Carrier

WeatherExpert®
48LC*H 07-12
Electric Cooling Packaged High Outdoor Air System with Puron® (R-410A) Refrigerant

Installation, Controls, and Start-up Instructions

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

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SAFETY CONSIDERATIONS

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

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

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

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

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

⚠ WARNING

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).

⚠ 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

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.

⚠ 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

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.

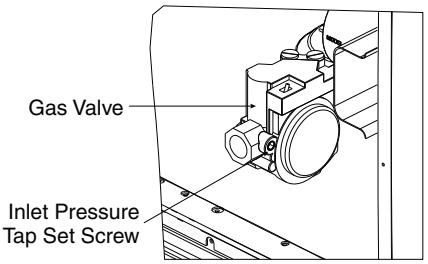
Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing air conditioning equipment.

⚠ WARNING

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.

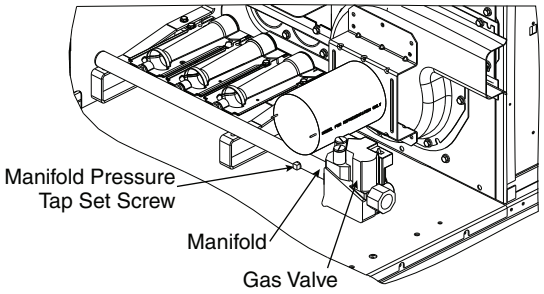


⚠ WARNING

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

Overview

APPLICATION RANGE

Table 1 lists the typical application ranges for the equipment covered in this document. This document contains guidance for the mechanical and basic electrical installation for the 48LC*H packaged high outdoor air system. See Fig. 1 for model number nomenclature. See Fig. 2-4 for unit dimensional drawings and service clearances, and Fig. 5 for unit leveling tolerances.

Additional control setup and sensor installation is required before equipment start-up and operation can be performed. Consult the 48/50LC*H Controls, Start-up, Operation, and Troubleshooting manual for additional instruction.

Table 1 — Application Ranges

DESCRIPTION	48LCH UNIT SIZE		
	07	08	12
Min. Airflow (cfm)	780	975	1300
Min. Full Load Airflow (cfm)	840	1050	1400
AHRI Rated Airflow (cfm)	2100	2625	3500
Cool Max. Ambient	115°F	115°F	115°F
Cool Min. Ambient	40°F	40°F	40°F
Cool Max. Entering	115°F	115°F	115°F
Cool Min. Entering	60°F	60°F	60°F
Dehum Max. Ambient	105°F	105°F	105°F
Dehum Min. Ambient	60°F	60°F	60°F
Dehum Max. Entering	105°F	105°F	105°F
Dehum Min. Entering	60°F	60°F	60°F
Heat Max. Entering	70°F	70°F	70°F
Heat Min. Entering	10°F	10°F	10°F

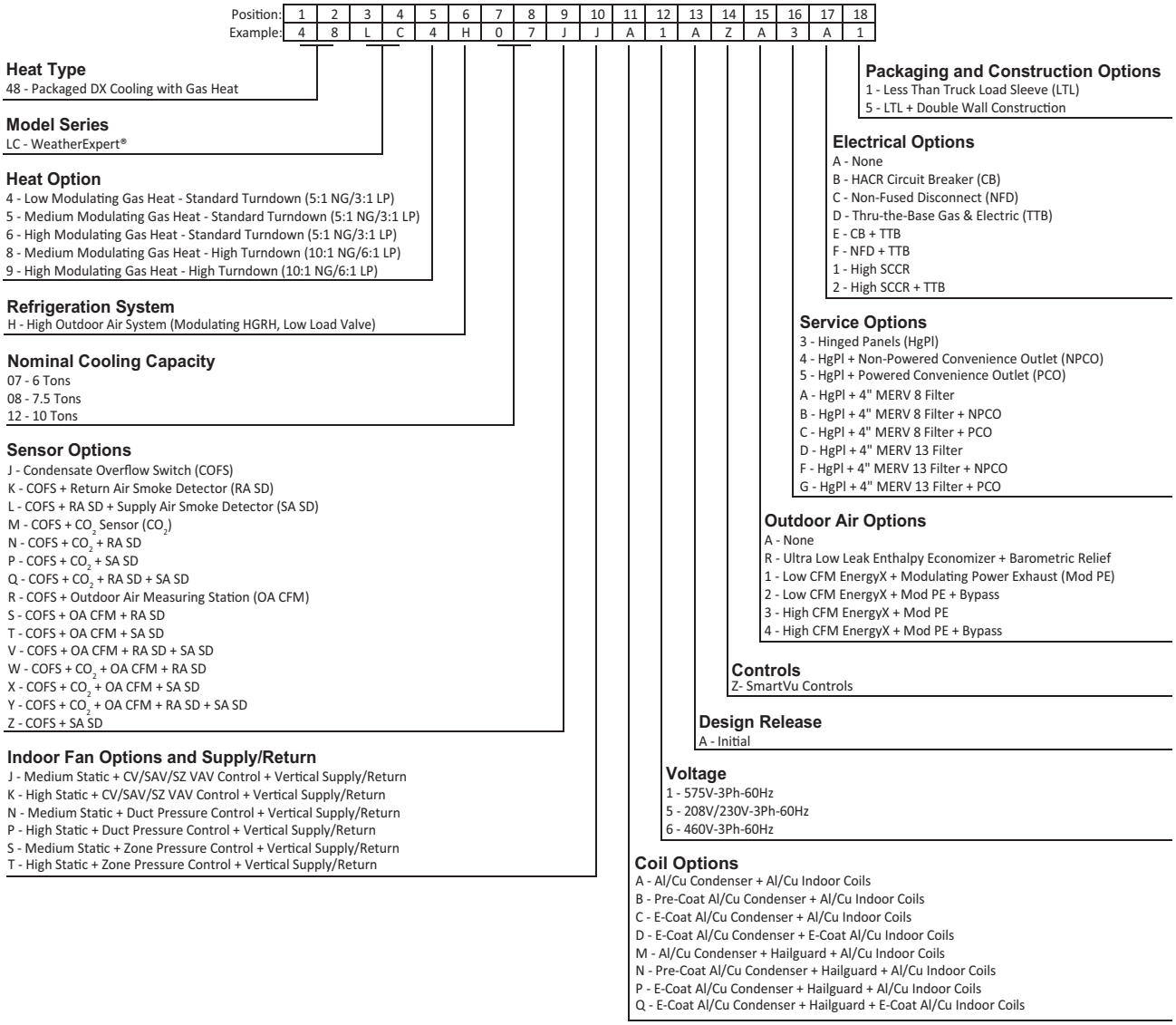


Fig. 1 — 48LC*H 07-12 Model Number Nomenclature

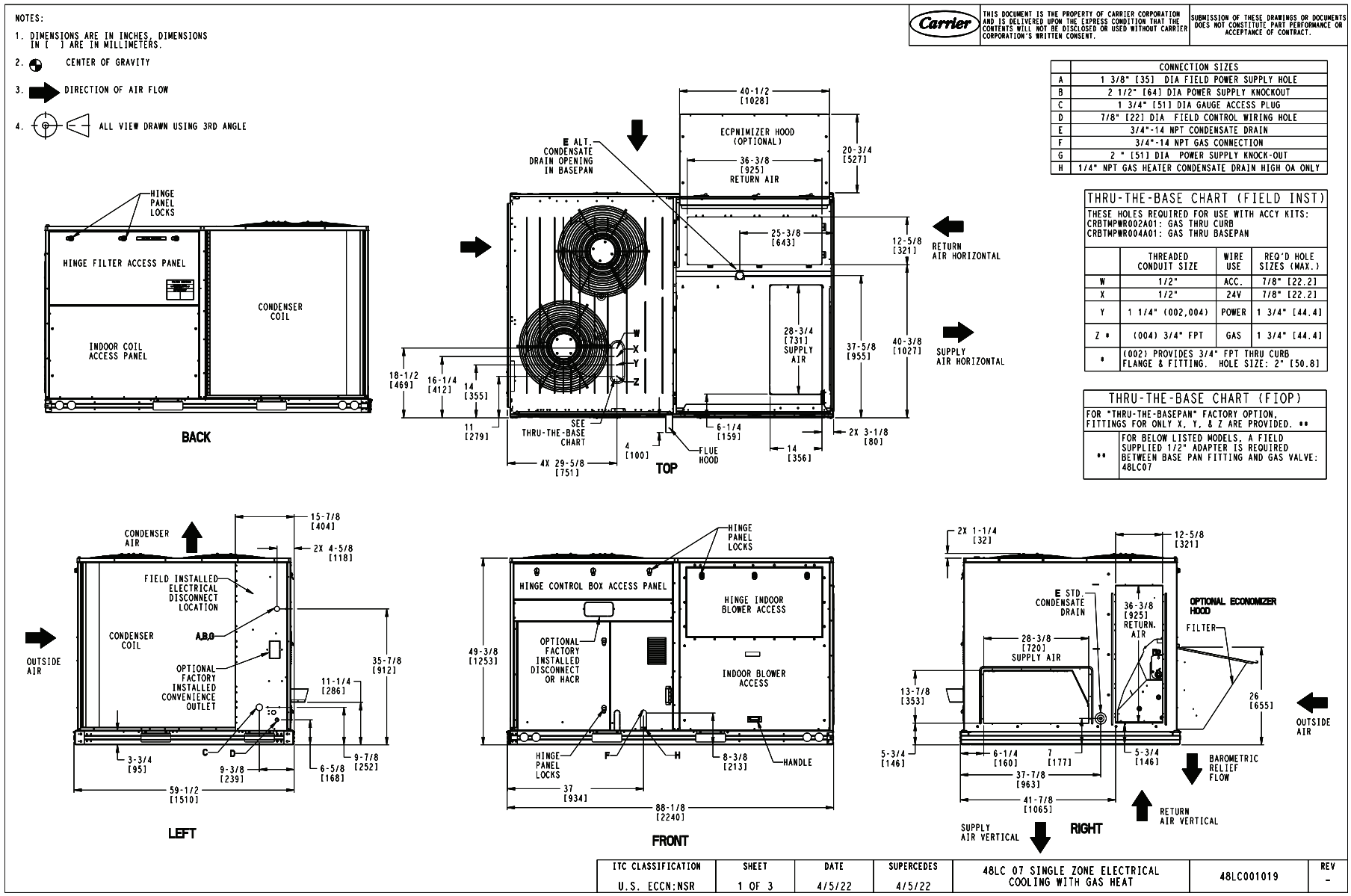
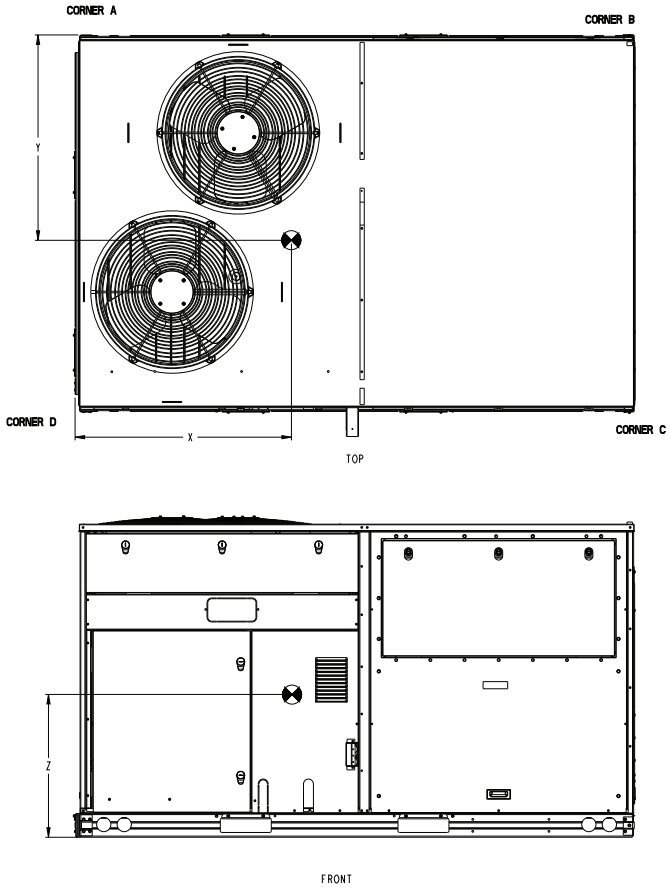
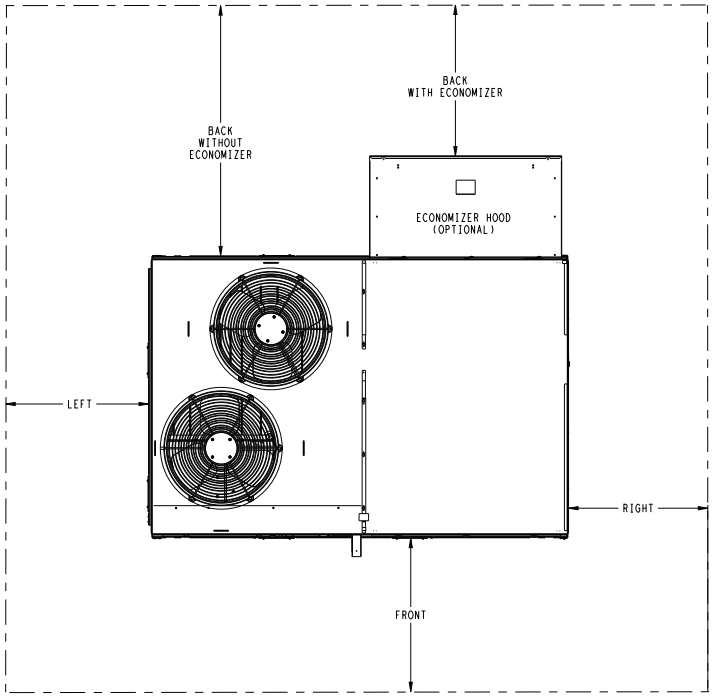


Fig. 2 — Unit Dimensional Drawing, Size 07, Single-Zone Electric Cooling with Gas Heat

UNIT	INSULATION	OUTDOOR COIL TYPE	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
48LC*H07	FOIL FACE	RTPF	1059	481	412	187	150	68	235	107	262	119	42	24 1/2	20 3/4
48LC*H07	DOUBLE WALL	RTPF	1203	546	449	204	182	83	286	130	286	130	45	24 1/2	20 3/4

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





CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

NOTE:
1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		
U.S. ECCN:NSR	2 OF 3	4/5/22	4/5/22	48LC 07 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC001019	REV -

Fig. 2 — Unit Dimensional Drawing, Size 07, Single-Zone Electric Cooling with Gas Heat (cont)

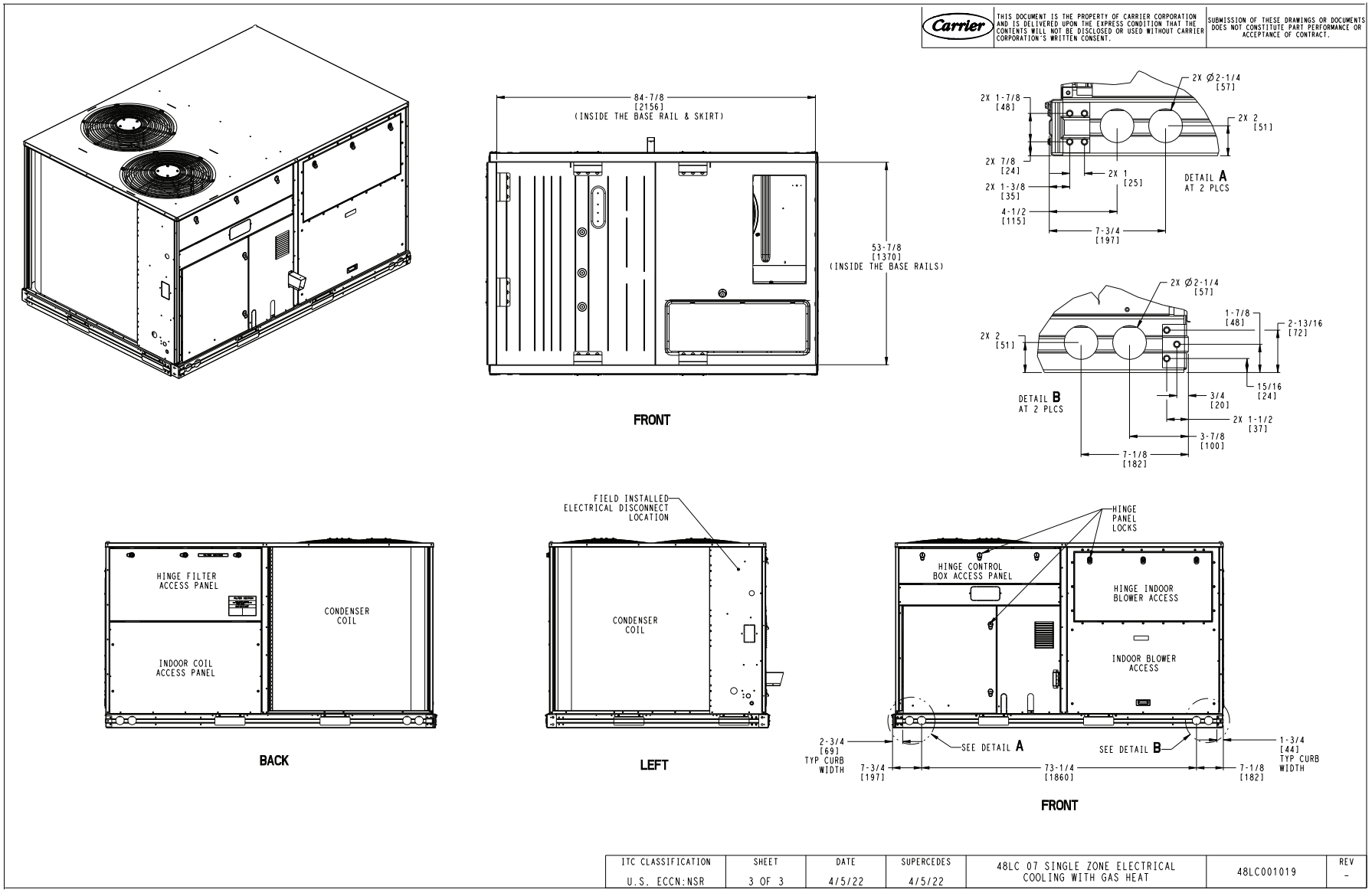


Fig. 2 — Unit Dimensional Drawing, Size 07, Single-Zone Electric Cooling with Gas Heat (cont)

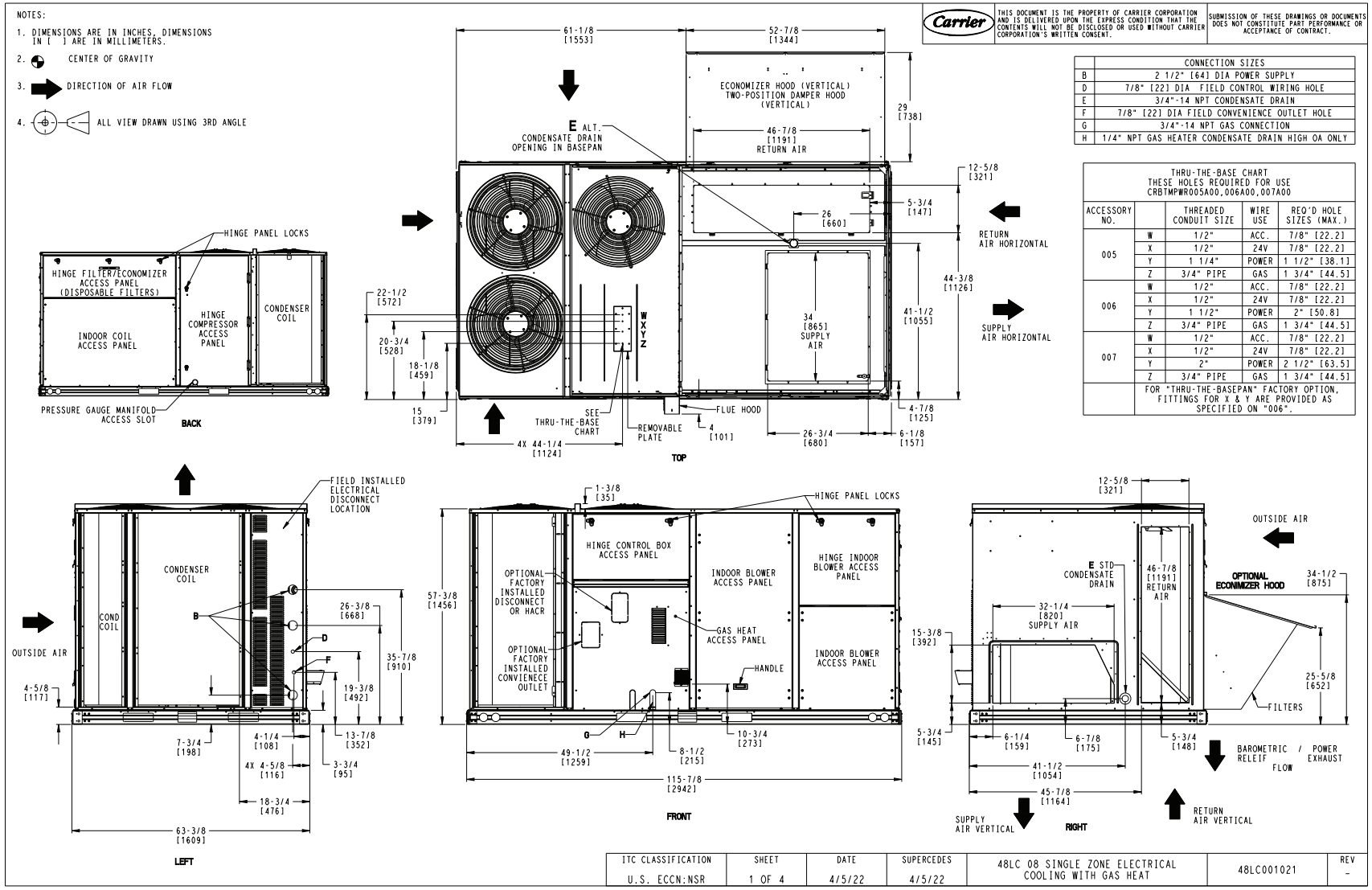
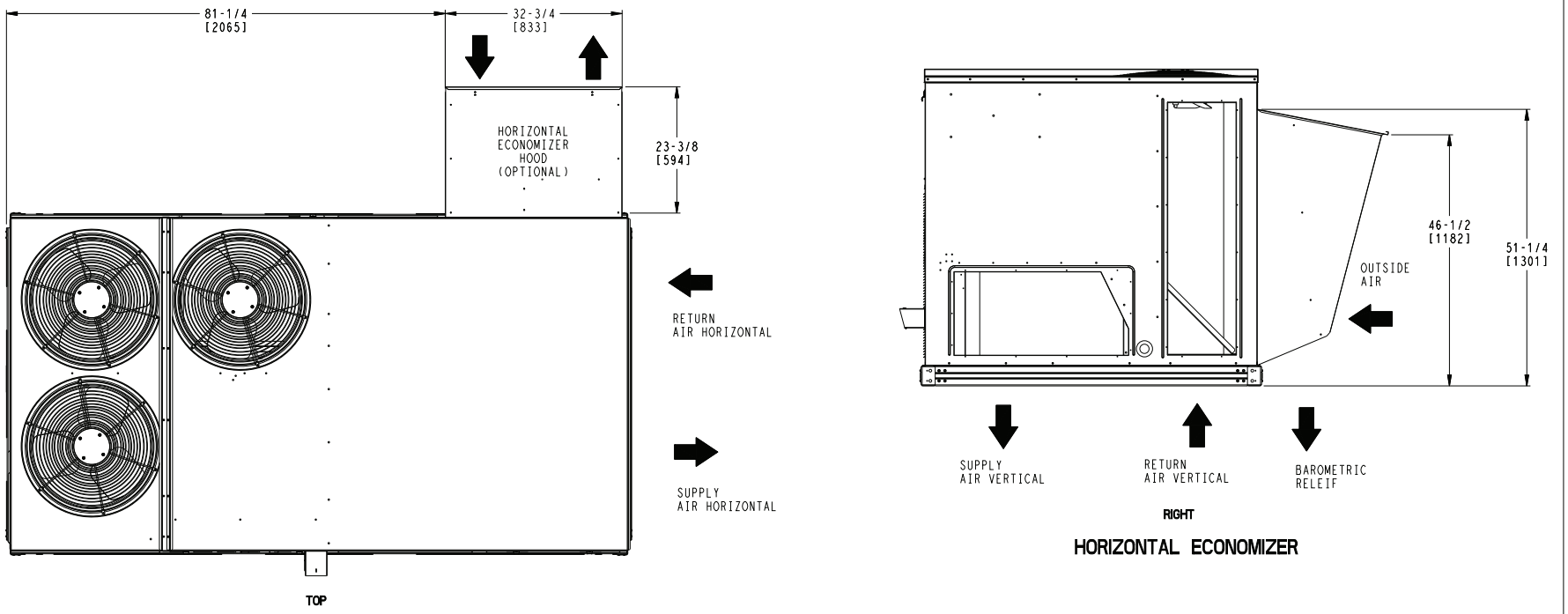


Fig. 3 — Unit Dimensional Drawing, Size 08, Single-Zone Electric Cooling with Gas Heat

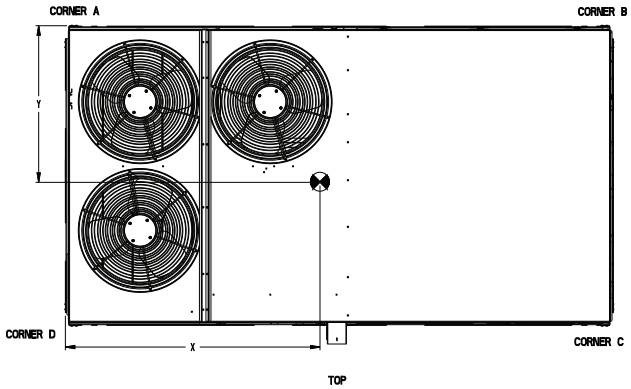


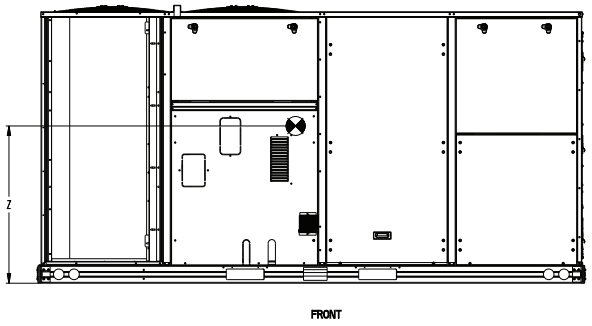
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48LC 08 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC001021	REV
U.S. ECCN:NSR	2 OF 4	4/5/22	4/5/22			-

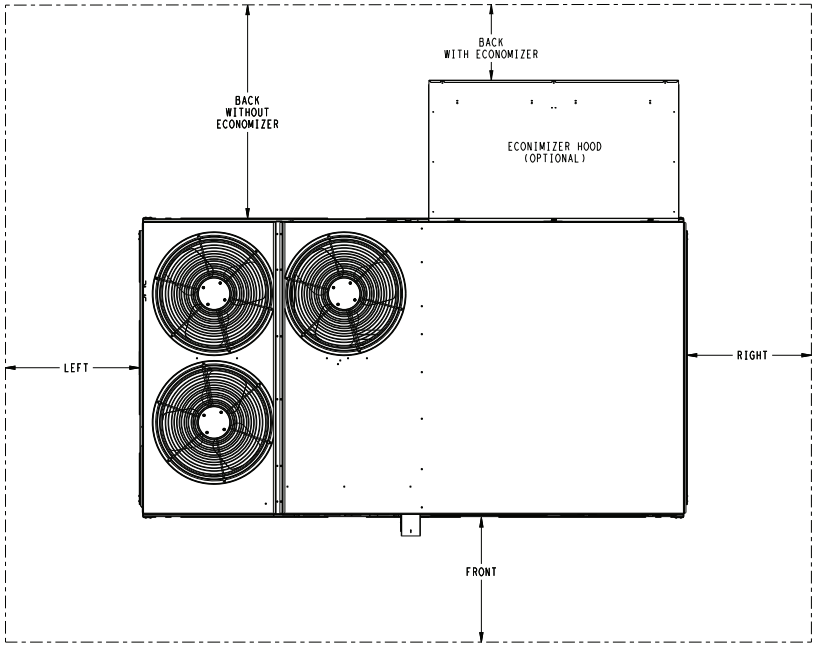
Fig. 3 — Unit Dimensional Drawing, Size 08, Single-Zone Electric Cooling with Gas Heat (cont)

UNIT	INSULATION	OUTDOOR COIL TYPE	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
48LC*H08	FOIL FACE	RTPF	1516	688	393	178	365	166	389	177	369	167	57 1/2	30 1/2	20 5/8
48LC*H08	DOUBLE WALL	RTPF	1707	774	419	190	433	196	461	209	394	179	60 1/2	30 1/2	20 5/8

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







CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 4	4/5/22	4/5/22	48LC 08 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC001021	-

Fig. 3 — Unit Dimensional Drawing, Size 08, Single-Zone Electric Cooling with Gas Heat (cont)

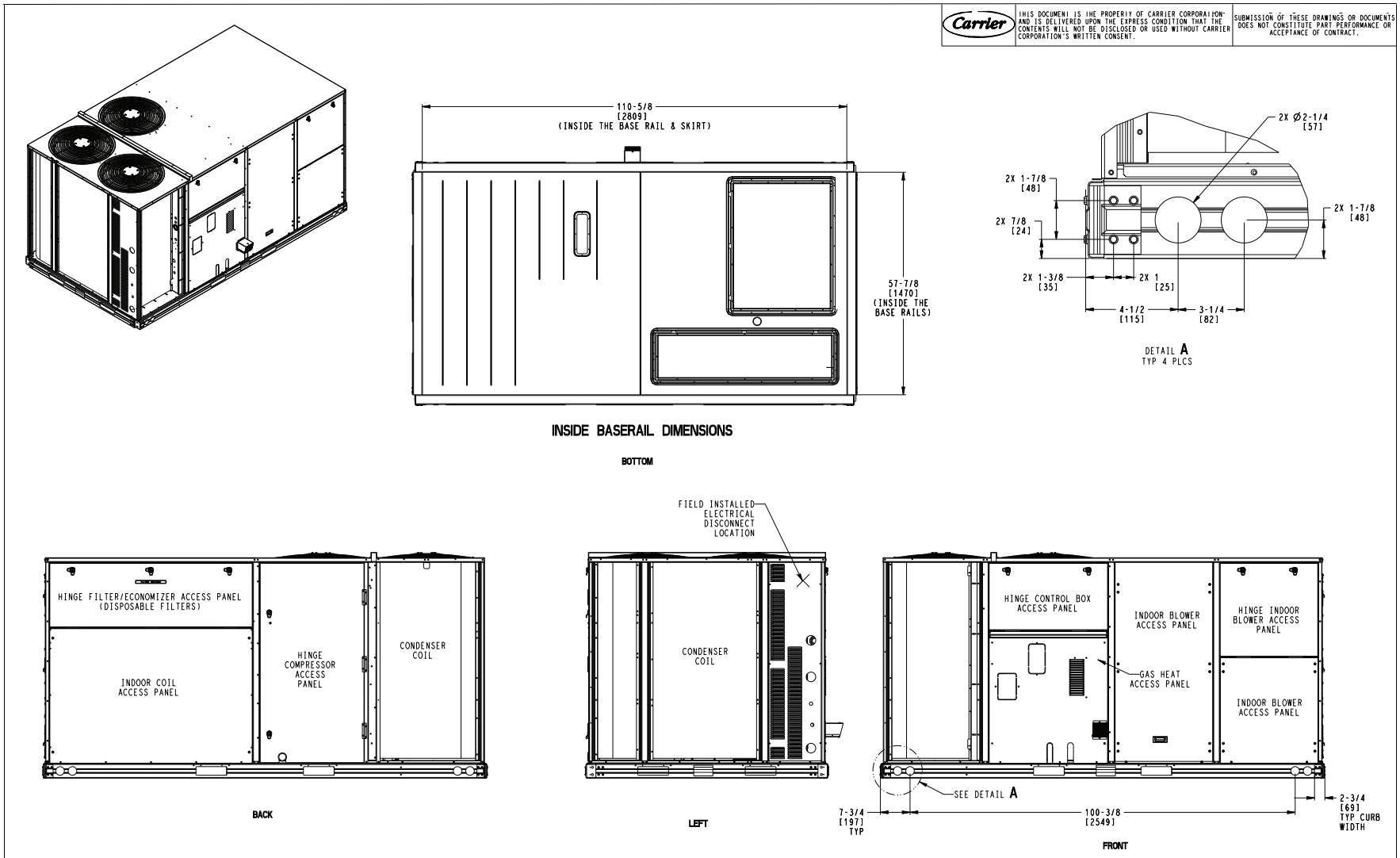


Fig. 3 — Unit Dimensional Drawing, Size 08, Single-Zone Electric Cooling with Gas Heat (cont)

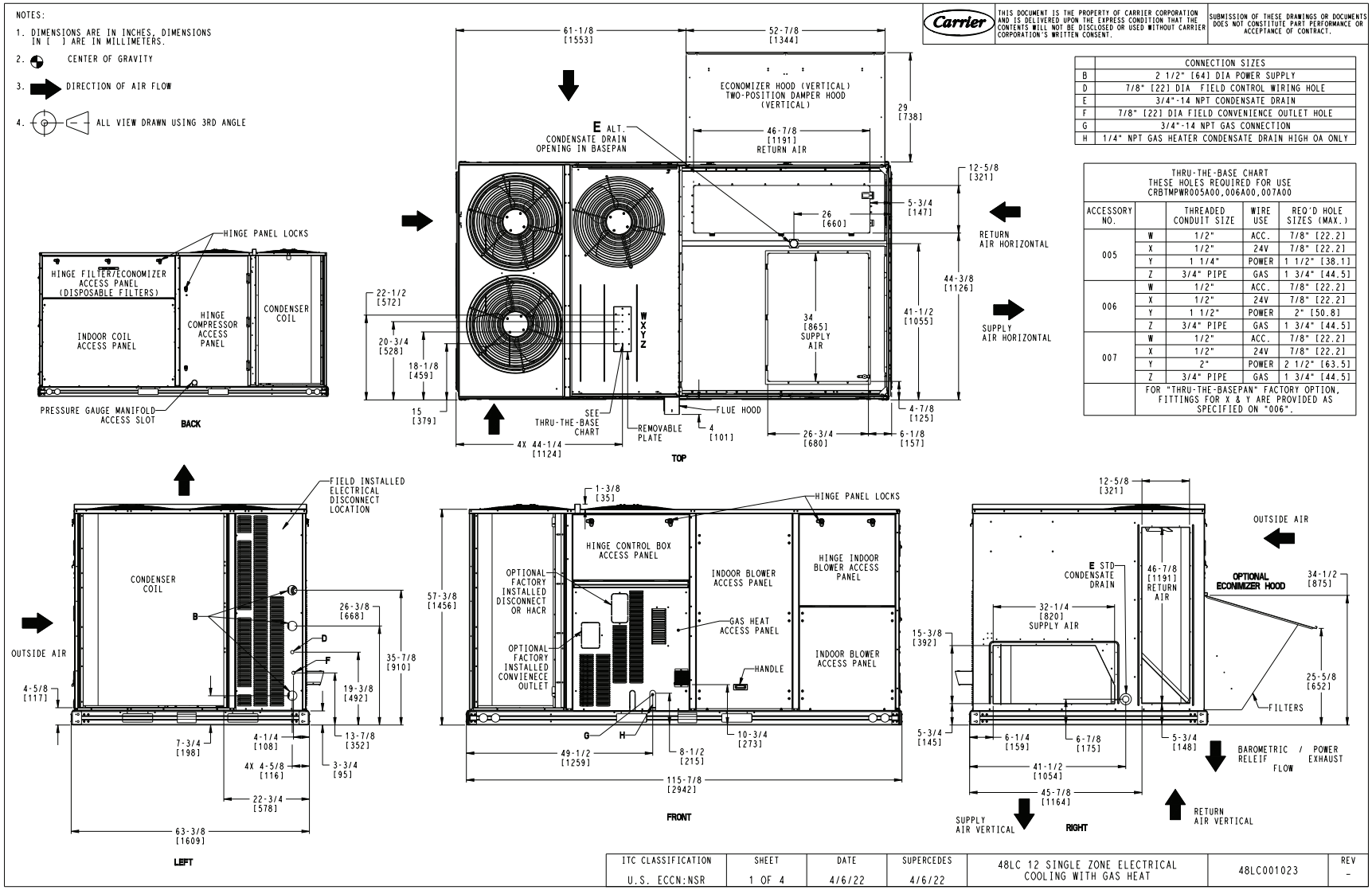
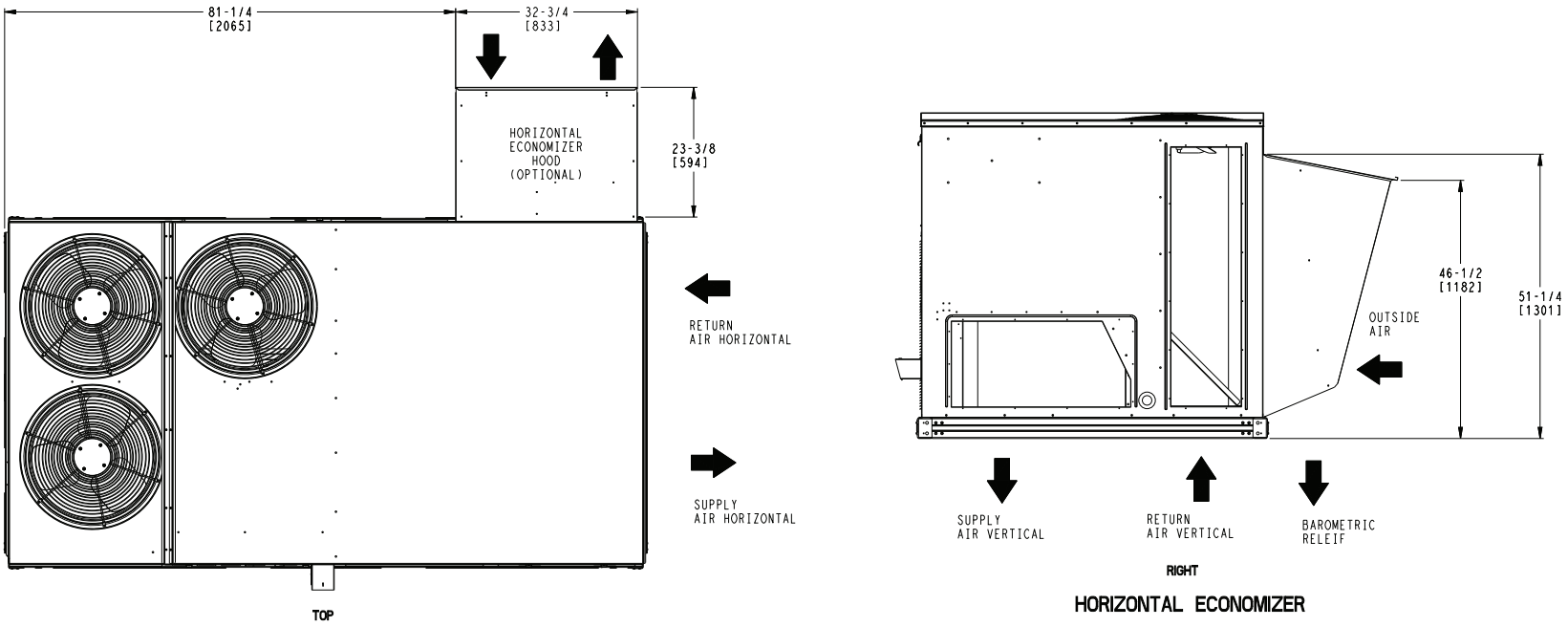


Fig. 4 — Unit Dimensional Drawing, Size 12, Single-Zone Electric Cooling with Gas Heat

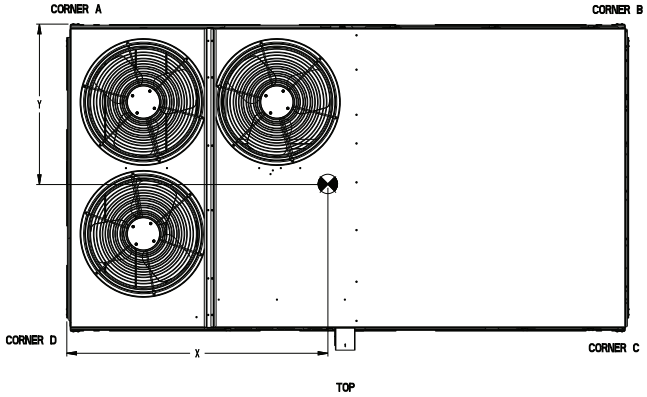


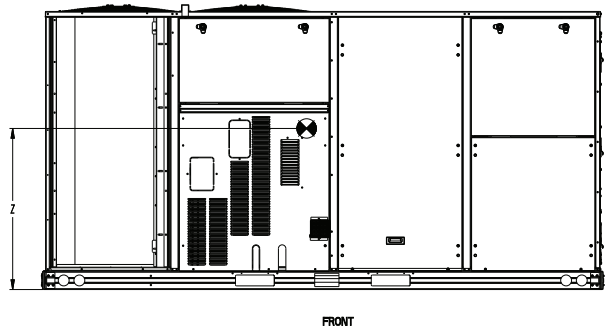
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 4	4/6/22	4/6/22	48LC 12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC001023	-

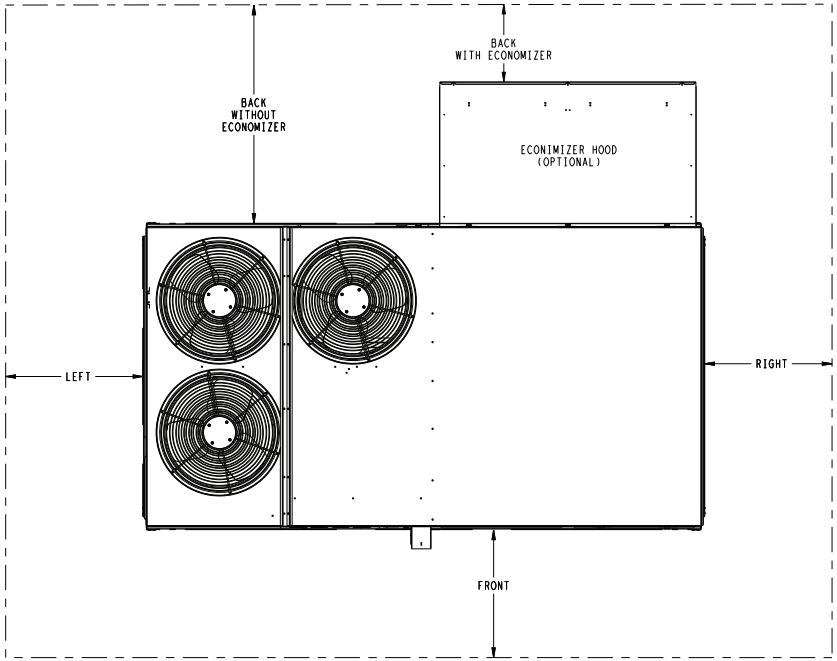
Fig. 4 — Unit Dimensional Drawing, Size 12, Single-Zone Electric Cooling with Gas Heat (cont)

UNIT	INSULATION	OUTDOOR COIL TYPE	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
48LC*H12	FOIL FACE	RTPF	1596	724	419	190	379	172	430	195	369	167	58 1/2	29 1/2	20 5/8
48LC*H12	DOUBLE WALL	RTPF	1787	811	446	202	444	201	504	229	393	178	60 1/4	29 1/2	20 5/8

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







CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		
U.S. ECCN:NSR	3 OF 4	4/6/22	4/6/22	48LC 12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48LC001023 REV -

Fig. 4 — Unit Dimensional Drawing, Size 12, Single-Zone Electric Cooling with Gas Heat (cont)

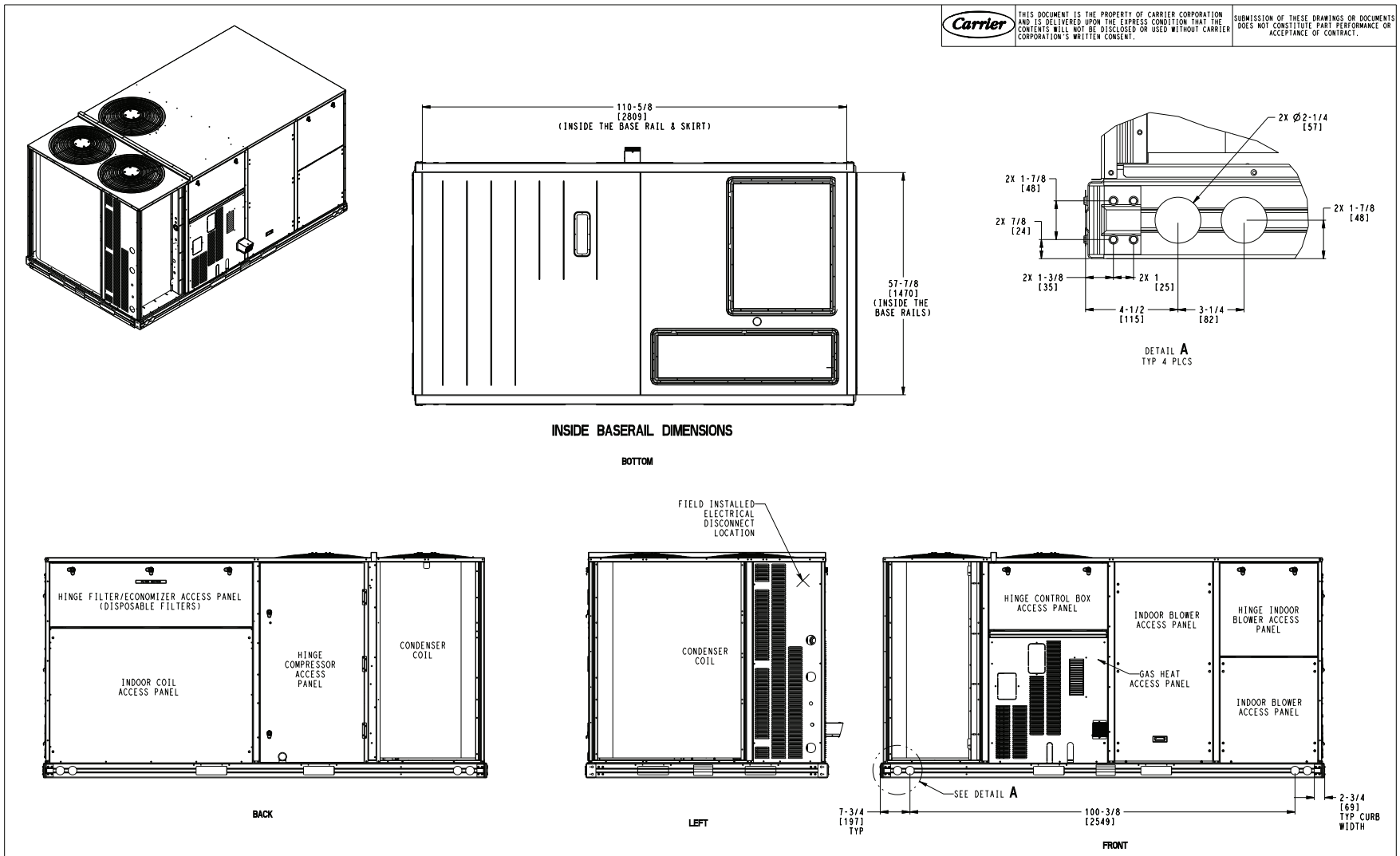


Fig. 4 — Unit Dimensional Drawing, Size 12, Single-Zone Electric Cooling with Gas Heat (cont)

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.

IMPORTANT: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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. Refer to Fig. 2-4.

NOTE: Consider the effect of adjacent units. Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

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

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

Select a unit mounting system that provides adequate height to allow installation of condensate trap per requirements. Refer to Install External Condensate Trap and Line on page 24 for required trap dimensions.

ROOF MOUNT

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

Table 2 — Operating Weights

48LC*H	UNIT SIZE lb (kg)		
	07	08	12
BASE UNIT	1360 (618)	1430 (650)	1500 (682)
ECONOMIZER			
Vertical	103 (47)	103 (47)	103 (47)
Horizontal	242 (110)	242 (110)	242 (110)
POWERED OUTLET	35 (16)	35 (16)	35 (16)
CURB			
14 in. (356 mm)	180 (82)	180 (82)	180 (82)
24 in. (610 mm)	255 (116)	255 (116)	255 (116)

Step 2 — Plan for Sequence of Unit Installation

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

TYPICAL CURB-MOUNTED INSTALLATION (VERTICAL SUPPLY/RETURN)

1. Inspect unit.
2. Install curb.
3. Install field-fabricated ductwork inside curb.
4. Install supply air temperature sensor.
5. Install accessory thru-base service connection package (optional – affects curb and unit). Refer to accessory installation instructions for details.
6. Prepare bottom condensate drain connection to suit planned condensate line routing (optional – refer to Install External Condensate Trap and Line on page 24 for details).
7. Rig and place unit.
8. Install return air opening cover (optional – 100% outdoor air applications only).
9. Install outdoor air hood.
10. Install condensate line trap and piping.
11. Make electrical connections.
12. Setup unit options.
13. Install other accessories.
14. Complete controls setup and equipment start-up (not covered in this manual).

TYPICAL PAD-MOUNTED INSTALLATION (HORIZONTAL SUPPLY/RETURN)

1. Inspect unit.
2. Prepare pad and unit supports.
3. Check and tighten the bottom condensate drain connection.
4. Plan for condensate drain piping.
5. Rig and place unit.
6. Convert unit to side duct connection arrangement.
7. Install the return air opening cover (100% outdoor air applications only).
8. Install field-fabricated ductwork at unit duct openings.
9. Install supply air temperature sensor.
10. Install outdoor air hood.
11. Install condensate line trap and piping.
12. Make electrical connections.
13. Setup unit options.
14. Install other accessories.
15. Complete controls setup and equipment start-up (not covered in this manual).

FRAME-MOUNTED INSTALLATION

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

Step 3 — Inspect Unit

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

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

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

Locate the carton containing the outside air hood parts. See Fig. 16 on page 23 for package location. Do not remove carton until unit has been rigged and located in final position.

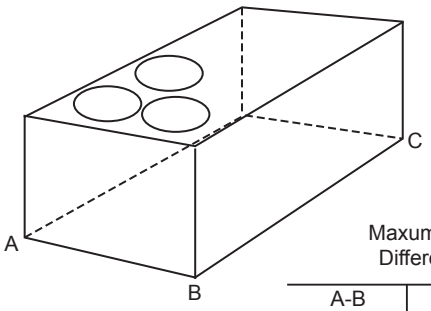
Step 4 — Provide Unit Support

ROOF CURB MOUNT

Accessory roof curb details and dimensions are shown in Fig. 6 and 7. Assemble and install accessory roof curb in accordance with instructions shipped with the curb.

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

Curb should be level. This is necessary for unit drain to function properly. Unit leveling tolerances are shown in Fig. 5. Refer to Accessory Roof Curb Installation Instructions for additional information as required. Install insulation, cant strips, roofing felt, and counter flashing as shown. *NOTE: Ductwork must be attached to curb and not to the unit.*



Maxumum Allowable Difference in. (mm)

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

Fig. 5 — Unit Leveling Tolerances

IMPORTANT: If the unit's electric and control wiring is to be routed through the basepan and the unit is equipped with the factory-installed thru-the-base service option, see the following section:

- Factory-Option Thru-Base Connections on page 38.

If using the field-installed Thru-the-Base accessory, follow the instructions provided with the accessory kit.

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

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.

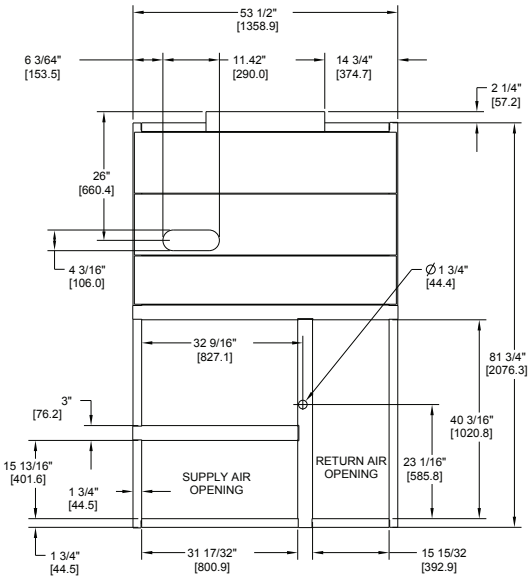
ALTERNATE UNIT SUPPORT (IN LIEU OF CURB OR SLAB MOUNT)

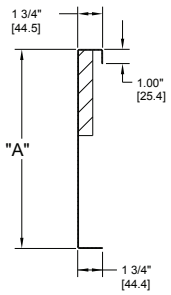
A non-combustible sleeper rail can be used in the unit curb support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4 in. x 4 in. (102 mm x 102 mm) pads on each side.

ROOF CURB ACCESSORY #	A
CRRFCURB003A01	14" [356]
CRRFCURB004A01	24" [610]

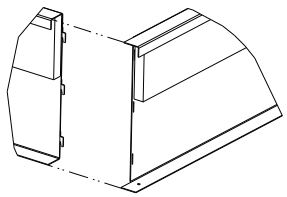
NOTES:
1. ROOFCURB ACCESSORY IS SHIPPED DISASSEMBLED.
2. INSULATED PANELS: 25.4 [1"] THK. POLYURETHANE FOAM, 44.5 [1-3/4] # DENSITY.
3. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4. ROOFCURB: 18 GAGE STEEL.
5. ATTACH DUCTWORK TO CURB. (FLANGES OF DUCT REST ON CURB).
6. SERVICE CLEARANCE 4 FEET ON EACH SIDE.
7. ▨ DIRECTION OF AIR FLOW.
8. CONNECTOR PACKAGE CRBTMPWR002A01 IS FOR THRU-THE-CURB GAS TYPE PACKAGE CRBTMPWR004A01 IS FOR THRU-THE-BOTTOM TYPE GAS CONNECTIONS.

CONNECTOR PKG. ACC.	GAS CONNECTION TYPE	GAS FITTING	POWER WIRING FITTING	CONTROL WIRING FITTING	ACCESSORY CONVENIENCE OUTLET WIRING CONNECTOR
CRBTMPWR002A01	THRU THE CURB	3/4" [19] NPT	1 1/4" [31.7] NPT	1/2" [12.7] NPT	1/2" [12.7] NPT
CRBTMPWR004A01	THRU THE BOTTOM				

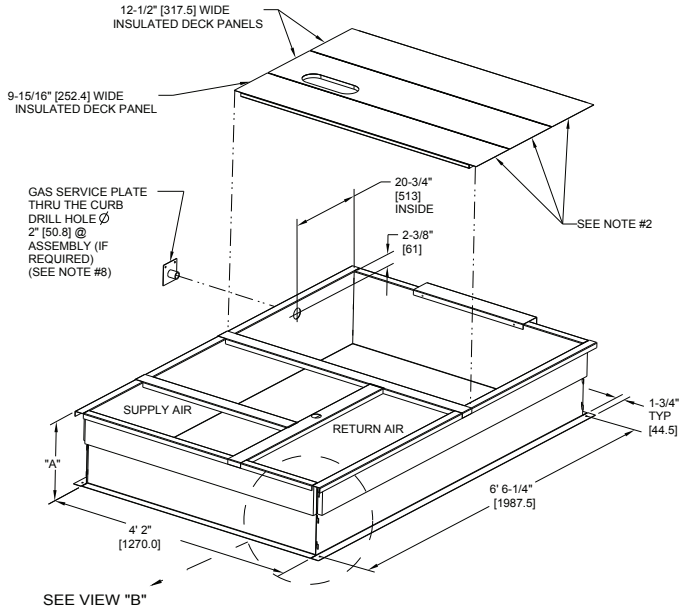




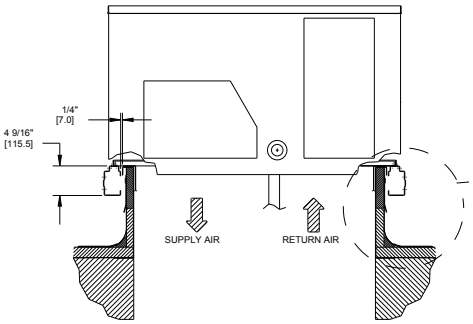
SECTION THRU SIDE

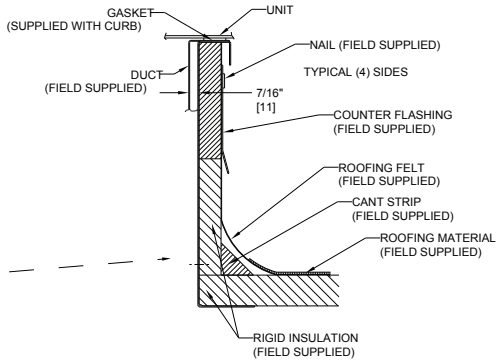


VIEW "B"
CORNER DETAIL



CERTIFIED DRAWING





REV	REVISION RECORD	DATE	BY	CHK'D	APP'D	ECN NO.
C	6' 61/4" WAS 6' 7 1/6", 4'2" WAS 4' 2 13/16"; 18 GA WAS 16 GA.; 15 13/16" WAS 15 15/16"; NAIL FIELD SUPPLIED WAS WITH CURB	4/22/13	MMC	-	-	1067898

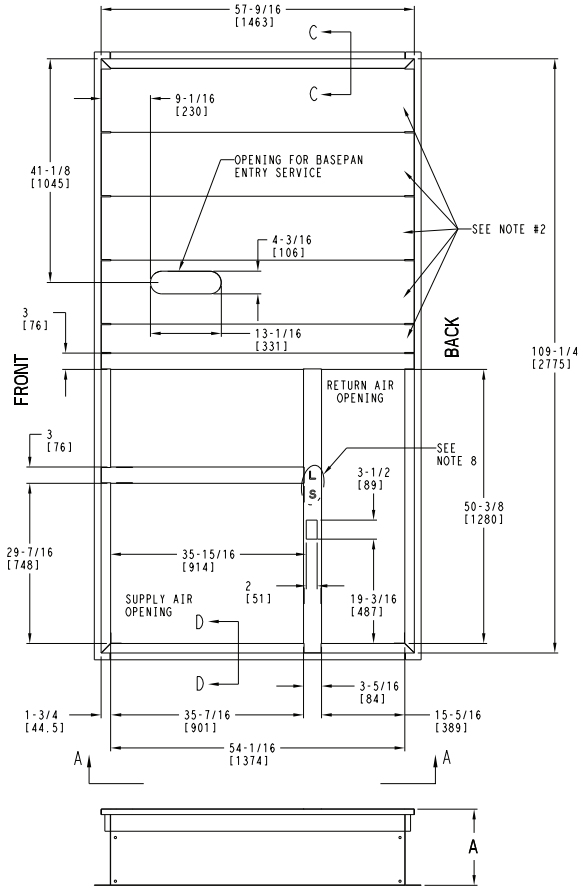
DRAWING RELEASE LEVEL: PRODUCTION
THIRD ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: 1 DEC ± - | 2 DEC ± - | 3 DEC ± - | ANG ± °
MATERIAL: - - -
AUTHORIZATION NUMBER: 1029120
ENGINEERING REQUIREMENTS: T-005, Y-002
ENGINEERING: - | MANUFACTURING: - -
WEIGHT: -
DRAFTER: MMC 12/16/09 | CHECKER: - -
SURFACE FINISH: - | MFG/PURCH: PURCH
MODEL (INTERNAL USE ONLY)

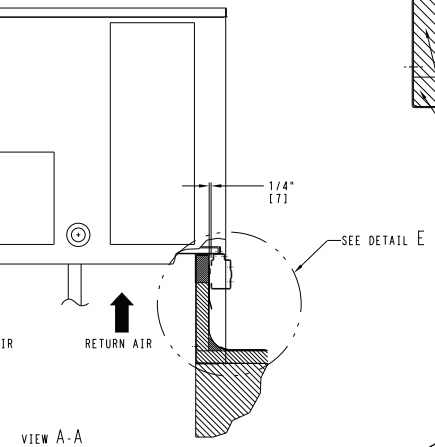
TITLE: CURB ASY, ROOF
SIZE: D | DRAWING NUMBER: 50HJ405012 | SHEET 5 OF 5 | REV: C
NEXT DRAWING: - | SCALE: N/A | DISTRIBUTION: -

Fig. 6 — Roof Curb Details, Size 07 Units

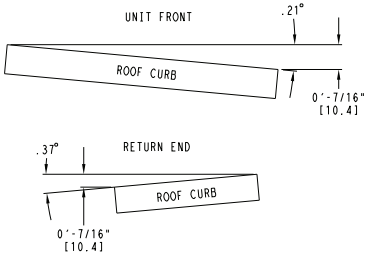
ROOF CURB ACCESSORY #	A
CRRFCURB074A00	14" [356]
CRRFCURB075A00	24" [610]

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

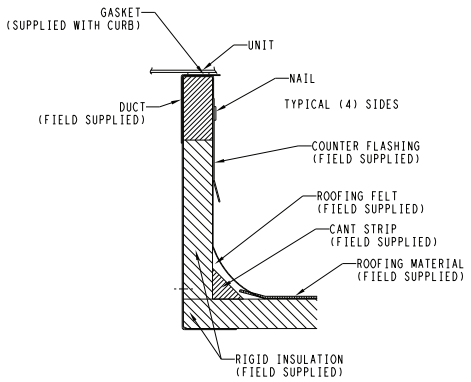




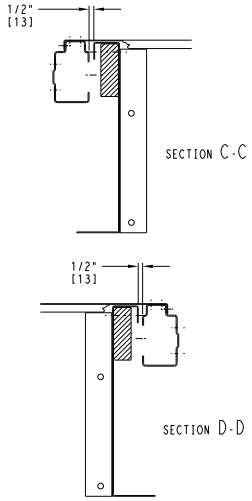
VIEW A-A



MAX CURB LEVELING TOLERANCES



DETAIL E



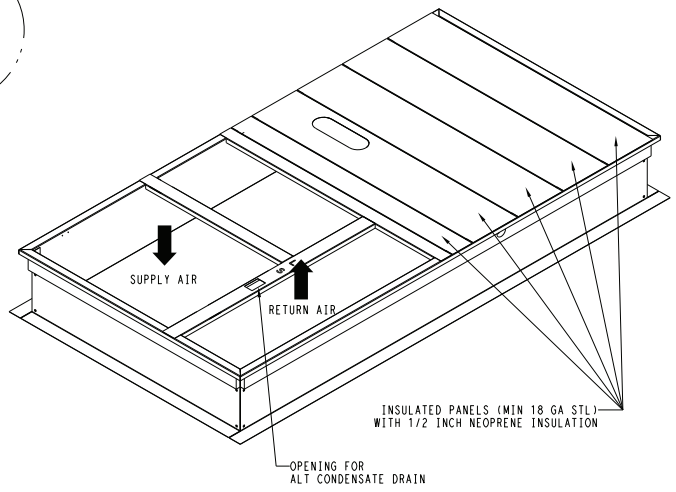


Fig. 7 — Roof Curb Details, Sizes 08-12 Units

Step 5 — Field Fabricate Ductwork

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

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

NOTE: 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.

FOR UNITS WITH OPTIONAL ELECTRIC HEATERS

All installations require a minimum clearance to combustible surfaces of 1 in. (25 mm) from duct for first 12 in. (305 mm) away from unit. Outlet grilles must not lie directly below unit discharge.

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could cause personal injury.

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

⚠ 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

When the unit is ready to be rigged and no longer will be lifted by a fork truck, the wood protector under the basepan must be removed. Remove 4 screws from each base rail. Wood protector will drop to the ground. See instructions on the unit base rails.

Keep unit upright and do not drop. Spreader bars are not required. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. Refer to Table 2 and Fig. 8 for additional information.

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

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

When using the standard side drain connection, ensure the red plug in the alternate bottom connection is tight. Do this before setting the unit in place. The red plug can be tightened with a 1/2 in. square socket drive extension. For further details, see Step 10 on page 23. Before setting the unit onto the curb, recheck gasketing on curb.

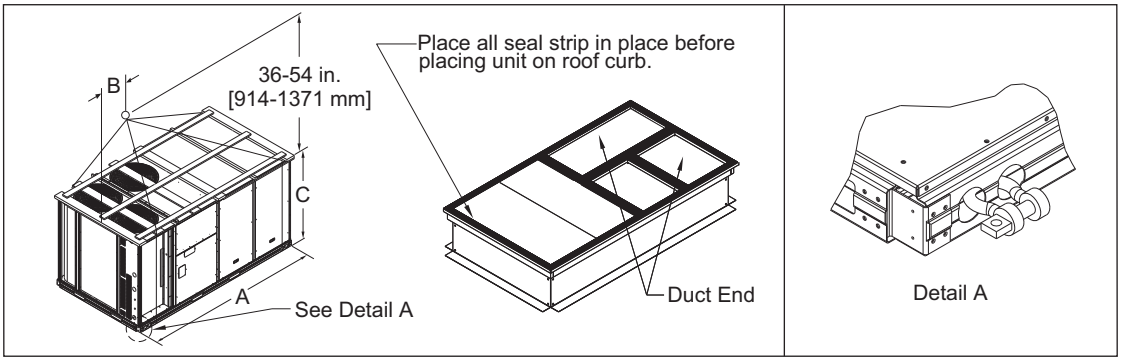
⚠ CAUTION

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.



48LCH UNIT SIZE[a,b]	MAX WEIGHT		DIMENSIONS in. [mm]		
	lb	kg	A	B	C
07	2280	1034	116 [2945]	63 [1600]	59.5 [1510]
08	2285	1037	116 [2945]	58 [1473]	59.5 [1510]
12	2285	1037	116 [2945]	58[1473]	59.5 [1510]

NOTE(S):

a. 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.
b. Use wooden top to prevent rigging straps from damaging unit.

Fig. 8 — Rigging Details

POSITIONING ON CURB

For full perimeter curbs CRRFCURB074A00 and CRRFCURB075A00, the clearance between the roof curb and the front and rear base rails should be 1/4 in. (6.4 mm). The clearance between the curb and the end base rails should be 1/2 in. (13 mm). For retrofit applications with curbs CRRFCURB003A01 and CRRFCURB004A01, the unit should be positioned as shown in Fig. 11. Maintain the 15-1/2 in. (394 mm) and 8-5/8 in. (220 mm) clearances and allow the 22-5/6 in. (567 mm) dimension to float if necessary.

If the alternative condensate drain location through the bottom of the unit is used in conjunction with a retrofit curb, the hole in the curb must be moved 12-1/2 in. (320 mm) towards the end of the unit. (See Fig. 9.)

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

IMPORTANT: If the unit has the factory-installed thru-the-base option, make sure to complete installation of the option before placing the unit on the roof curb.

See the following section:

- Factory-Option Thru-Base Connections on page 38.

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

Remove all shipping materials and top skid. Remove extra center post from the condenser end of the unit so that the condenser end of the unit matches. Refer to page 29 for conduit options. Recycle or dispose of all shipping materials.

Step 7 — Convert to Horizontal or 100% Outdoor Air and Connect Ductwork (when required)

All units are shipped in the vertical duct configuration. Units without factory-installed economizer or return-air smoke detector option may be field converted to horizontal ducted configuration. All units with an economizer may be used for 100% outdoor air applications without a return air duct.

HORIZONTAL TO VERTICAL SUPPLY CONVERSION (6 TON UNITS)

Remove the screws from the horizontal supply duct cover (see Fig. 10) and save. Remove the horizontal supply duct cover and place the cover over the vertical supply air opening with the painted gray sheet metal side facing up (towards the sky).

HORIZONTAL TO VERTICAL SUPPLY CONVERSION (7.5 TO 10 TON UNITS)

The accessory CRDUCTCV002A00 supply duct cover is required to covert from vertical to horizontal supply. Remove the screws from the horizontal supply duct cover (see Fig. 10) and save. Remove the horizontal supply duct cover and discard it. Place the CRDUCTCV002A00 accessory supply duct cover over the vertical supply air opening with the painted gray sheet metal side facing up (towards the sky).

HORIZONTAL TO VERTICAL RETURN CONVERSION (FOR ALL UNITS)

Remove the screws from the horizontal return duct cover (see Fig. 10) and save. Remove the return duct cover and place it over the vertical return air opening with the painted gray sheet metal side facing up (towards the sky).

100% OUTDOOR AIR RETURN BLOCK OFF

For 100% outdoor air units without return air ductwork, the vertical return air opening must be blocked off using replacement cover (size 07 part no. single wall: 50DK400833, double-wall: 48TM006195) and (size 08-12 Part no. single wall: 50TM400305, double-wall: 50TM002157). Place the return air opening cover over the vertical return air opening with the painted gray sheet metal side facing up (towards the sky).

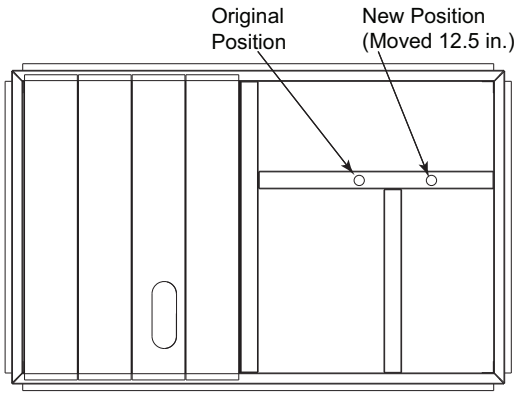


Fig. 9 — Alternative Condensate Drain Hole Positions

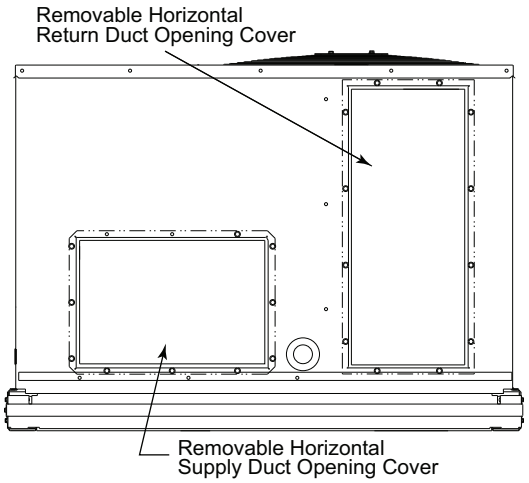


Fig. 10 — Horizontal Conversion Panels

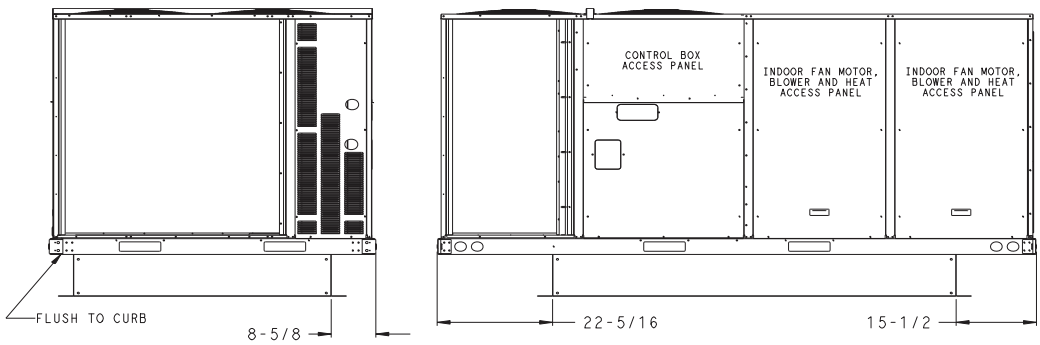


Fig. 11 — Retrofit Installation Dimensions

FOR ALL CONVERTED UNITS

Ensure the covers are inserted into the notches on the base pan. The notches are covered by the tape used to secure the insulation to the basepan and are not easily seen. See Fig. 12 for position of the notches in the basepan. Use the saved screws or replacement screws to secure the cover to the base as shown in Fig. 13. Check seals around duct openings to ensure they are tight. Adjust as needed. Cover all seams with foil tape.

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

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

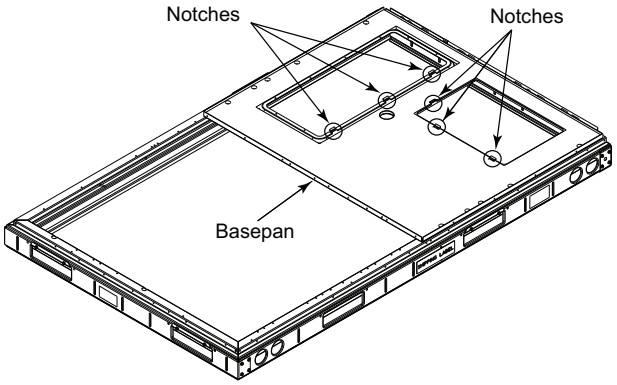


Fig. 12 — Location of Notches

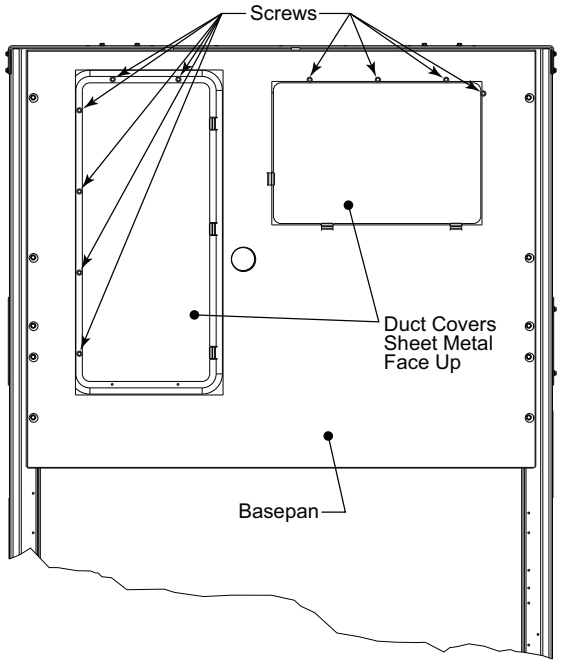


Fig. 13 — Horizontal Duct Panels In Place

Step 8 — Relocate SAT Sensor

The 48LC*H requires a duct mounted supply air temperature (SAT) sensor for proper operation. The SAT sensor is factory supplied in the supply section of the unit and requires field relocation to the supply duct. See Fig. 14 for shipping locations. A field supplied and installed, 10k Type II duct thermistor can be used instead of the factory sensor.

To relocate the factory SAT sensor, remove the SAT sensor from the shipping location. Cut or disconnect the factory SAT sensor wires as needed, ensuring enough wire length is left at the sensor for field wire connection.

Identify a location for the SAT sensor. The sensor should be at least 10 linear ft away from the unit and in the middle of the side of the supply duct to ensure proper readings. Do not install the sensor more than 100 ft (linear and vertical) away from the unit. Identify a location that is away from duct heaters, turning vanes, duct filters, or smoke dampers.

Once the SAT sensor location is identified, drill or punch a 1/2 in. (1.5 cm) hole into the side of the duct. Insert the 6 in. sensor probe into the duct work. Ensure that the probe is not touching any part of the duct, any duct insulation, or any duct accessories. Ensure the SAT sensor is reading within the air stream.

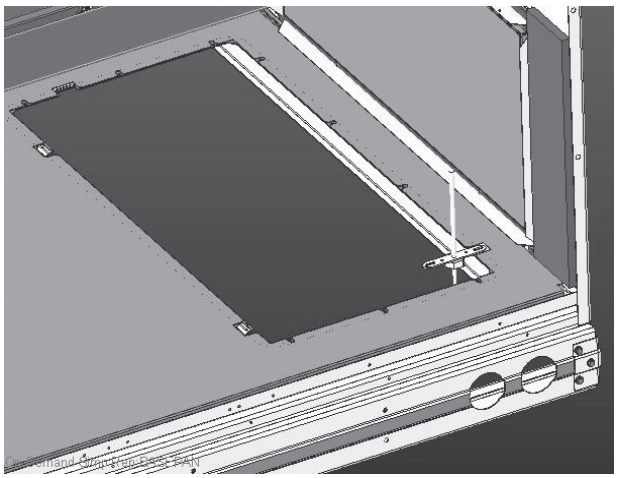


Fig. 14 — SAT Sensor Install Locations

Step 9 — Install Outside Air Hood

ECONOMIZER HOOD REMOVAL AND SETUP (FACTORY OPTION)

The hood is shipped in knock-down form and located in the return air compartment. It is attached to the economizer using 2 plastic tie-wraps.

1. To gain access to the hood, remove the filter access panel. (See Fig. 15.)
2. Locate and cut the 2 plastic tie-wraps, being careful to not damage any wiring. (See Fig. 16.)
3. Carefully lift the hood assembly through the filter access opening and assemble per the steps outlined in the Economizer Hood Assembly section on page 23.

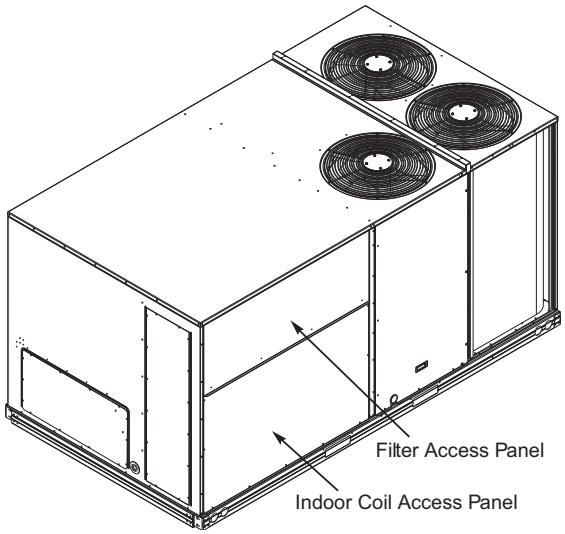


Fig. 15 — Typical Access Panel Locations

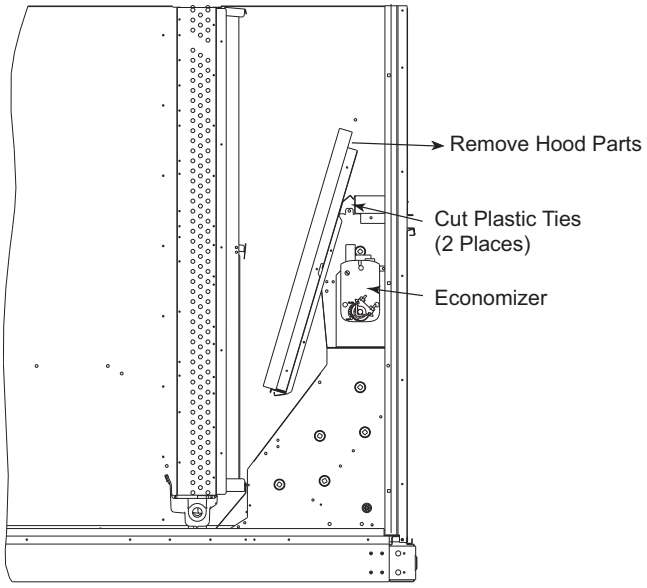


Fig. 16 — Economizer Hood Package Location

ECONOMIZER HOOD ASSEMBLY

NOTE: If the power exhaust accessory is to be installed on the unit, the hood shipped with the unit will not be used and must be discarded. Save the aluminum filter for use in the power exhaust hood assembly.

1. The indoor coil access panel will be used as the top of the hood. If the panel is still attached to the unit, remove the screws along the sides and bottom of the panel. See Fig. 17.
2. Swing out indoor coil access panel and insert the hood sides under the panel (hood top). Be careful not to lift the panel too far as it might fall out. Use the screws provided to attach the hood sides to the hood top and to attach the hood sides to the unit. See Fig. 18.
3. Remove the shipping tape holding the economizer barometric relief damper in place.
4. Insert the hood divider between the hood sides. See Fig. 18 and 19 for construction and installation. Secure hood divider with 3 screws on each hood side. The hood divider is also used as the bottom filter rack for the aluminum filter.
5. Attach the post that separates the filters with the screws provided.
6. Open the filter clips which are located underneath the hood top. Insert the aluminum filters into the bottom filter rack (hood divider). Push the filter into position past the open filter clips. Close the filter clips to lock the filters into place. See Fig. 19.
7. Install the 2 rain deflectors on the edge of the hood top as shown in Fig. 17.
8. Caulk the ends of the joint between the unit top panel and the hood top as shown in Fig. 17.
9. Replace the filter access panel.

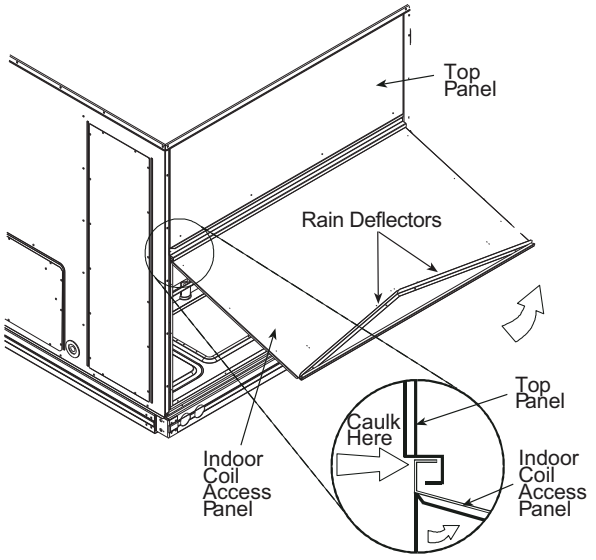


Fig. 17 — Indoor Coil Access Panel Relocation

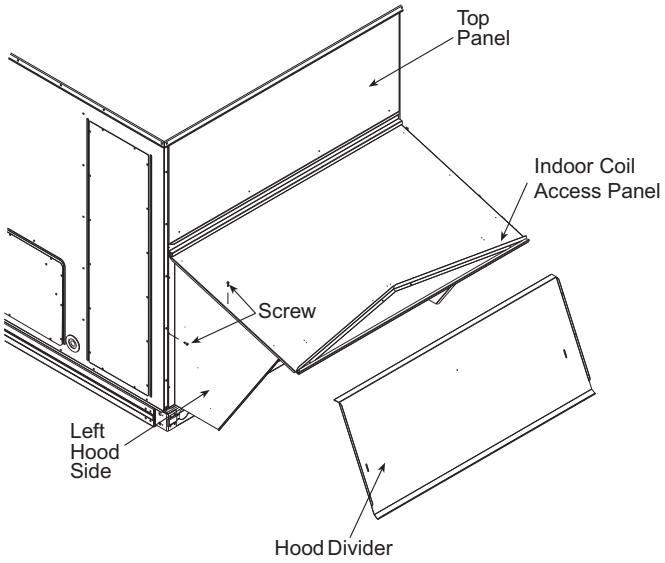


Fig. 18 — Economizer Hood Construction

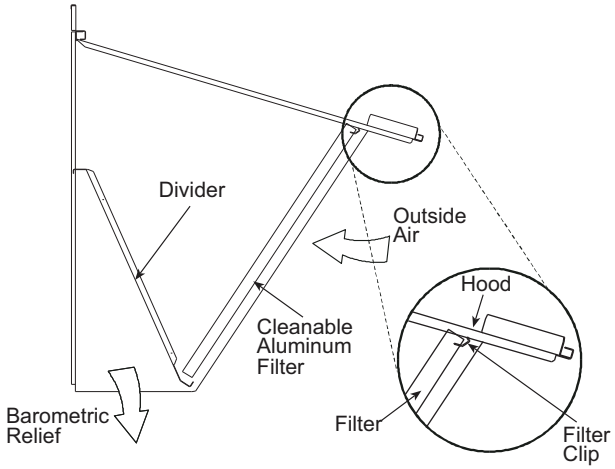


Fig. 19 — Economizer Filter Installation

Step 10 — Install External Condensate Trap and Line

The unit has one 3/4 in. condensate drain connection on the end of the condensate pan and an alternate connection on the bottom. See Fig. 20. Unit airflow configuration does not determine which drain connection to use. Either drain connection can be used with vertical or horizontal applications.

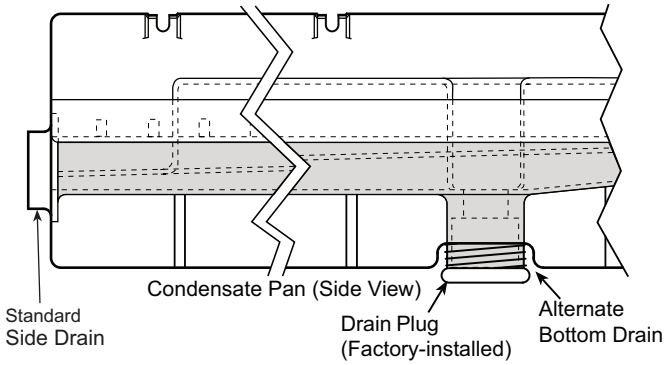
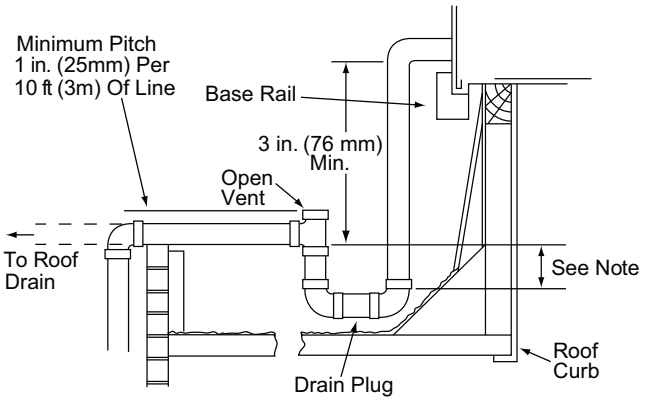


Fig. 20 — Condensate Drain Pan (Side View)

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

The piping for the condensate drain and external trap can be completed after the unit is in place. See Fig. 21.

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.).



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

Fig. 21 — Condensate Drain Piping Details

Step 11 — Install Flue Hood

The flue hood is shipped screwed to the basepan beside the burner compartment access panel. Remove the panel below the control box access panel to access the flue hood shipping location. Using screws provided, install flue hood and screen in location shown in Fig. 22.

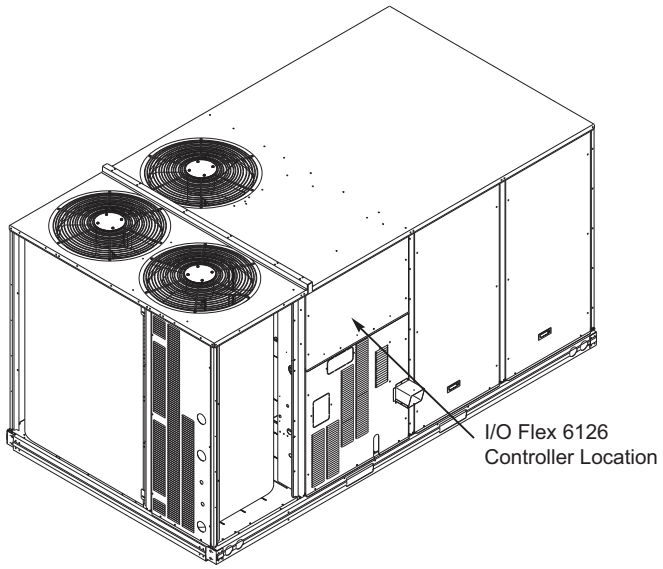


Fig. 22 — Flue Hood Details

Step 12 — Install Gas Piping

Installation of the gas piping must be accordance with local building codes and with applicable national codes. In U.S.A., refer to NFPA 54/ANSI Z223.1 National Fuel Gas Code (NFGC). In Canada, installation must be 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: In U.S.A. the input rating for altitudes above 2000 ft (610 m) must be derated by 4% for each 1000 ft (305 m) above sea level.

For natural gas applications, gas pressure at unit gas connection must not be less than 5 in. wg (1244 Pa) or greater than 13 in. wg (3240 Pa) while the unit is operating (see Table 3). For liquified 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).

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 FPT gas inlet port on the unit gas valve(s). See Table 7 for gas connection sizes and quantities. See Fig. 23 for single connection location and Fig. 23 for dual connection locations.

Table 3 — Natural Gas Supply Line Pressure Ranges

48LCH UNIT SIZES	MIN	MAX
07/08/12	5.0 in. wg (1244 Pa)	13.0 in. wg (3240 Pa)

Table 4 — Liquid Propane Supply Line Pressure Ranges

48LCH UNIT SIZES	MIN	MAX
07/08/12	11.0 in. wg (2740 Pa)	13.0 in. wg (3240 Pa)

Manifold pressure is factory-adjusted for natural gas fuel use. Adjust as required to obtain best flame characteristics. See Table 5.

Manifold pressure for liquid propane fuel must be adjusted to specified range. Follow instructions in the accessory kit to make initial readjustment. See Table 6.

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

The gas supply line can approach the unit in three ways: horizontally from outside the unit (across the roof), thru-curb/under unit basepan (accessory kit required) or through unit basepan (factory-option or accessory kit required). Consult accessory kit installation instructions for details on these installation methods. Observe clearance to gas line components per Fig. 23.

Table 5 — Natural Gas Manifold Pressure Ranges

48LCH UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
D/E/S/R0	07,08,12	3.5 in. wg (872 Pa)	2.0 in. wg (498 Pa)
48LCF/T0 (High Heat units only)	12 only	3.4 in. wg (847 Pa)	2.3 in. wg (573 Pa)

Table 6 — Liquid Propane Manifold Pressure Ranges

48LCH UNIT MODEL	UNIT SIZE	HIGH FIRE	LOW FIRE
D/E/S/R0	07,08,12	10.0 in. wg (2491 Pa)	5.7 in. wg (1420 Pa)
F/T0 (High Heat units only)	12 only	6.2 in. wg (1554 Pa)	3.9 in. wg (971 Pa)

LEGEND

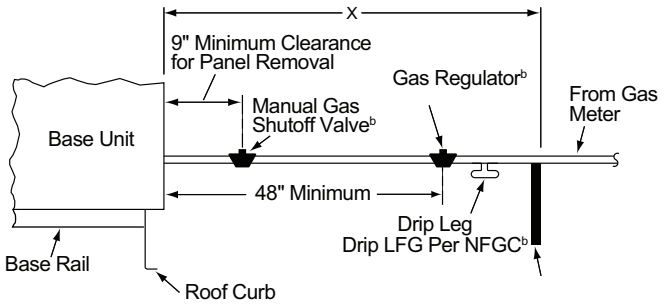
LP — Liquid Propane
NP — Natural Gas

⚠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.



LEGEND
NFGC — National Fuel Gas Code

NOTES:
a. Follow all local codes.
b. Field-supplied.

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

Fig. 23 — Gas Piping Guide

Table 7 — Gas Connection Quantity and Size

HEAT SIZE	TURNDOWN	NO. CONNECTION	07	08	12
LOW	Standard (5:1/3:1)	1	1/2 in.	3/4 in.	3/4 in.
MEDIUM	Standard (5:1/3:1)	1	1/2 in.	3/4 in.	3/4 in.
HIGH	Standard (5:1/3:1)	1	1/2 in.	3/4 in.	3/4 in.
MEDIUM	High (10:1/6:1)	1	N/A	N/A	3/4 in.
HIGH	High (10:1/6:1)	2	N/A	3/4 in.	3/4 in.

FACTORY-OPTION THRU-BASE CONNECTIONS (GAS CONNECTION)

This service connection kit consists of a 3/4 in. NPT gas adapter fitting (stainless steel), a 1/2 in. electrical bulkhead connector and a 1-1/2 in. electrical bulkhead connector, connected to an "L" bracket covering the embossed (raised) section of the unit basepan in the condenser section. See Fig. 24.

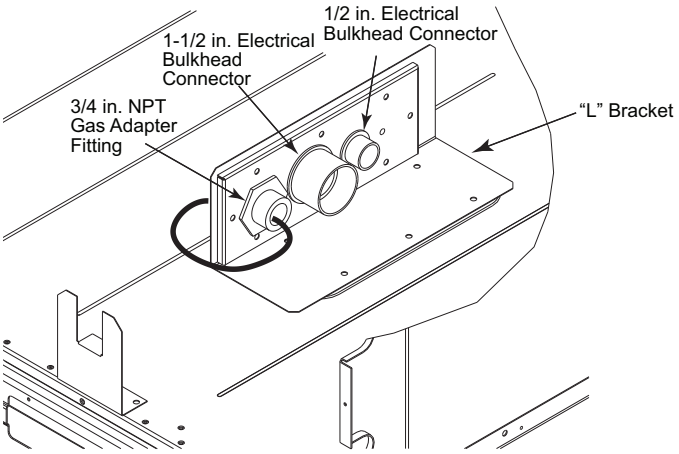


Fig. 24 — Thru-the-Base Option, Shipping Position

1. Remove the "L" bracket assembly from the unit (see Fig. 24).
2. Cut and discard the wire tie on the gas fitting. Hand tighten the fitting if it has loosened in transit.
3. Remove connector plate assembly from the "L" bracket and discard the "L" bracket, but retain the washer head screws and the gasket (located between the "L" bracket and the connector plate assembly.

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

4. Place the gasket over the embossed area in the basepan, aligning the holes in the gasket to the holes in the basepan. See Fig. 25.
5. Install the connector plate assembly to the basepan using 8 of the washer head screws.

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

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

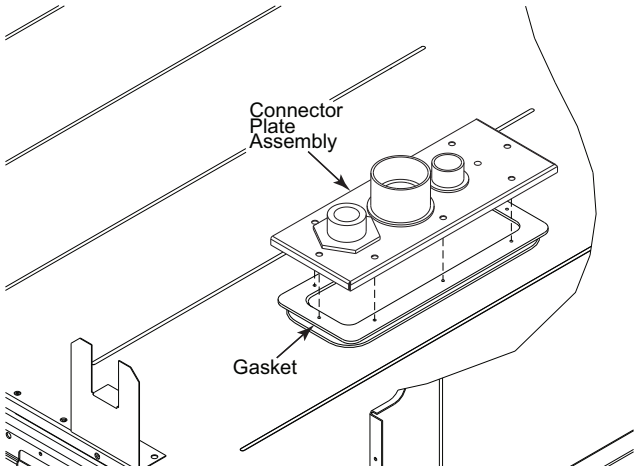


Fig. 25 — Completing Installation of Thru-the-Base Option

Check tightness of connector lock nuts before connecting gas piping. Install a 3/4 in. NPT street elbow on the thru-base gas fitting. Attach a 3/4 in. pipe nipple with minimum length of 16 in. (406 mm) (field-supplied) to the street elbow and extend it through the access panel at the gas support bracket. See Fig. 26.

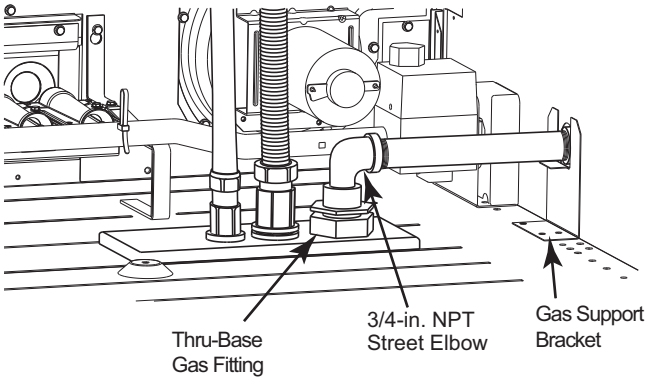


Fig. 26 — Gas Line Piping

Other hardware required to complete the installation of the gas supply line will include a manual shutoff valve, a sediment trap (drip leg) and a ground-joint union. A pressure regulator valve may also be required (to convert gas pressure from pounds to inches of pressure). The manual shutoff valve must be located within 6 ft (1.83 m) of the unit. The union, located in the final leg entering the unit, must be located at least 9 in. (230 mm) away from the access panel to permit the panel to be removed for service. If a regulator valve is installed, it must be located a minimum of 4 ft (1220 mm) away from the unit's flue outlet. Some municipal codes require that the manual shutoff valve be located upstream of the sediment trap. See Fig. 27 and 28 for typical piping arrangements for gas piping that has been routed through the sidewall of the curb. See Fig. 29 for typical piping arrangement when thru-base is used. Ensure that all piping does not block access to the unit's main control box or limit the required working space in front of the control box.

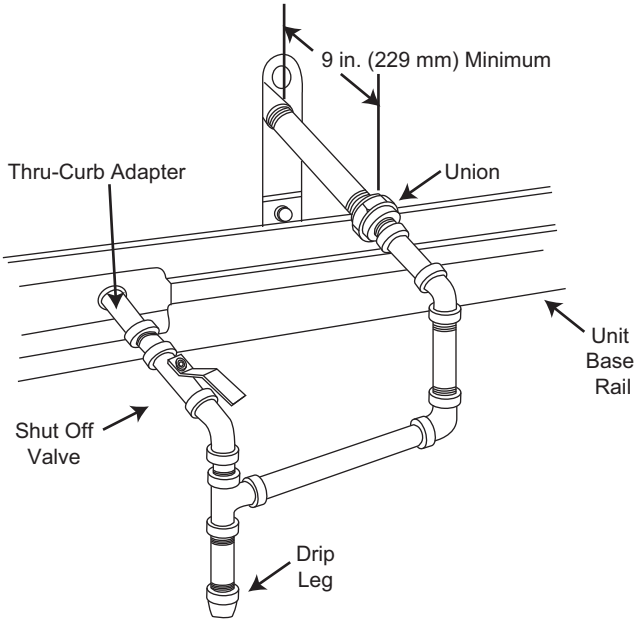


Fig. 27 — Gas Piping with Direct Drip Leg

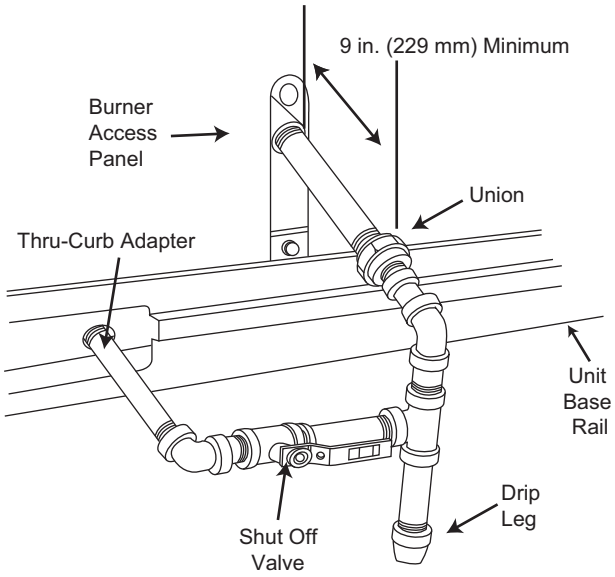


Fig. 28 — Gas Piping with Offset Drip Leg

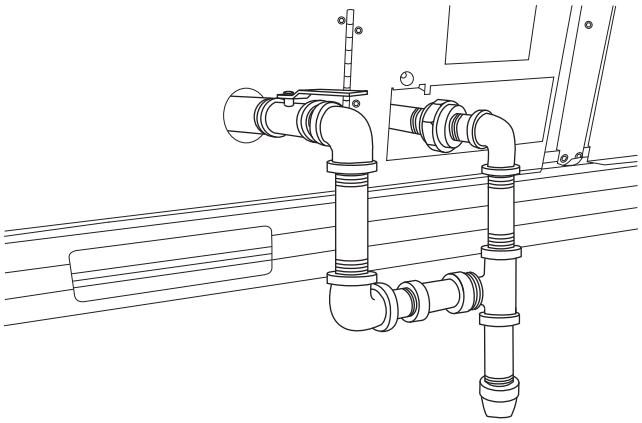


Fig. 29 — Gas Piping Thru-Base Connections

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

1. Avoid low spots in long runs of pipe. Grade all pipe 1/4 in. in every 15 ft (7 mm in every 5 m) to prevent traps. Grade all horizontal runs downward to risers. Use risers to connect to heating section and to meter.
2. Protect all segments of piping system against physical and thermal damage. Support all piping with appropriate straps, hangers, etc. Use a minimum of one hanger every 6 ft (1.8 m). For pipe sizes larger than 1/2 in., follow recommendations of national codes.
3. Apply joint compound (pipe dope) sparingly and only to male threads of joint when making pipe connections. Use only pipe dope that is resistant to action of liquefied petroleum gases as specified by local and/or national codes. If using PTFE (Teflon[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).

⚠WARNING

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

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

NOTE: If orifice hole appears damaged or it is suspected to have been re-drilled, check orifice hole with a numbered drill bit of correct size. Never re-drill an orifice. A burr-free and squarely aligned orifice hole is essential for proper flame characteristics. See Fig. 30.

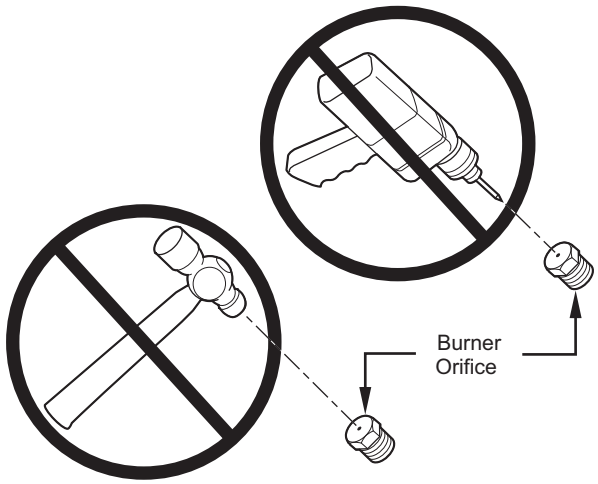


Fig. 30 — Orifice Hole

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Step 13 — Install Gas Heating Condensate Drain

Condensation in the heater can occur during heating operation in applications with modulating heat or in 100% outdoor air applications. Condensation in the heater section can also occur during cooling operation, as the heater is downstream of the cooling coil. In these applications, connection of the drain line is required to prevent condensate buildup and possible heat exchanger damage. A 1/4 in. NPT condensate drain connection is provided in the flue box to remove condensate from inside the heat exchanger. See Fig. 31 for condensate drain fitting location.

The condensate drain must be connected to a drain. A P-trap is recommended in the drain, as the system operates under a negative pressure. The use of a "Tee" fitting is recommended to allow for priming and cleaning the trap. Use a plug in the cleanout opening. See Fig. 32 for typical condensate drain piping example.

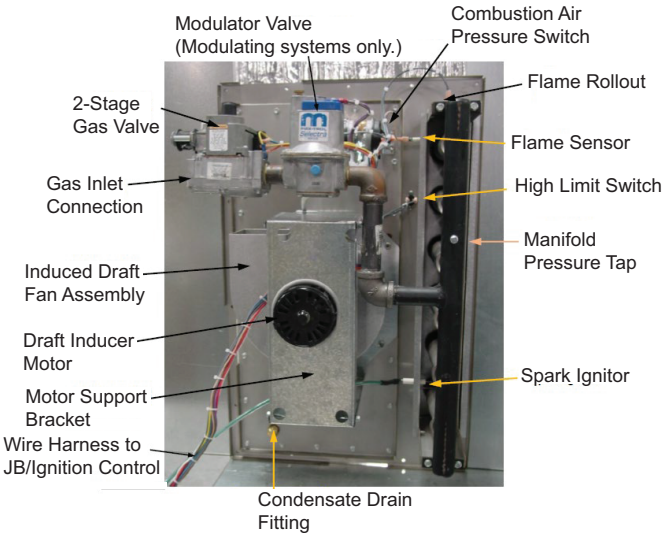


Fig. 31 — Gas Heater Condensate Drain Fitting

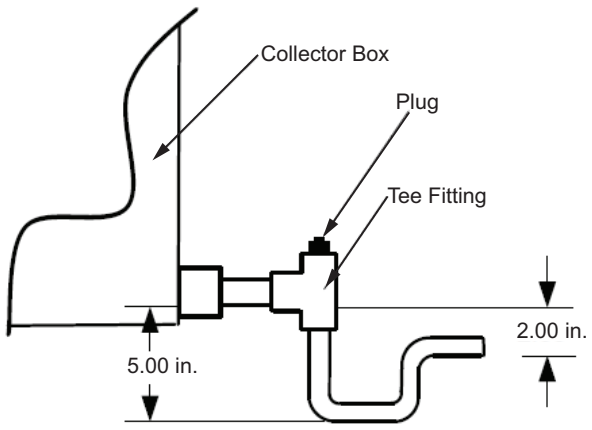


Fig. 32 — Gas Heater Condensate Drain Example

IMPORTANT: Flue gas condensate generated during heating is corrosive and may result in shortened heat exchanger life. Use corrosion resistant metal tubing or composite tubing. Metal condensate drain lines should have corrosion resistance at least equal to that of 304 SS. Copper tubing is not suitable for flue gas condensate. Disposal of flue gas condensate is subject to local codes and ordinances. Some municipalities require that the acidic condensate produced be neutralized before being discharged into the sanitary sewer. Acidic condensate can cause damage to roofing material and may void the roof warranty.

IMPORTANT: Disposal of flue gas condensate is subject to local codes and ordinances. Some municipalities require that the acidic condensate produced be neutralized before being discharged into the sanitary sewer.

IMPORTANT: Flue gas condensate can damage roofing material and may void the roof warranty. Consult with the roof installer or material manufacturer for guidance.

Step 14 — Make Electrical Connections

⚠ WARNING

ELECTRIC SHOCK HAZARD

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

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

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

FIELD POWER SUPPLY

For those units without thru-the-curb power, conduit must be used to route the main power from the condenser end, via the power entry in the corner post of the unit (see Fig. 33-35) to either the factory option disconnect or the bottom of the control box. A 1 in. conduit is provided (wrapped around compressor). A second conduit is provided with factory-installed powered convenience outlet. For those units that require conduit larger than 1 in., it must be field supplied. Fig. 33-35 show the various wire routings. See Fig. 36-38 for wiring information.

If the field disconnect is larger than 100A, it must be attached to the unit using accessory CRDISBKT001A00 (disconnect switch bracket). See Fig. 39. Follow the instructions provided with this accessory. For smaller field disconnects, be sure to use 1/2 in. screws to mount the disconnect directly to the end panel, following the instructions on the Field Disconnect Warning Label (see Fig. 40). In either case, set the disconnect vertical location on the unit so that a 90 degree fitting can be used to connect the conduit to the disconnect.

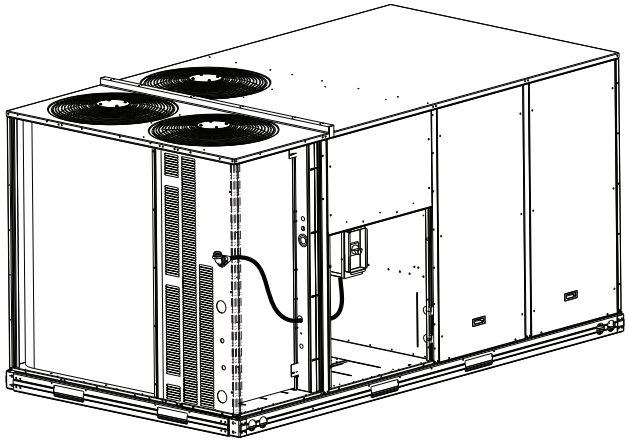


Fig. 33 — Conduit into Factory Option Non-Fused Disconnect (NFD) or HACR

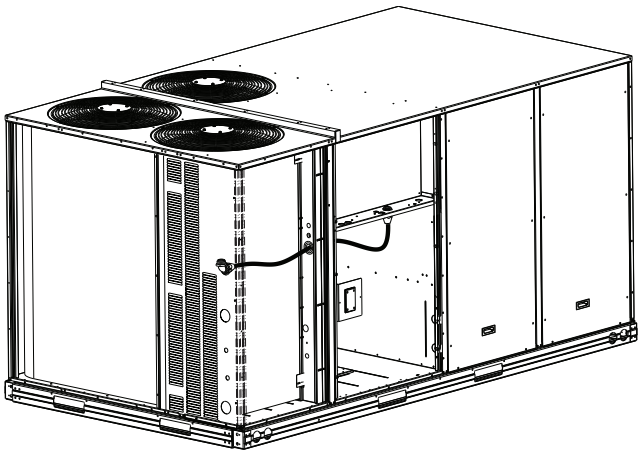


Fig. 34 — Conduit into Control Box

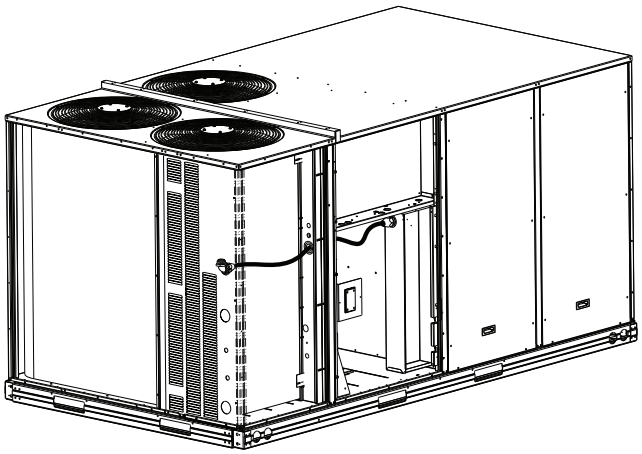


Fig. 35 — Conduit into Single Point Box

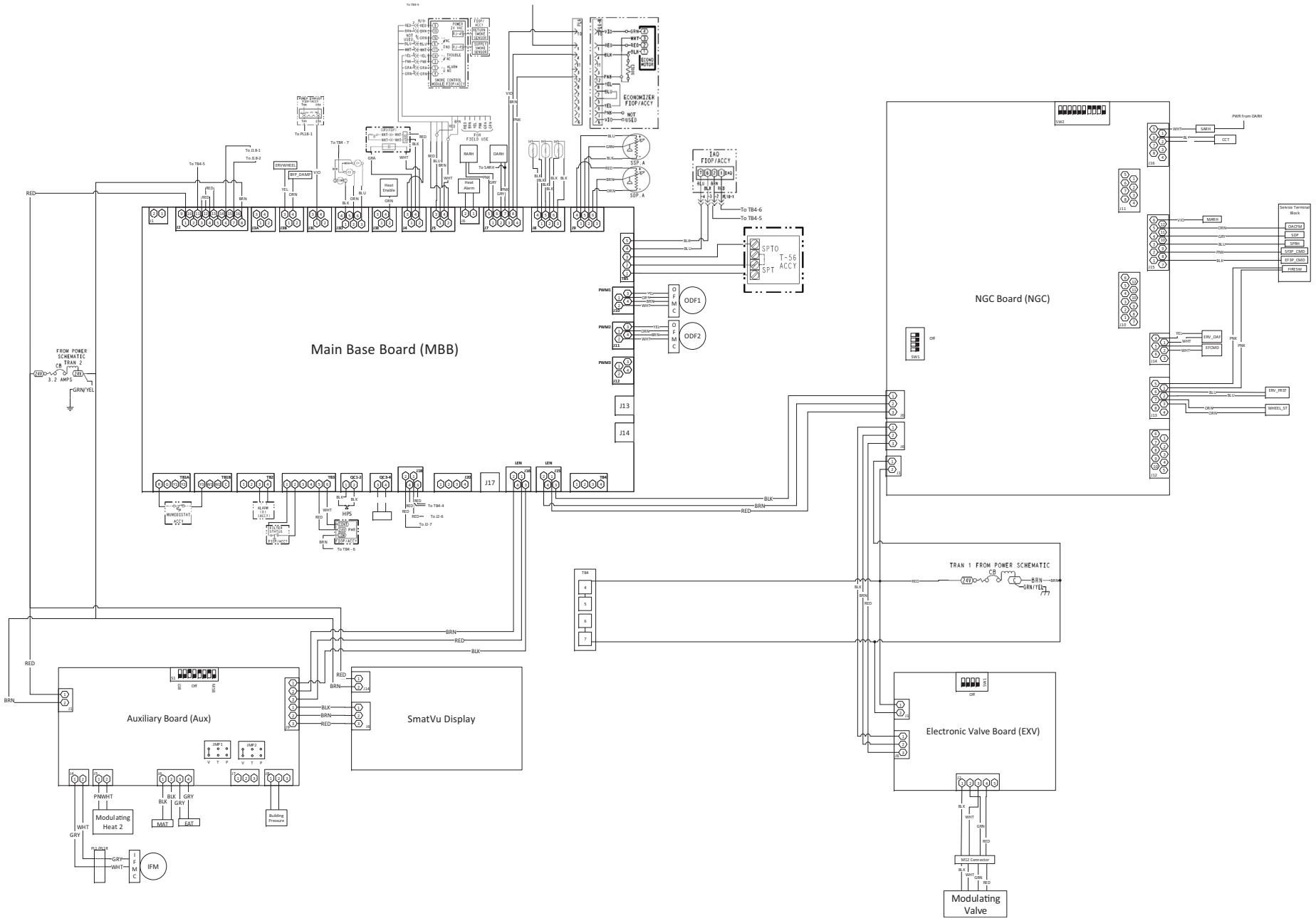


Fig. 36 — 48LC*H 07 SmartVu™ Control Wiring Diagram (208/230-v, 460-v, 575-v Units)

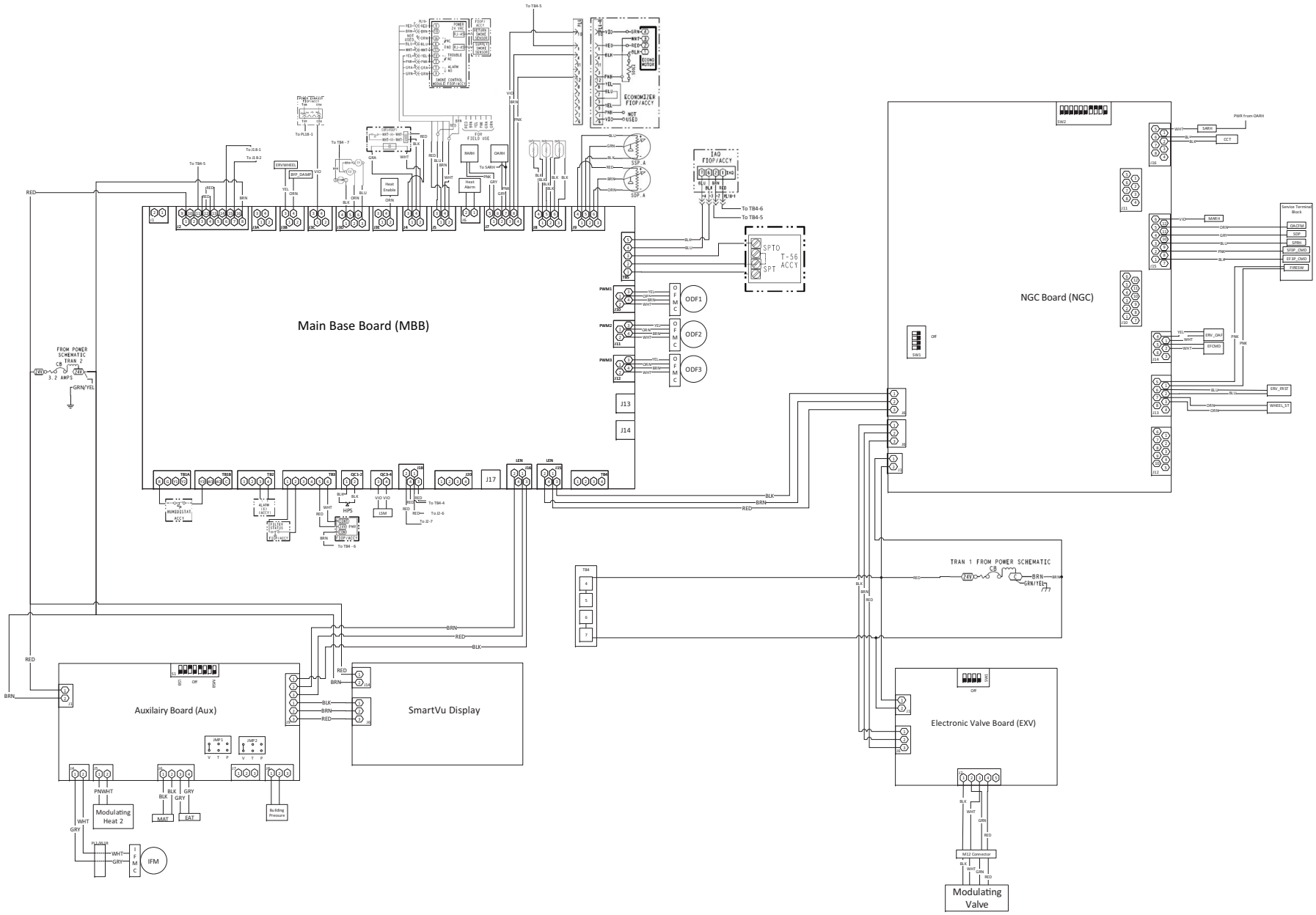


Fig. 37 — 48LC*H 08-12 SmartVu™ Control Wiring Diagram (208/230-v, 460-v, 575-v Units)

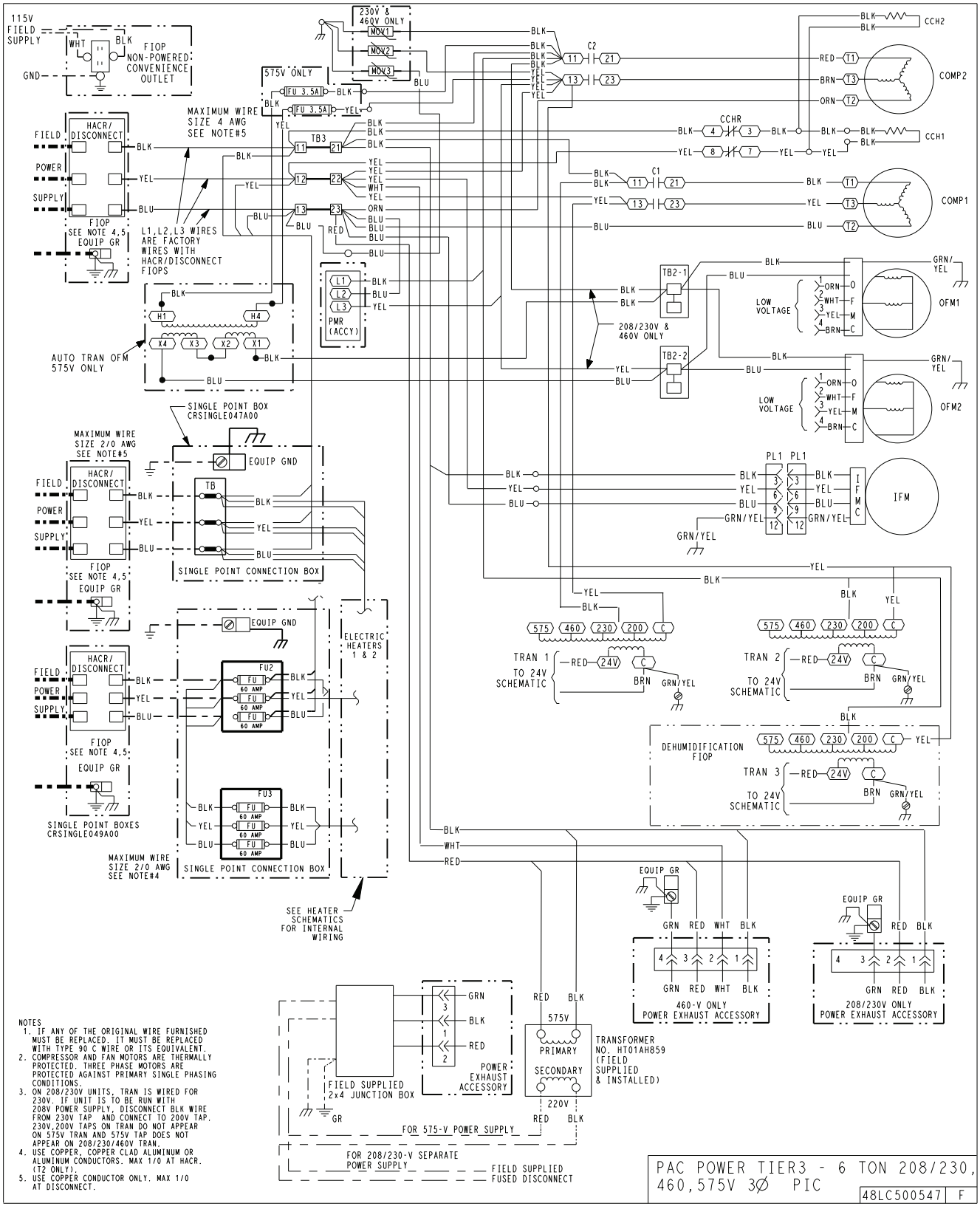


Fig. 38 — 48LC*H 07 Power Wiring Diagram (208/230-v, 460-v, 575-v Units)

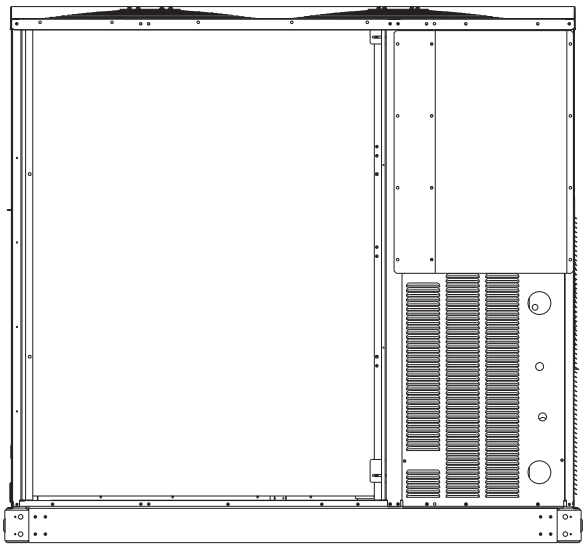


Fig. 39 — Mounting Position for Field Disconnects (over 100A)

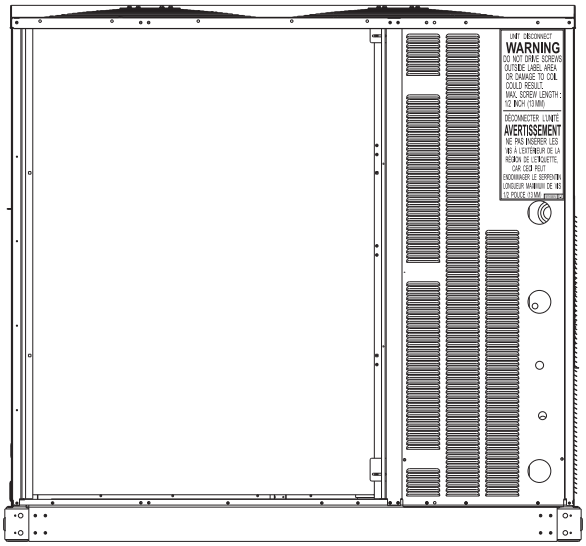
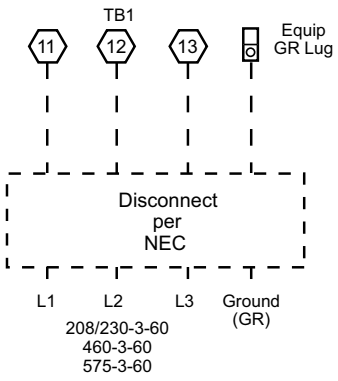


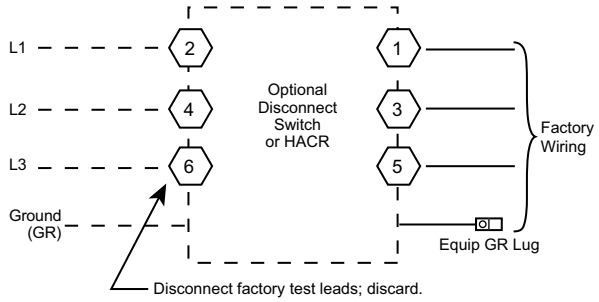
Fig. 40 — Mounting Position for Field Disconnects (up to 100A)

Field power wires are connected to the unit at line-side pressure lugs at the main terminal block (TB1), at factory-installed option non-fused disconnect switch or HACR, or field or factory-installed single point box for electric heat. See Table 8 for maximum wire size at connection lugs. Use copper wire only. See Fig. 41.

Units Without Single Point Box, Disconnect or HACR Option



Units With Disconnect or HACR Option



Units With Electric Heat Option with Single Point Box and Without Disconnect or HACR Option

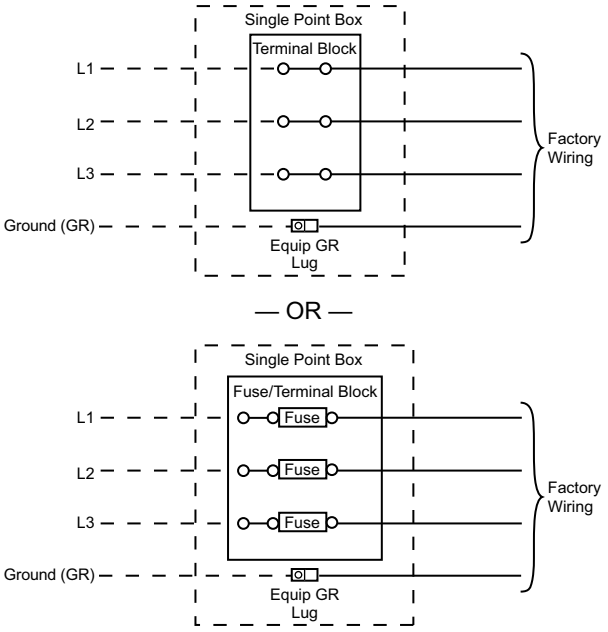


Fig. 41 — Power Wiring Connections

Table 8 — Connection Lug Min/Max Wire Sizes

CONNECTION	MINIMUM	MAXIMUM
TB1 in unit control box	No. 14	No. 1
Terminal/fuse block in single point box for electric heat	No. 8	3/0
80A Disconnect Option	No. 14	No. 4
100A Disconnect Option	No. 8	1/0
200A Disconnect Option	No. 4	300 kcmil
25A HACR Option	No. 14	1/0
30A HACR Option	No. 14	1/0
35A HACR Option	No. 14	1/0
40A HACR Option	No. 14	1/0
50A HACR Option	No. 14	1/0
60A HACR Option	No. 14	1/0
70A HACR Option	No. 14	1/0
80A HACR Option	No. 14	1/0
90A HACR Option	No. 14	1/0
100A HACR Option	No. 14	1/0
110A HACR Option	No. 4	300 kcmil
125A HACR Option	No. 4	300 kcmil
150A HACR Option	No. 4	300 kcmil
175A HACR Option	No. 4	300 kcmil
200A HACR Option	No. 4	300 kcmil

NOTE: Test Leads – unit may be equipped with short leads (pigtails) on the field line connection points off the optional non-fused disconnect switch or HACR. These leads are for factory run-test purposes only; remove and discard before connecting field power wires to unit connection points. Make field power connections directly to line connection pressure lugs only.

⚠ 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.

ALL UNITS

All field wiring must comply with the NEC and local requirements. Size wire based on MCA (Minimum Circuit Amps) on the unit informative plate. Refer to Fig. 41 and the unit label diagram for power wiring connections to the unit power terminal blocks and equipment ground. Refer to Table 8 for maximum wire size at connection lugs. See Fig. 42.

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 Overcurrent Protection) device size.

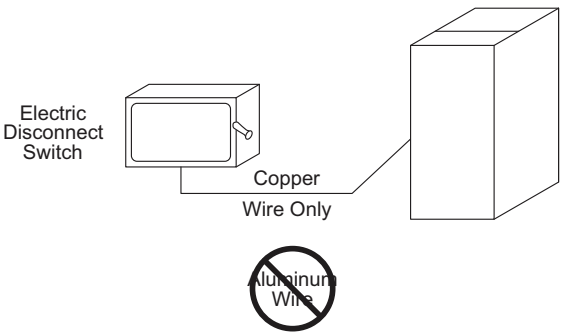


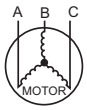
Fig. 42 — Disconnect Switch and Unit

NOTE: Units ordered with factory-installed HACR do not need an additional ground-fault and short-circuit over-current protection device unless local codes require.

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

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

Example: Supply voltage is 230-3-60



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

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

Determine maximum deviation from average voltage.

(AB) 227-224 = 3-v

(BC) 231-227 = 4-v

(AC) 227-226 = 1-v

Maximum deviation is 4-v.

Determine percent of voltage imbalance.

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

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

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

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

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

UNITS 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 disconnect switch is located in a weatherproof enclosure located under the main control box (see Fig. 43 and 44). The manual switch handle is shipped in the disconnect or HACR enclosure. Assemble the shaft and handle to the switch or HACR at this point. Discard the factory test leads (refer to Fig. 41). The factory disconnect is a 200A disconnect on 230-3-60 units and a 100A disconnect on 460-3-60 and 575-3-60 units. On units with factory-installed non-fused disconnect, without factory-installed electric heat, the factory-supplied load side wires may be of insufficient size for accessory electric heat applications. If so, remove the load side factory wiring. Re-size wires per unit nameplate data provided with accessory electric heat. See Fig. 45 and 46 for NFD and HACR shaft and handle installation.

To field install the NFD shaft and handle:

1. Remove the unit front panel (refer to Fig. 2-4).
2. Remove 3 hex screws on the NFD enclosure (2 on the face of the cover and 1 on the bottom).
3. Remove the front cover of the NFD enclosure.
4. Make sure the NFD shipped from the factory is at OFF position (the arrow on the black handle knob should be set to OFF).
5. Insert the shaft with the cross pin on the top of the shaft in the horizontal position.
6. Measure the tip of the shaft to the top surface of the pointer to be 3.75 in. - 3.88 in. (95 mm - 99 mm) for 80A and 100A NFD and 3.43 in. - 3.56 in. (87 mm - 90 mm) for 200A NFD.
7. Tighten the locking screw to secure the shaft to the NFD.
8. Turn the handle to the OFF position with red arrow pointing at OFF.
9. Install the handle on to the painted cover horizontally with the red arrow pointing to the left.
10. Secure the handle to the painted cover with 2 screws and lock washers supplied.
11. Engaging the shaft into the handle socket, re-install 3 hex screws on the NFD enclosure.
12. Re-install the unit front panel.

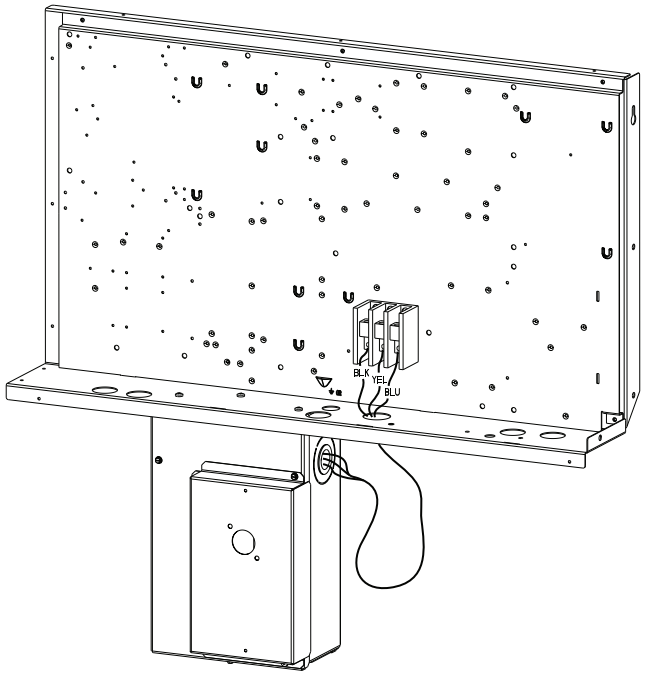


Fig. 43 — Location of Non-Fused Disconnect (NFD) Enclosure

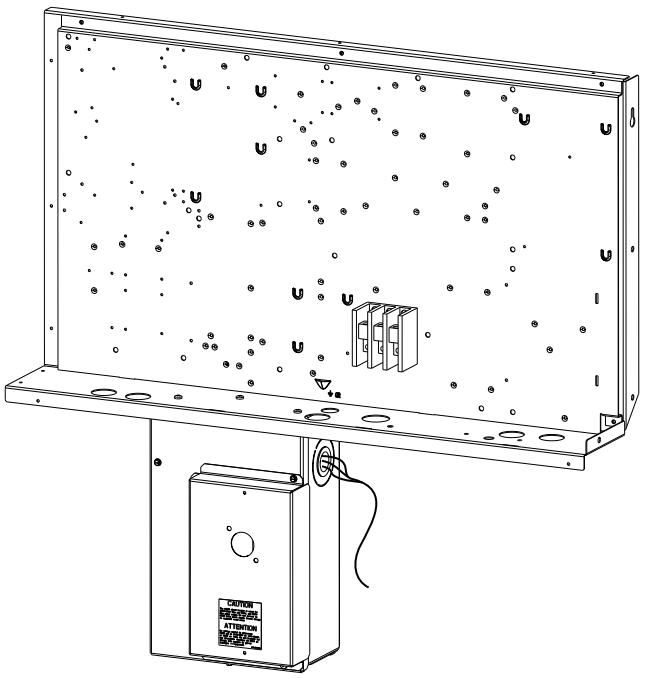


Fig. 44 — Location of HACR Enclosure

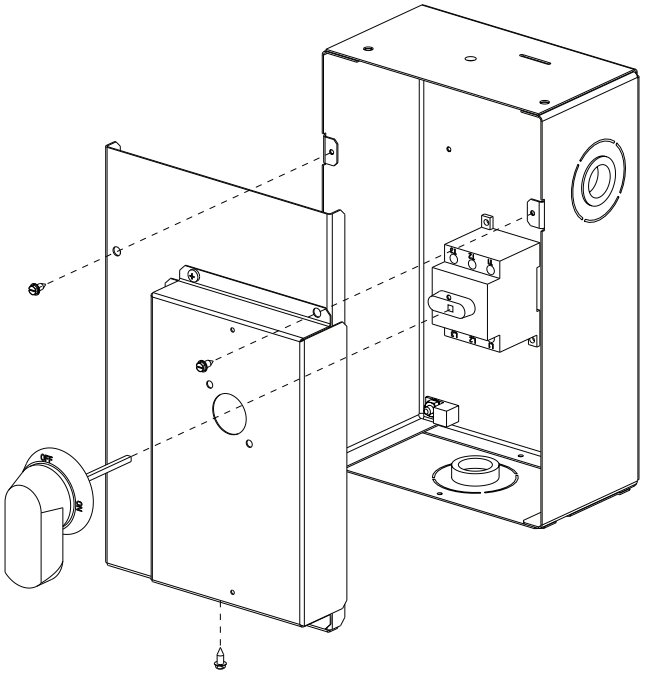


Fig. 45 — Handle and Shaft Assembly for NFD

To field install the HACR shaft and handle:

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

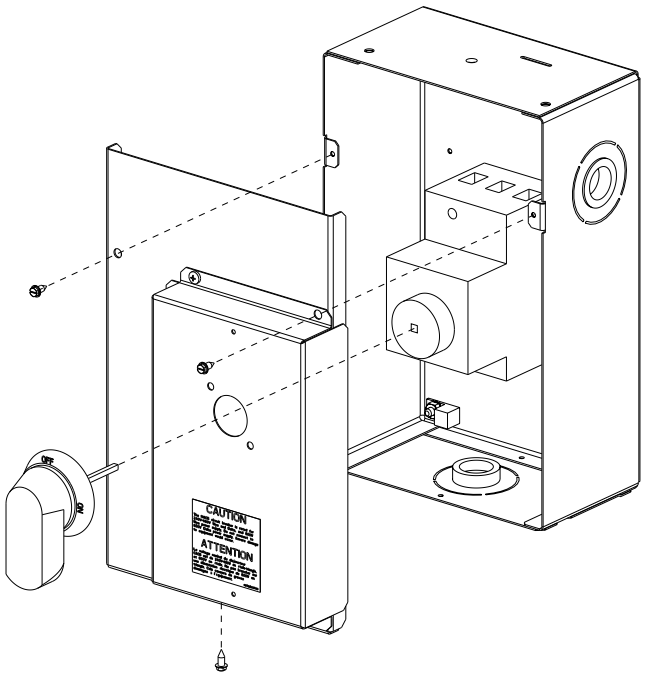


Fig. 46 — Handle and Shaft Assembly for HACR

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 the 48LCH 07-12 units: non-powered and unit-powered. Both types provide a 125-v GFCI (ground-fault circuit-interrupter) duplex receptacle rated at 15-A behind a hinged waterproof access cover, located on the panel beneath the control box. See Fig. 47.

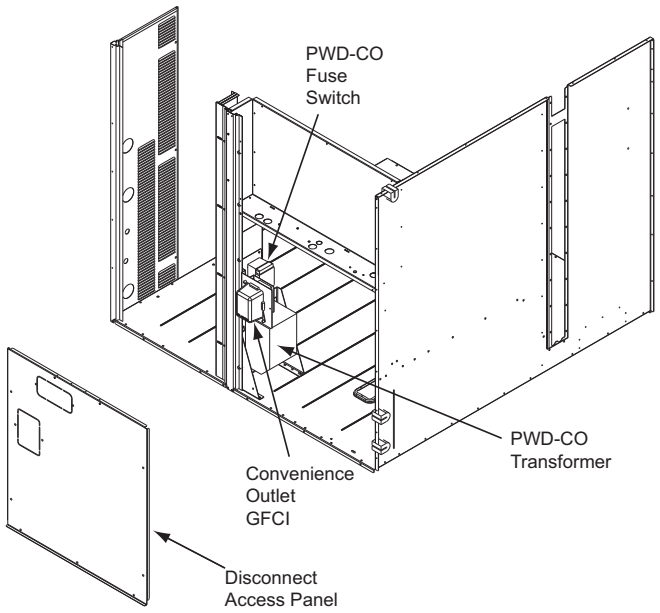


Fig. 47 — Convenience Outlet Location

Non-powered type

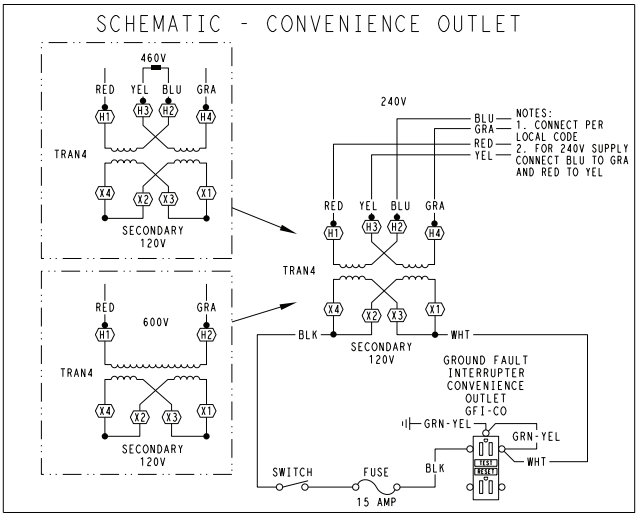
This type requires the field installation of a general-purpose 125-v 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size and conduit requirements, fuse or breaker requirements and disconnect switch size and location. Route 125-v power 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 panel beneath the control box. See Fig. 48.

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on the unit-mounted non-fused disconnect switch; this will provide service power to the unit when the unit disconnect switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect switch is open. (See Fig. 49.) On a unit without a unit-mounted disconnect, connect the source leads to the main terminal block (TB1).

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



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. 48 — Unit Powered Convenience Outlet

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

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

Fuse on power type

The factory fuse is a Bussman™[1] "Fusetron" T-15, non-renewable screw-in (Edison base) type plug fuse. (See Fig. 49.)

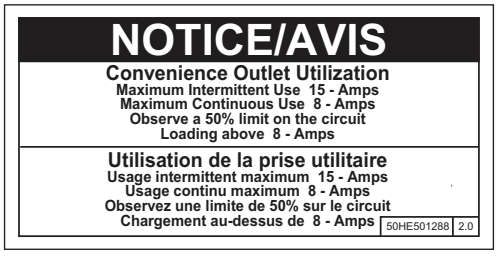


Fig. 49 — Convenience Outlet Utilization Notice

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

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

Installing Weatherproof Cover

IMPORTANT: 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.

IMPORTANT: 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.

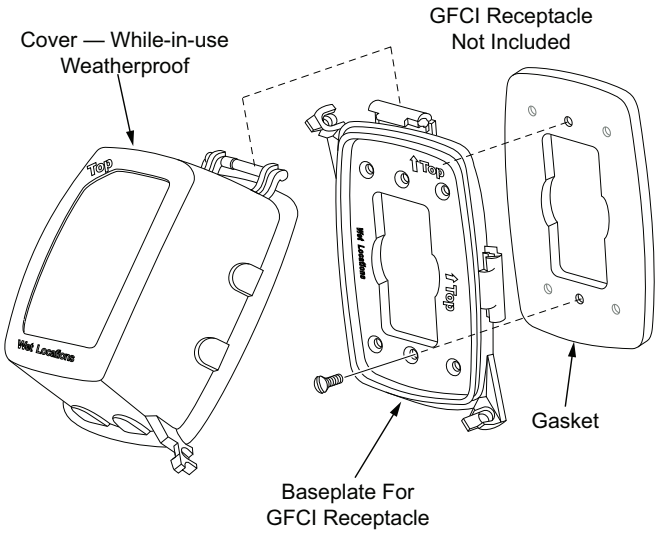


Fig. 50 — Weatherproof Cover Installation

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

HACR BREAKER (OPTION)

The amp rating of the HACR factory-installed option is based on the size, voltage, indoor motor, and other electrical options of the unit as shipped from the factory. If field-installed accessories are added or changed in the field (e.g., electric heat, power exhaust), the HACR may no longer be of the proper amp rating and therefore will need to be removed from the unit. See unit nameplate and label on factory-installed HACR for the amp rating of the HACR that was shipped with the unit from the factory. See unit nameplates for the proper fuse, HACR or maximum over-current protection device required on the unit with field-installed accessories. (See Fig. 51.)

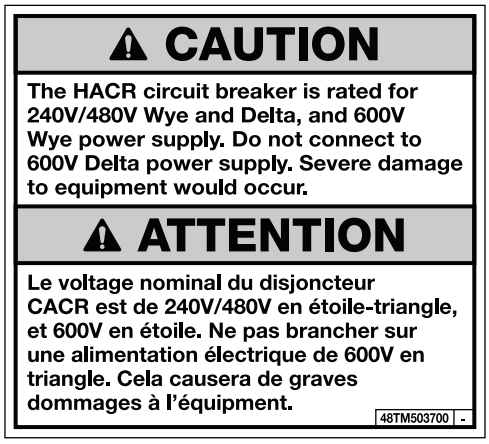


Fig. 51 — HACR Caution Label

FACTORY-OPTION THRU-BASE CONNECTIONS

This service connection kit consists of a 1/2 in. electrical bulkhead connector and a 1-1/2 in. electrical bulkhead connector, connected to an "L" bracket covering the embossed (raised) section of the unit basepan in the condenser section. (See Fig. 52.) The 1/2 in. bulkhead connector enables the low-voltage control wires to pass through the basepan. The 1-1/2 in. electrical bulkhead connector allows the high-voltage power wires to pass through the basepan.

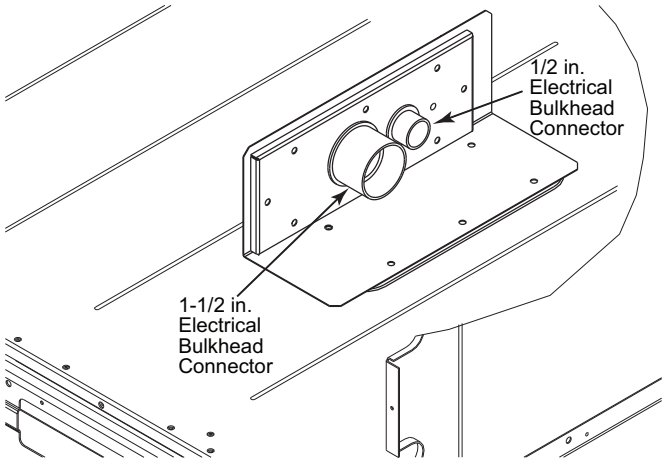


Fig. 52 — Thru-the-Base Option, Shipping Position

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

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

3. Place the gasket over the embossed area in the basepan, aligning the holes in the gasket to the holes in the basepan. (See Fig. 53.)
4. Install the connector plate assembly to the basepan using 8 of the washer head screws.

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

Check tightness of connector lock nuts before connecting electrical conduits.

Field-supplied and field-installed liquid tight conduit connectors and conduit may be attached to the connectors on the basepan. Pull correctly rated high voltage and low voltage wires through appropriate conduits. Connect the power conduit to the internal disconnect (if unit is equipped) or to the external disconnect (through unit side panel). Remove one of the two knockouts located on the bottom left side of the unit control box. Use this hole for the control conduit.

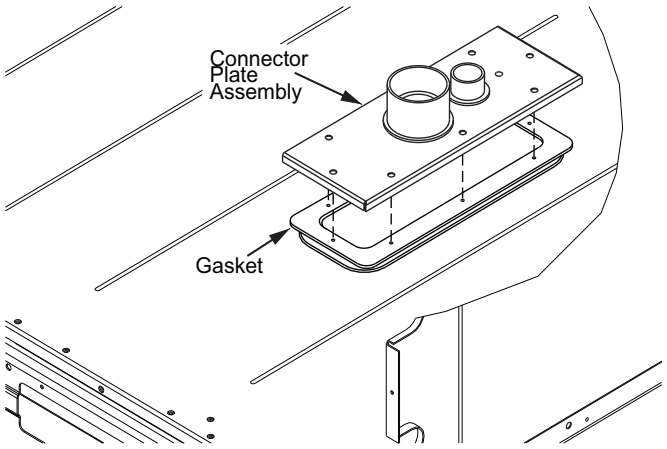


Fig. 53 — Installing Thru-the-Base Option

UNITS WITHOUT THRU-BASE CONNECTIONS

1. Install power wiring conduit through side panel openings. Install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 41.

FIELD CONTROL WIRING

Unit requires a field installed and wired supply air temperature sensor for proper operation. Additional control and communication wiring for space sensors, thermostat, or a building automation system (BAS), may be needed based on project requirements. See the Controls, Start-up, Operation, Troubleshooting, and Maintenance manual for additional details on sensor usage. See the sensor installation instructions for wiring and installation details.

NOTE: Unit controls are not compatible with Rnet sensors or interfaces.

NOTE: Ensure all low and high voltage wiring are separated in accordance with UL and NEC requirements.

UNIT WITHOUT THRU-BASE CONNECTION KIT

Pass the control and communication control wires through the bushing on the unit end panel. Route the wire through the snap-in wire tie and up to the web bushing near the control box. Route the wire through the bushing and into the bottom left side of the control box after removing one of the two knockouts in the corner of the box. Using a connector at the control box to protect the wire as it passes into the control box, pull the wires over to the required connection points in the control box. Use the connector at the control box and the wire tie to ensure that the control and communicating wire is tight and will not be damaged by contact with the condenser coil. (See Fig. 54.)

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

NOTE: Using the bushings and wire ties will ensure all low and high voltage wiring are separated in accordance with UL and NEC requirements.

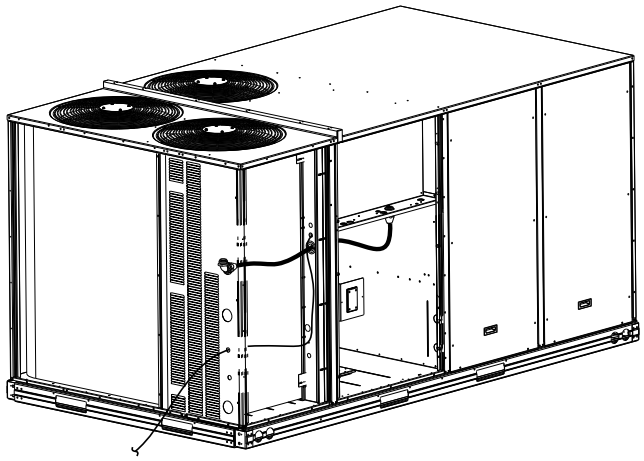


Fig. 54 — Thermostat Wire Routing

HEAT ANTICIPATOR SETTINGS

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

ELECTRIC HEATERS

48LC*H 07-12 units may be equipped with factory-installed electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators, line-break limit switches and a control contactor. 1 or 2 heater modules may be used in a unit.

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. (See Fig. 55.)

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

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

Fig. 55 — Typical Component Location

Step 15 — Adjust Factory-Installed Options

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on all unit sizes. Smoke detectors may be specified for supply air only, for return air with or without economizer, or in combination of supply air and return air. Return-air smoke detectors are arranged for vertical return configurations only. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for 30 second smoke detector shutdown operation; additional wiring or modifications to the SmartVu™ control may be necessary to complete the unit and smoke detector configuration to meet project requirements.

Units equipped with factory-optional return-air smoke detectors require a relocation of the sensor module at unit installation. See Fig. 56 for the as-shipped location.

Completing Installation of Return Air Smoke Sensor

1. Unscrew the two screws holding the return air smoke detector assembly. See Fig. 57, Step 1. Save the screws.
2. Turn the assembly 90 degrees and then rotate end to end. Make sure that the elbow fitting is pointing down. See Fig. 57, Step 2.
3. Screw the sensor and detector plate into its operating position using screws from Step 1. See Fig. 57, Step 3.
4. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.

Additional Application Data

Refer to installation instructions for Factory-Installed Smoke Detectors for Small and Medium Rooftop Units 2 to 25 Tons for instruction and explanation on additional control features of these smoke detectors including multiple unit coordination.

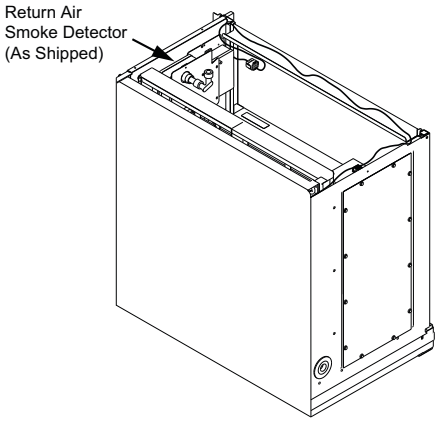


Fig. 56 — Return-Air Smoke Detector (Shipping Position)

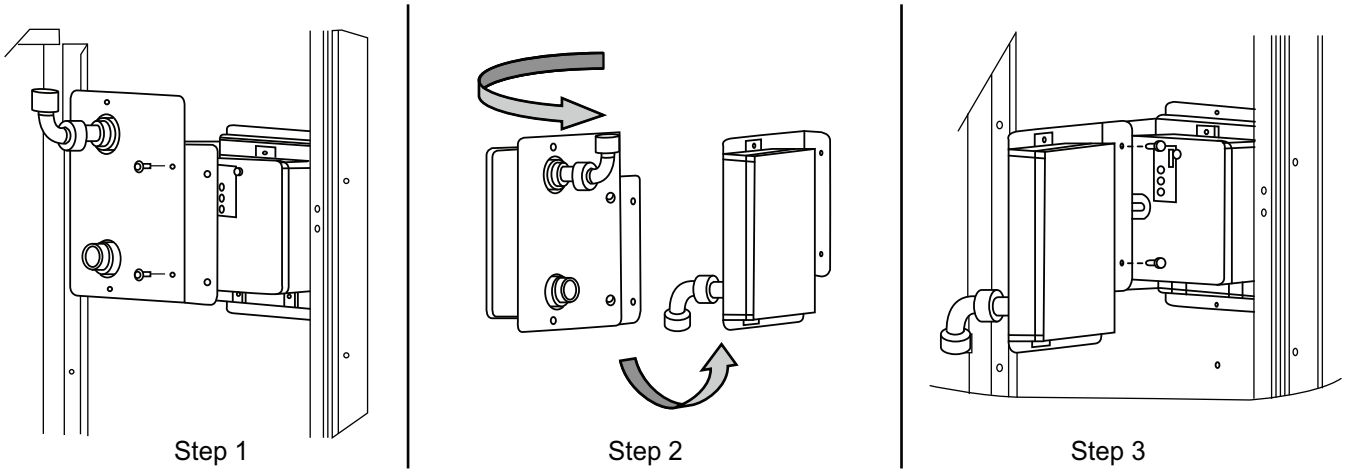


Fig. 57 — Completing Installation of Return-Air Smoke Sensor

DUCT PRESSURE TRANSDUCER

The unit can be equipped with factory wired and installed duct pressure transducer for variable speed fan operation based on duct static pressure. (See Fig. 58.) The 1/4 in. OD (outside dimensions) high pressure pickup port must be piped to the supply duct for pressure measurement.

First, identify a location in the supply ductwork for pressure measuring. The sensing location should be 1/3 to 2/3 of the way down the ductwork, if possible. Make sure the pressure sensing location is away from any duct accessories that would cause pressure disturbances, such as turning vanes, duct tees or wyes, VAV (Variable Air Volume) boxes, or smoke dampers. Install a static pressure probe for best results.

Identify the total length between the unit and the pressure measuring location. For applications up to 100 ft, use 3/16 in. ID (inside dimensions) pneumatic tubing. For applications up to 200 ft, use 1/4 in. ID pneumatic tubing. Connect the pneumatic tubing to the pressure pickup port in the duct and route it to the high side pressure pickup port of the transducer. Ensure the tubing is not pinched or kinked.

Prior to connecting the pneumatic tubing to the high pressure port, verify that the sensor is reading 0. With the sensor powered and both the high and low port open to atmosphere, check the current output between +EXC and OUT. The reading should be 4mA. If the reading is not 4 mA, turn the zero adjustment screw to adjust the output to 4 mA. Connect the pneumatic tubing to the high side pressure port on the sensor. Verify the review the sensor output and verify the reading.

NOTE: The low side pickup port can be left open inside the control box. If the low side pressure is not reading properly, connect it to pneumatic tubing to a pressure pickup port outside the control box to measure atmospheric pressure.

BUILDING PRESSURE TRANSDUCER

The unit can be equipped with factory wired and installed building pressure transducer for variable speed supply fan operation based on zone static pressure (100% OA only) or variable speed exhaust fan operation based on building pressure. The 1/4 in. OD (outside dimensions) high pressure pickup port must be piped to the building or zone for pressure measurement.

First, identify a location in the building or zone for pressure measuring. The pressure measuring location can be on a wall or on the ceiling. Make sure the pressure sensing location is away from any devices that would affect the pressure reading, such as exhaust fan intakes or supply diffusers. Install a static pressure probe for best results.

Identify the total length between the unit and the pressure measuring location. For applications up to 100 ft, use 3/16 in. ID (inside dimensions) pneumatic tubing. For applications up to 200 ft, use 1/4 in. ID pneumatic tubing. Connect the pneumatic tubing to the pressure pickup port in the space and route it to the high side pressure pickup port of the transducer. Ensure the tubing is not pinched or kinked.

Prior to connecting the pneumatic tubing to the high pressure port, verify that the sensor is reading 0. With the sensor powered and both the high and low port open to atmosphere, check the current output between +EXC and OUT. The reading should be 12 mA. If the reading is not 12 mA, turn the zero adjustment screw to adjust the output to 12 mA. Connect the pneumatic tubing to the high side pressure port on the sensor. Verify the review sensor output and verify the reading.

NOTE: The low side pickup port can be left open inside the control box. If the low side pressure isn't reading properly, connect it to pneumatic tubing to a pressure pickup port outside the control box to measure atmospheric pressure.

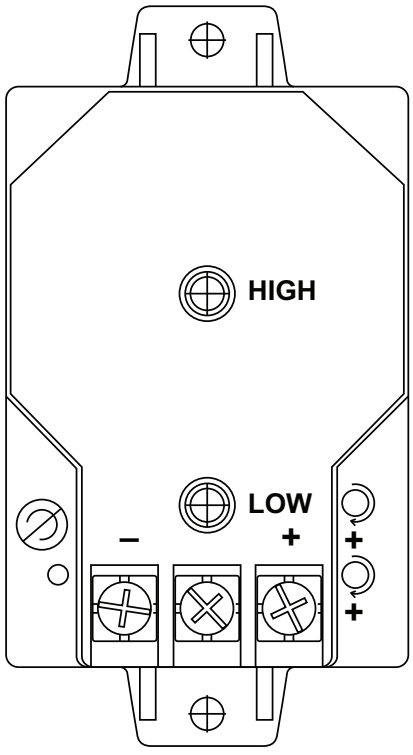


Fig. 58 — Duct Pressure Transducer

Step 16 — Install Accessories

Available accessories include:

- Smoke Detectors
- Roof Curb (must be installed before unit)
- Thru-base Connection Kit (must be installed before unit is set on curb)
- EconoMi$er® 2
- Power Exhaust
- CO_2 Sensor
- Space Temperature and Humidity Sensors
- Louvered Hail Guard
- Phase Monitor Control
- Smoke Detectors
- Differential Pressure Transmitter
- Return Duct Cover
- Thermostat and Humidistat
- Filter Status Switch
- Filter Kits

Refer to separate installation instructions for information on installing these accessories. See price pages for a complete list of field-installed accessories.

Step 17 — Controls Setup, Pre-Startup Checklist, Startup Checklist

The mechanical installation of the unit is now complete. Prior to operating the unit, the controls setup, pre-startup checklist, and start-up checklist must be completed. Refer to the unit Controls, Operation, Start-up, Troubleshooting, and Maintenance manual for further instruction. Refer to HVAC Partners (HVACPartners.com) to obtain the latest manual.

Step 18 — Temporary Construction Operation

OPERATION

If the unit will be used for temporary cooling or heating for a building under construction, consider the following guidance. Consult your local Carrier sales office for additional details on temporary operation.

Prior to temporary operation

1. The unit shall not operate during interior finishing. Return air and supply air vent openings shall be covered during installation and construction to minimize penetration of dust and debris at all times prior to the finishing stages of construction.
2. Interior drywall installation shall be completed and covered with paint or primer and premises shall be substantially free of debris and dust prior to unit operation.
3. The installation shall comply with all manufacturer's installation instructions and operating guidance.
4. Air filters must be in place. A minimum filter rating of MERV 11 is recommended during final completion.
5. Cooling and heating (if equipped) – pre-start-up and start-up checks shall be performed prior to unit operation.
6. Configure controls for temporary operating control.

During temporary operation

1. The system must be checked daily to ensure proper system operation.
2. Cooling and heating operating conditions and airflows must be in accordance with manufacturer's guidance.
3. The system must be maintained in accordance with manufacturer's recommendations and timelines.

Prior to normal operation

1. Clean unit, duct work, and components upon substantial completion of the construction process, and verify unit operating conditions are in accordance with the manufacturer's instructions.
2. Install a new, clean air filter.
3. Perform Cooling and Heating (if equipped) – pre-start-up and start-up checks.

NOTE: Equipment damage or failures caused by improper application, operation, or lack of maintenance is excluded from warranty coverage. Consult the Carrier Warranty certification for the applicable equipment details.

CONTROLS

Introduction

The WeatherExpert™ 48LC*H features the Carrier SmartVu™ control system, which controls and monitors the unit operation. This manual provides basic, step by step guidance on control setup and unit operation for typical applications. For more detailed information, refer to the Controls, Operation, and Troubleshooting guide on HVACPartners (HVACPartners.com) or Carrier.com/commercial.

Overview

The SmartVu control system includes multiple control boards and a touchscreen interface, which can be found in the control box. See Fig. 59 for control box location and Fig. 64 for typical control box layout. The SmartVu controls include multiple standard and optional factory-installed sensors. See Table 9 for sensor listing and Fig. 60-62 for sensor locations.

Control Interface

NAVIGATION

The interface operation method is the same for both touchscreen and web browser use and is typical of a touchscreen interface, like a smartphone or tablet. Clicking on specific icons or buttons will perform an action. See Table 11 for a list of the interface buttons related to navigation.

Screens can contain multiple pages of information. When additional pages are present, the page up/down button will be displayed at the bottom of the screen and the number after will show as two or more. Pressing the page up/down button will scroll through the available pages. See Fig. 63 for an example of a screen with multiple pages.

TOUCHSCREEN DISPLAY

The SmartVu touchscreen display is the primary method of interfacing with the controls for setup and equipment start-up. The touchscreen is a capacitive 7 in. LCD that can be activated with a finger, touch compatible gloves, or stylus. See Fig. 65 for display layout and port locations.

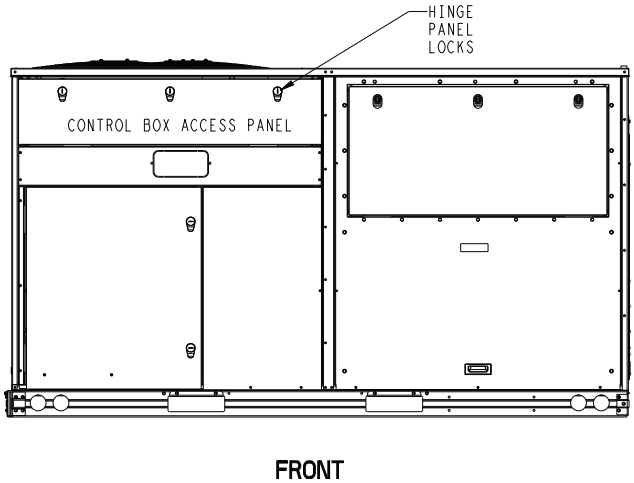


Fig. 59 — Control Box Location

Table 9 — Factory-Installed Sensors and Switches

NAME	DESCRIPTION	LOCATION	INCLUDED
OAT	Outdoor Air Temperature	Condenser Section	Standard
OARH	Outdoor Air Relative Humidity	Condenser Section	Standard
RAT	Return Air Temperature	Return Section	Standard
RARH	Return Air Relative Humidity	Return Section	Standard
SAT	Supply Air Temperature	Field-installed in Supply Duct	Standard
SARH	Supply Air Relative Humidity	Supply Fan Section	Standard
HPS	Refrigerant High-pressure Switch	Discharge Line	Standard
SSP.A	Saturated Suction Pressure	Suction Line	Standard
SDP.A	Saturated Discharge Pressure	Discharge Line	Standard
COFS	Condensate Overflow Switch	Condensate Pan	Standard
SP	Supply Duct Pressure	Control Box	Optional
BP	Building Pressure	Control Box	Optional
IAQ	Return Air Carbon Dioxide (CO_2)	Return Section	Optional

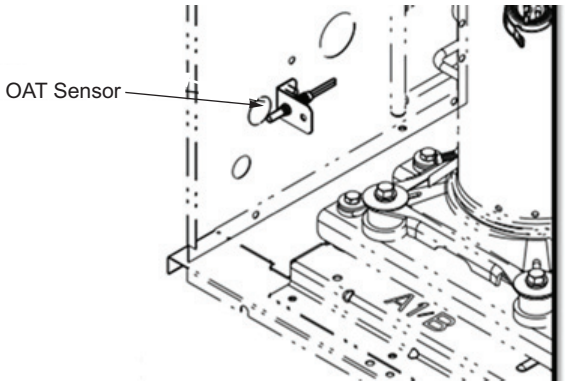


Fig. 60 — OAT Sensor Location

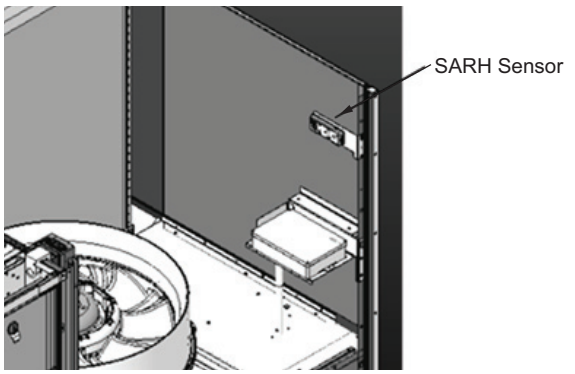


Fig. 61 — SARH Sensor Location

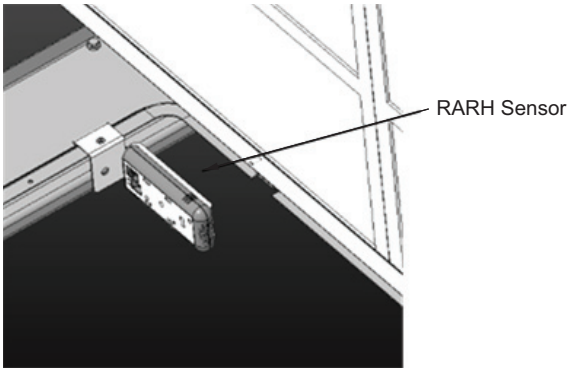


Fig. 62 — RARH Sensor Location

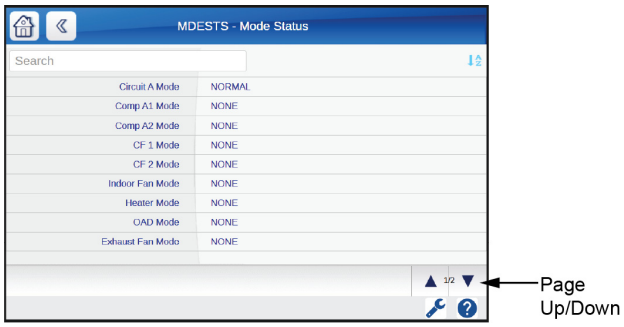


Fig. 63 — Page Up/Down Buttons

WEB BROWSER

The SmartVu controls can be accessed using a hardwired ethernet connection and a web browser. See Fig. 65 (SmartVu touchscreen display) for internet port locations. See Table 10 for default IP addresses.

Once the hardwired connection is established between the computer and the control, open a web browser, and enter the default address to access the control. The user interface should appear on the web browser.

NOTE: The web UI connection may be detected as a non-secure connection by your web browser. If so, use the advanced menu option on the web browser to acknowledge and accept the connection.

LEGACY CONTROL INTERFACES

The SmartVu controls are not compatible with legacy Carrier control interfaces, such as the Navigator™, TouchPilot™, Equipment Touch™, or System Touch™ interfaces.

Table 10 — Ethernet Addresses

PORT NAME	LOCATION	DEFAULT ADDRESSES
ETH0	Right side of display	169.254.1.1
ETH1	Bottom of display	169.254.1.1/192.168.100.100

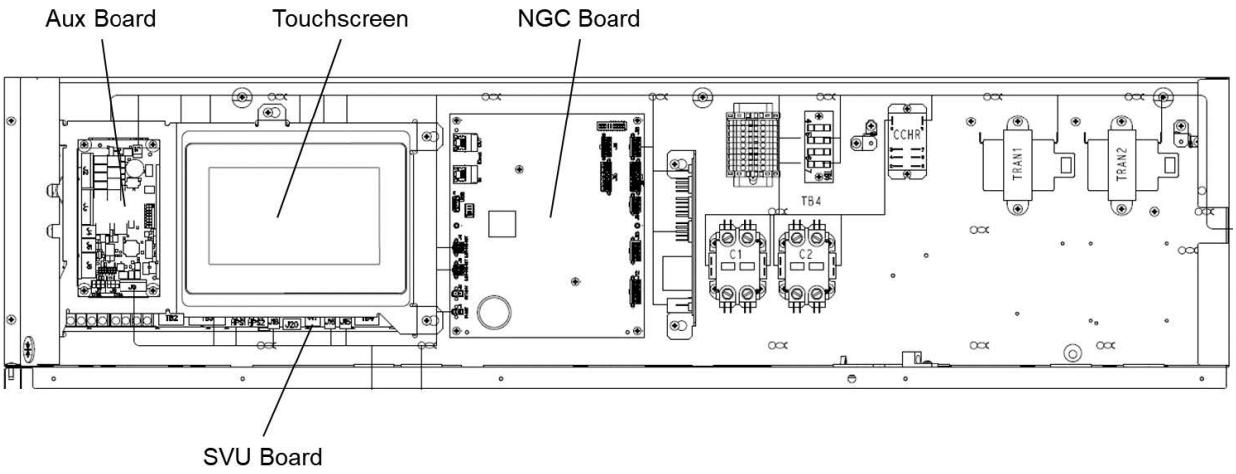


Fig. 64 — Typical Control Box Layout

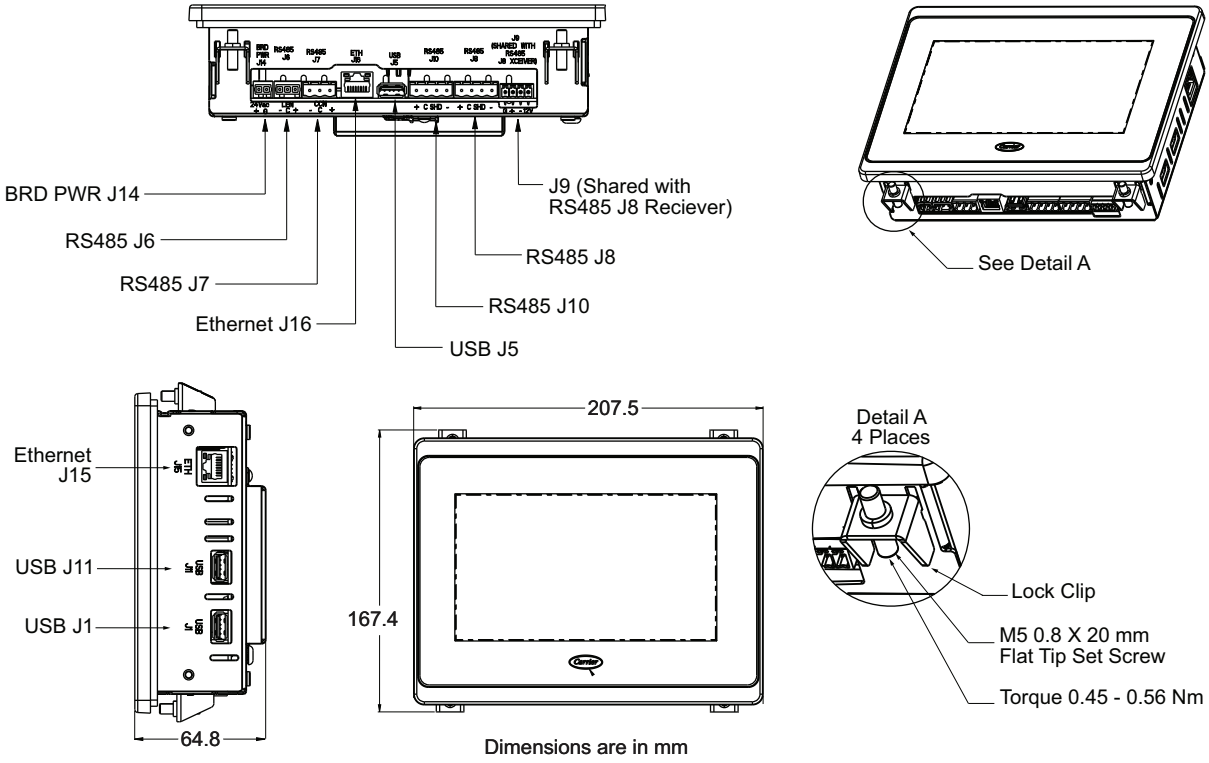


Fig. 65 — Carrier SmartVu™ Touchscreen Display Interface and Connections

Table 11 — Navigation Buttons

BUTTON	NAME	ACTION
	Home Button	Goes to the home screen.
	Back Button	Goes back to the previous screen.
	Main Menu Button	Goes to the main menu screen.
	Login Button	Goes to the login screen.
	Start/Stop Button	Goes to the start/stop screen.
	Screen Icon	Goes to the screen indicated by the icon name.
	Alarm Button	Goes to the alarm screen. The bell turns red when an alarm or alert is active.
	Page Up/down	Scrolls through screens with multiple pages.
	Status Button	Goes to the status screen for the associated component.
	Technical Documents	Only shown on web user interface. Opens technical documents in a new browser tab.
	Help	Only shown on web user interface. Opens help document in a new browser tab.

NAVIGATION CONVENTION

This manual provides guidance to access specific screens to perform specific functions. The convention used is this manual to get to a specific screen is (***Main Menu → System Config → Cooling Config***).

Based on the above guidance, the user must go to the main menu screen (by pressing the Main Menu button from the home screen or other screens), then go to the System Configuration screen (by pressing the system configuration icon on the main menu screen), then go to the Cooling Configuration screen (by pressing the cooling configuration icon on the system configuration screen). See Fig. 66 for the screen views and click points for this example. NOTE: Sufficient access level (user or higher) is required to access certain screens.

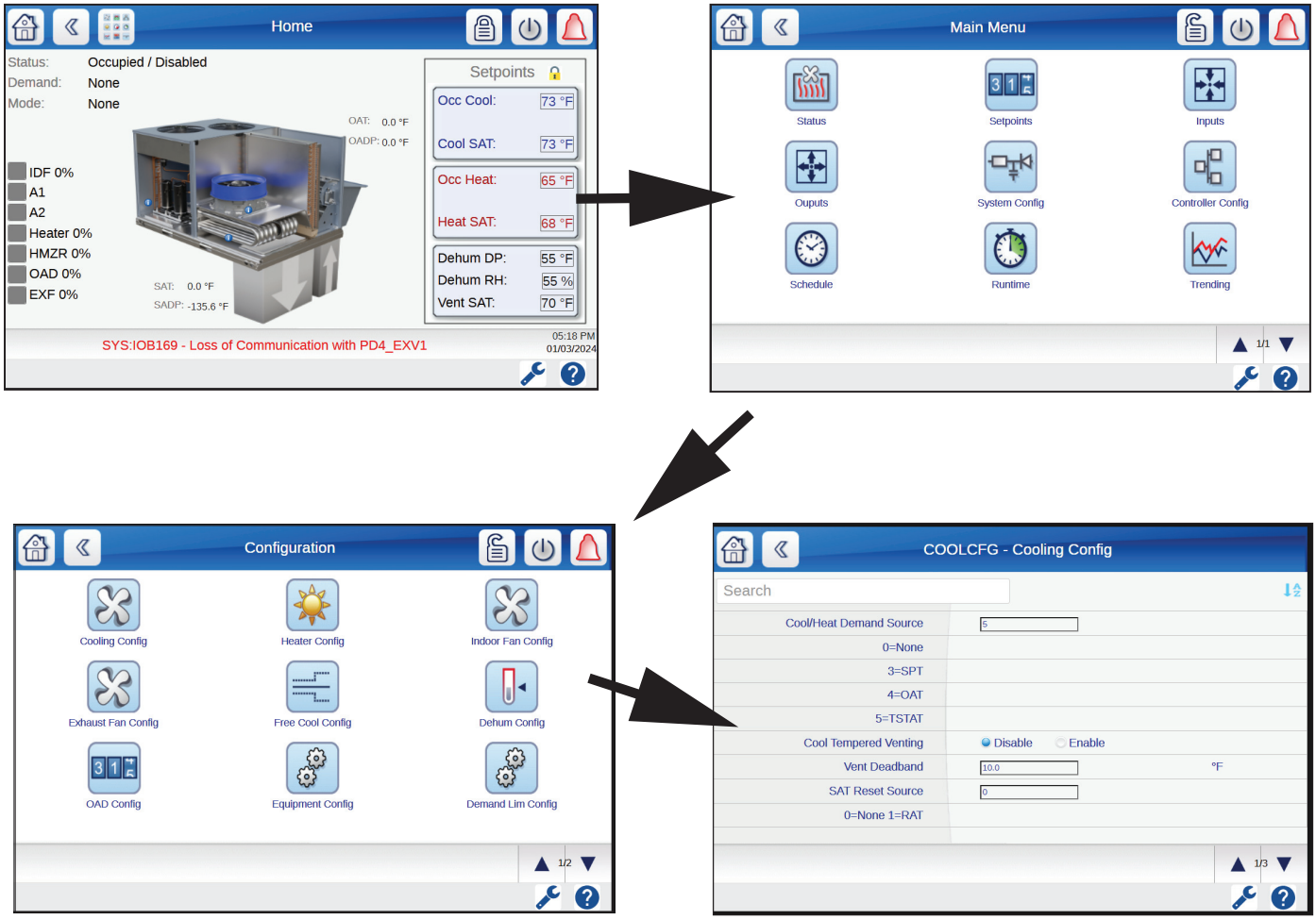


Fig. 66 — Equipment Configuration Screen Navigation Example

DATA ENTRY

Most screens contain data that is editable or selectable between multiple options, such as setpoints and configurations. See Table 12 for interface buttons related to data entry.

NOTE: Sufficient access level may be required to modify setpoints and settings.

Editable data is indicated by a number with a box around it 100.00 or letters/characters with a box or oval ***. When editable data is numerical, such as a temperature setpoint, clicking on editable data, on the touchscreen UI will bring up the keypad to allow the user to change the data. See Fig. 67 for keypad layout.

When editable data is alpha-numerical, such as a password entry, clicking on the editable data will bring up the keyboard to allow the user to change the data. See Fig. 68 for keyboard touchscreen layout.

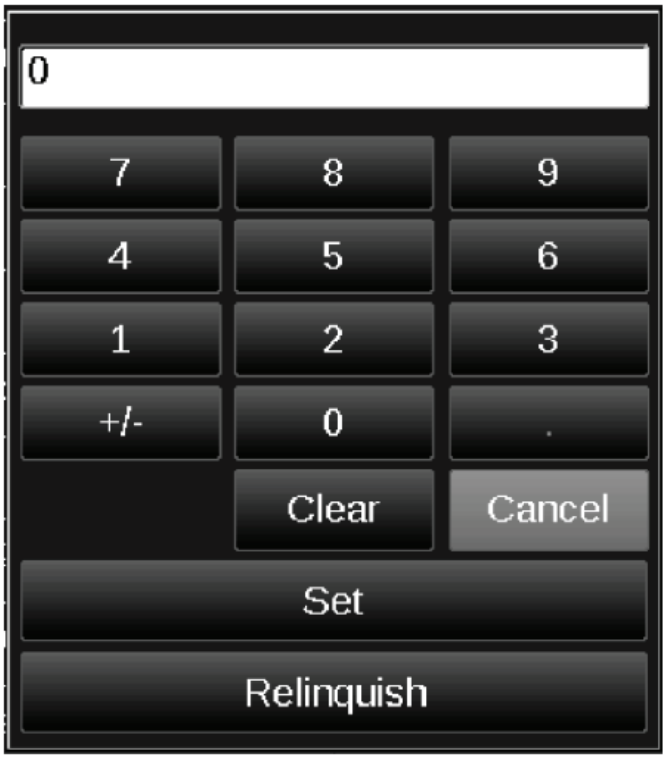


Fig. 67 — Keypad Layout

Fig. 68 — Keyboard Layout Touchscreen

For settings that have two configurations options, bubbles are used to indicate the configuration. See Fig. 69 for a configuration example. In this example, the smoke detector is enabled, and the thermostat is disabled.

For settings that have multiple configuration options, a numerical value is used to indicate the configuration. The possible configurations are listed below the device name and are assigned a numerical value. See Fig. 70 for an example of a configured device. In this example, the Cool/Heat Demand Source is set to 5, which is TSTAT heat based on the configuration descriptions (5=TSTAT).

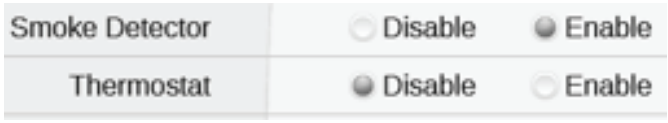


Fig. 69 — Enable/Disable Configuration Example

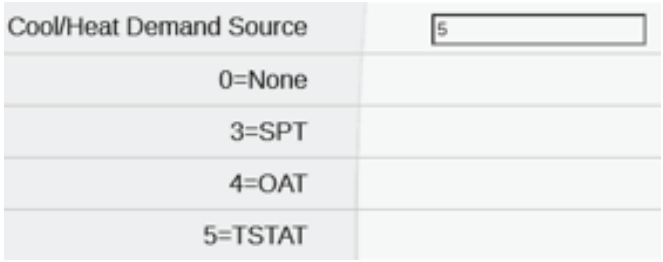
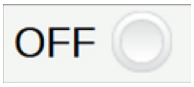


Fig. 70 — Configured Device Example

Table 12 — Data Buttons

VIEW	NAME	ACTION
	View Only Data	None. The data is not editable.
	Editable Data	Brings up the keypad or keyboard for data entry.
	Password Entry	Brings up the keyboard to allow password entry.
	Inactive Bubble	The indicated option is not active.
	Active Bubble	The indicated option is active.
	Save Button	Saves changes made on a screen.
	Discard Button	Discards changes made on a screen.
	Locked Button	Indicated that the value is locked for editing based on access level. Goes to the login screen.
	Login Button	Accepts the current access level and returns to the Home screen.
	Logout Button	Reverts to the basic access level and returns to the Home screen.

Main Screens

WELCOME SCREEN

The welcome screen is the first screen shown after Carrier Controller is powered on and will be shown for 2 to 3 minutes. See Fig. 71. The welcome screen will automatically change to the Home screen when the controller has completed initialization.

LOGIN SCREEN

The login screen can be accessed by pressing the login button from the top of the home screen. The login screen is used to elevate the user access level above basic and displays the current access level at the bottom of the screen. See Fig. 72 for login screen layout.

PASSWORDS

There are multiple user access levels. See Table 13 for a listing of the access levels, default password, and the explanation of access. All instructions in this manual, including equipment start-up, can be performed with user access.

USER LOGINS SCREEN

To enter the user access password, click on the user login from the login screen to go to the user login screen. See Fig. 73 for user login screen layout. Click on ✱✱✱_ to bring up the keyboard and enter the password, then click done. Click on to complete the login.

NOTE: The bottom login screen should update to reflect the user access level.

MAIN MENU

The main menu screen can be accessed by pressing the main menu button from the home screen or other screens. The main menu screen provides a view of screens that are available to the user based on access level. See Fig. 74 for main menu layout for the user access level.

HOME SCREEN

The home screen is the first screen that is displayed after the welcome screen provides an overview of the unit operation and key setpoints, and has shortcuts for the main menu screen, login screen, start/stop screen, and alarm screen. The home screen can be accessed by pressing the home shortcut .

The home screen graphic, component status, and setpoints will vary based on the system configuration and the control configuration. The setpoints on the home screen are only editable with the user access level or higher. See Fig. 75 for typical home screen layout.

Fig. 71 — Welcome Screen Example

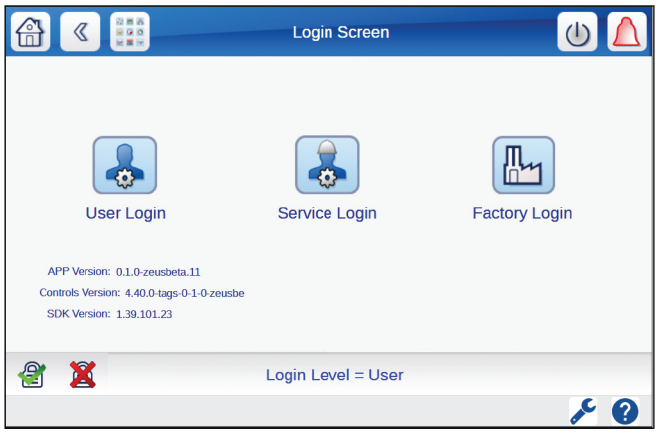


Fig. 72 — Login Screen

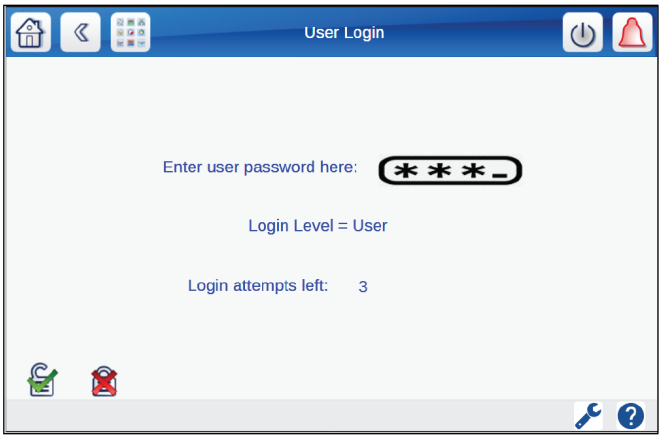


Fig. 73 — User Login Screen

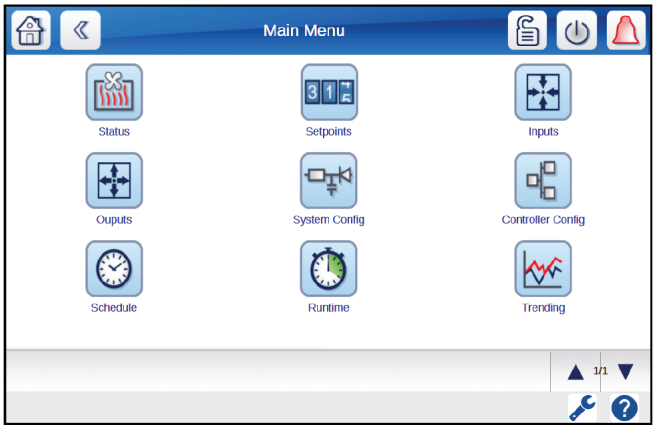


Fig. 74 — Main Menu Screen

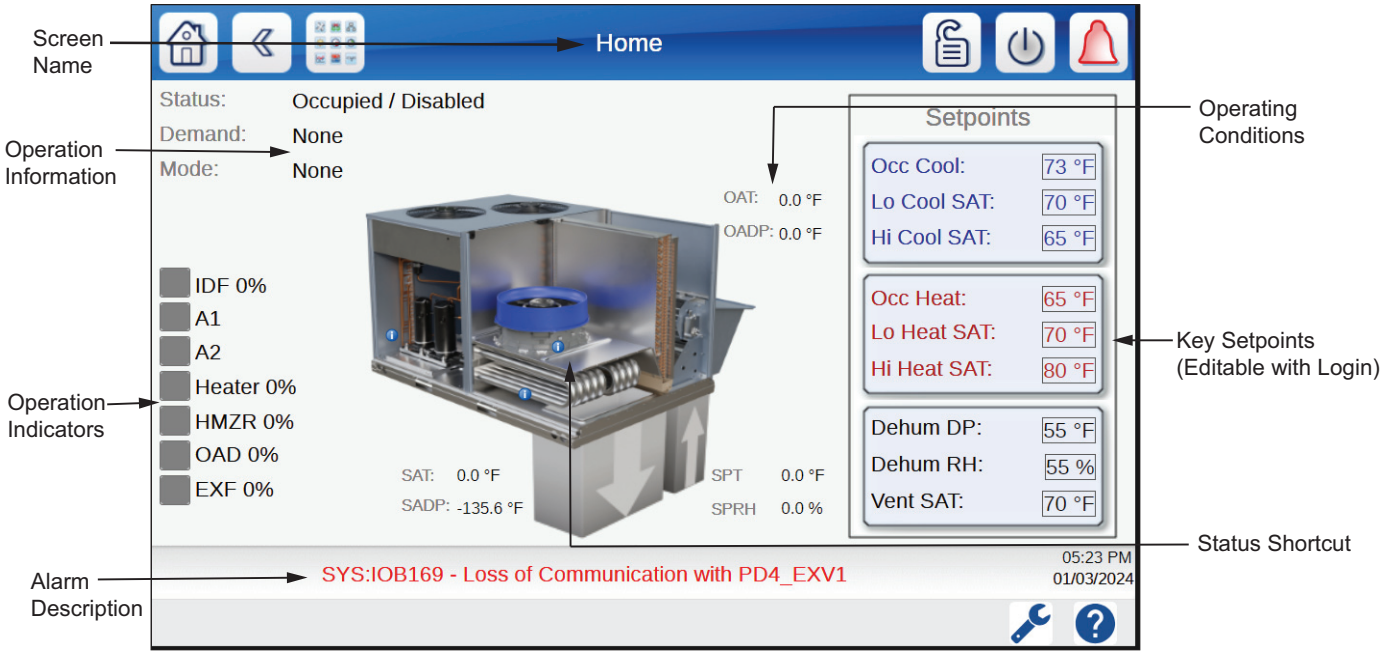


Fig. 75 — Home Screen Example

Table 13 — Control Access Levels

ACCESS LEVEL	PASSWORD	DESCRIPTION
BASIC	None	Access level at initial start-up or after a timeout has expired. Provides view only access to select setpoints and settings. Not all screens will be viewable. Basic access can disable the unit.
USER	1111	Intermediate access to adjust setpoints and settings and access most screens. User can enable/disable the unit, enable component and system tests, and acknowledge alarms.
SERVICE	Rolling	Includes all User access, plus access to advanced setpoints and settings. Password is only available to factory trained personnel. See Advanced Controls, Operation, and Troubleshooting Guide for information on obtaining the service password or contact your local Carrier sales office for emergency service password access.
FACTORY	Rolling	Factory use only.

STATUS SCREEN

The status screens can be accessed by pressing the status icon from the main menu screen. The status screens are accessible for all access levels. The types of status screens shown will depend on the unit configuration. The status screens are not editable and will display information about a specific component or system. See Fig. 76 for status screen example.

SETPOINT SCREENS

The setpoint screens can be accessed by pressing the setpoints icon from the main menu screen. The setpoint screen is only accessible with the user access level or higher and the available setpoint screens will vary based on the unit configuration. See Fig. 77 for setpoint screen layout.

SYSTEM CONFIGURATION SCREENS

The system configuration screen can be accessed by pressing the system configuration icon from the main menu screen. The system configuration screen is only accessible with the user access level or higher and contains all user accessible configurations. See Fig. 78 for the system configuration screen layout.

CONTROLLER CONFIGURATION SCREENS

The controller configuration screen is accessed by pressing the Controller Configuration icon from the Main Menu screen. The controller configuration screen is only accessible with the user access level or higher and contains user accessible configurations related to control functions, such as time/date, communication, and user password. See Fig. 79 for the controller configuration screen layout.

CONTROLLER ID SCREEN

The controller ID screen is accessed by pressing the Controller ID icon from the Controller Configuration screen. The controller ID screen is only accessible with the user access level or higher and contains the unit model and serial number, software version, and other control information. See Fig. 80 for the controller ID screen layout.

START/STOP SCREEN

The start/stop screen can be accessed by pressing the start/stop button from the Home or Main Menu screen. With basic access level, the user can only disable unit operation or press emergency stop (if the unit was running). User or higher access level is required to enable unit operation, adjust the auto-restart configuration, and access the schedule menu. User or higher access level can also enable service run mode, enable component test mode, and access the service tests screen when in service run or component test mode. See Fig. 81 for the start/stop screen layout (shown with user access level in Service Run mode). See Table 14 for the start/stop screen functions.

Fig. 76 — Status Screen

Fig. 77 — Setpoint Screen

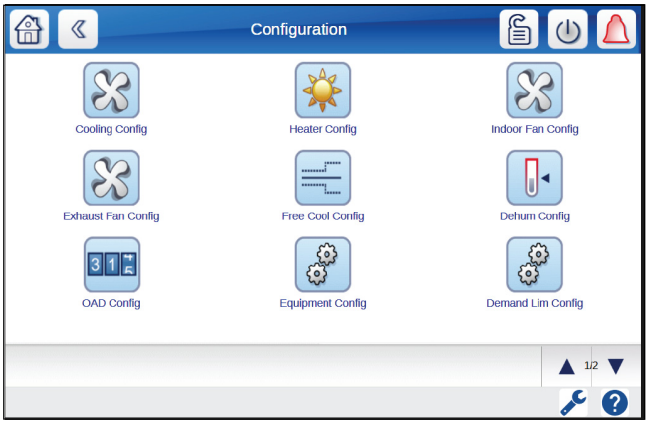


Fig. 78 — System Configuration Screen

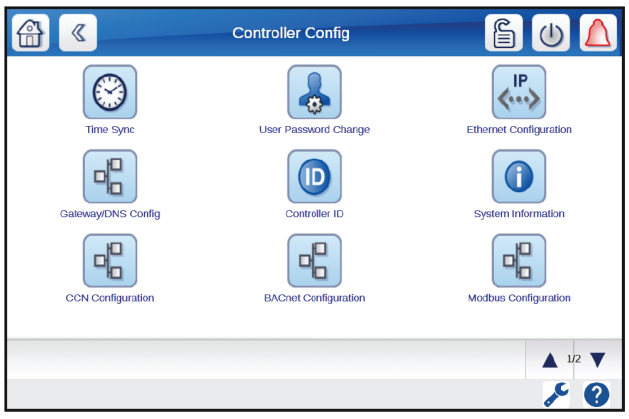


Fig. 79 — Controller Configuration Screen

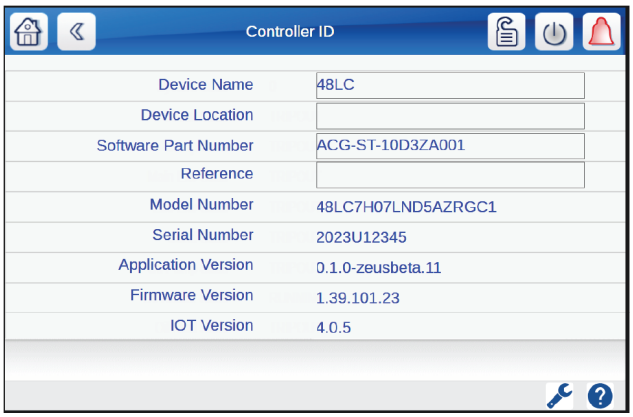


Fig. 80 — Controller ID Screen

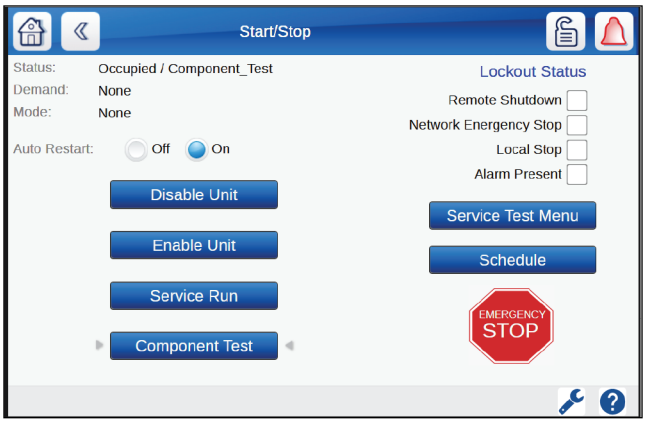


Fig. 81 — Start/Stop Screen

Table 14 — Start/Stop Functions

FUNCTION	DESCRIPTION
AUTO RESET	Off – unit operation is disabled when power is cycled.
	On – unit operation is enabled when power is cycled.
DISABLE UNIT	Unit operation is prevented.
ENABLE UNIT	Normal unit operation is enabled.
SERVICE RUN	Service Run mode is enabled.
COMPONENT TEST	Component Test mode is enabled.
SERVICE TEST MENU	Goes to the Service Test Menu screen.
SCHEDULE	Goes to the Schedules screen.
EMERGENCY STOP	Immediately shuts down the unit and disables unit operation.

Control Quick Setup

The 48LC*H unit can be used in a wide variety of applications. The remainder of the control section provides step by step directions and actions for control setup for typical applications, including 100% outdoor (100% OA) for ventilation or make-up air or single-zone air conditioning (SZ A/C) with mixed outdoor and return air. See Table 15 for an overview of the typical control quick setup steps. See the Control, Operation, and Troubleshooting Guide for further instructions.

STEP 1 — POWER ON THE CONTROL

Turn power on at the unit disconnect. Verify the control board lights illuminate and the touchscreen display turns on. The unit will show the Home screen when the control is booted up. The unit operation is disabled by default, so the unit should not begin to operate. Once the control is fully booted, proceed to Step 2.

If the unit does startup (indoor fan, compressors, or heat turn on), navigate to the Start/Stop screen by pressing the start/stop icon on the top bar and press the disable button to disable unit operation. The control will still be able to function if unit operation is disabled.

If the touchscreen or control boards do not power on, refer to the Controls, Operation, and Troubleshooting manual for troubleshooting steps or contact your Carrier sales office.

Table 15 — Control Quick Setup Steps

QUICK SETUP STEPS
1. Power on the control.
2. Login with the user access level.
3. Optional: Set daylight savings time.
4. Set date and time.
5. Configure the equipment for field-installed devices (sensors or accessories).
6. Configure the equipment for field-installed sensors.
7. Configure indoor fan.
8. Configure the outdoor air damper.
9. Configure the cooling system.
10. Configure the dehumidification system.
11. Optional: Configure the heating system (only units with heat).
12. Optional: Configure the exhaust fan (only units with exhaust fan).
13. Optional: Configure free cooling (SZ A/C only).
14. Optional: Set indoor fan setpoints (only SP or ZP indoor fan control).
15. Set cooling setpoints.
16. Set dehumidify setpoints.
17. Optional: Set heating setpoints (units with heat only).
18. Optional: Set exhaust fan setpoint (BP exhaust fan control only).
19. Setup occupancy control method or schedule.

STEP 2 — LOGIN WITH USER ACCESS LEVEL

Click on the login icon on the top right panel of the Home screen to go to the Login screen. Then, click on the user login icon. On the User Login screen, click on password entry button (***) to bring up the keyboard. Enter the user password (1111) and click done. Then, click on the login icon at the bottom left of the screen to complete the login and go back to the home screen.

NOTE: User access level (or higher) is required to complete the listed control setup steps and start-up.

NOTE: The user access level is automatically logged out after a period of inactivity.

STEP 3 — SET DAYLIGHT SAVINGS TIME (DST) (OPTIONAL)

Navigate to the Daylight Savings Time screen (***Main Menu → Controller Config → Time Sync → Manual Time Sync→ Daylight Savings Time)***. See Fig. 82 for daylight savings time screen layout. Set the start and stop days for daylight savings installation location. When finished, click the save changes button at the bottom of the page.

The system automatically updates the current time based on when DST is enabled, and the current time and date is in between the start and stop conditions. DST start or stop status is indicated in the upper right-hand corner of the screen. See Table 16 for DST configurations.

NOTE: If the time is manually set before DST is set, the time will be automatically changed based on the DST time settings. Manually change the time again to the current time to correct this issue.

STEP 4 — SET DATE AND TIME

Navigate to the Manual Time Sync screen (***Main Menu → Controller Config→ Time Sync→manual Time Sync***). See Fig. 83 for manual time sync screen layout. Set date and time for the installation location. When finished, click the save changes button at the bottom of the page.

Time and date are used as part of the unit occupancy schedule and must be set based on application requirements. To change the date, click on the box containing the date to bring up the calendar. See Fig. 84 for calendar layout. Use the arrow buttons on the left and right of the month/year to increase or decrease the month or click on the month or year to bring up a drop-down list. Once the calendar is at the correct month and year, click on the current date to finalize the date selection. NOTE: The date will show on this screen in month/day/year format.

To change the time, click on the box containing the time to bring up the time adjuster. See Fig. 85 for time adjuster layout. Use the up and down arrows to change the hours, minutes, and seconds. NOTE: Time is in 24-hour (military) format. Click OK to complete the time setting.

STEP 5 — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED DEVICES

Navigate to the Equipment Configuration screen (***Main Menu→System Config→Equipment Config***). Review the device listing and enable or configure any field-installed or field-use devices. See Fig. 86 for equipment configuration screen layout. When finished, click the save changes button at the bottom of the page.

NOTE: Configuration changes may require a reboot for the change to take effect. Press the reboot button to reboot the controller.

Field-installed accessories (smoke detector, economizer, phase monitor, filter switch) and field-use control inputs and outputs must be configured to match the application requirements and for associated screens, configurations, and setpoints to be displayed on the user interface. For example, if the economizer (OAD) is disabled, the ventilation configuration screen and free cooling configuration screen will not display.

If using a network point, the local (hardwired at unit control) input/output point does not have to be enabled in the equipment configuration. For example, if the system will be configured for IDF modulation based on a third-party signal and a network third-party IDF modulation signal is provided, the local third-party IDF input does not need to be enabled.

See Table 17 for equipment configurations by application. All devices in this screen are disabled by default, except when the device is included as a factory-installed option (based on unit model number).

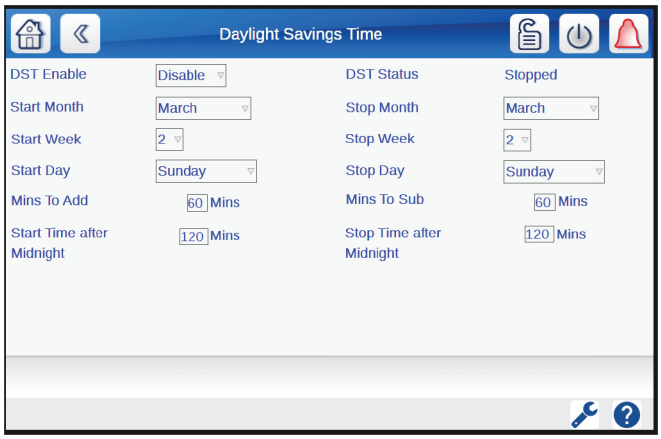


Fig. 82 — Daylight Savings Time Screen

Table 16 — Daylight Savings Time Configurations

CONFIGURATION	VALUE	DESCRIPTION
DST Enable	Enable	Daylight savings time is enabled, the system time will automatically be adjusted based on the DST configuration.
	Disable	Daylight savings time is not used.
Start Month	Jan. to Dec.	The month that DST will start.
Start Week	1 to 5	The week of the month that DST will start.
Start Day	Mon. to Sun.	The day of the week that DST will start.
Minutes To Add	9 to 10 min.	The amount of daylight savings time change (addition).
Start Time After Midnight	0 to 720	Time after 0:00 to apply the daylight savings time change.
Start Month	Jan. to Dec.	The month that DST will stop.
Start Week	1 to 5	The week of the month that DST will stop.
Start Day	Mon. to Sun.	The day of the week that DST will stop.
Minutes To Add	9 to 10 min.	The amount of daylight savings time change (subtraction).
Start Time At Midnight	0 to 720	Time after 0:00 to apply the daylight savings time change.

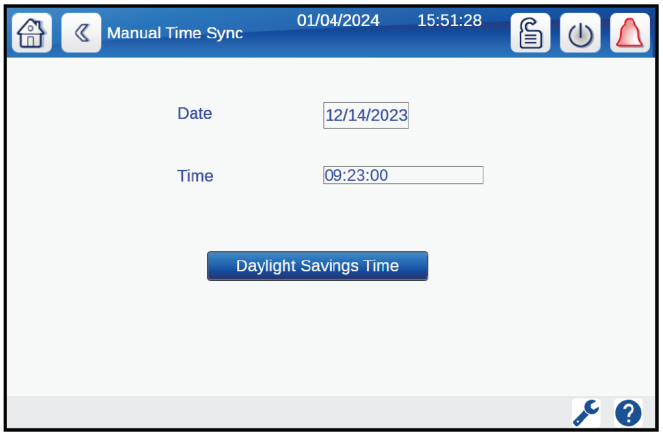


Fig. 83 — Manual Time Sync Screen

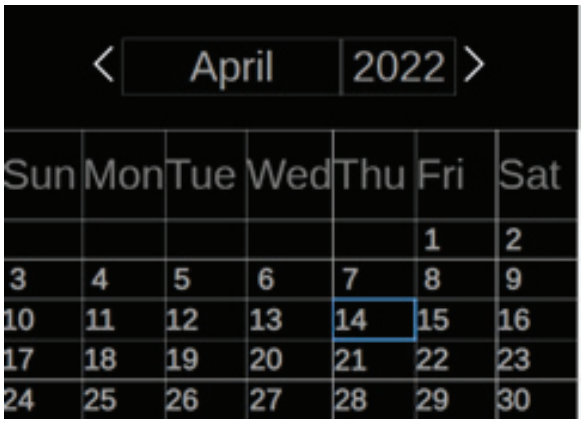


Fig. 84 — Calendar Layout

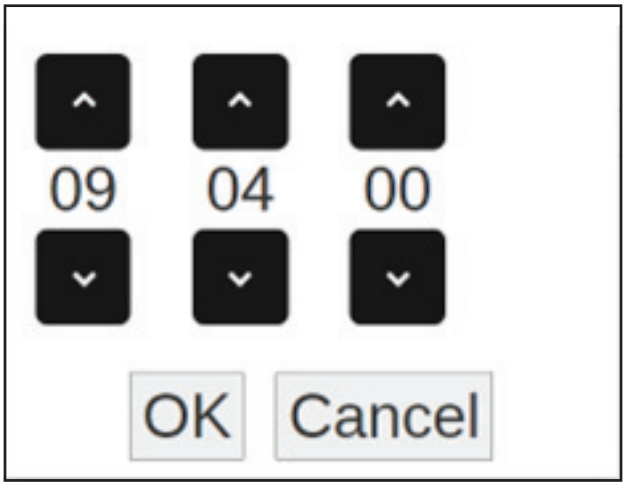


Fig. 85 — Time Adjuster Layout

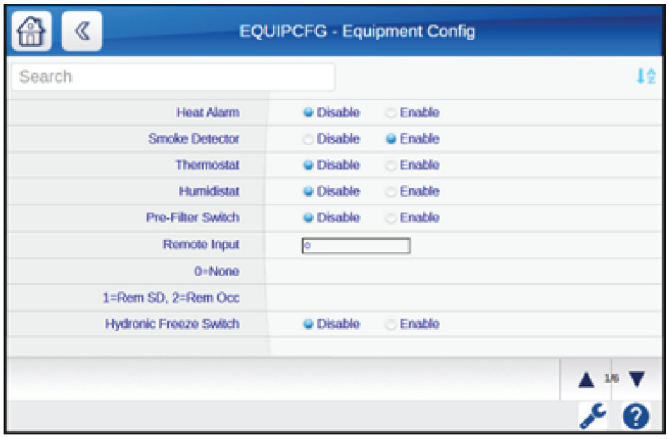


Fig. 86 — Equipment Configuration Screen

Table 17 — Equipment Configuration by Application

ITEM	VALUE	DESCRIPTION	APPLICATION
Smoke Detector	Enable	The system monitors local smoke detector input for smoke shutdown. NOTE: The smoke detector will default to enabled for units with a factory-installed smoke detector.	Any
	Disable	The system does not monitor the local smoke detector input.	Any
Thermostat	Enable	The system monitors the local thermostat inputs (Y1, Y2, G, W1, W2). Used with the TSTAT cool/heat demand source to establish cooling and heating demands.	SZ A/C
	Disable	The system does not monitor the local thermostat inputs.	Any
Humidistat	Enable	The system monitors the local humidistat (dehumidify) input (Y3/H). Used with the HSTAT dehumidify demand source to establish dehumidify demand.	SZ A/C
	Disable	The system does not monitor the local humidistat input.	Any
Pre-filter Swicth	Enable	The system monitors the local pre-filter input. Used with the pre-filter change reminder alert configuration is set to switch.	Any
	Disable	The system does not monitor the local pre-filter input.	Any
Remote Switch	0=None	Remote switch not used.	Any
	1=Remote Shutdown	The system monitors the local remote switch input for a non-emergency shutdown command.	Any
	2= Remote Occupancy	The system monitors the local remote switch input to determine occupancy status.	Any
Phase Monitor	Enable	The system monitors the local phase monitor input for emergency shutdown.	Any
	Disable	The system does not monitor the local phase monitor input.	Any
Fire Shutdown	Enable	The system monitors the local fire shutdown input for emergency shutdown.	Any
	Disable	The system does not monitor the local fire shutdown input.	Any
ZDOR	Enable	The system provides a zone damper override relay to notify zone dampers to override their position when the system is in heating mode, dehumidification mode, test mode, or the IDF is operating during the unoccupied period.	Any
	Disable	The system does not provide a zone damper override relay.	Any
IDF Third-party Mod.	Enable	The system monitors the local third-party indoor fan speed analog input. Used with third-party IDF control type.	Any
	Disable	The system does not monitor the third-party indoor fan speed analog input.	Any
EXF Third-party Mod	Enable	The system monitors the local third-party exhaust fan speed analog input. Used with third-party EXF control type.	Any
	Disable	The system does not monitor the third-party exhaust fan speed analog input.	Any
OAD Third-party Mod	Enable	The system monitors the local third-party outdoor air damper position analog input. Used with 3rd party OAD control type.	SZ A/C
	Disable	The system does not monitor the third-party outdoor air damper position analog input.	Any
Exhaust Fan	Enable	The system provides a local binary output enable signal and a local analog output modulation signal to control a third-party modulating exhaust fan.	Any
	Disable	The system does not provide an exhaust fan output.	Any
Economizer (OAD)	Enable	The system provides a local analog output for outdoor air damper modulation and monitors a local analog input for damper position feedback. Required for 100% OA or SZ A/C with ventilation or free cooling. NOTE: The system defaults to enabled for units with factory-installed economizer.	Any
	Disable	The system does not provide an economizer (OAD) output.	SZ A/C
COFS	Enable	The system monitors a local condensate overflow switch input for overflow status. NOTE: System with factory-installed COFS will default to enabled.	Any
	Disable	The system does not monitor the COFS input.	SZ A/C
Auxiliary Relay	0=Not Used	Auxiliary relay is not used.	Any
	1-Alarm Status	The auxiliary relay indicates alarm status. Commonly used with Carrier VRF ERV controllers.	Any
	2= Occ Status	The auxiliary relay indicates occupancy status.	Any

STEP 6 — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED SENSORS

Navigate to the Sensor Configuration screen (***Main Menu → System Config→ Sensor Config)***. Review the sensor listing and enable or configure any field-installed sensors. See Fig. 87 for sensor configuration screen layout. When finished, click the save changes button at the bottom of the page.

NOTE: Configuration changes may require a reboot for the change to take effect. Press the reboot button to reboot the controller.

Field-installed sensors must be configured to match applications requirements. For example, if the cool/heat demand source is configured for SPT and a network SPT input is not used, then the sensor configuration for SPT must be enabled for the system to read a local sensor.

If using a network sensor, the local sensor point does not have to be enabled in the sensor configuration. For example, if the cool/heat demand source is configured for SPT and a network SPT input is used, the local SPT does not need to be disabled. However, best practice is to have a local sensor as backup, in the event of network communication issues. In that case, the local sensor must be enabled. If both a local input and network input are valid, the system will prioritize the network input.

See Table 18 for a listing of commonly used sensors by application. All devices in this screen are disabled by default, except when the device is included as a factory-installed option (from model number).

NOTE: Sensors that are standard on all units (RAT, OAT), will not be listed in the sensor configuration.

STEP 7 — CONFIGURE INDOOR FAN

Navigate to the Indoor Fan configuration screen (***Main Menu →System Config → Indoor Fan Config***). Configure the indoor fan operation and operating speeds based on application requirements. See Fig. 88 for indoor fan configuration screen layout. When finished, click the save changes button at the bottom of the screen.

The indoor fan operation, including the control type, occupied operation, and unoccupied operation, and indoor fan speeds must be configured to match application requirements. See Table 19 for indoor fan control configurations by application.

NOTE: Fan speed configurations are in % of maximum operating speed (rpm). Review the unit submittal or the fan tables in the Product Data documents to identify the required operating rpm to achieve the applications airflow. The maximum fan speed is typically 2000 rpm for medium static fans, and 2200 rpm for high static fans.

For example, if a unit has a medium static motor (2000 rpm max.) and the fan needs to operate at 1500 rpm to achieve the design cooling and heating airflows, the associated max/high fan speed configurations should be set to 75% (1500/2000 rpm).

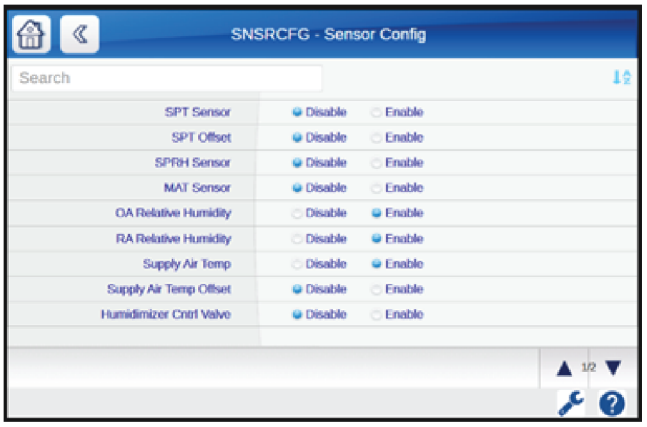


Fig. 87 — Sensor Configuration Screen Layout

Fig. 88 — Indoor Fan Configuration Screen

Table 18 — Sensor Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SPT Sensor	Enable	The system monitors a local space temperature sensor input. Required for applications where the cool/heat demand source is configured for SPT.	SZ A/C
	Disable	The system does not monitor the local space temperature sensor input.	Any
SPT Offset	Enable	The system monitors a local space temperature sensor offset.	SZ A/C
	Disable	The system does not monitor the local space temperature offset input.	Any
SPT OCC Override	Enable	The system monitors the local space temperature sensor for occupied override during the unoccupied period.	SZ A/C
	Disable	The system does not monitor for local occupancy override.	Any
OCC Override Time	0 to 4 Hours, 0 Default	When SPT occupied override is used, this is the occupied override time applied when the button is first pressed.	SZ A/C
OCC Override 2nd Press	0 = Reset	When occupied override is in effect and the override button is pressed a second time during the override period, the override period is restarted at the occupied override time.	SZ A/C
	1 = Clear	When occupied override is in effect and the override button is pressed a second time during the override period, the override time is cleared, and the unit is returned to unoccupied.	SZ A/C
MAT Sensor	Enable	The system monitors a local mixed air temperature sensor. Use for mixed air applications for more accurate cooling or heating mode processing based on MAT.	SZ A/C
	Disable	The system does not monitor the local MAT sensor.	Any
OARH Sensor	Enable	The system monitors a local outdoor air relative humidity sensor. OARH is used to calculate outdoor air enthalpy for enthalpy or differential enthalpy free cooling or outdoor air dew point calculation for OADP dehumidify demand source or free cooling. OARH is enabled by default on all LC*H units.	Any
	Disable	Not used on LC*H units.	Any
RARH Sensor	Enable	The system monitors a local return air relative humidity sensor. RARH is used to calculate return air enthalpy for differential enthalpy free cooling or RARH dehumidify demand source. RARH is enabled by default on all LC*H units.	Any
	Disable	Not used on LC*H units.	Any
SAT Sensor	Enable	The system monitors a local supply air temperature sensor. SAT is required for unit operation. SAT sensor is enabled by default for all LC*H units.	All
	Disable	Not used on LC*H units.	None
SP Sensor	Enable	The system monitors a local duct supply pressure sensor. Supply pressure is used for SP indoor fan control. SP is used for true constant volume operation to account for filter loading and is not intended for multi-zone VAV applications.	Any
	Disable	The system does not monitor a local duct supply pressure sensor.	Any
BP Sensor	Enable	The system monitors a local building pressure sensor. Building pressure is used for zone pressure (ZP) indoor fan control and for exhaust fan control based on building pressure (BP).	Any
	Disable	The system does not monitor a local building pressure sensor.	Any

Table 19 — Indoor Fan Configurations by Application[a]

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="5">Indoor Fan Control</td><td>0 = Constant Volume</td><td>The indoor fan operates at the IDF high cool speed with a cool, vent, or dehum demand, and the IDF high heat speed with a heat demand. CV IDF control is common for 100% OA applications, can be used in select single zone A/C applications (where code allows).</td><td>100% OA</td></tr>
<tr><td>1 = Staged Air Volume (SAV™)</td><td>The indoor fan speed stages based on demand level or cooling and heating capacity level. SAV is common for single-zone air conditioning applications. See the SAV mode selection for more details on specific operation for SAV demand and SAV capacity. SAV can only be used with SPT or TSTAT cool/heat demand source.</td><td>SZ A/C</td></tr>
<tr><td>2 = Third-Party IDF Modulation</td><td>The indoor fan speed modulates between min. and max. speed based on a third-party input. Requires a local third-party IDF modulation input or network third-party IDF modulation signal.</td><td>Any</td></tr>
<tr><td>3 = Supply Pressure (SP)</td><td>The indoor fan speed modulates between min. and max. speed to maintain the supply pressure at the supply pressure setpoint. Most common for 100% OA or space air conditioning with true constant volume operation (compensates for filter loading). Not intended for multi-zone VAV. Requires the local or supply pressure sensor or network supply pressure reading.</td><td>Any</td></tr>
<tr><td>4 = Zone Pressure (ZP)</td><td>The indoor fan speed modulates between min. and max. speed to maintain the building pressure at the zone pressure setpoint. Common for 100% OA make-up air applications with variable exhaust airflow. Requires the local building pressure sensor or network building pressure reading.</td><td>100% OA Only (Make-Up Air)</td></tr>
<tr><td rowspan="2">SAV Mode Selection</td><td>0 = Demand</td><td>The indoor fan speed is based on the demand level. See below for SAV demand IDF speed details.<table><tr><th>DEMAND</th><th>INDOOR FAN SPEED</th></tr><tr><td>Vent</td><td>IDF Min. Speed</td></tr><tr><td>Low Cool</td><td>IDF Low/cool Speed</td></tr><tr><td>High Cool And Dehumidify</td><td>IDF High/cool Speed</td></tr><tr><td>Low Heat</td><td>IDF Low Heat Speed</td></tr><tr><td>High Heat</td><td>IDF High Heat Speed</td></tr></table>The IDF control must be set to SAV for SAV demand operation. SAV demand is recommended in single zone air conditioning applications for tighter space temperature control.</td><td>SZ A/C</td></tr>
<tr><td>1 = Capacity</td><td>The indoor fan speed is based on the demand level or the cool or heat capacity level. See below for SAV demand IDF speed details.<table><tr><th>DEMAND/CAPACITY</th><th>INDOOR FAN SPEED</th></tr><tr><td>Vent Demand</td><td>IDF Low/cool Speed</td></tr><tr><td>Dehum Demand</td><td>IDF High/cool Speed</td></tr><tr><td>Cool Capacity < SAV Low Cool Threshold</td><td>IDF Min. Speed</td></tr><tr><td>SAV Low Cool Threshold ≤ Cool Capacity < SAV Med. Cool Threshold</td><td>IDF Low/cool Speed</td></tr><tr><td>SAV Med. Cool Threshold ≤ Cool Capacity < SAV Hi Cool Threshold</td><td>IDF Med. cool Speed</td></tr><tr><td>Cool Capacity ≥ SAV High Cool Threshold</td><td>IDF High/cool Speed</td></tr><tr><td>1% < Heat Capacity < 75%</td><td>IDF Low Heat Speed</td></tr><tr><td>Heat Capacity ≥ 75%</td><td>IDF High Heat Speed</td></tr></table>The IDF control must be set to SAV for SAV capacity operation. SAV capacity is recommended in single-zone air conditioning applications for most efficient operation.</td><td>SZ A/C</td></tr>
<tr><td>IDF Min. Speed</td><td>0 to 100%
33% default</td><td>IDF min. speed is used directly for SAV, SP, and ZP indoor fan control types. The system will prevent any other IDF speed configuration from being below the IDF min. speed configuration.</td><td>Any</td></tr>
<tr><td>IDF Max. Speed</td><td>0 to 100%,
100% default</td><td>IDF max. speed is used directly for SP and ZP indoor fan control types. The system will prevent any other IDF speed configuration from being above the IDF max. speed configuration.</td><td>Any</td></tr>
<tr><td>IDF Low Cool Speed</td><td>0 to 100%,
66% default</td><td>IDF low cool speed is only used as part of SAV demand or SAV capacity IDF control.</td><td>SZ A/C</td></tr>
<tr><td>IDF Med. Cool Speed</td><td>0 to 100%,
75% default</td><td>IDF med. cool speed is only used as part of SAV capacity IDF control.</td><td>SZ A/C</td></tr>
<tr><td>IDF High Cool Speed</td><td>0 to 100%,
100% default</td><td>IDF high cool speed is used as part of CV, SAV demand, or SAV capacity IDF control.</td><td>Any</td></tr>
</table>

Table 19 — Indoor Fan Configurations by Application[a] (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SAV Low Cool Cap. Threshold	0 to 100%, 10% default	SAV low cool capacity threshold is only used with SAV capacity IDF control.	SZ A/C
SAV Med. Cool Cap. Threshold	0 to 100%, 50% default	SAV med. cool capacity threshold is only used with SAV capacity IDF control.	SZ A/C
SAV Med. Cool Cap. Threshold	0 to 100%, 100% default	SAV high cool capacity threshold is only used with SAV capacity IDF control.	SZ A/C
IDF Low Heat Speed	0 to 100%, 66% default	IDF lo heat speed is only used as part of SAV demand or SAV capacity IDF control for units with a heat source.	SZ A/C
IDF High Heat Speed	0 to 100%, 100% default	IDF high heat speed is used as part of CV, SAV demand, or SAV capacity IDF control for units with a heat source.	Any
Occupied Fan	0 = Demand Based	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify during the occupied period. Demand based IDF should only be used for single zone A/C applications where the RTU does not provide zone ventilation.	SZ A/C
	1 = Continuous	The IDF will operate continuously during the occupied period. Recommended for 100% OA applications or single zone A/C applications where the RTU provides zone ventilation.	Any
Unoccupied Fan	0 = Disabled	The IDF is off during the unoccupied period. Required for 100% OA applications.	Any
	1 = Demand Based	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify during the unoccupied period. This configuration must be set for the RTU to provide unoccupied cooling, heating, dehumidification, or venting.	SZ A/C

NOTE(S):

a. See the Controls, Operation, and Troubleshooting guide for details on Supply Pressure (SP) reset.

STEP 8 — CONFIGURE OUTDOOR AIR DAMPER

Navigate to the Outdoor Air Damper Configuration screen (***Main Menu → System Config → OAD Config***). Review the OAD position configurations and adjust as need. See Fig. 89 for outdoor air damper configuration screen layout. When finished, click the save changes button at the bottom of the screen.

⚠ CAUTION

For all applications, verify that proper building pressure relief (barometric or power exhaust) is operational before operating the unit with the outdoor air damper open. Operating a unit with outdoor air without proper building pressure relief can cause doors to push open, damage to building and roofing materials, and damage to HVAC equipment.

NOTE: The OAD configuration screen will only display when the economizer (OAD) is enabled on the configure equipment screen.

The OAD configuration screen is used to set the OAD operation, ventilation control, and position restrictions. Free cooling is configured on a separate screen. All OAD positions are based on 0 to 100% range. See Table 20 for outdoor air damper configurations by application.

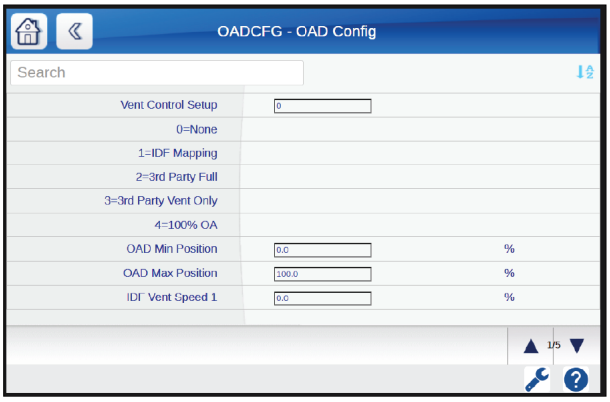


Fig. 89 — Outdoor Air Damper Configuration Screen

⚠ WARNING

For all applications, verify that proper building pressure relief (barometric or power exhaust) is operational before operating the unit with the outdoor air damper open. Operating a unit with outdoor air without proper building pressure relief can cause doors to push open, damage to building and roofing materials, and damage to HVAC equipment.

Table 20 — Outdoor Air Damper Configurations by Application[a]

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="5">Vent Control</td><td>0 = None</td><td>Ventilation is not performed. This configuration should only be used on equipment without an economizer (OAD).</td><td>SZ A/C</td></tr>
<tr><td>1 = IDF Mapping</td><td>The OAD ventilation position is modulated linearly based on the indoor fan speed and IDF/OAD vent positions 1 to 4 configurations. See below for IDF mapping OAD position details
<table><tr><th>IDF SPEED</th><th>OAD POSITION</th></tr><tr><td>IDF VENT SPEED 1</td><td>OAD vent pos 1</td></tr><tr><td>IDF VENT SPEED 2</td><td>OAD vent pos 2</td></tr><tr><td>IDF VENT SPEED 3</td><td>OAD vent pos 3</td></tr><tr><td>IDF VENT SPEED 4</td><td>OAD vent pos 4</td></tr></table>When the IDF speed is in between two IDF vent speed configurations, the OAD vent position is linearly calculated based on the IDF speed and the closest OAD vent position configurations.
For example, if IDF Vent Speed 1 = 30%, IDF Vent Speed 2 = 50%, OAD Vent Pos 1 = 40%, OAD Vent Pos 2 = 30%, and the IDF speed was 40%, the OAD position would be 35%.</td><td>SZ A/C</td></tr>
<tr><td>2 = Third-Party Full</td><td>The OAD position modulates between the min. and max. OAD positions based on a third-party input. Free cooling or IAQ reset will not override the third-party commanded OAD position. Requires the local third-party IDF input or a network third-party IDF modulation signal.</td><td>SZ A/C</td></tr>
<tr><td>3 = Third-Party Vent Only</td><td>The OAD ventilation position modulates between the minimum and maximum OAD positions based on a third-party input. Free cooling or IAQ reset will override the third-party commanded OAD position. Requires the local third-party IDF input or a network third-party IDF modulation signal.</td><td>SZ A/C</td></tr>
<tr><td>4 = 100% OA</td><td>The OAD opens to maximum position during the occupied period and is closed during the unoccupied period. The configuration must be used for 100% OA applications.</td><td>100% OA</td></tr>
<tr><td>OAD Min. Position</td><td>0 to 100%
Default 10%</td><td>This is the minimum OAD position that the system is allowed to operate at while ventilation or free cooling is being performed. No other OAD position configuration can be lower the OAD minimum position.</td><td>SZ A/C</td></tr>
<tr><td>OAD Max. Position</td><td>0 to 100%
Default, 98%</td><td>This is the maximum OAD position that the system is allowed to open to. No other OAD position configuration can be higher than the OAD maximum position.</td><td>Any</td></tr>
<tr><td>IDF Vent Speed 1</td><td>0 to 100%,
Default XX%</td><td>IDF vent speed 1 is only used when the OAD control type is set to IDF mapping. The IDF vent speed 1 should match the lowest configured IDF speed, typically the IDF min speed. IDF vent speed 1 cannot be below IDF min speed or more than IDF vent speed 2.</td><td>SZ A/C</td></tr>
<tr><td>IDF Vent Speed 2</td><td>0 to 100%,
Default XX%</td><td>IDF vent speed 2 is only used when the OAD control type is set to IDF mapping. For SAV IDF control, the IDF vent speed 2 should match the low cool IDF speed. IDF vent speed 2 cannot be below IDF vent speed 1 or more than IDF vent speed 3.</td><td>SZ A/C</td></tr>
<tr><td>IDF Vent Speed 3</td><td>0 to 100%,
Default XX%</td><td>IDF vent speed 3 is only used when the OAD control type is set to IDF mapping. For SAV IDF control, the IDF vent speed 3 should match the med. cool IDF speed (if used) or be between the low cool and high cool IDF speeds. IDF vent speed 3 cannot be below IDF vent speed 2 or more than IDF vent speed 4.</td><td>SZ A/C</td></tr>
<tr><td>IDF Vent Speed 4</td><td>0 to 100%,
Default XX%</td><td>IDF vent speed 4 is only used when the OAD control type is set to IDF mapping. The IDF vent speed 4 should match the highest configured IDF speed, typically the IDF max. speed or the IDF high cool speed. IDF vent speed 4 cannot be below IDF vent speed 3 or more than IDF max. speed.</td><td>SZ A/C</td></tr>
<tr><td>OAD Vent Pos 1</td><td>0 to 100%,
Default XX%</td><td>OAD vent pos 1 is only used when the OAD control type is set to IDF mapping and is the highest of the vent positions. OAD vent position 1 cannot be below OAD vent position 2 or above max. OAD position.</td><td>SZ A/C</td></tr>
<tr><td>OAD Vent Pos 2</td><td>0 to 100%,
Default XX%</td><td>OAD vent pos 2 is only used when the OAD control type is set to IDF mapping. OAD vent position 2 cannot be below OAD vent position 3 or above OAD vent position 1.</td><td>SZ A/C</td></tr>
<tr><td>OAD Vent Pos 3</td><td>0 to 100%,
Default XX%</td><td>OAD vent pos 3 is only used when the OAD control type is set to IDF mapping. OAD vent position 3 cannot be below OAD vent position 4 or above OAD vent position 2.</td><td>SZ A/C</td></tr>
<tr><td>OAD Vent Pos 4</td><td>0 to 100%,
Default XX%</td><td>OAD vent pos 4 is only used when the OAD control type is set to IDF mapping and is the lowest of the vent positions. OAD vent position 4 cannot be below the min. OAD position or above the vent OAD position 4.</td><td>SZ A/C</td></tr>
</table>

NOTE(S):

a. See the Controls, Operation, and Troubleshooting guide for details on IAQ reset or pre-occupancy purge.

STEP 9 — CONFIGURE THE COOLING SYSTEM

Navigate to the Cooling Configuration screen (***Main Menu*** → ***System Config*** → ***Cooling Config***). Configure the cool/heat demand source for OAT for 100% OA applications or SPT or TSTAT for SZ A/C applications. See Fig. 90 for cooling configuration screen layout. When finished, click the save changes button at the bottom of the screen.

The cooling system must be configured based on application requirements using the cooling configuration screen. The cool/heat demand source indicates which inputs the control will monitor to determine if there is a demand for cooling. For units with a heat source, the same demand source is used to determine a heating demand.

The control can be configured to monitor a local or network temperature sensor input, such as space temperature (SPT) or outdoor air temperature (OAT) and will compare the sensor readings to the occupied or unoccupied cooling (and heating) setpoints to establish a cooling (or heating) demand. The control can also be configured to monitor inputs from a thermostat (TSTAT) to interpret a cooling (or heating) demand.

For 100% outdoor air applications, the OAT cool/heat demand source should be used so that the cooling and heating functions based on OAT. For single-zone air conditioning applications, either SPT or TSTAT can be used, based on application requirements. See Table 21 cooling configurations and applications.

STEP 10 — CONFIGURE THE DEHUMIDIFICATION SYSTEM

Navigate to the Dehumidify Configuration screen ***(Main Menu*** → ***System Config*** →***Dehum Config***). Configure the dehumidify demand source as OADP for 100% OA applications or SPRH, RARH, or HSTAT for SZ A/C applications. See Fig. 91 for dehumidify donfiguration screen layout. When finished, click the save changes button at the bottom of the screen.

The dehumidification system must be configured based on application requirements using the dehumidification configuration screen. The dehum demand source indicates which inputs the control will monitor to determine if there is a demand for dehumidification.

For single-zone A/C applications, the control can be configured to monitor the RARH or SPRH sensor and will compare the RH sensor reading to the dehum RH setpoint to determine if there is a dehumidify demand. The control can also be configured to monitor a dehumidify input (HSTAT), from a humidistat or thermostat with dehumidify output, to establish a dehumidify demand.

For 100% outdoor air applications, the control should be configured to monitor outdoor air dewpoint (OADP) and will compare the OADP to the dehum DP setpoint to establish a dehumidify demand. OADP is calculated by the control based on the OAT and OARH sensor readings.

See Table 22 dehumidification configurations and applications.

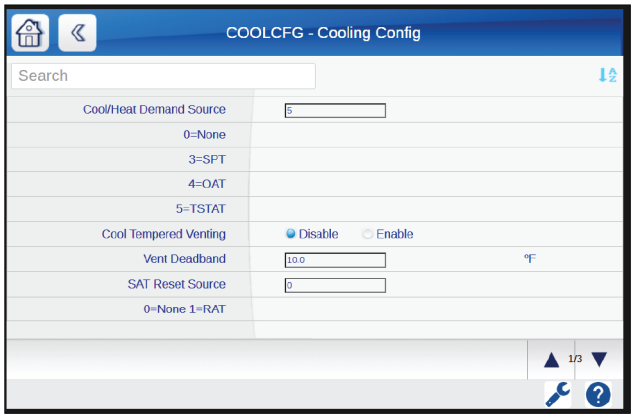


Fig. 90 — Cooling Configuration Screen

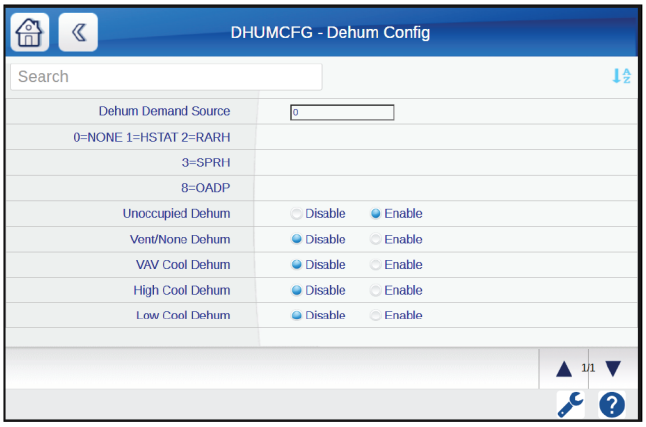


Fig. 91 — Dehumidification Configuration Screen

Table 21 — Cooling Configurations by Application[a]

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Cool/Heat Demand Source	0 = None (Default)	Cooling and heating is disabled.	None
	1 = SPT	The control compares the space temperature sensor (SPT) reading to the occupied/unoccupied cooling (and heating) setpoints to determine if there is a cooling (or heating) demand. Used for single-zone space air conditioning applications. Requires a local SPT sensor or network SPT value	SZ A/C
	3 = OAT	The control compares the outdoor air temperature sensor (OAT) reading the occupied cooling (and heating) setpoints to determine if there is a cooling (or heating) demand. Used for 100% outdoor air applications. Requires a local OAT sensor or network OAT value.	100% OA
	4 = TSTAT	The control monitors the thermostatic inputs (Y1, Y2, W1, W2) to determine a cooling (or heating) demand. Used for single-zone space air conditioning applications with 2-stage heat/cool thermostat. Requires a local thermostat or network thermostat values. See below for demand mapping based on input: **ACTIVE INPUT** / **DEMAND LEVEL** Y1 — Low Cool Y2 — High Cool W1 — Low Heat W2 — High Heat G — Vent NOTE: If Y2 or W2 are active without Y1 or W1 also active, the demand level will be set to high heat or cool, but the control will trigger an alert. If any Y1/2 and W1/2 inputs are active at the same time, the control will trigger and alarm and will disable cooling and heating.	SZ A/C
Cool Tempered Venting	Enable	The system monitors the MAT during venting mode. If the MAT is above the vent SAT setpoint by the vent deadband for more than 2 minutes, the system will enable mechanical cooling to temper the MAT to the vent SAT setpoint.	SZ A/C
	Disable	Cool tempered venting is disabled.	Any
Vent Deadband	10 to 20°F, Default 10°F	Used as part of cool tempered venting and heat tempered venting.	SZ A/C

NOTE(S):

a. See the Controls, Operation, and Troubleshooting guide for details on SAT reset, comfort trending, or temperature compensated start.

Table 22 — Dehumidify Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Demand Source	0 = None	Dehumidification is not performed.	None
	1 = HSTAT	The unit monitors the humidistat input (Y3) to determine a dehumidify demand. Used for single-zone A/C applications humidistat or two-stage cooling/heating thermostat with dehumidification output. Requires the equipment configuration for humidistat to be enabled. See below for demand mapping based on input: **Y3 INPUT STATUS** / **DEHUM DEMAND** Inactive — No Active — Yes	SZ A/C
	2 = RARH	The unit compares the return air relative humidity (RARH) sensor reading to the dehumidify relative humidity (dehum RH) setpoint to determine if there is a dehumidify demand. Requires local RARH sensor or network RARH value.	SZ A/C
	3 = SPRH	The unit compares the space relative humidity (SPRH) sensor reading to the dehumidify relative humidity (dehum RH) setpoint to determine if there is a dehumidify demand. Requires local SPRH sensor or network SPRH value.	SZ A/C
	4 = OADP	The unit compares the outdoor air dewpoint (OADP), calculated from OAT and OARH, to the dehumidify dewpoint (dehum DP) setpoint to determine if there is a dehumidify demand. Requires local OARH sensor and either local OAT sensor or network OAT value.	100% OA
Unoccupied Dehum.	Enable	Dehumidification can occur during the unoccupied period.	SZ A/C
	Disable	Dehumidification is prevented the unoccupied period.	Any
Vent/None Dehum.	Enable	A dehumidify demand can exist with a vent or none demand. This configuration is recommended for most applications.	Any
	Disable	A dehumidify demand is prevented with a vent or none demand.	SZ A/C
High Cool Dehum.	Enable	A dehumidify demand can exist with a high cool demand.	Any
	Disable	A dehumidify demand is prevented with a high cool demand. This configuration is recommended for applications that prioritize space temperature over dehumidification.	SZ A/C
Low Cool Dehum.	Enable	A dehumidify demand can exist with a low cool demand.	Any
	Disable	A dehumidify demand is prevented with a low cool demand.	SZ A/C
Low Heat Dehum.	Enable	A dehumidify demand can exist with a low heat demand. This configuration is only recommended for applications that prioritize dehumidification over space temperature.	Any
	Disable	A dehumidify demand is prevented with a low heat demand.	SZ A/C

STEP 11 — CONFIGURE THE HEATING SYSTEM (OPTIONAL)

For units with a heat source, navigate to the Heating Configuration screen (***Main Menu → System Config→Heating Config***). The heater configuration screen will only show if the unit is equipped with a heat source. Set the heater configurations based on the application requirements. See Fig. 92 for heater configuration screen layout. When finished, click the save changes button at the bottom of the screen. Heating on/off deadband.

The heater must be configured based on application requirements. Select configurations that govern the heater operation are included in the cooling configuration screen, including the cool/heat demand source and venting deadband. See Table 23 for heater configurations and applications.

STEP 12 — CONFIGURE EXHAUST FAN (OPTIONAL)

For units with an exhaust fan, navigate to the Exhaust Fan Configuration screen (***Main Menu → System Config → Exhaust Fan Config***). The exhaust fan screen will only show if the exhaust is enabled in the equipment configuration. Configure the exhaust fan control based on application requirements. See Fig. 93 for exhaust fan configuration screen layout. When finished, click the save changes button at the bottom of the screen.

The exhaust configuration governs how the fan operates when it is on and what speeds it operates at. See Table 24 for exhaust fan control configurations and descriptions by application.

STEP 13 — CONFIGURE FREE COOLING – SZ A/C ONLY (OPTIONAL)

If the unit has an outdoor air damper that will be used for free cooling, navigate to the Free Cooling Configuration screen (***Main Menu → System Config → Free Cooling Config***). Configure the free cooling configuration based on application requirements. See Fig. 94 for free cooling configuration screen layout. When finished, click the save changes button at the bottom of the screen. Basic control setup is complete.

Single-zone A/C units with an outdoor air damper can be configured to provide free cooling. When free cooling is enabled, the system will check to see if free cooling or integrated cooling (free cooling + mechanical cooling), prior to starting mechanical cooling mode. Multiple free cooling checks can be enabled and used simultaneously. All enabled free cooling checks must pass to allow free cooling or integrated cooling. See Table 25 for free cooling configurations and Table 26 for free cooling setpoints.

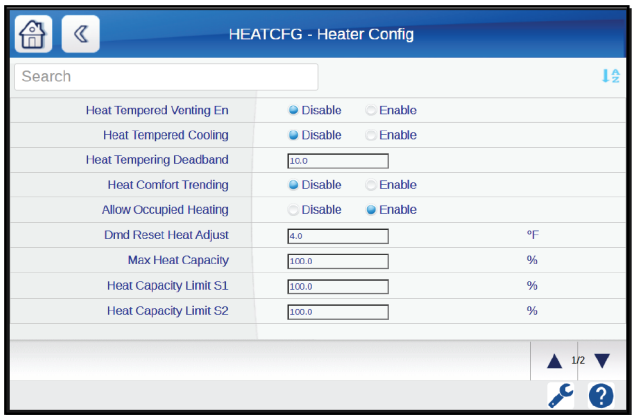


Fig. 92 — Heater Configuration Screen

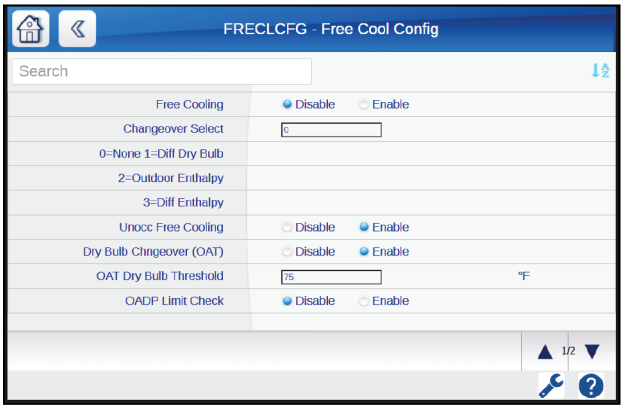


Fig. 93 — Exhaust Fan Configuration Screen

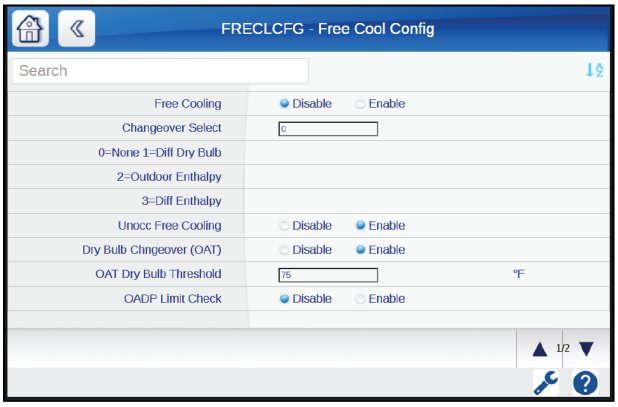


Fig. 94 — Free Cooling Configuration Screen

Table 23 — Heater Configurations by Application[a]

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Heat Tempered Venting	Enable	The system monitors the MAT during venting mode. If the MAT is below the vent SAT setpoint by the vent deadband for more than 2 minutes, the system enables the heater to temper the MAT to the vent SAT setpoint. Requires modulating heat source.	SZ A/C
	Disable	Heat tempered vending is not performed.	Any
Heat Tempered Cooling	Enable	The system monitors the MAT during cooling mode. If the MAT is below the SAT control point by the heat tempering deadband, the system enables the heater to temper the MAT to the vent SAT setpoint. Requires modulating heat source.	SZ A/C
	Disable	Heat tempered cooling is not performed.	Any
Heat Tempering Deadband	5 to 15°F, 10°F Default	Used as part of heat tempered cooling.	SZ A/C

NOTE(S):

a. See the Controls, Operation, and Troubleshooting guide for details on comfort trending and morning warm up only.

Table 24 — Exhaust Fan Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Exhaust Fan Control	0 = None	The unit does not have an exhaust fan	All
	1 = 2-Stage	The exhaust fan stages between off and two discrete speeds based on outdoor air damper position. Requires the outdoor air damper and exhaust fan to be enabled in the equipment configuration. See below for exhaust fan speeds based on OAD position configurations:	SZ A/C
	2 = Third-Party	The exhaust fan modulates between off and max. speed based on a third-party modulation signal. Requires local third-party EXF modulation input or third-party EXF modulation network value.	Any
	3 = Building Pressure	The exhaust fan modulates between off and max speed to maintain the building pressure sensor reading at the building pressure (BP) setpoint. Requires local BP sensor or network BP value.	Any
EXF Max Speed	0 to100%, Default 100%	The maximum speed that the exhaust fan can operate at. No other exhaust fan speed configuration can be higher than the EXF max. speed.	Any
EXF Speed OAD Pos 1	0 to 100%, Default 50%	Use with 2-stage exhaust fan control. Speed cannot be higher than EXF speed OAD pos 2.	SZ A/C
EXF Speed OAD Pos 2	0 to 100%, Default 100%	Use with 2-stage exhaust fan control. Speed cannot be lower than EXF speed OAD pos 1 or higher than EXF max. speed.	SZ A/C
EXF OAD Pos 1	0 to 100%, Default 50%	Use with 2-stage exhaust fan control. Position cannot be higher than EXF OAD pos 2 or lower than OAD min position.	SZ A/C
EXF OAD Pos 2	0 to 100%, Default 100%	Use with 2 -stage exhaust fan control. Position cannot be lower than EXF OAD pos 1 or higher than OAD max position.	SZ A/C

OAD POSITION	EXHAUST FAN SPEED
< OAD Pos 1	Off
≥ OAD Pos 1, < OAD Pos 2	EXF Speed OAD Pos 1
≥ OAD Pos 2	EXF Speed OAD Pos 2

Table 25 — Free Cooling Configurations

ITEM	VALUE	DESCRIPTION	APPLICATION
Free Cooling	Enable	The system is allowed to perform free cooling during the occupied period.	SZ A/C
	Disabled	Free cooling is not performed at any time.	100% OA
Unoccupied Free Cooling	Enable	Free cooling is allowed during the unoccupied period.	SZ A/C
	Disable	Free cooling is not performed during the unoccupied period.	100% OA
Changeover Select	0 = None	Changeover check is not used.	100% OA
	1 = Diff Dry Bulb	The system will check the differential between the OAT and RAT to the differential dry bulb threshold to see if free cooling is allowed.	SZ A/C – Dry Climate
	2 = Enthalpy	The system will check the OAE versus the 28 btu/lb. limit to see if free cooling is allowed.	SZ A/C – Humid Climate
	3 = Diff Enthalpy	The system will check the differential between the OAE and RAE versus the differential enthalpy threshold to see if free cooling is allowed.	SZ A/C – Humid Climate
OADP Limit Check	Enable	The system will check the differential between the OAT and RAT to see if free cooling is allowed.	SZ A/C – Humid Climates
	Disable	The control does not check OADP to determine if free cooling is available.	100% OA or SZ A/C - Dry Climates
OAT Dry Bulb Limit Check	Enable	The system will check the OAT versus the OAT dry bulb limit to see if free cooling is allowed.	SZ A/C
	Disable	The control does not check OAT to determine if free cooling is available.	Any

Table 26 — Free Cooling Setpoints

SETPOINT	RANGE	FREE COOL CONFIGURATION	DESCRIPTION
OAT Dry Bulb Threshold	–40 to 120°F, Default 70°F	OAT Dry Bulb Limit	If the OAT dry bulb limit check is enabled, free cooling is prevented when the OAT is above the OAT dry bulb threshold.
OADP Threshold	50 to 62°F, Default 55°F	OADP Limit	If the OADP limit check is enabled, free cooling is prevented when the OADP is above the OADP threshold.
Diff Dry Bulb Threshold	0 to 10°F, Default 5°F	Diff Dry Bulb Changeover	If the changeover select is set to differential dry bulb threshold, free cooling is prevented when the OAT > RAT= differential dry bulb threshold.
Diff Enthalpy Threshold	0 to 2 btu/hr., Default .2 btu/hr.	Diff Enthalpy Changeover	If the changeover select is set to differential enthalpy threshold, free cooling is prevented when the OAE > RAE=differential enthalpy threshold.

STEP 14 — SET INDOOR FAN SETPOINTS (OPTIONAL)

If the unit is configured for SP or ZP IDF control, navigate to the Indoor Fan Setpoint screen (***Main Menu→ Setpoints → Indoor Fan Setpoints***). Adjust the fan setpoints as needed based on application requirements. See Fig. 95 for indoor fan setpoint screen layout. When finished, click the save changes button at the bottom of the screen.

For units configured for supply pressure (SP) or zone pressure (ZP) control (IDF Control = 3 or 4), the supply pressure or zone pressure setpoints can be adjusted on the Indoor Fan Setpoint screen. For all other indoor fan control configurations, the indoor fan setpoints do not need to be adjusted. See Table 27 for indoor fan setpoints.

STEP 15 — SET COOLING SETPOINTS

Navigate to the Cooling Setpoints screen (***Main Menu→ Setpoints → Cooling Setpoints***). Adjust the cooling setpoints as needed based on application requirements. See Fig. 96 for cooling setpoint screen layout. When finished, click the save changes button at the bottom of the screen.

The occupied and unoccupied cooling setpoints, setpoint deadbands, and the cooling supply air temperature (SAT) setpoints can be adjusted on the cooling setpoint screen. See Table 28 for setpoint information and descriptions by application type.

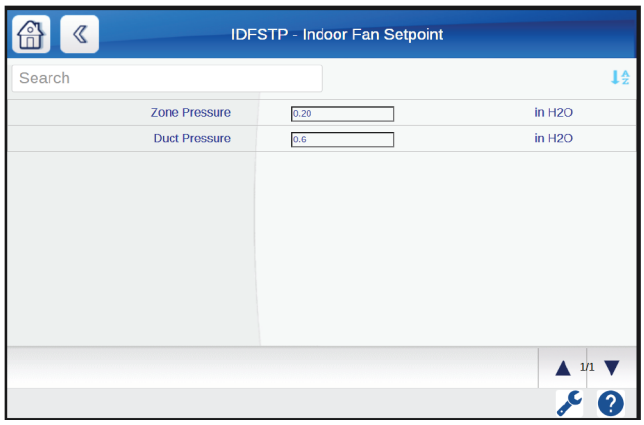


Fig. 95 — Indoor Fan Setpoints Screen

Fig. 96 — Cooling Setpoints Screen

Table 27 — Indoor Fan Setpoints

SETPOINT	RANGE	IDF CONTROL CONFIG.	DESCRIPTION
Supply Pressure	0 to 3 in., Default 1 in.	Supply Pressure Control (SP)	The indoor fan will modulate to maintain the supply pressure at the supply pressure setpoint. Requires local SP sensor or network SP value.
Zone Pressure	–.25 in. to .25 in., Default.03 in.	Zone Pressure Control (ZP)	The indoor fan will modulate to maintain the building pressure at the zone pressure setpoint. Requires local BP sensor or network BP value.

Table 28 — Cooling Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Cooling	55 to 80°F, Default 72°F	SPT or OAT	In the occupied period, the system compares the demand source temperature to the occupied cooling setpoint and setpoint deadbands to determine cooling demands.
Unoccupied Cooling	55 to 110°F, Default 85°F	SPT	In the unoccupied period, the system compares the demand source temperature to the unoccupied cooling setpoint and setpoint deadbands to determine cooling demands.
Low Cool SAT	55 to 75°F, Default 65°F	SPT or TSTAT	The effective SAT setpoint with a low cool demand.
High Cool SAT	45 to 75°F, Default 55°F	SPT or TSTAT	The effective SAT setpoint with a high cool demand.
100% OA Low Cool SAT	55 to 75°F, Default 70°F	OAT	The effective SAT setpoint with a low cool demand.
100% OA High Cool SAT	55 to 75°F, Default 65°F	OAT	The effective SAT setpoint with a high cool demand.
Vent SAT	55 to 85°F, Default 70°F	All	The effective SAT setpoint with a vent demand.
Low Cool On DB	0 to 2°F, Default 1°F	SPT or OAT	The amount that the demand source temperature needs to be above the effective cooling setpoint to initiate a low cool demand.
Low Cool Off DB	.5 to 2°F, Default 1°F	SPT or OAT	The amount that the demand source temperature needs to be below the effective cooling setpoint to stop a low cool demand.
High Cool On DB	.5 to 20°F, Default 2°F	SPT or OAT	The amount that the demand source temperature needs to be above a low cool demand to initiate a high cool demand.

STEP 16 — SET DEHUMIDIFY SETPOINTS

Navigate to the Dehumidify Setpoints screen (***Main Menu → Setpoints→ Dehum Setpoints***). Adjust the dehumidify setpoints based on application requirements. See Fig. 97 for dehumidify setpoint screen layout. When finished, click the save changes button at the bottom of the screen.

The dehumidify RH and DP setpoints can be adjusted on the Dehumidify Setpoint screen. See Table 29 for setpoint information and descriptions.

STEP 17 — SET HEATING SETPOINTS (OPTIONAL)

For units with heat, navigate to the Heating Setpoint screen (***Main Menu → Setpoints → Heating Setpoints***). The heating setpoints screen will only show if the unit is equipped with a heat source. Adjust the heating setpoints based on application requirements. See Fig. 98 for heating setpoint screen layout When finished, click the save changes button at the bottom of the screen.

