fan stop; LDV and RDV solenoids de-energized (Y/N) _____
8. Open W1 restore unit to dehumid mode (Y/N) _____
9. Open humidistat input compressor and outdoor fan stop; LDV and RDV solenoids de-energized (Y/N) _____
10. Restore set-points for thermostat and humidistat (Y/N) _____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE