WeatherMaster® 50V 28-98
Optional Electric or Hydronic Heating and Electric Cooling Applied Rooftop Units with Puron® Advance Refrigerant (R-454B) and Carrier SmartVu™ Control

Installation and Start-up Instructions

CONTENTS

Page

GENERAL 2
SAFETY CONSIDERATIONS 2
A2L REFRIGERATION INFORMATION 3
Transportation 3
Minimum Conditioned Space Area 3
Leak Detection and Dissipation 4
Duct System 6
Installation 6
Service 6
- SERVICE PARTS
- ELECTRICAL SAFETY
- REFRIGERANT SYSTEM SAFETY
- ELECTRONIC LEAK DETECTORS
- LEAK DETECTION FLUIDS

Charging 8
Decommissioning 8
PRE-INSTALLATION 9
Step 1 — Inspect Equipment 9
Step 2 — Unload Equipment 9
Step 3 — Store Equipment (If Required) 9
INSTALLATION 10
Step 1 — Perform Jobsite Survey 10
Step 2 — Install Unit Support 10
- ROOF CURB
- STEEL BEAMS
- SLAB MOUNT UNIT
- RETROFIT UNIT

Step 3 — Install Field-Fabricated Ductwork 10
Step 4 — Install Field-Fabricated Ductwork 28
Step 5 — Install Curb Gasketing (Vertical Supply or Return Units Only) 28
Step 6 — Rig Unit 28
Step 7 — Connect Primary Condensate Drain 28
Step 8 — Connect Secondary Condensate Drain (Sizes 54-98) 28
Step 9 — Install Barometric Relief Hoods (Standard or Extended Chassis with Barometric Relief Only) 59
Step 10 — Set Up Power Exhaust (Size 28-98 with Standard Static Power Exhaust or Size 28-50 with Medium Static Power Exhaust Only) 59
Step 11 — Route Field Wiring 61
- UNIT POWER FEED
- UNPOWERED CONVENIENCE OULET
- ULTRA-VIOLET LIGHT (UV-C) FIXTURES
- POWER WIRE SIZING
- OPERATING VOLTAGE
- GROUND WIRING
- OVERCURRENT PROTECTION
- SHORT CIRCUIT CURRENT PROTECTION
- ROUTE FIELD WIRING

Step 12 — Set Up Pre-Filter Status Switch (Optional) 66
Step 13 — Connect Air Pressure Tubing 66
- VAV INDOOR FAN
- POWER EXHAUST BUILDING PRESSURE CONTROL

Step 14 — Set Up Return Air Smoke Detector (Optional) 67
Step 15 — Connect Hot Water Piping and Accessories (Hot Water Coil Units Only — Optional) 67
Step 16 — Wire Hot Water Control Valve (Units with Hot Water Coil Only) 68
Step 17 — Install Supply-Air Temperature Sensor (Modulating Heat Units Only) 68
Step 18 — Install Unit Accessories 68
Step 19 — Install Control Wiring (Optional) 68
- CONFIGURE CONTROL TRANSFORMER (208V UNITS ONLY)
- ROUTE WIRING
- FIELD USE TERMINAL STRIPS

Step 20 — Install Communication Wiring (Optional) 72
- CARRIER COMFORT NETWORK® CCN
- BACNET MS/TP WIRING RECOMMENDATIONS
- BACNET IP/ETHERNET COMMUNICATION
- NON-CCN COMMUNICATION WIRING

CONTROLS OPERATION AND QUICK SETUP 74
Introduction 74
Overview 74
Control Interface 74
- NAVIGATION
- TOUCHSCREEN DISPLAY
- VNC VIEWER
- LEGACY CONTROL INTERFACES
- NAVIGATION CONVENTION
- DATA ENTRY

Main Screens 79
- WELCOME SCREEN
- LOGIN SCREEN
- PASSWORDS
- USER LOGINS SCREEN
- MAIN MENU
- HOME SCREEN
- STATUS SCREEN
- SETPOINT SCREENS
- SYSTEM CONFIGURATION SCREENS
- CONTROLLER CONFIGURATION SCREENS
- CONTROLLER ID SCREEN
- START/STOP SCREEN

Control Quick Set Up 81
- STEP A — POWER ON THE CONTROL
- STEP B — LOGIN WITH USER ACCESS LEVEL
- STEP C — SET DAYLIGHT SAVINGS TIME (DST) (OPTIONAL)
- STEP D — SET DATE AND TIME

Catalog No. 04-53500489-01 Printed in U.S.A. Form No. 50V-2SI Pg 1 12-24 Replaces: 50V-1SI

- STEP E — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED DEVICES
- STEP F — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED SENSORS
- STEP G — CONFIGURE INDOOR FAN
- STEP H — CONFIGURE OUTDOOR AIR DAMPER (OPTIONAL)
- STEP I — CONFIGURE THE COOLING SYSTEM
- STEP J — CONFIGURE THE DEHUMIDIFICATION SYSTEM (OPTIONAL)
- STEP K — CONFIGURE THE HEATING SYSTEM (OPTIONAL)
- STEP L — CONFIGURE EXHAUST FAN (OPTIONAL)
- STEP M — CONFIGURE FREE COOLING (OPTIONAL)
- STEP N — SET INDOOR FAN SETPOINTS (OPTIONAL)
- STEP O — SET COOLING SETPOINTS
- STEP P — SET DEHUMIDIFY SETPOINTS (OPTIONAL)
- STEP Q — SET HEATING SETPOINTS (OPTIONAL)
- STEP R — SET EXHAUST FAN SETPOINTS (OPTIONAL)
- STEP S — SET UP OCCUPANCY CONTROL

OPERATION 98

Temporary Operation for an Under-Construction Building 98

Temporary Operation During Building Finishing . . 98

Temporary Operation with a Generator 98

Temporary Operation for a Completed Building . . 98

Normal Operation 98

SEQUENCE OF OPERATION 98

Cool/Heat Demand Sources 99

- RETURN AIR TEMPERATURE (RAT)
- SPACE TEMPERATURE (SPT)
- THERMOSTAT (TSAT)

Dehumidify Demand Sources 101

- RETURN AIR RELATIVE HUMIDITY (RARH)
- SPACE RELATIVE HUMIDITY (SPRH)
- HUMIDISTAT (HSTAT)

Indoor Fan 101

- CONSTANT VOLUME (CV)
- STAGED AIR VOLUME (SAV) CAPACITY
- SUPPLY PRESSURE CONTROL (SP)
- THIRD-PARTY INPUT CONTROL (THIRD-PARTY)
- SINGLE ZONE VAV (SZ-VAV)

Cooling and Heating Modes 106

- MECHANICAL COOLING
- HEAT TEMPERED COOLING MODE
- VENTING MODES
- MODULATING HEATING MODE
- TWO-STAGE HEATING MODE

Dehumidification Modes 107

Outdoor Air Damper 107

- VENTILATION
- FREE COOLING

Exhaust Fan 107

- OTHER OPERATION FUNCTION

APPENDIX A — START-UP CONTROL OPERATION 109

APPENDIX B — AIR BALANCE INSTRUCTIONS . . 111

APPENDIX C —48V MODEL NUMBER NOMENCLATURE. 114

APPENDIX D — CHARGING CHARTS. 115

PRE-START AND START-UP CHECKLISTS CL-1

GENERAL

This installation instruction contains basic unit installation information and basic controls configuration and start-up information.

For additional information on installation, operation, and service, refer to the advanced controls, operation, and troubleshooting guide, service manual, integration guide, or accessory installation instructions.

This equipment is designed for elevation up to 10,000 ft for cooling and electric or hydronic heating.

SAFETY CONSIDERATIONS

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

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Affix any labels that ship with the unit or accessory installation instructions to the unit. Consult local building codes and the National Electrical Code (NEC)/National Fire Protection Association (NFPA) 70.

In Canada refer to the current editions of the and Canadian Electrical Code (CEC) CSA C22.1.

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, and CAUTION. 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

This equipment may contain a UV-C LAMP. Look for this UVC warning on panels or doors before opening. Disconnect UVC power before opening access doors, removing panels, or installing, maintaining, or servicing UVC lamps or fixtures. Do not operate UVC with open access doors or with panels removed. Do not operate UVC outside of unit cabinet. Exposure to UVC can cause harm to the eyes and skin. Review the UVC lamp accessory installation instructions for details on installing, testing, and maintaining UVC lamps.

⚠ ADVERTISSEMENT

Cet équipement peut contenir une LAMPE UV-C. Recherchez ces avertissements UVC sur les panneaux ou les portes avant de les ouvrir. Débranchez l'alimentation UVC avant d'ouvrir les portes d'accès, de retirer les panneaux ou d'installer, d'entretenir ou de réparer des lampes ou des luminaires UVC. N'utilisez pas de lampes UVC en dehors du boîtier de l'appareil. L'exposition aux UVC peut endommager les yeux et la peau. Consultez les instructions d'installation des accessoires de lampe UVC pour plus de détails sur l'installation, le test et l'entretien des lampes UVC.

⚠ WARNING

ELECTRICAL SHOCK HAZZARD

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

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

⚠ ADVERTISSEMENT

RISQUE DE CHOC ÉLECTRIQUE

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

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

⚠ WARNING

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

⚠ ADVERTISSEMENT

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

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

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

⚠ ADVERTISSEMENT

RISQUE DE BLESSURE CORPORELLE

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

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

A2L REFRIGERATION INFORMATION

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

⚠ WARNING

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

⚠ ADVERTISSEMENT

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

Transportation

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

Minimum Conditioned Space Area

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

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

Compare the calculated total conditioned space area to the minimum conditioned space area (TA_{min}) listed in Table 1, based on the unit size and configuration (with or without Humidi-MiZer).

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

UNIT SIZE 50V	HUMIDI-MIZER[a]	(TA_{MIN})[b]	
		Sq Ft	Sq Meter
28	No	1102	102
	Yes	1532	142
30	No	1013	94
	Yes	1409	131
34	No	1066	99
	Yes	1468	136
40	No	1236	115
	Yes	1679	156
50	No	1817	169
	Yes	1964	182
54	No	1829	170
	Yes	2145	199
60	No	1905	177
	Yes	2201	205
70	No	2213	206
	Yes	2530	235
74	No	2809	261
	Yes	3126	290
90	No	TBD	TBD
	Yes	TBD	TBD
98	No	TBD	TBD
	Yes	TBD	TBD

NOTE(S):

a. Humidi-Mizer is indicated by position 6 of the model number being R,T, or Y.
b. TA_{min} is based on a minimum ceiling height of 7.2 ft (2.2 m) and the worst-case unit refrigerant charge.

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

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

⚠ CAUTION

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

⚠ ADVERTISSEMENT

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

Leak Detection and Dissipation

This unit is equipped with a factory-installed A2L refrigerant leak dissipation system to ensure safe operation in the event of a refrigerant leak. The leak dissipation system may have up to four leak detection sensors and up to two dissipation boards depending on the unit size and configuration. See Table 2 for sensor and board part numbers. The A2L detection sensor communicates via a wiring harness to the dissipation board and two dissipation control boards.

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

See Fig. 1 for A2L refrigerant leak sensor details and Fig. 2 for typical A2L sensor locations. See Fig. 3 for A2L dissipation board layout (ADBD). See certified drawings (Fig. 15-34, on page 29) for A2L dissipation board locations.

A test button is included on the A2L dissipation board. See Fig. 3 for test button location. After pressing the test button for approximately 1 second, the system will enter A2L Leak Dissipation Mode for 60 seconds. See the Advanced Controls, Operation, and Troubleshooting guide for additional A2L dissipation board functions and troubleshooting.

Table 2 — Refrigerant Leak Dissipation System Parts (RLDS)

DESCRIPTION	PART NUMBER
A2L Leak Sensor	HH96ZX005
A2L Dissipation Board (Single Sensor)	HK50ZA004
A2L Dissipation Board (Two Sensor)	HK50ZA007

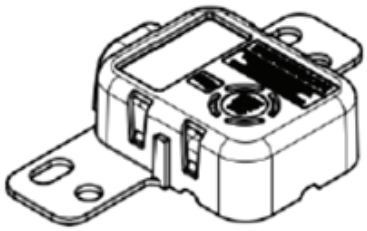


Fig. 1 — A2L Refrigerant Leak Sensor (ARLS)

IMPORTANT: The A2L leak detection and dissipation control requires unit power for operation. The unit must always be powered, except when performing service or maintenance.

When the system detects a refrigerant leak, SmartVu user interface will display a refrigerant leak alarm and the unit will perform the following:

1. Shut down cooling and heating.
2. Enable the zone damper override relay (ZDOR).
3. Enable the indoor fan (IDF) to operate at the IDF dissipation speed.
4. Enable the outdoor fans (ODF) to operate at the ODF dissipation speed.

If auto-restart is enabled, and no alarms are present that prevent operation, unit operation will restart.

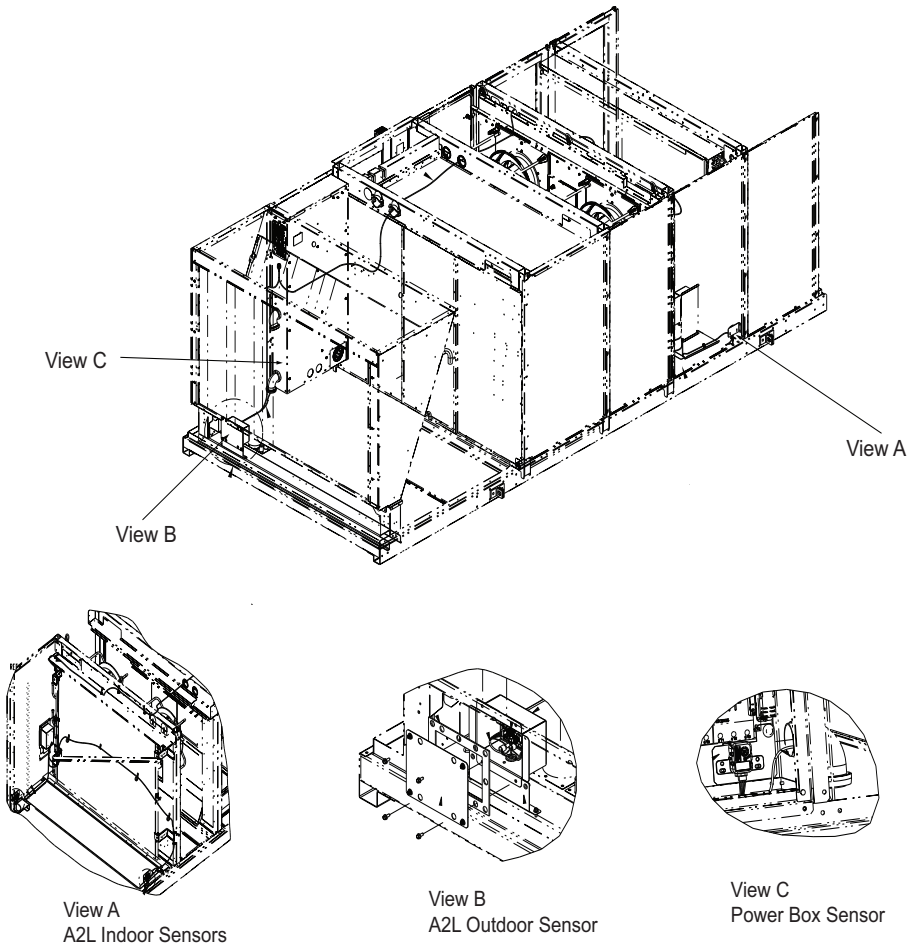


Fig. 2 — A2L Refrigerant Leak Sensor Locations (Sizes 28-34 Shown)

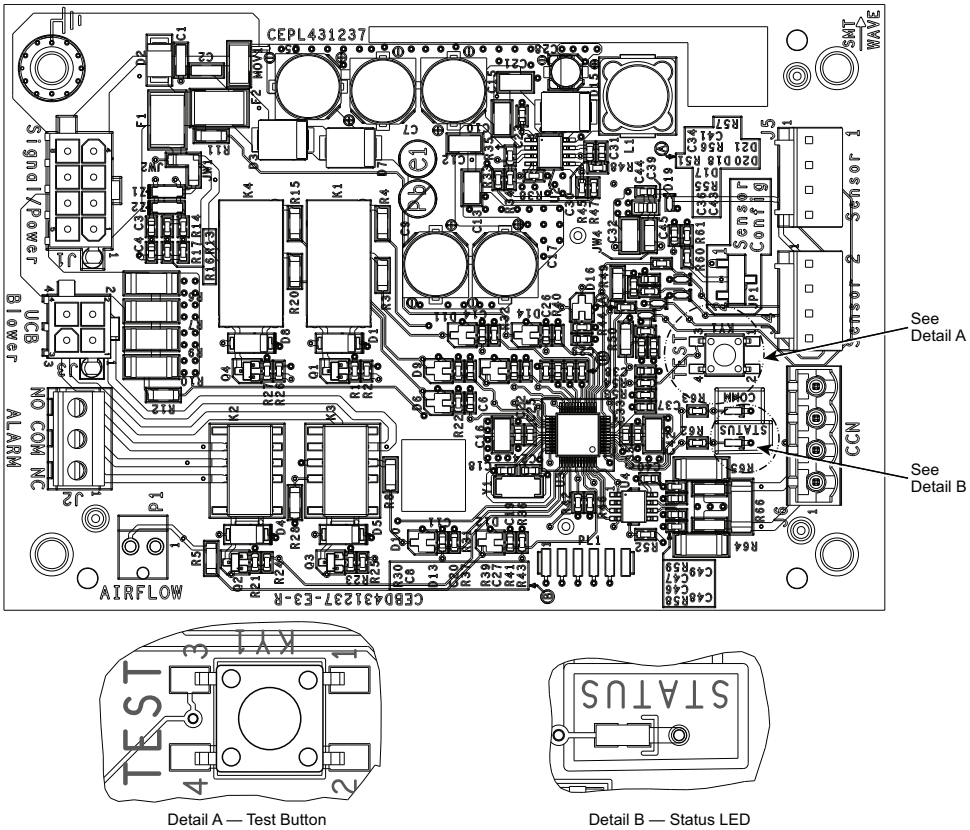


Fig. 3 — A2L Dissipation Board Details

IMPORTANT: An emergency mode, such as emergency stop, fire/smoke shutdown, smoke purge, fire pressurization, or fire evacuation will override dissipation mode.

All duct dampers, including zone dampers, fire dampers, or backdraft dampers, must be wired and controlled to open when the unit is performing A2L dissipation. A hardwired, normally open (N/O) Zone Damper Override Relay (ZDOR) output is provided to indicate when zone dampers are required to open for dissipation mode and other unit operating modes that require fully open zone dampers. See Step 17 “Install Control Wiring (Optional)” on page 68 for ZDOR wiring details. Zone Damper Override Relay status is also available as a BACnet[1] point.

The IDF dissipation speed can be field adjusted based on application ventilation requirements for refrigerant dissipation. The IDF dissipation speed must be set to achieve no lower than the minimum dissipation circulation rate (Q_{min}), which is based on the unit refrigerant volume. See Table 3 for minimum dissipation circulation rate by unit size and configuration. See Tables 4-7 for indoor fan performance information.

Refer to local code, UL-60335-2-40, or ASHRAE standard 15 for required ventilation rates.

IMPORTANT: All ventilation air inlets and outlets must be free from obstruction for proper refrigerant dissipation.

Table 3 — Minimum Dissipation Circulation Rate (Q_{min})

UNIT SIZE 50V	HUMIDI-MIZER® SYSTEM	(Q_{min})	
		cfm	M³H
28	No	992	1686
	Yes	1380	2344
30	No	912	1550
	Yes	1269	2156
34	No	960	1631
	Yes	1322	2246
40	No	1113	1891
	Yes	1512	2569
50	No	1636	2780
	Yes	1768	3005
54	No	1647	2798
	Yes	1932	3283
60	No	1716	2915
	Yes	1983	3368
70	No	1993	3386
	Yes	2279	3871
74	No	2530	4298
	Yes	2815	4783
90	No	TBD	TBD
	Yes	TBD	TBD
98	No	TBD	TBD
	Yes	TBD	TBD

Duct System

Equipment with A2L refrigerant should be utilized with an air distribution system with a fully ducted supply and return. If an open (plenum) return is required, refer to local or national building code for requirements for using open plenum return duct systems with equipment with A2L refrigerant.

⚠ CAUTION

Do not install ignition sources in the duct distribution system.

⚠ AVERTISSEMENT

N'installez pas de sources d'inflammation dans le système de conduit de distribution.

Installation

The following checks shall be made to installations using A2L refrigerants:

1. The actual charge is in accordance with the room size within which the refrigerant containing parts are installed.
2. Supplementary ventilation machinery and outlets are operating adequately and are not obstructed.
3. For appliances utilizing indirect refrigeration, the secondary circuit shall be checked for the presence of refrigerant.
4. Warning markings on the equipment are visible and legible, with those that are not being either replaced or corrected.
5. Refrigerant piping or components are installed in a position where they are unlikely to be exposed to any substance which may corrode them, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against said corrosion.
6. Validate that the A2L leak dissipation function is operational by using the test function on the A2L dissipation board.

Service

All equipment service and repair must be in accordance with the manufacturer’s guidelines and instruction, local codes, and national codes.

SERVICE PARTS

For continued performance, reliability, and safety, the only approved accessories and replacement parts, including refrigerant sensors, are those specified by the equipment manufacturer. The use of non-manufacturer approved parts and accessories may invalidate the equipment limited warranty and result in the ignition of refrigerant in the atmosphere from a leak, a fire risk, equipment malfunction, and failure.

ELECTRICAL SAFETY

Prior to performing service (including service to the refrigeration circuit) check the equipment electrical service and components, including:

- Verify that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- Verify that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
- Verify that there is continuity of earth bonding.

If a fault exists that could compromise safety, then no electrical supply should be connected to the circuit until the fault is identified and solved.

If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so that all parties are aware of the temporary solution used.

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

REFRIGERANT SYSTEM SAFETY

Prior to, and during the work being performed on an appliance containing A2L refrigerants, the area must be checked with an appropriate refrigerant detector to ensure that the person or persons performing work are aware of a potentially toxic or flammable atmosphere. The area must also be surveyed to ensure there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

⚠ CAUTION

All possible ignition sources, including cigarette smoking, must be kept sufficiently far away from the site of work. This includes, but is not limited to, installation, repair, removal, and disposal of equipment.

⚠ AVERTISSEMENT

Toutes les sources d'inflammation possibles, y compris la fumée de cigarette, doivent être maintenues suffisamment loin du lieu de travail. Cela comprend, sans toutefois s'y limiter, l'installation, la réparation, le retrait et l'élimination de l'équipement.

Should any hot work need to be performed on the refrigerant system, or associated parts, appropriate fire extinguishing equipment shall be available nearby. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

All maintenance staff and others working in the local area shall also be instructed on the nature of work being carried out. Work in confined spaces shall be avoided wherever possible.

No person carrying out work on an appliance containing A2L refrigerants which involves exposing any pipe work shall use any sources of ignition in such a way that can lead to the risk of fire or explosion.

Work shall be performed under a controlled procedure to minimize the risk of flammable gas or vapors being present while work is performed.

⚠ WARNING

Use quenching cloth and have an approved fire extinguisher on hand before performing hot work.

⚠ AVERTISSEMENT

Utilisez un chiffon absorbant et ayez un extincteur homologué à portée de main avant d'effectuer des travaux à chaud.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it into external atmosphere. Should an auxiliary ventilation system be present, check that it is operating correctly and no outlets are obstructed.

⚠ CAUTION

Do not use potential sources of ignition to search for or detect refrigerant leaks.

⚠ AVERTISSEMENT

N'utilisez pas de sources potentielles d'inflammation pour rechercher ou détecter des fuites de réfrigérant.

The following leak detection methods are deemed acceptable for all refrigerant systems:

ELECTRONIC LEAK DETECTORS

Electronic leak detectors may be used to detect refrigerant leaks. Ensure the leak detector is not a potential ignition source and is suitable for the type of refrigerant being detected. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% max.) is confirmed. Verify the detector has been calibrated in a refrigerant free environment.

LEAK DETECTION FLUIDS

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper refrigerant piping. Examples of leak detection fluids:

- Bubble method
- Fluorescent method agents

⚠ CAUTION

If a leak is suspected, all naked flames shall be removed/extinguished.

⚠ AVERTISSEMENT

Si une fuite est suspectée, toutes les flammes nues doivent être retirées/éteintes.

If a leakage of refrigerant is found which requires brazing, the entire refrigerant charge shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system away from the leak and leak repair. Follow Steps 1-6 below for removal of refrigerant.

When breaking into the refrigerant circuit to make repairs (or for any other purpose) conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.

⚠ CAUTION

Do not use torch to remove any component that contains a refrigerant or oil charge. Ensure the refrigerant or oil charge is fully evacuated or isolated from any hot work.

⚠ AVERTISSEMENT

N'utilisez pas de chalumeau pour retirer un composant contenant une charge de réfrigérant ou d'huile. Assurez-vous que la charge de réfrigérant ou d'huile est entièrement évacuée ou isolée de tout travail à chaud.

The following procedure shall be adhered to:

1. Follow all local and national regulations.
2. Evacuate.
3. Purge the circuit.
4. Evacuate (optional for A2L refrigerants).
5. Continuously flush or purge with inert gas when using flame to open circuit.
6. Open the circuit.

For appliances containing flammable refrigerants, purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process may need to be repeated several times until the system is free from refrigerant. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

⚠ CAUTION

Ensure the vacuum pump outlet is not near an ignition source.

⚠ AVERTISSEMENT

Assurez-vous que la sortie de la pompe à vide n'est pas proche d'une source d'inflammation.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. Ensure that the correct quantity of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant. Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect coupling and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer not arranged.

NOTE: Do not mix refrigerants in recovery units and in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The crank case heater may be turned on to help evaporate refrigerant that may be contained in the oil. When oil is drained from a system, it shall be carried out safely.

⚠ WARNING

Do not use a flame or any other ignition source to apply heat to the compressor shell to speed up refrigerant evaporation.

⚠ AVERTISSEMENT

N'utilisez pas de flamme ou toute autre source d'inflammation pour appliquer de la chaleur sur la coque du compresseur afin d'accélérer l'évaporation du réfrigérant.

Charging

In addition to conventional charging procedures, Steps 1-6 are requirements that must be followed.

1. Ensure that contamination of different refrigerants does not occur when using charging equipment.
2. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
3. Cylinders shall be kept in an appropriate position according to the instructions.
4. Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
5. Label the system when charging is complete (if not labeled already).
6. Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all unit details. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced. Follow Steps 1-11.

1. Become familiar with the equipment and its operation.
2. Isolate the system electrically.
3. Before attempting the procedure, ensure that:
   a. Mechanical handling equipment is available, if required for handling refrigerant cylinders.
   b. All personal protective equipment is available and being used correctly.
   c. The recovery process is supervised at all times by a competent person.
   d. Recovery equipment and cylinders conform to the appropriate standards.
   e. The correct volume of recovery cylinders are available based on the unit refrigerant volume.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that the cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% of volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from the site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

PRE-INSTALLATION

Inspect the unit prior to unloading or installation. Use a crane when unloading and moving equipment. Store units in accordance with the guidelines below to prevent damage.

Step 1 — Inspect Equipment

Upon receiving the equipment, take photos of the unit before unloading. Verify receipt of the correct unit by comparing the nameplate model number to the order information or submittal. The nameplate is located on a corner post or panel on the condenser end of the unit. Refer to Appendix C "50V MODEL NUMBER NOMENCLATURE" on page 114.

NOTE: Engineered to order (ETO) units, positions 13 and 14-18 of nameplate model number will not match submittal data. An "S" in the 13th mode position indicates an ETO unit.