The occupied or unoccupied heating setpoints and the heating supply air temperature (SAT) setpoints can be adjusted from the heating setpoint screen. See Table 30 for setpoint information and descriptions.

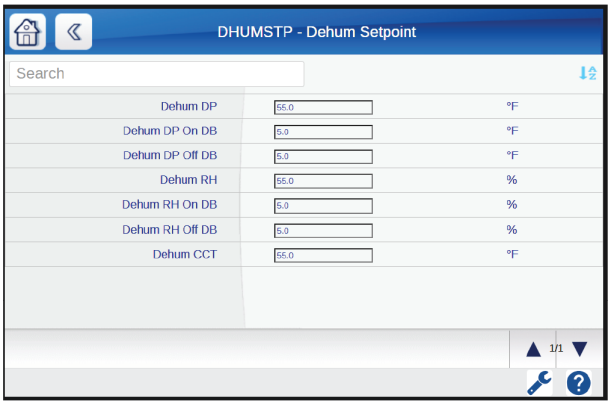


Fig. 97 — Dehumidify Setpoints Screen

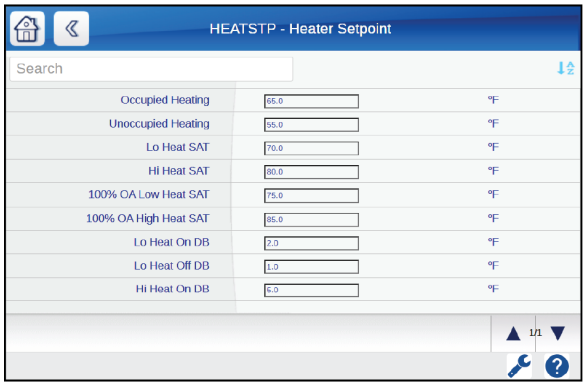


Fig. 98 — Heating Setpoints Screen

Table 29 — Dehumidify Setpoints

SETPOINT	RANGE	DEHUM DEMAND SOURCE CONFIG.	DESCRIPTION
Dehum. DP	50 to 75°F, Default 55°F	OADP	The unit compares OADP to the dehum DP setpoint and the dehum. DP on deadband to establish a dehum. demand.
Dehum. DP On DB	0 to 20°F, Default 5°F	OADP	The unit compares OADP to the dehum. DP setpoint and the dehum. DP on deadband to establish a dehum demand.
Dehum. DP Off DB	1 to 20°F, Default 5°F	OADP	The unit compares OADP to the dehum. DP setpoint and the dehum. DP off deadband to stop a dehum. demand.
Dehum. RH	40 to 100%, Default 60%	SPRH or RARH	The unit compares the RH to the dehum. RH setpoint and the dehum. RH on deadband to establish a dehum. demand.
Dehum. RH On DB	0 to 20%, Default 5%	SPRH or RARH	The unit compares the RH to the dehum. RH setpoint and the dehum. RH on deadband to establish a dehum. demand.
Dehum. RH Off DB	1 to 20%, Default 5%	SPRH or RARH	The unit compares the RH to the dehum. RH setpoint and the dehum. RH off deadband to stop a dehum. demand.
Dehum. CCT	40 to 60°F, Default 55°F	All	The cooling coil temperature that the system will try to maintain during dehumidification mode.

Table 30 — Heating Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Heating	55 to 80°F, Default 68°F	SPT or OAT	The unit compares the demand source temperature to the occupied cooling setpoint to determine an occupied cooling demand.
Unoccupied Heating	40 to 80°F, Default 60°F	SPT	The unit compares the SPT to the occupied cooling setpoint to determine an unoccupied cooling demand. Only used if unoccupied indoor fan is configured for demand.
Low Heat SAT	60 to 115°F, Default 75°F	SPT or TSTAT	The effective SAT setpoint with a low heat demand.
High Heat SAT	60 to 125°F, Default 85°F	SPT or TSTAT	The effective SAT setpoint with a high heat demand.
100% OA Low Heat SAT	60 to 115°F, Default 70°F	OAT	The effective SAT setpoint with a low heat demand.
100% OA High Heat SAT	60 to 125°F, Default 80°F	OAT	The effective SAT setpoint with a high heat demand.
Low Heat On DB	0 to 2°F, Default 1°F	SPT or OAT	The amount that the demand source temperature needs to be below the effective heating setpoint to initiate a low heat demand.
Low Heat Off DB	.5 to 2°F, Default 1°F	SPT or OAT	The amount that the demand source temperature needs to be above the effective heating setpoint to stop a low heat demand.
High Heat On DB	.5 to 20°F, Default 2°F	SPT or OAT	The amount that the demand source temperature needs to be below a low heat demand to initiate a high heat demand.

STEP 18 — SET EXHAUST FAN SETPOINTS WITH BP EXHAUST FAN CONTROL (OPTIONAL)

Navigate to the exhaust fan setpoint screen (***Main Menu→Setpoints→Indoor Fan Setpoints***). The Exhaust Fan Setpoints screen will only show when the exhaust fan is enabled. See Fig. 99 for exhaust fansSetpoint screen layout. Adjust the building pressure setpoint as needed based on application requirements. When finished, click the save changes button at the bottom of the screen.

For units with exhaust fan configured for building pressure (BP) control, the building setpoint is adjusted on the Exhaust Fan Setpoint screen. See Table 31 for setpoint information and descriptions.

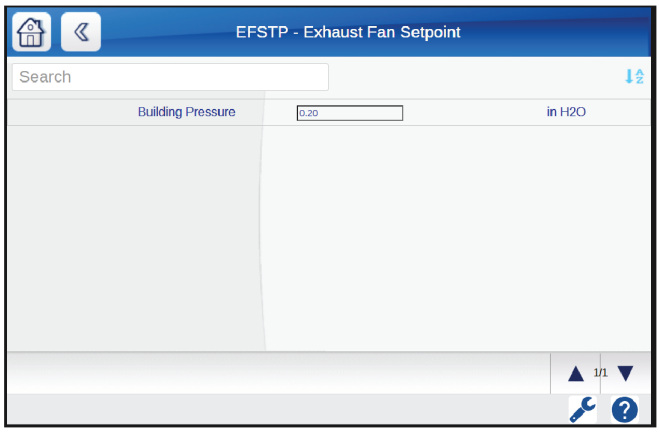


Fig. 99 — Exhaust Fan Setpoints Screen

STEP 19 — SETUP OCCUPANCY CONTROL

Setup the occupancy switch, unit schedule, or BAS occupancy point to determine when the unit is in the occupied or unoccupied period. See below for guidance on setting up the local schedule or occupancy switch. See the Advanced Controls, Operation, and Troubleshooting guide for direction on setting up BAS occupancy and communication.

Local Schedule

Navigate to the Local Schedule screen ***(Main Menu →Schedules →Local Schedules).*** Local schedules are often used for standalone applications. The default schedule 1 is set for 24/7 occupied.

Adjust the building pressure setpoint as needed based on application requirements. When finished, click the home button to exit to the home screen. When finished, click the save changes button at the bottom of the screen.

Up to eight different local schedules can be configured. To configure a schedule, use the page/up down arrows to change schedule number. Select which days the schedule is active by activating the check box below the day of the week. Enter the occupancy start time next to 'occupied from'. Enter the occupied stop time next to 'to'. NOTE: Time is in 24-hour (military) time.

In the example in Fig. 100, the schedule is active for Monday through Friday. The unit will be in the occupied period from 4AM (4:00) to 6 PM (18:00).

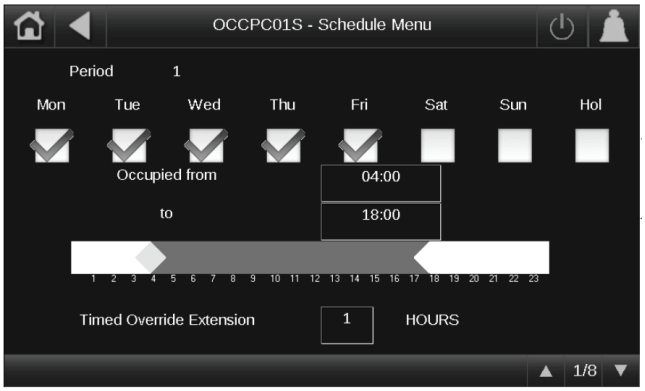


Fig. 100 — Local Schedule Screen

Occupancy Switch

Navigate to the Equipment Configuration screen. (***Main Menu→ System Config→Equipment Config***). Configure the remote switch for remote occupancy. When finished, click the save changes button at the bottom of the screen.

When the remote switch is configured for occupancy, the system will monitor inputs 3 and 4 on TB3. Refer to Fig. 36-38, SmartVu control wiring diagrams (sizes 07 and 08-12) for wiring details. When the inputs show open, the unit is unoccupied. When the input show closed (short), the unit is occupied. See Table 32 for remote switch configuration details.

Table 31 — Exhaust Fan Setpoints

SETPOINT	RANGE	DEFAULT	DEMAND SOURCE	DESCRIPTION	APPLICATION
Building Pressure	-0.25 in. to 0.25 in. Default .03 in.	0.03 in.	Building Pressure Control (BP)	The unit compares the demand source temperature to the occupied cooling setpoint to determine an occupied cooling demand.	All

Table 32 — Remote Switch Configuration

SETPOINT	RANGE	DESCRIPTION	APPLICATION
Remote Switch	2 = Remote Occupancy	The system will monitor the local remote switch input to determine occupancy status.	All

100% OUTDOOR AIR OPERATION

Overview

During the occupied period, the indoor fan (IDF) and exhaust fan (EXF, if equipped) turn on and the outdoor air damper (OAD) opens to its maximum position. The control monitors the outdoor air temperature (OAT) to determine if there is a low or high cool or low or high heat demand. If there is a cool or heat demand, the control operates the cooling or heating system (if equipped) to maintain the supply air temperature at the effective supply air temperature setpoint based on the active demand. The control also monitors the outdoor air dewpoint (OADP) to determine if there is a dehumidify demand. If there is, the control operates the cooling system to the cooling coil temperature setpoint to dehumidify the air and operates the hot gas reheat (HGRH) system to maintain the effective supply air temperature setpoint. If there is not a cool, heat, or dehumidify demand, the unit operates in fan only mode. During the unoccupied period, the unit is off.

Cool/Heat Demand Source

OUTDOOR AIR TEMPERATURE (OAT)

The control monitors the outdoor air temperature (OAT) and comnspares the sensor reading to the occupied cooling and heating setpoints to determine if there is a cool or heat demand. Deadbands are used to adjust when the demand starts and stops versus the occupied setpoints. If there isn't a cool or heat demand and the indoor fan (IDF) is on (occupied period), the demand is set to vent. When the unit is off (unoccupied period), the demand is set to none.

Dehumidify Demand Source

OUTDOOR AIR DEWPOINT (OADP)

The control monitors the outdoor air temperature (OAT) and relative humidity (OARH) and calculates the outdoor air dewpoint (OADP). The OADP is compared to the dehumidify dewpoint setpoint to determine if there is a dehumidify demand. Deadbands are used to adjust when the demand starts and stops compared to the dehumidify setpoint. A dehumidify demand can co-exist with a cool demand or a vent demand.

See Tables 33 and 34 for available demands for the OAT cool/heat demand source and OADP dehumidify demand source configurations and the start and stop conditions for each demand level.

Table 33 — OAT and OADP Unoccupied Demand Determination (100% OA)

DEMAND	START CONDITION	STOP CONDITION
None	The IDF is configured for disabled during the unoccupied period.	Occupancy starts.

Table 34 — OAT and OADP Occupied Demand Determination (100% OA)

DEMAND	START CONDITION	STOP CONDITION
	OCCUPIED PERIOD	
Vent	OAT is below the occupied cooling setpoint, plus the low cool on deadband and above the occupied heating setpoint minus the low heat on deadband. OADP is below the dehum. DP setpoint plus the dehum. DP on deadband. **OR** Low Cool, Low Heat, or Vent/Dehumidify demand stops.	Low Cool, Low Heat, or Vent/Dehumidify demand starts.
Low Cool	The OAT rises above the occupied cooling setpoint plus the low cool on deadband. **OR** Low Cool/Dehumidify or High Cool demand stops.	The OAT drops below the occupied cooling setpoint plus the low cool on deadband minus the low cool off deadband. **OR** Low Cool/Dehumidify or High Cool demand starts.
High Cool	OAT rises above the occupied cooling setpoint plus the low cool on deadband plus the high cool on deadband. **OR** High Cool/Dehumidify demand stops.	OAT drops below the occupied cooling setpoint plus the low cool on deadband plus the high cool on deadband minus the 1/2 low cool off deadband. **OR** High Cool/Dehumidify demand starts.
Vent/Dehum.	OAT is below the occupied cooling setpoint plus the low cool on deadband and above the occupied heating setpoint minus the low heat on deadband and the OADP is above the dehum DP setpoint plus the dehum DP on deadband. **OR** Low Cool/Dehumidify demand stops.	OADP drops below the dehum DP setpoint minus the dehum DP off deadband. **OR** Low Cool/Dehumidify or High Cool demand starts.
Low Cool/Dehum.	The OAT rises above the occupied cooling setpoint plus the low cool on deadband and the OADP rises above the dehum DP setpoint plus the dehum DP on deadband. **OR** High Cool/Dehumidify demand stops.	The OAT drops below the occupied cooling setpoint plus the low cool on deadband minus the low cool off deadband or the OADP drops below the dehum DP setpoint plus the dehum DP on deadband minus the dehum DP off deadband. **OR** Low Cool/Dehumidify or High Cool demand starts.
High Cool/Dehum.	OAT rises above the occupied cooling setpoint plus the low cool on deadband plus the high cool on deadband and the OADP rises above the dehum DP setpoint plus the dehum DP on deadband.	OAT drops below the occupied cooling setpoint plus the low cool on deadband plus the high cool on deadband minus the 1/2 low cool off deadband or OADP drops below the dehum DP setpoint minus the dehum DP deadband.
Low Heat	OAT drops below the occupied heating setpoint minus the low heat on deadband. **OR** High Heat demand stops.	OAT rises above the occupied heating setpoint minus the low heat on deadband plus the low heat off deadband. **OR** High Heat demand starts.
High Heat	OAT drops below the occupied heating setpoint minus the low heat on deadband minus the high heat on deadband.	OAT rises above the occupied heating setpoint minus the low heat on deadband minus the high heat on deadband plus the 1/2 low heat off deadband.

Sequence of Operation (100% Outdoor Air)

The control sequence of operation depends on the occupancy period, component configuration, and demand level (cooling, heating, and dehumidify). See Tables 35-39 for the typical 100% outdoor air operation by component for the occupied period and Table 40 for the unoccupied period. Operation may additionally be limited by service lockouts.

Table 35 — 100% OA Indoor Fan (IDF) Occupied Sequence of Operation by Configuration

OCCUPANCY	IDF CONTROL CONFIG.	OCC IDF CONFIG.	DEMAND	OPERATION
Occupied	Constant Volume (CV)	Continuous	All	The IDF operates at the constant volume (CV) speed configuration.
	Supply Pressure (SP)	Continuous	All	The IDF modulates between min. and max. speeds to maintain the supply duct pressure at the SP setpoint.
	Zone Pressure (ZP)	Continuous	All	The IDF modulates between min. and max. speeds to maintain the building static pressure at the ZP setpoint.

Table 36 — 100% OA Outdoor Air Damper (OAD) Occupied Sequence of Operation by Operation

OCCUPANCY	DEMAND	OAD CONTROL	DEMAND	OPERATION
Occupied	All	100% OAD	All	The OAD is at the maximum OAD position.

Table 37 — 100% OA Occupied Cool and Dehumidify Occupied Sequence of Operation by Configuration

OCCUPANCY	COOL/HEAT DEMAND SOURCE CONFIG.	DEHUM DEMAND SOURCE CONFIG.	DEMAND	OPERATION
Occupied	Outdoor Air Temperature (OAT)	Outdoor Air Dewpoint (OADP)	Vent	The compressors and HGRH are off. The unit supplies unconditioned OA.
			Low Cool	The compressors stage between min. and max. capacity to maintain the SAT at the 100% OAT Low Cool SAT setpoint. The HGRH is off.
			High Cool	The compressors stage between min. and max. capacity to maintain the SAT at the 100% OAT High Cool SAT setpoint. The HGRH is off.
			Vent/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the Vent SAT setpoint.
			Low Cool/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the 100% OA Low Cool SAT setpoint.
			High Cool/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the 100% OA High Cool SAT setpoint.

Table 38 — 100% OA Exhaust Fan Occupied Sequence of Operation bu Configuration

OCCUPANCY	EXF CONTROL	DEMAND	OPERATION
Occupied	None	All	The unit does not have an EXF.
	Building Pressure	All	If the building pressure is above the BP setpoint, the EXF modulates between the min. and max. EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF is off.

Table 39 — 100% OA Heat Occupied Sequence of Operation (If Equipped)

OCCUPANCY	COOL/HEAT DEMAND SOURCE	DEHUM DEMAND SOURCE	DEMAND	OPERATION
Occupied	Outdoor Air Temperature (OAT)	Outdoor Air Dewpoint (OADP)	Vent	The heat source is off.
			Low Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the 100% OAT Low Heat SAT setpoint.
			High Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the 100% OAT High Heat SAT setpoint.

Table 40 — 100% OA Unoccupied Sequence of Operation by Configuration

INDOOR FAN (IDF)				
OCCUPANCY	**DEMAND**	**UNOCC IDF**	**IDF CONTROL**	**OPERATION**
Unoccupied	None	Disabled	All	The IDF is off.
OUTDOOR AIR DAMPER (OAD)				
OCCUPANCY	**DEMAND**	**OAD CONTROL**		**OPERATION**
Unoccupied	None	100% OAD enabled		The OAD is closed.
COOL AND DEHUMIDIFY				
OCCUPANCY	**DEMAND**	**COOL/HEAT DEMAND SOURCE**	**DEHUM DEMAND SOURCE**	**OPERATION**
Unoccupied	None	OAT	OADP	The compressors and HGRH are off.
EXHAUST FAN (EXF if enabled)				
OCCUPANCY	**DEMAND**	**EXF CONTROL**		**OPERATION**
Unoccupied	None	All		The EXF is off.
HEAT (if enabled)				
OCCUPANCY	**DEMAND**	**COOL/HEAT DEMAND SOURCE**	**DEHUM DEMAND SOURCE**	**OPERATION**
Unoccupied	None	OAT	OADP	The heat source is off.

SINGLE-ZONE AIR CONDITIONING OPERATION

Overview

During the occupied period, the indoor fan (IDF) operates continuously or only with a cool, heat, or dehumidify demand. The exhaust fan (EXF, if equipped) turns on based on outdoor air damper (OAD) position or building pressure (BP) level. The OAD modulates to maintain constant ventilation when the IDF is on. The OAD can also be configured to provide free cooling based on outdoor, outdoor air and return air conditions.

The control monitors the thermostat inputs (TSTAT) or space temperature (SPT) to determine if there is a cool or heat demand. If there is a cool or heat demand, the control operates the cooling or heating systems to a cold (55°F to 65°F) or warm (85°F to 95°F) supply air temperature (SAT). When there isn't a cool or heat demand, but the IDF is commanded on (continuous or with dehumidify demand), the demand is set to VENT and the unit operates to a neutral (65°F to 75°F) SAT. The demand is set to NONE when there isn't a cool, heat, or dehumidify demand and the IDF is configured for operation only with a demand. The control also monitors the space relative humidity (SPRH) or humidistat input (HSTAT) to determine if there is a dehumidify demand. If there is, the control operates the cooling system to dehumidify the air to a neutral dewpoint (55°F) and operates the hot gas reheat (HGRH) system to a cold (55°F to 65°F) SAT with a cool demand or neutral (65°F to 75°F) SAT with a vent demand.

Cool/Heat Demand Sources

SPACE TEMPERATURE (SPT)

The SPT control monitors the space temperature (SPT) and compares the sensor reading to the occupied and unoccupied cooling and heating setpoints to determine if there is a cool or heat demand. Deadbands are used to adjust when the demand starts and stops versus the cooling and heating setpoints. During the occupied period, if there isn't a cool or heat demand and the IDF is on, the demand is set to VENT. If the IDF is off during the occupied or unoccupied period, the demand is set to NONE.

THERMOSTAT (TSTAT)

The TSTAT control monitors the thermostat inputs (Y1, Y2, W1, W2) to determine if there is a cool or heat demand. During the occupied period, if there isn't a cool or heat demand and the IDF is on, the demand is set to VENT. If the IDF is off during the occupied or unoccupied period, the demand is set to NONE.

Dehumidify Demand Sources

SPACE RELATIVE HUMIDITY (SPRH)

The SPRH control monitors the space relative humidity (SPRH) and relative humidity (OARH) and compares the sensor reading to the dehumidify relative humidity (Dehum RH) setpoint to determine if there is a dehumidify demand. Deadbands are used to adjust when the demand starts and stops compared to the dehumidify setpoint. A dehumidify demand can co-exist with a cool demand or a vent demand.

HUMIDISTAT (HSTAT)

The HSTAT control monitors the humidistat input (Y3) to determine if there is a dehumidify demand. A dehumidify demand can co-exist with a cool demand or a vent demand.

See Tables 41 to 42 for available demands for the SPT cool/heat demand source and SPRH dehumidify demand source configurations. See Tables 43 to 44 for TSTAT cool/heat demand source and HSTAT dehumidify demand source configurations and the start and stop conditions for each demand level.

Table 41 — SPT Occupied Demand Determination (SZ A/C)

DEMAND	START CONDITION	STOP CONDITION
None	The IDF is configured for demand during the occupied period, and the SPT is below the Occupied Cooling setpoint plus the Low Cool On deadband and above the Occupied Heating setpoint minus the Low Heat On deadband. **AND** The SPRH is below the Dehum RH setpoint plus the Dehum RH On deadband.	Low Cool, Low Heat, or Vent/Dehumidify demand starts.
Vent	The IDF is configured for continuous during the occupied period and the SPT is below the Occupied Cooling setpoint plus the Low Cool On deadband and above the Occupied Heating setpoint minus the Low Heat On deadband, **AND** The SPRH is below the Dehum RH setpoint plus the Dehum RH On deadband **OR** The IDF is configured for continuous during the occupied period and a Low Cool, Low Heat, or Vent/Dehumidify demand stops	Low Cool, Low Heat, or Vent/Dehumidify demand starts.
Low Cool	The SPT rises above the occupied Cooling setpoint plus the Low Cool On deadband. **OR** Low Cool/Dehumidify or High Cool demand stops.	The SPT drops below the occupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband. **OR** Low Cool/Dehumidify or High Cool demand starts.
High Cool	SPT rises above the occupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband. **OR** High Cool/Dehumidify demand stops.	SPT drops below the occupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband. **OR** High Cool/Dehumidify demand starts.
Vent/Dehum.	SPT is below the occupied Cooling setpoint plus the Low Cool On deadband and above the occupied Heating setpoint minus the Low Heat On deadband and the SPRH rises above the Dehum RH setpoint plus the Dehum RH On deadband. **OR** Low Cool/Dehumidify demand stops.	SPRH drops below the Dehum RH setpoint minus the Dehum RH Off deadband.
Low Cool/Dehum.	The SPT rises above the occupied Cooling setpoint plus the Low Cool On deadband and the SPRH rises above the Dehum RH setpoint plus the Dehum RH On deadband.	The SPT drops below the occupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband **OR** the SPRH drops below the Dehum RH setpoint minus the Dehum RH Off deadband **OR** High Cool/Dehumidify demand starts.
High Cool/Dehum.	SPT rises above the occupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband and the SPRH rises above the Dehum RH setpoint plus the Dehum RH On deadband.	SPT drops below the occupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband **OR** SPRH drops below the Dehum RH setpoint minus the Dehum RH Off deadband.
Low Heat	SPT drops below the occupied Heating setpoint minus the Low Heat On deadband.	SPT rises above the occupied Heating setpoint minus the Low Heat On deadband plus the Low Heat Off deadband.
High Heat	SPT drops below the occupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband.	SPT rises above the occupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband plus the 1/2 Low Heat Off deadband.

Table 42 — SPT Unoccupied Demand Determination (SZ A/C)[a]

DEMAND	START CONDITION	STOP CONDITION
None	The IDF is configured for disabled during the unoccupied period.	N/A
	OR The IDF is configured for demand during the unoccupied period and SPT is below the Unoccupied Cooling setpoint plus the Low Cool On deadband and above the Unoccupied Heating setpoint minus the Low Heat On deadband, and the SPRH is below the Dehum RH setpoint plus the Dehum RH On deadband. **OR** The IDF is configured for demand during the unoccupied period and a Low Cool, Low Heat, or Vent/Dehumidify demand stops.	The IDF is configured for demand during the unoccupied period and a Low Cool, Low Heat, or Vent/Dehumidify demand starts.
Low Cool	The SPT rises above the occupied cooling setpoint plus the low cool on deadband. **OR** Low Cool/Dehumidify or High Cool demand stops.	The SPT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband. **OR** Low Cool/Dehumidify or High Cool demand starts.
High Cool	SPT rises above the occupied cooling setpoint plus the low cool on deadband plus the high cool on deadband. **OR** High Cool/Dehumidify demand stops.	SPT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband. **OR** High Cool/Dehumidify demand starts.
Vent/Dehum.	SPT is below the occupied cooling setpoint plus the low cool on deadband and above the unoccupied heating setpoint minus the low heat on deadband and the SPRH rises above the dehum RH setpoint plus the dehum RH on deadband. **OR** Low Cool/Dehumidify demand stops.	SPRH drops below the Dehum RH setpoint minus the Dehum RH Off deadband. **OR** Low Cool/Dehumidify or Low Heat demand starts.
Low Cool/Dehum.	The SPT rises above the occupied cooling setpoint plus the low cool on deadband and the SPRH rises above the Dehum RH setpoint plus the Dehum RH On deadband. **OR** High Cool/Dehumidify demand stops.	The SPT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband. **OR** The SPRH drops below the Dehum RH setpoint minus the Dehum RH Off deadband. **OR** High Cool/Dehumidify demand starts.
High Cool/Dehum.	SPT rises above the occupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband and the SPRH rises above the Dehum RH setpoint plus the Dehum RH On deadband.	SPT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband **OR** SPRH drops below the Dehum RH setpoint minus the Dehum RH deadband.
Low Heat	SPT drops below the occupied Heating setpoint minus the Low Heat On deadband. **OR** High Heat demand stops.	SPT rises above the occupied Heating setpoint minus the Low Heat On deadband plus the Low Heat Off deadband. **OR** High Heat demand starts.
High Heat	SPT drops below the occupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband.	SPT rises above the occupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband plus the 1/2 Low Heat Off deadband.

NOTE(S):

a. Low Cool, High Cool Vent/Dehumidify, Low Cool/dehumidify, High Cool/Dehum, Low Heat, High Heat require the IDF to be configured for demand operation during the unoccupied period.

Table 43 — TSTAT Occupied Demand Determination (SZ A/C)

DEMAND	START CONDITION	STOP CONDITION
None	The IDF is configured for demand operation during the occupied period and no inputs are active.	Y1, Y3, and W1 inputs become active.
Vent	The IDF is configured for continuous operation during the occupied period and no inputs are active.	Y1, Y3, or W1 inputs become active.
Low Cool	Y1 input is active.	Y1 input is deactivates. **OR** Y2 or Y3 input actives.
High Cool	Y1 and Y2 inputs are active.	Y2 input deactivates. **OR** Y3 inputs actives.
Vent/Dehum.	Y3 input is active.	Y3 input deactivates. **OR** Y1 or W1 will activate.
Low Cool/Dehum.	Y1 and Y3 inputs are active.	Y1 or Y3 input deactivates. **OR** Y2 input activates.
High Cool/Dehum.	Y1, Y2, and Y3 inputs are active.	Y2 or Y3 inputs deactivate.
Low Heat	W1 input is active.	W1 input deactivates **OR** W2 input activates.
High Heat	W1 and W2 inputs are active.	W2 input deactivates.

Table 44 — TSTAT Unoccupied Demand Determination (SZ A/C)[a]

DEMAND	START CONDITION	STOP CONDITION
None	The IDF is configured for disabled operation during the unoccupied period.	N/A
	The IDF is configured for demand and no inputs are active.	Y1, Y3, or W1 inputs activate.
Low Cool	Y1 input is active.	Y1 input is deactivates **OR** Y2 or Y3 input actives.
High Cool	Y1 and Y2 inputs are active.	Y2 inputs deactivates **OR** Y3 input actives.
Vent/Dehum.	Y3 input is active.	Y3 input deactivates. **OR** Y1 or W1 active.
Low Cool/Dehum.	Y1 and Y3 inputs are active.	Y1 or Y3 input deactivates **OR** Y2 input actives.
High Cool/Dehum.	Y1, Y2, and Y3 inputs are active.	Y2 or Y3 inputs deactivates.
Low Heat	W1 input is active.	W1 input deactivates or W2 input activates.
High Heat	W1 and W2 input is active.	W2 input deactivates.

NOTE(S):

a. Low Cool, High Cool Vent/Dehumidify, Low Cool/dehumidify, High Cool/Dehumidify, Low Heat, High Heat require the IDF to be configured for demand operation during the unoccupied period.

Sequence of Operation (Single-Zone AC Operation)

The control sequence of operation depends on the occupancy period, component configuration, and demand level (cooling, heating, and dehumidify). See Tables 45-50 for the typical 100% outdoor air operation by configuration for the occupied period. See Tables 51-56 for the unoccupied period. Operation may additionally be limited by service lockouts.

Table 45 — SZ A/C Indoor Fan (IDF) Occupied Sequence of Operation by Configuration

OCCUPANCY	IDF CONTROL	OCC IDF	DEMAND	OPERATION
Occupied	Constant Volume (CV)	Continuous	All	The IDF operates at the constant volume (CV) speed configuration.
		Demand	None	The IDF is off.
			All Other	The IDF operates at the constant volume (CV) speed configuration.
	Supply Pressure (SP)	Continuous	All	The IDF modulates between min. and max. speeds to maintain the supply duct pressure at the SP setpoint.
		Demand	None	The IDF is off.
			All Other	The IDF modulates between min. and max. speeds to maintain the supply duct pressure at the SP setpoint.
	Staged Air Volume (SAV)	Continuous	Vent	The IDF operates at the low cool IDF speed.
			Low Cool	
			High Cool	The IDF operates at the high cool IDF speed.
			Vent/Dehumidify	
			Low Cool/Dehumidify	
			High Cool/Dehumidify	
			Low Heat	The IDF operates at the low heat IDF speed.
			High Heat	The IDF operates at the high heat IDF speed.
		Demand	None	The IDF is off.
			Low Cool	The IDF operates at the low cool IDF speed.
			High Cool	The IDF operates at the high cool IDF speed.
			Vent/Dehumidify	
			Low Cool/Dehumidify	
			High Cool/Dehumidify	
			Low Heat	The IDF operates at the low heat IDF speed.
			High Heat	The IDF operates at the high heat IDF speed.
	Space Temperature (SPT) or Thermostat (TSTAT)	Space Relative Humidity (SPRH) or Humidistat (HSTAT)	None	The heat source is off.
			Vent	If the MAT is above the Vent SAT setpoint minus the Vent deadband, the heat source is off. If the MAT is below the Vent SAT setpoint minus the Vent deadband, the heat source modulates between min. and max. capacity to maintain the SAT at the Vent SAT setpoint.
			Low Cool	If the MAT is at or above the Low Cool SAT setpoint, the heat source is off. If the MAT is below the Low Cool SAT setpoint, the heat source will modulate between min. and max. capacity to maintain the SAT at the Low Cool SAT setpoint.
			High Cool	If the MAT is at or above the High Cool SAT setpoint, the heat source is off. If the MAT is below the High Cool SAT setpoint, the heat source will modulate between min. and max. capacity to maintain the SAT at the High Cool SAT setpoint.
			Low Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the 100% OAT Heat SAT setpoint.
			High Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the 100% OAT Heat SAT setpoint.

Table 46 — SZ A/C outdoor Air Damper (OAD) Occupied Sequence of Operation by Configuration

OCCUPANCY	OAD CONTROL CONFIG.	DEMAND	OPERATION
Occupied	IDF Mapping	None	The OAD is closed.
		All Other	The OAD modulates between min. and max. position based on IDF speed. The OAD position calculated based on a 4 point curve based on IDF min. speed, IDF 1 speed, IDF 2 speed, IDF max. speed, and OAD position at IDF min. speed, OAD position at IDF 2 speed, and OAD position at IDF max. speed configurations.

Table 47 — SZ A/C Cool/Dehumidify Occupied Sequence of Operation by Configuration

OCCUPANCY	COOL/HEAT DEMAND SOURCE CONFIG.	DEHUM DEMAND SOURCE CONFIG.	DEMAND	OPERATION

Table 47 — SZ A/C Cool/Dehumidify Occupied Sequence of Operation by Configuration

Occupied	Space Temperature (SPT) or Thermostat (TSTAT)	Space Relative Humidity (SPRH) or Humidistat (HSTAT)	None	The compressors and HGRH are off.
			Vent	If the MAT is above the Vent SAT setpoint minus the Vent deadband the compressors and HGRH are off. If the MAT is above the Vent SAT setpoint plus the Vent deadband, the compressors stage between min. and max. capacity to maintain the SAT at the Vent SAT setpoint.
			Low Cool	If the MAT is at the Low Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the Low Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the Low Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the Low Cool SAT setpoint. The HGRH is off.
			High Cool	If the MAT is at the High Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the High Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the High Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the High Cool SAT setpoint. The HGRH is off.
			Vent/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the Vent SAT setpoint.
			Low Cool/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the Low Cool SAT setpoint.
			High Cool/Dehumidify	The compressors stage between min and max capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the High Cool SAT setpoint.

Table 48 — SZ A/C Exhaust Fan (EXF) Occupied Sequence of Operation by Configuration

OCCUPANCY	EXF CONTROL CONFIG.	DEMAND	OPERATION
Occupied	None	All	The EXF is off.
	OAD Mapping	None	The EXF is off.
		All Other	The EXF speed stages based on OAD position and OAD mapping configurations. When the OAD is at or above OAD position 1, the EXF is at EXF speed at OAD 1. When the OAD is at or above OAD position 2, the EXF is at EXF speed at OAD 2.
	Building Pressure (BP)	None	The EXF is off.
		All Other	If the building pressure is above the BP setpoint, the EXF modulates between the min. and max. EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF is off.

Table 49 — SZ A/C Heat (If Equipped) Occupied Sequence of Operation by Configuration

OCCUPANCY	COOL/HEAT DEMAND SOURCE CONFIG.	DEHUM DEMAND SOURCE CONFIG.	DEMAND	OPERATION
Occupied	Space Temperature (SPT) or Thermostat (TSTAT)	Space Relative Humidity (SPRH) or Humidistat (HSTAT)	None	The heat source is off.
			Vent	If the MAT is above the Vent SAT setpoint minus the Vent deadband the compressors and HGRH are off. If the MAT is above the Vent SAT setpoint plus the Vent deadband, the compressors stage between min. and max. capacity to maintain the SAT at the Vent SAT setpoint.
			Low Cool	If the MAT is at the Low Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the Low Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the Low Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the Low Cool SAT setpoint. The HGRH is off.
			High Cool	If the MAT is at the High Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the High Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the High Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the High Cool SAT setpoint. The HGRH is off.
			Low Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the Low Heat SAT setpoint.
			High Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the High Heat SAT setpoint.

Table 50 — SZ A/C Free Cooling Occupied Sequence of Operation by Configuration

OCCUPANCY	OCCUPIED FREE COOLING	FREE COOL CHANGEOVER	DEMAND	OPERATION
Occupied	Disabled	All	All	Free cooling is disabled.
	Enabled	Outdoor Air Temperature (OAT)	Low or High Cool	If the OAT is at or above the Dry Bulb Changeover (OAT) setpoint, free cooling is disabled. If the OAT is below the Dry Bulb Changeover (OAT) setpoint, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Differential Outdoor Air Temperature and Return Air Temperature (OAT vs. RAT)	Low or High Cool	If the OAT is at or above the RAT minus the Diff. Dry Bulb Threshold, free cooling is disabled. If the OADP is below the RAT minus the Diff. Dry Bulb Threshold, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Outdoor Air Enthalpy (OAE)	Low or High Cool	If the OAE is at or above 28 btu/h, free cooling is disabled. If the OAE is below 28 btu/h, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Differential Outdoor Air Enthalpy and Return Air Enthalpy (OAE vs. RAE)	Low or High Cool	If the OAE is at or above the RAE, free cooling is disabled. If the OAE is below the RAE, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Outdoor Air Dewpoint (OADP)	Low or High Cool	If the OADP is at or above the OADP Limit setpoint, free cooling is disabled. If the OADP is below the OADP Limit setpoint, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.

Table 51 — SZ A/C Indoor Fan (IDF) Unoccupied Sequence of Operation by Configuration

OCCUPANCY	IDF CONTROL CONFIG.	UNOCCUPIED IDF CONFIG.	DEMAND	OPERATION
Unoccupied	Constant Volume (CV)	Disabled	All	The IDF is off.
		Demand	None	The IDF is off.
			All Other	The IDF operates at the constant volume (CV) speed configuration.
	Supply Pressure (SP)	Disabled	All	The IDF is off.
		Demand	None	The IDF is off.
			All Other	The IDF modulates between min. and max. speeds to maintain the supply duct pressure at the SP setpoint.
	Staged Air Volume (SAV)	Disabled	All	The IDF is off.
		Demand	None	The IDF is off.
			Low Cool	The IDF operates at the low cool IDF speed.
			High Cool	The IDF operates at the high cool IDF speed.
			Vent/Dehumidify	
			Low Cool/Dehumidify	
			High Cool/Dehumidify	
			Low Heat	The IDF operates at the low heat IDF speed.
			High Heat	The IDF operates at the high heat IDF speed.

Table 52 — SZ A/C Outdoor Air Damper (OAD) Unoccupied Sequence of Operation by Configuration

OCCUPANCY	OAD CONTROL CONFIG.	DEMAND	OPERATION
Unoccupied	All	All	The OAD is closed.

Table 53 — SZ A/C Cool/Dehumidify Unoccupied Sequence of Operation by Configuration

OCCUPANCY	COOL/HEAT DEMAND SOURCE	DEHUM. DEMAND SOURCE	DEMAND	OPERATION
Unoccupied	Space Temperature (SPT) or Thermostat (TSTAT)	Space Relative Humidity (SPRH) or Humidistat (HSTAT)	None	The compressors and HGRH are off.
			Low Cool	If the MAT is at the Low Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the Low Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the Low Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the Low Cool SAT setpoint. The HGRH is off.
			High Cool	If the MAT is at the High Cool SAT setpoint, the compressors and HGRH are off. If the MAT is above the High Cool SAT setpoint and free cooling is unavailable or is being performed and the SAT is above the High Cool SAT setpoint, the compressors stage between min. and max. capacity to maintain the SAT at the High Cool SAT setpoint. The HGRH is off.
			Vent/Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the Vent SAT setpoint.
			Low Cool/ Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the Low Cool SAT setpoint.
			High Cool/ Dehumidify	The compressors stage between min. and max. capacity to maintain the SADP at 55°F. The HGRH modulates between min. and max. position to maintain the SAT at the High Cool SAT setpoint.

Table 54 — SZ A/C Exhaust Fan (EXF) Unoccupied Sequence of Operation by Configuration

OCCUPANCY	EXF CONTROL	DEMAND	OPERATION
Unoccupied	All	All	The EXF is off.

Table 55 — SZ A/C Heat (If Occupied) Sequence of Operation by Configuration

OCCUPANCY	COOL/HEAT DEMAND SOURCE	DEHUM. DEMAND SOURCE	DEMAND	OPERATION
Unoccupied	Space Temperature (SPT) or Thermostat (TSTAT)	Space Relative Humidity (SPRH) or Humidistat (HSTAT)	None	The heat source is off.
			Low Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the Low Heat SAT setpoint.
			High Heat	The heat source modulates between min. and max. capacity to maintain the SAT at the High Heat SAT setpoint.

Table 56 — SZ A/C Free Cooling Unoccupied Sequence of Operation by Configuration

OCCUPANCY	UNOCCUPIED FREE COOLING	FREE COOL CHANGEOVER CONFIG.	DEMAND	OPERATION
Occupied	Disabled	All	All	Free cooling is disabled.
Unoccupied	Enabled	Outdoor Air Temperature (OAT)	Low or High Cool	If the OAT is at or above the Dry Bulb Changeover (OAT) setpoint, free cooling is disabled. If the OAT is below the Dry Bulb Changeover (OAT) setpoint, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Differential Outdoor Air Temperature and Return Air Temperature (OAT vs. RAT)	Low or High Cool	If the OAT is at or above the RAT minus the Diff. Dry Bulb Threshold, free cooling is disabled. If the OADP is below the RAT minus the Diff. Dry Bulb Threshold, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Outdoor Air Enthalpy (OAE)	Low or High Cool	If the OAE is at or above 28 btu/h, free cooling is disabled. If the OAE is below 28 btu/h, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Differential Outor Air Enthalpy and Return Air Enthalpy (OAE vs. RAE)	Low or High Cool	If the OAE is at or above the RAE, free cooling is disabled. If the OAE is below the RAE, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.
		Outdoor Air Dewpoint (OADP)	Low or High Cool	If the OADP is at or above the OADP Limit setpoint, free cooling is disabled. If the OADP is below the OADP Limit setpoint, free cooling is enabled. The OAD modulates between min. and max. position to maintain the SAT at the Low Cool or High Cool SAT setpoint.
			All Other	Free cooling is disabled.

APPENDIX A — START-UP CONTROL OPERATION

Overview

The SmartVu™ controls include test modes that can be used as part of the start-up process. See below for guidance on initiating Component and System Test modes.

Step 1 — Login with the User Access Level

The User access level is required to enable component tests and set configurations and setpoints. To login, navigate to the User Login screen (*press on the top bar→**User Login***), Click on to bring up the keyboard and enter the user password (1111 default).

Step 2 — Enable Component Test Mode

The component tests can be used to enable and test individual components, including indoor fan (IDF), outdoor air damper (OAD), exhaust fan (EXF), condenser fans (CFs), and hot gas reheat valve (HGRH).

To enable Component Test mode, navigate to the Start/Stop screen (*press on the top bar*). Click on the component test button to enable Component Test mode. The Service Test Menu link will appear on the Start/Stop screen when Component Test mode is enabled. See Fig. A for Start/Stop screen layouts in test mode (Service Run or Component Test).

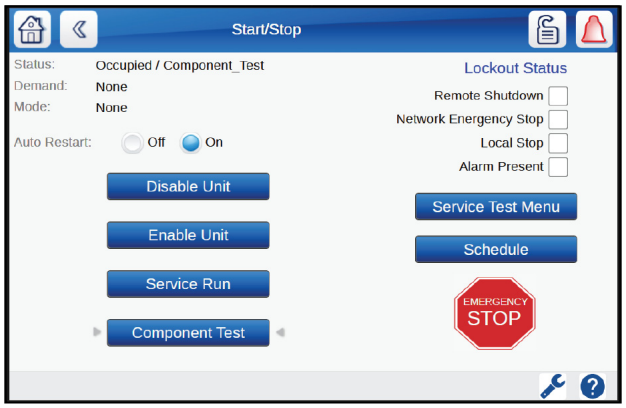


Fig. A — Start/Stop Screen in Test Mode

Step 3 — Service Test Menu

Click on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu. Click on the Test Air System icon to go to the Air System Test screen (IDF, EXF, OAD test) or the Test DX Circuit to go to the Test DX Circuit screen (condenser fans, crankcase heater, or HGRH valve). See Fig. B for Test DX Circuit and Test Air System screen layout when Component Test is enabled.

The Test Air System or Test DX Circuit screen listing reflects the only unit equipment configuration as set by the model number or in the Equipment Configuration screen (for field installed accessories). If a field installed component, such as the economizer (OAD) or exhaust fan, are missing from this screen, refer to the Configure Equipment section of the controls quick start guide. If a factory-installed component is missing from this screen, such as the indoor fan, or HGRH valve, contact your local Carrier sales representative.

TEST ON/OFF DEVICE

Click on the bubble next to ON to turn on the component. Click on the bubble next to OFF to turn the component off. See Fig. C for an example of the crankcase heater turned on in test mode.

TEST MODULATING DEVICE

Click on the bubble next to MANUAL to enable the test. When the test is enabled, the request field will be displayed on the screen. Click on the request field to bring up the keypad. Enter the requested operating capacity and click OK. The device will begin to operate. Click on the bubble next to OFF to turn the component off. See Fig. D for an example of the indoor fan turned on and requested at 20% speed in test mode.

STOP COMPONENT TEST

To stop Component Test mode, navigate back to the Start/Stop screen. Disabling or enabling the unit or starting Service Run mode will stop Component Test mode. Component Test mode will also automatically timeout after 60 minutes and unit operation will be disabled if auto restart is set to off, or unit operation will be enabled if auto restart is set to on.

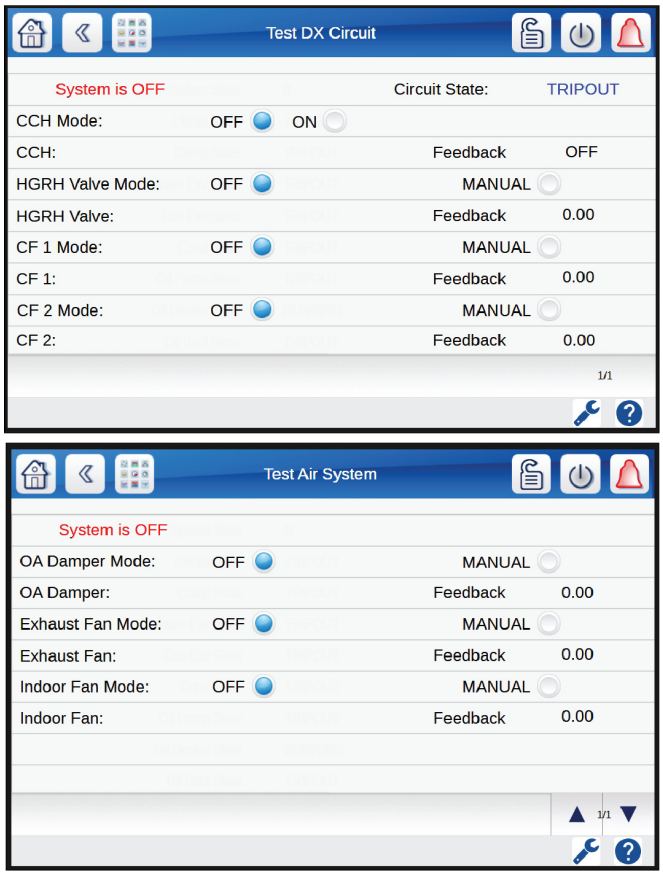


Fig. B — Test DX Circuit and Test Air System Screens (Component Test)

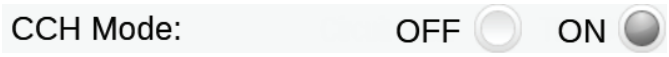


Fig. C — Crankcase Heater Test Example

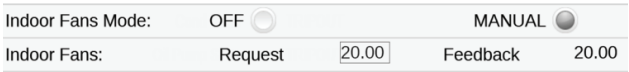


Fig. D — Indoor Fan Test Example

Step 4 — Enable Service Run Mode

Service can be used to enable and test systems, such as cooling, dehumidification, and heating. The unit must be in Service Run mode to perform system tests.

Prior to enabling Service Run, it is recommended to disable unit operation. To disable unit operation, navigate to the Start/Stop screen (*press on the top bar)* and press disable unit. This will disable all unit components prior to starting Service Run. To enable Service Run mode, navigate to the Start/Stop screen (*press on the top bar*). Click on the Service Run button to enable Service Run mode. The Service Test Menu link will appear on the Start/Stop screen when Service Run mode is enabled.

Step 5 — Test Devices Using Service Run

Click on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu and click on the Test Air System icon to get to the Air System Test screen or the Test DX Circuit button to get to the Test DX Circuit screen. See Fig. E for Test DX Circuit and Test Air System screen layout when Service Run is enabled.

When Service Run mode is enabled, all components will be set to OFF in the service test if unit operation was disabled prior to starting Service Run mode. If unit operation was enabled prior to starting Service Run mode, all components will be set to auto.

NOTE: The system will prevent conflicting systems from being tested at the same time. For example, the compressors cannot be set to ON when the heater is set to ON or MANUAL.

ON/OFF MANUAL CONTROL

For on/off systems (compressors), click on the bubble next to ON to turn on the system. To test modulating systems (modulating heat), click on the bubble next to MANUAL to enable the test. When the test is enabled, the request field will be displayed on the screen. Click on the request field to bring up the keypad. Enter the requested operating capacity and click OK. To turn a component or system off, press the bubble next to OFF.

AUTO CONTROL

In addition to manual tests, systems can be set to auto control mode for testing. In auto control mode, the system/component behaves like it would if under normal operating conditions based on the unit configuration, occupancy, operating conditions, and demand level. Additionally, when a system that requires additional components to operate (operating compressors requires indoor fan and condenser fans, operating heat requires indoor fan), is set to auto, on, or manual control, the required components will be set to auto control mode and will operate normally based on the control configuration. Select modulating components (indoor fan, outdoor air damper) can be put into manual control mode for manual component modulation.

See Fig. F for an example of an air system test in Service Run Mode. In this example, the heater is in manual control and set to 50% capacity. The outdoor air damper is in manual control and set to 25%. The indoor fan and exhaust fan are in auto control and will behave as they would under normal operating conditions and their associated control configurations.

STOP SERVICE RUN

To stop Service Run mode, navigate back to the Start/Stop screen. Disabling or enabling the unit or starting Component Test mode will stop Service Run mode. Service Run mode will also automatically timeout after 60 minutes and unit operation will be disabled if auto restart is set to off, or unit operation will be enabled if auto restart is set to on.

Step 6 — Restore Unit Operation

Navigate back to the Start/Stop screen. Press disable unit to prevent unit operation. Press enable unit to restore normal unit operation.

NOTE: If the unit needs to remain disabled in the event of a power cycle, ensure the auto restart configuration is set to off. If auto restart is set to on, the unit will automatically be enabled after a power cycle.

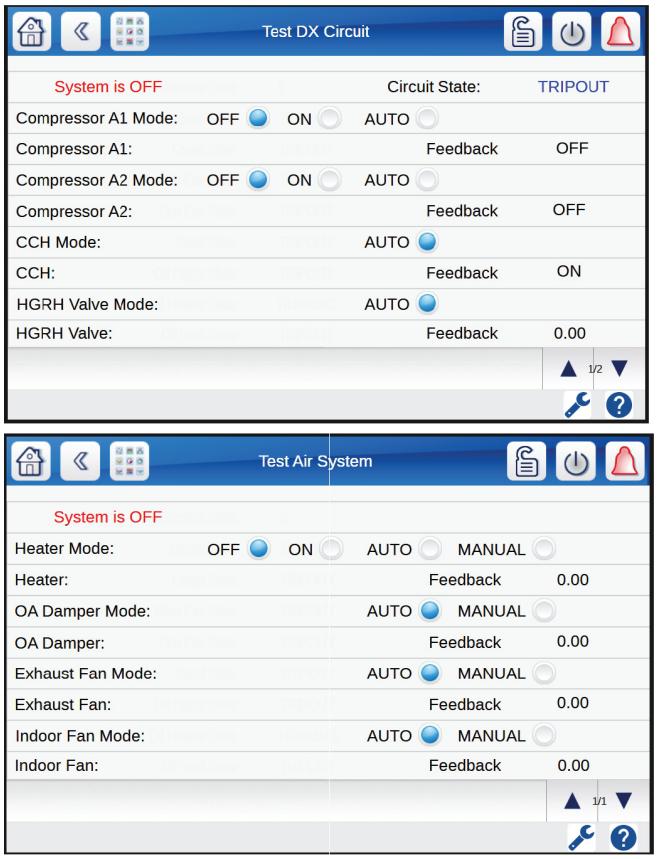


Fig. E — Test DX Circuit and Test Air System Screens (Service Run)

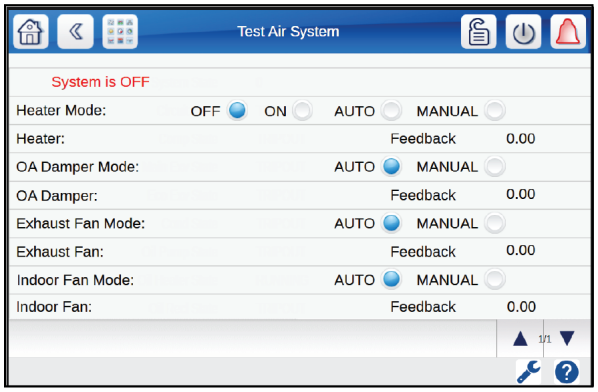


Fig. F — Test Air System Example (Service Run)

APPENDIX B — AIR BALANCE INSTRUCTIONS

Overview

This section provides basic guidance on using component test to test the air system and details on key air system configurations and setpoints. An air balance is recommended for all applications to ensure proper system operation. The air balance should be performed prior to equipment startup. See Tables A-E for component configurations.

Step 1 — Login with the User Access Level

The User access level is required to enable component tests and set configurations and setpoints. To login, navigate to the User Login screen (*press on the top bar→**User Login***), Click on ✱✱✱_ to bring up the keyboard and enter the user password (1111 default).

Step 2 — Enable Component Test Mode

The component tests can be used to enable and test individual components, including indoor fan (IDF), outdoor air damper (OAD), and exhaust fan (EXF).

To enable Component Test mode, navigate to the Start/Stop screen (*press on the top bar*). Click on the component test button to enable Component Test mode. The Service Test Menu link will appear on the start/stop screen after Component Test is enabled. See Fig. G for start/stop screen layout in component test mode.

NOTE: Component test is recommended for performing an air balance. If the space is occupied or the ambient conditions require the unit to operate cooling or heating during the air balance, refer to Appendix A "Step 4 — Enable Service Run Mode" on page 79 for controls start-up guidance. Leave the compressors and heat in auto control mode, and modulate the air balance components according to the guidance below.

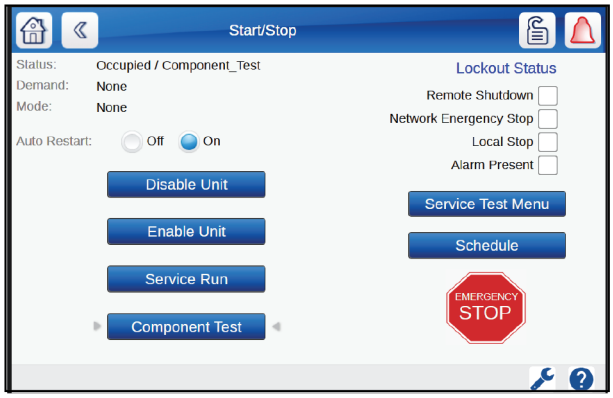


Fig. G — Start/Stop Screen in Test Mode

Step 3 — Go to the Service Test Menu

Click on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu. Click on the Test Air System icon to go to the Air System Test screen (IDF, EXF, OAD test). See Fig. H for test air system screen layout when component test is enabled.

The test air system screen listing reflects the only unit equipment configuration as set by the model number or in the Equipment Configuration screen (for field installed accessories).

TEST MODULATING DEVICE

Click on the bubble next to MANUAL to enable the test. When the test is enabled, the request field will be displayed on the screen. Click on the request field to bring up the keypad. Enter the requested operating capacity and click OK. The device will begin to operate. Multiple components can be tested together simultaneously, such as testing the outdoor air damper and the indoor fan at the same time. Click on the bubble next to OFF to turn the component off. See Fig. I for an example of the indoor fan turned on and requested at 20% speed in test mode.

Step 4 — Record Required Test Values, Set Configurations and Setpoints

Use the Component Test mode to identify the required values for the following configurations and setpoints, where applicable. Fan speeds are in % based on % of maximum rpm. Damper positions are based on 0-100% open. The configurations and setpoints can be set during the component test, exiting out of the component test screen won't exit the test mode.

Step 6 — Restore Unit Operation

To exit Component Test mode, navigate back to the start/stop screen. Disabling or enabling the unit will stop component test mode. Press enable unit to restore normal unit operation or disable unit to shut off the unit.

NOTE: If the unit needs to remain disabled in the event of a power cycle, ensure the auto restart configuration is set to off. If auto restart is set to on, the unit will automatically be enabled after a power cycle.

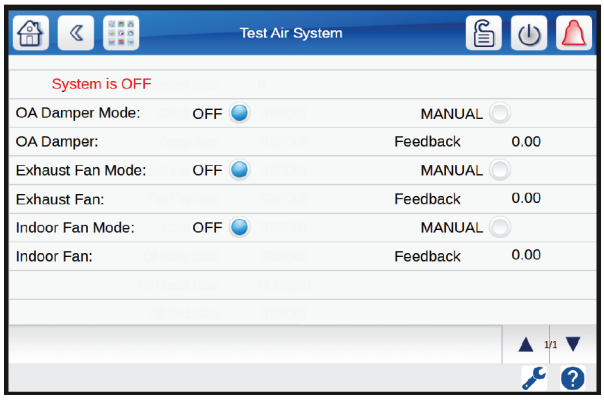


Fig. H — Test Air System Screens (Component Test)

Fig. I — Indoor Fan Test Example

APPENDIX B — AIR BALANCE INSTRUCTIONS (cont)

Table A — Indoor Fan Configurations

CONFIGURATION	VALUE	DESCRIPTION
(Main Menu→System Config→IDF Config)		
IDF Min. Speed	%	Minimum speed the IDF can operate at, typically during vent mode. Used for SAV Demand, SAV Capacity, SP, ZP, or third-party IDF control configurations.
IDF Max. Speed	%	Maximum speed the IDF can operate at, typically the higher of the cooling or heating design airflows. Used for SP, ZP, or third-party IDF control configurations.
IDF Low Cool Speed	%	IDF speed with a low cool demand or low cool capacity. If unknown, target 50%-66% of design cooling airflow. Used with SAV demand or SAV capacity IDF control configurations.
IDF Med Cool Speed	%	IDF speed with med cool capacity. If unknown, target 66% of design cooling airflow. Used with SAV capacity IDF control configuration.
IDF High Cool Speed	%	IDF speed with a high cool demand or high cool capacity, typically the design cooling airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.
IDF Low Heat Speed	%	IDF speed with a low heat demand or low heat capacity. If unknown, target 66%-75% of design heating airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.
IDF High Heat Speed	%	IDF speed with a high heat demand or high heat capacity, typically the design heating airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.

Table B — Indoor Fan Setpoints

SETPOINT	VALUE	DESCRIPTION
(Main Menu→Setpoints→IDF Setpoints)		
Supply Pressure (SP)	in. wg	The required supply pressure to achieve the peak design airflow. Used with SP IDF control configuration.
Zone Pressure (ZP)	in. wg	The required zone pressure that the indoor fan is trying to maintain. Used with ZP IDF control configuration for 100% OA applications.

Table C — Outdoor Air Damper Configurations

CONFIG/SETPOINT	VALUE	DESCRIPTION
(Main Menu→System Config→ IDF Config)		
OAD Min. Position	%	Minimum position that the OAD is allowed to operate at when providing ventilation. Typically based on the required ventilation position at the highest airflow. Used for IDF mapping, third-party vent only, and third-party full ventilation control.
OAD Max. Position	%	Minimum position that the OAD is allowed to operate at when providing ventilation or free cooling. Typically limited to 98%. Used for all control types and for free cooling.
IDF Vent Speed 1	%	Lowest fan speed for calculating OAD position as part of IDF mapping ventilation control. Typically fan speed 1 should match the minimum IDF speed.
IDF Vent Speed 2	%	Second lowest fan speed for calculating OAD position as part of IDF mapping ventilation control. Typically fan speed 2 should match the low cool IDF speed or 1/3 of the way between min. and max. IDF speed.
IDF Vent Speed 3	%	Second highest fan speed for calculating OAD position as part of IDF mapping ventilation control. Typically fan speed 3 should match the medium cool IDF speed or be 2/3 of the way between min. and max. IDF speed.
IDF Vent Speed 4	%	Highest fan speed for calculating OAD position as part of IDF mapping ventilation control. Typically fan speed 4 should match the max. IDF speed or the higher of the high cool/high heat IDF speed.
OAD Vent Pos 1	%	OAD position required to achieve the design ventilation airflow when the IDF is at vent speed 1 as part of IDF mapping ventilation control. Should be the most open damper position.
OAD Vent Pos 2	%	OAD position required to achieve the design ventilation airflow when the IDF is at vent speed 2 as part of IDF mapping ventilation control. Should be the second most open damper position.
OAD Vent Pos 3	%	OAD position required to achieve the design ventilation airflow when the IDF is at vent speed 3 as part of IDF mapping ventilation control. Should be the second most closed damper position.
OAD Vent Pos 4	%	OAD position required to achieve the design ventilation airflow when the IDF is at vent speed 4 as part of IDF mapping ventilation control. Should be the most closed damper position.

Table D — Exhaust Fan Configurations

CONFIG/SETPOINT	VALUE	DESCRIPTION
(Main Menu→System Config →IDF Config)		
EXF Max. Speed	%	The maximum speed the EXF can operate at, based on the max design exhaust airflow (usually during free cooling). Used with 2-stage, third-party, or building pressure exhaust fan control.
EXF OAD Pos 1	%	The OAD position where the exhaust fan turns on and operates at speed 1 when using 2-stage exhaust fan control. EXF OAD position 1 is typically set to the OAD min. position for ventilation.
EXF OAD Pos 2	%	The OAD position where the exhaust fan turns operates at speed 2 when using 2-stage exhaust fan control. EXF OAD position 2 is typically set above OAD vent position 1 so that the exhaust fan only operates at speed 2 during free cooling (when the OAD is open more than the normal ventilation position).
EXF Speed OAD Pos 1	%	The speed that the exhaust fan operates at when the OAD is at or above OAD position1, but below OAD position 2. EXF speed OAD position 1 is typically set to maintain neutral or slightly positive building pressure during normal ventilation operation.
EXF Speed OAD Pos 2	%	The speed that the exhaust fan operates at when the OAD is at or above OAD position1, but below OAD position 2. EXF speed OAD position 2 is typically set to maintain neutral or slightly positive building pressure during free cooling operation.

Table E — Exhaust Fan Setpoints

CONFIG/SETPOINT	VALUE	DESCRIPTION
(Main Menu →Setpoints→ EXF Setpoints)		
BP Setpoint	in. wg	The required building pressure that the exhaust fan is trying to maintain. Used with BP EXF control configuration.

PRE-START-UP INFORMATION FOR CHECKLIST

(The pre-start-up checklist must be completed by installing contractor. For Carrier factory start-up, the prestart-up checklist must be submitted to the Carrier start-up team prior to arranging start-up. Please review to the unit submittal or air balance report for airflow information.)

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. PROJECT INFORMATION

PROJECT NAME_____
ADDRESS _____
CITY _____.
STATE/PROVIDENCE/ZIPCODE _____
INSTALLER _____
CONTACT NAME _____
CONTACT PHONE_____
CONTACT EMAIL _____

Unit Information

MODEL NUMBER _____
UNIT TAG/NAME_____
SERIAL NUMBER _____
UNIT LOCATION _____
LADDER NEEDED_____ YES/NO
APPROX. HEIGHT _____FT

Application Information

APPLICATION TYPE: 100% OUTDOOR AIR_____COMFORT COOLING_____OTHER_____
SUPPLY AIRFLOW_____CFM SUPPLY EXTERNAL STATIC_____in. wg
EXHAUST AIRFLOW_____CFM EXHAUST ETERNAL STATIC_____in. wg
OUTDOOR AIRFLOW_____CFM
OCCUPANCY AIRFLOW:_____LOCAL SCHEDULE_____OCCUPANCY SWITCH_____BAS_____
COMMUNICATION TYPE:_____NONE_____CCN_____BACNet MS/TP_____BACnet IP_____
COMMUNICATION DETAILS:_____

START-UP NOTES:

Record any notes that the start-up technician must be aware of, such as special access requirements (fall protection, etc.), any training or escort requirements, third-party control information, the presence of air terminal units or fire dampers, or any time of access restrictions (days/time where site is not available).

_____
_____
_____
_____
_____
_____
_____

II. PRE-START-UP CHECKLIST

Check to verify the activity has been completed, write Y. If the activity does not apply, write N/A.

Verify packing materials have been removed from the unit. (Y/NA) _____
Verify the unit is free of damage. If damage exists, contact your local Carrier sales representative. (Y/NA) _____
Verify the unit has been installed in accordance with the service clearances in the installation instructions. (Y/NA) _____
Verify the supply and return ductwork have been installed per the unit installation instructions. (Y/NA) _____
Verify the unit is within level tolerances to promote proper condensate drainage. (Y/NA) _____
Verify all required field installed components or accessories (hoods, sensors, etc.) have been installed. (Y/NA) _____
Verify the unit power feed is installed, and the phasing is correct (L1, L2, L3). (Y/NA) _____
Verify the unit voltage and frequency have been verified to match the incoming power feed. (Y/NA) _____
Verify the incoming power voltage is steady and within 10% tolerance from nameplate. (Y/NA) _____
Verify the power feed wire size meets the MCA requirements on the unit nameplate. (Y/NA) _____
Verify an overcurrent production device (fuse or breaker) has been installed upstream of the unit (units without HACR breaker) is compliant with the MOCP requirements indicated on the unit nameplate. (Y/NA) _____
Verify a means of disconnecting and locking out electrical service at the unit has been provided (units without non-fused disconnect or HACR breaker). (Y/NA) _____
Verify for units with high SCCR, field provided J type fuses have been installed before the unit terminal block. (Y/NA) _____
Verify all electrical connections and terminals are tight; all terminals are free from corrosion. (Y/NA) _____
Verify the air-cooled condenser coil(s) is clean and free from obstructions and defects. (Y/NA) _____
Verify The crank case heaters verified to be operational and will operate 24 hours prior to performing cooling start-up.(Y/NA) _____
Verify the evaporator filters and outdoor air hood screens installed and are clean. (Y/NA) _____
Verify a properly sized condensate drain trap has been installed and is free from obstructions. (Y/NA) _____
Verify the refrigerant circuit is free from leaks. (Y/NA) _____
Verify the supply and return ductwork are installed and free from obstructions (smoke dampers, etc.). (Y/NA) _____
Verify the equipment has been applied and installed in accordance with product documentation. (Y/NA) _____
Verify the gas piping is installed, is free from leaks, and is at the correct pressure (Y/NA) _____
Verify The heat condensate drain has been installed (Y/NA) _____

Factory-Installed Options (If Equipped)

1. For units with economizer, the outdoor air hood and screens have been installed and are clear, and the outdoor air damper and return air dampers move freely without binding. (Y/N) _____
2. For units with barometric relief, the relief hoods have been installed and the dampers are free to open. (Y/N) _____
3. For units with supply pressure control, pneumatic tubing with a duct pressure pickup has been installed on the high side port of the transducer and the tubing is free from kinks or bends. (Y/N) _____
4. For units with zone/building pressure control, pneumatic tubing with a building pressure pickup has been installed on the high side port of the transducer and the tubing is free from kinks or bends. (Y/N) _____
5. For units with field wired convenience outlet, field provided power wiring with disconnecting means has been provided to the outlet. The outlet has been noted to be powered even when the unit power is disconnected. (Y/N) _____
6. The SAT sensor has been installed in the supply ductwork and wired back to the controller. (Y/N) _____
7. For units requiring for space temperature (SPT) or relative humidity control (SPRH), a space temperature sensor and space relative humidity sensor has been installed or network points will be available. (Y/N) _____
8. The units requiring thermostat (TSTAT) or humidistat (HSTAT) control, a two-stage heat/cool thermostat and humidistat (or thermostat with dehumidification output) has been installed or network points will be available. (Y/N) _____
9. The control configuration is complete, and the controls are setup according to project requirements. (Y/N) _____

Air Balance

See Appendix B on page 80 for air balance instructions.

1. An air balance has been performed and the supply fan, outdoor air dampers, and exhaust fan (if equipped) have been configured for operation in accordance with the system design. (Y/N) _____
2. For units where air balance has been completed, include a copy of the air balance with the pre-startup checklist. (Y/N) _____

III. CONTROL CONFIGURATION

Fill in the tables to indicate the unit control configurations that are set as part of the prestart-up setup. Control and configuration setup are not included in factory start-up.

Schedule

CONFIGURATION	VALUE	APPLICATION
(Main Menu →Schedules →Local Schedule)		
Schedule 1	Mon Tue Wed Thu Fri Sat Sun	
	Start	Stop
Schedule 2	Mon Tue Wed Thu Fri Sat Sun	
	Start	Stop
Schedule 3	Mon Tue Wed Thu Fri Sat Sun	
	Start	Stop
Schedule 4	Mon Tue Wed Thu Fri Sat Sun	
	Start	Stop
Other Schedules	—	

Equipment Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config →Equipment Config)	
Smoke Detector	Enable/Disable
Thermostat	Enable/Disable
Humidistat	Enable/Disable
Pre-Filter Switch	Enable/Disable
Remote Switch	0 = None
	1 = Remote Shutdown
	2 = Remote Occupancy
Phase Monitor	Enable/Disable
Fire Shutdown	Enable/Disable
ZDOR	Enable/Disable
IDF Third-Party Mod	Enable/Disable
EXF Third-Party Mod	Enable/Disable
OAD Third-Party Mod	Enable/Disable
Exhaust Fan	Enable/Disable
Economizer (OAD)	Enable/Disable
COFS	Enable/Disable
Auxiliary Relay	0=Not Used
	1=Alarm Status
	2=OCC Status

Sensor Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → Sensor Config)	
SPT Sensor	Enable/Disable
SPT Offset	Enable/Disable
SPT OCC Override	Enable/Disable
OCC Override Time	Hours
OCC Override 2nd Press	0 = Reset
	1 = Clear
MAT Sensor	Enable/Disable
OARH Sensor	Enable/Disable
RARH Sensor	Enable/Disable
SAT Sensor	Enable/Disable
SP Sensor	Enable/Disable
BP Sensor	Enable/Disable

Outdoor Air Damper Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → OAD Config)	
Vent Control	0 = None
	1= IDF Mapping
	2 = Third-Party Full
	3 = Third-Party Vent Only
	4 = 100% OA
OAD Min. Position	%
OAD Max. Position	%
IDF Vent Speed 1	%(IDF Map Only)
IDF Vent Speed 2	%(IDF Map Only)
IDF Vent Speed 3	%(IDF Map Only)
IDF Vent Speed 4	%(IDF Map Only)
OAD Vent Pos 1	%(IDF Map Only)
OAD Vent Pos 2	%(IDF Map Only)
OAD Vent Pos 3	%(IDF Map Only)
OAD Vent Pos 4	%(IDF Map Only)

Indoor Fan Configurations

CONFIGURATION	VALUE
(Main Menu → System Config →Indoor Fan Config)	
Indoor Fan Control	0 = Constant Volume
	1 = Staged Air Volume
	2 = Third-Party IDF Mod
	3 = Supply Pressure (SP)
	4 = Zone Pressure (ZP)
SAV Mode Selection	0 = Demand
	1 = Capacity
IDF Min. Speed	%
IDF Max. Speed	%
IDF Low Cool Speed	% (SAV only)
IDF Med. Cool Speed	% (SAV only)
IDF High Cool Speed	% (SAV only)
SAV Low Cool Cap	% (SAV only)
SAV Med. Cool Cap	% (SAV only)
SAV Med. Cool Cap	% (SAV only)
IDF Low Heat Speed	% (SAV only)
IDF High Heat Speed	% (SAV only)
Occupied Fan	0=Demand 1=Continuous
Unoccupied Fan	0=Disabled 1=Demand

Cooling Configurations

CONFIGURATION	VALUE
(Main Menu→System Config →Cooling Config)	
Cool/Heat Demand Source	0=None (Default)
	1 = SPT
	3 = OAT
	4 = TSTAT
Cool Tempered Venting	Enable/Disable
Vent Deadband	°F

Dehumidify Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config→Dehum Config)	
Demand Source	0=None
	1 = HSTAT
	2 = RARH
	3 = SPRH
	4 = OADP
Unoccupied Dehumidification	Enable/Disable
Vend/None Dehumidification	Enable/Disable
High Cool Dehumidification	Enable/Disable
Low Cool Dehumidification	Enable/Disable
Low Heat Dehumidification	Enable/Disable

Heater Configurations

CONFIGURATION	VALUE
(Main Menu→System Config →Heater Config)	
Heat Tempered Venting	Enable/Disable
Heat Tempered Cooling	Enable/Disable
Heat Tempering Deadband	°F

Exhaust Fan Configurations

CONFIGURATION	VALUE
(Main Menu→System Config→Exhaust Fan Config)	
Exhaust Fan Control	0 = None
	1 = 2-Stage
	2 = Third-Party
	3 = Building Pressure
EXF Max. Speed	%
EXF Speed OAD Pos 1	% (2-Stage Only)
EXF Speed OAD Pos 2	% (2-Stage Only)
EXF OAD Pos 1	% (2-Stage Only)
EXF OAD Pos 2	% (2-Stage Only)

Free Cooling Configurations

ITEM	VALUE
(Main Menu→ System Config→Free Cool Config)	
Free Cooling	Enable/Disable
Unoccupied Free Cooling	Enable/Disable
Changeover Select	0 = None
	1 = Diff Dry Bulb
	2 = Enthalpy
	3 = Diff Enthalpy
OADP Limit Check	Enable/Disable
OAT Dry Bulb Limit Check	Enable/Disable

CONFIGURATION NOTES:_____

_____

_____

_____

_____

IV. CONTROL SETPOINTS

Fill in the table to indicate the unit control setpoints that are set as part of the prestart-up setup. Control and setpoint setup not included in factory start-up.

Free Cooling Setpoints

(Main Menu → System Config →Free Cool Config)		
SETPOINT	**VALUE**	**FREE COOL CONFIG.**
OAT Dry Bulb Threshold	°F	OAT Dry Bulb Limit
OADP Threshold	°F	OADP Limit
Diff. Dry Bulb Threshold	°F	Diff. Dry Bulb Changeover
Diff. Enthalpy Threshold	Btu/hr.	Diff. Enthalpy Changeover

Indoor Fan Setpoints

(Main Menu → Setpoints →Indoor Fan Setpoints)		
SETPOINT	**VALUE**	**IDF CONTROL CONFIG.**
Supply Pressure	in.wg	SP
Zone Pressure	in.wg	ZP

Cooling Setpoints

(Main Menu → Setpoints →Cooling Setpoints)		
SETPOINT	**VALUE**	**COOL DEMAND SOURCE**
Occupied Cooling	°F	SPT or OAT
Unoccupied Cooling	°F	SPT
Low Cool SAT	°F	SPT or TSTAT
High Cool SAT	°F	SPT or TSTAT
100% OA Low Cool SAT	°F	OAT
100% OA High Cool SAT	°F	OAT
Vent SAT	°F	All
Low Cool On DB	°F	SPT or OAT
Low Cool Off DB	°F	SPT or OAT
High Cool On DB	°F	SPT or OAT

Dehumidify Setpoints

(Main Menu → Setpoints →Dehum Setpoints)		
SETPOINT	**VALUE**	**DEHUM. DEMAND SOURCE**
Dehum. DP	°F	OADP
Dehum. DP On DB	°F	OADP
Dehum. DP Off DB	°F	OADP
Dehum. RH	°F	SPRH or RARH
Dehum. RH On DB	°F	SPRH or RARH
Dehum. RH Off DB	°F	SPRH or RARH
Dehum. CCT	°F	All

Heating Setpoints

(Main Menu → Setpoints →Heating Setpoints)		
SETPOINT	**VALUE**	**HEAT DEMAND SOURCE**
Occupied Heating	°F	SPT or OAT
Unoccupied Heating	°F	SPT
Low Heat SAT	°F	SPT or TSTAT
High Heat SAT	°F	SPT or TSTAT
100% Low OA Heat SAT	°F	OAT
100% OA High Heat SAT	°F	OAT
Low Heat On DB	°F	SPT or OAT
Low Heat Off DB	°F	SPT or OAT
High Heat On Db	°F	SPT or OAT

Exhaust Fan Setpoints

(Main Menu → Setpoints →Exhaust Fan Setpoints)		
SETPOINT	**VALUE**	**EXF CONTROL**
Building Pressure	in.wg.	BP

SETPOINT NOTES:_____

_____

_____

_____

_____

START-UP CHECKLIST

To be completed by installing contractor or Carrier Factory Service. A copy of the checklist, start-up checklist, and log must be provided to the Carrier start-up team after start-up has been completed.

WARNING: 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, wear personal protective equipment (PPE), and adhere to the safety considerations/information as outlined in preceding sections of this installation instruction.

Prior to performing start-up, the crank case heaters **MUST** operate for 24 hours. Cooling start-up can only be completed when the outdoor air temperature is above 60°F.

START-UP PERFORMED BY:

COMPANY _____
ADDRESS _____
CITY _____
STATE/PROVIDENCE _____
ZIP CODE _____

CONTACT PHONE _____
CONTACT EMAIL _____
START-UP DATE _____
TECHNICIAN _____

UNIT INFORMATION:

MODEL NUMBER: _____
UNIT TAG/NAME: _____
SERIAL NUMBER: _____
SOFTWARE VERSION: _____
(***Main Menu → Controller Config → Controller ID***)

INSTRUCTIONS:

Check to verify the activity has been completed, write Y. If the activity does not apply, write N/A.

PRE-START CHECK

1. The pre-start-up checklist has been reviewed and is complete and accurate. (Y/NA) _____
2. Unit is free from damage or defects; all parts and accessories appear to be properly installed. (Y/NA) _____
3. Unit has been installed with proper service clearances and air flow clearances. (Y/NA) _____
4. Verify that the supply and return ductwork has been installed and is complete. (Y/NA) _____
5. Power feed, voltage, overcurrent protection, and phasing are correct. (Y/NA) _____
6. Electrical connections and terminals are tight and free from corrosion. (Y/NA) _____
7. The supply air temperature sensor has been relocated to the supply ductwork. (Y/NA) _____
8. The evaporator filters and outdoor air hood screens installed and are clean. (Y/NA) _____
9. Outdoor air screens, filters, condenser coil, and evaporator coil are all clean. (Y/NA) _____
10. The supply fan and exhaust fans (if equipped) rotate freely. (Y/NA) _____
11. All required accessories, factory options, and sensors have been setup/installed properly. (Y/NA) _____
12. A properly sized condensate drain trap has been installed and is free from obstructions. (Y/NA) _____
13. The controls setup is complete and has been documented in the pre-startup list. (Y/NA) _____
14. All air terminal units (VAV or VVT boxes), fire dampers, and volume dampers are confirmed to be fully open or at their maximum balanced condition. (Y/NA) _____
15. No construction, remodeling, or major renovation is occurring in the space or around the unit that could negatively impact unit operation. (Y/NA) _____
16. No safety conditions exist that would prevent start-up or operation of the equipment. (Y/NA) _____
17. No application or installation concerns exist that would prevent start-up or operation of the equipment. (Y/NA) _____

START-UP LOG

ELECTRICAL

Incoming Voltage L1-L2_____L1-L3_____L2-L3_____
Average Voltage L1 _____ (L1-L2+L1-L3+L2-L3)/3
Voltage Tolerance L1 _____(Average Voltage-Nameplate Voltage)/Nameplate Voltage
Voltage Imbalance L1 _____(Maximum Deviation Voltage/Average Voltage) x 100

The Maximum Deviation Voltage is the voltage that is furthest away from the Average Voltage.

IMPORTANT: Do not proceed with start-up if voltage tolerance or imbalance exceeds 10%.

SUPPLY FAN AND EXHAUST FAN CHECKS

The supply fan rotates freely and in the correct direction. _____
The exhaust fan rotates freely and in the correct direction _____
An air balance has been completed or the unit is configured for proper airflow operation. _____

SUPPLY FAN AND EXHAUST FAN LOG

Use Component Test Mode to test component operation (see Appendix A on (Y/N) for start-up control operation).
NOTE: Motor amp readings should be taken at full load airflow (per air balance).

Supply Fan _____ RPM_____Amps
Exhaust Fan _____ RPM _____Amps

COOLING CHECKS

The air-cooled condenser coil(s) is clean and free from obstructions and defects. _____
The condenser fan motors rotate freely are positioned correctly in the condenser housing. _____
The evaporator coil and reheat coils are clean and free from obstructions and defects. _____
The compressor rotation has been verified to be in the correct direction. _____
The refrigerant circuit is free from leaks. _____

IMPORTANT: Do not proceed with cooling startup unless the following are verified:

- Crankcase heaters have been confirmed to be operating for 24 hours prior to cooling start-up. Y/N_____
- Ambient condition is above 60°F and will allow for cooling start-up. Y/N _____

COOLING LOG

Use Service Run Mode to test cooling operation (see Appendix A on page 79).
NOTE: Cooling start-up should only occur when the outdoor air temperature is above 60°F and at full load airflow (per air balance). Force economizer closed (for recirculating applications) or open (100% outdoor air applications) and disable HGRH (hot gas reheat) when measuring cooling performance.

Outdoor Air Temperature (OAT) _____° F DB
Return Air Temperature (RAT) if circulating _____° F DB_____° F WB
Cooling Supply Air Temperature (SAT) _____° F DB _____° F WB

Circuit A
Compressor 1 Voltage L1-L2_____L1-L3_____L2-L3_____Amps_____A
Compressor 2 Voltage L1-L2_____L1-L3_____L2-L3_____Amps_____A

Suction Line Temp_____°F Press_____PSIGSuperheat_____°F
Liquid Line Temp_____°F Press_____PSIGSubcooling_____°F
Discharge Line Temp_____°F Press_____PSIG

Verify factory refrigerant charge using the charging charts in the service and maintenance instructions. _____
Disable HGRH and verify condenser fans are at 100% speed when verifying refrigerant charge. _____

Charge Adjustment ±_____lb.

GAS HEATING CHECKS

The gas piping has been installed per manufacturer recommendations, is free from leaks. Y/N_____
The gas feed is at the correct inlet pressure. Y/N_____
The gas flue hood has been installed. Y/N_____
The gas heat condensate drain has been installed per recommendations and connected to a drain. Y/N_____

GAS HEATING LOG

Heating start-up should only occur at full load airflow (per air balance). Force economizer closed (for recirculating applications) or open (100% outdoor air applications).

Outdoor Air Temperature (OAT) _____° F DB
Return Air Temperature (RAT) _____° F DB (if recirculating)
Unit Supply Air A Temperature (SAT) _____°F DB at 100% capacity
Gas Inlet Pressure _____in. wg
Gas Manifold Pressure _____in. wg at 100% capacity

START-UP NOTES:_____
_____
_____
_____
_____
_____
_____

TEMPORARY FURNACE OPERATION DURING CONSTRUCTION

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

1. Prior to the finishing stage of construction, ensure that return air and vent openings are covered to minimize penetration of dust and construction debris into the unit. (Y/N)_____
2. Interior drywall installation shall be completed and covered with paint or primer prior to unit operation . (Y/N)_____
3. Premises shall be substantially free of debris and dust. (Y/N)_____
4. Ensure all return and vent coverings have been removed. (Y/N)_____
5. Verify the return ducts (except 100% OA) and supply ducts are connected, are free from obstructions, are clean, and are properly sealed. (Y/N)_____
6. Ensure proper vent installation per installation instructions. (Y/N)_____
7. Ensure gas piping has been connection per installation instructions. (Y/N)_____
8. Verify that the gas piping is free of leaks. (Y/N)_____
9. Furnace to be set to operate under appropriate control to ensure proper operation. (Y/N)_____
10. Minimum MERV 11 air filters to be installed during the finishing stages of construction. (Y/N)_____
11. Set furnace input rate and temperature rise per rating plate marking. (Y/N)_____
12. Ensure means for providing combustion air in accordance with the manufacturer's shipped installation instructions. (Y/N)_____
13. Return air temperature to be maintained between 55°F (13°C) and 80°F (27°C). (Y/N)_____
14. Furnace shall be set up to operate in accordance with installation instructions and shall be verified for operating conditions including ignition, input rate, pressure, temperature rise, and venting. (Y/N)_____
15. Install new filters as per installation instructions prior to final occupancy. (Y/N)_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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

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