Prior to unloading, inspect the equipment exterior for damage caused by impact or by improper securing of the equipment to the trailer. Take photos of the damage and make note of the damage on the bill of lading.

NOTE: Freight damage claims must be filed with the freight carrier within sixty (60) days of delivery.

After unloading, check the unit interior for major components that may have come loose during shipping.

Contact your local Carrier sales office if you received the wrong unit, for assistance with freight claims, or for assistance with missing or damaged components identified after unloading.

Step 2 — Unload Equipment

Do not lift equipment with a fork truck. Unload units with a crane using the included base rail rigging lugs. Use a spreader bar when rigging equipment. See unit rigging label for unit rigging points, center of gravity, maximum weight, and spreader bar usage. See "Rigging Label (Sizes 28-34 Shown)" on page 11 for unit rigging label example.

NOTE: Do not lift unit with forklift truck. Move unit with overhead rigging only.

NOTE: Do not move or transport equipment with panels removed or with doors open. Doing so may cause damage to the unit structure.

Step 3 — Store Equipment (If Required)

Project schedules may dictate storage of equipment prior to installation. Carrier rooftop units are designed for outdoor installation when used with field-sealed utility connections, including electrical, piping, and duct openings. Units are not designed for outdoor storage without proper care and weather proofing.

Modern HVAC equipment, including Carrier's rooftop units, contain motors, electronic circuit boards, and sensors that have specific storage requirements. As a result, storage and transportation that requires more than a few days can impact some of these components. Use the following guidance (Steps 1-7) when storing equipment, including equipment installed for an extended period, prior to operation.

1. Store units in a location that is:
   a. Level with adequate support along the full length of the base rail on each side of the unit.
   b. Secure and not accessible by the public. Provide protection against people and animals entering the unit.
   c. Away from traffic or construction and provide protection against damage.
   d. Meets the minimum total conditioned area (MCSA) requirement. Refer to Table 1.
      If the storage area is below the minimum total conditioned space area, evacuate the refrigerant charge or provide the required ventilation per local code, UL 60335-2-40, or ASHRAE standard 15.
2. Carrier recommends storing equipment indoors in a dry location, free from dust and debris. Follow the guidance below (Steps 2a-2h) when storing equipment outdoors (including the installation position), in humid environments, or dirty environments:
   a. Elevate equipment to allow proper draining and prevent the base pan bottom from getting wet (for units with single wall bottom) when stored outdoors.
   b. Ensure all access panels are in place, close and secure all doors, and ensure door gasketing material is in place.
   c. Cover or block off the return and supply duct openings.
   d. Block off any primary or secondary condensate drain openings.
   e. Cover the openings in the side of the control and power box.
   f. Cover the outdoor air openings.
   g. Shut and secure barometric dampers (units with barometric relief or power exhaust).
   h. Make any other provisions necessary to isolate the unit airside section, control box, and power box from the environment.
3. Take precautions to prevent condensate formation inside the unit on panels, electrical components, and motors by:
   a. Removing the unit shipping shrink wrap. Leaving the wrap on the equipment can cause excessive heat and moisture condensation around and inside the equipment.
   b. Minimizing the introduction of ambient air used by following Steps 2a-2h above.
   c. Adding desiccant material to the unit airside section, control box, and power box.
   d. Providing mechanical ventilation or dehumidification (with proper drainage) in the airside section in very humid environments.
   e. Installing a small heat source in the power and control box.
   f. Applying rust preventing compounds on panels inside the unit cabinet to prevent rusting or discoloration.

IMPORTANT: Do not use the unit heating, cooling, or dehumidification features as temporary means to dry out the inside of the unit before performing pre-startup and start-up checks. Improper operation may cause unit damage.

4. If the unit was operational prior to storage and will be out of operation for an extended period, prepare the unit for storage by:
   a. Turning off all motor protectors or breakers.
   b. Close all refrigerant service valves and lockout/tagout.
   c. Close water valves (for units with hot water heat).
   d. Disconnect the unit power and lockout/tagout.
5. Inspect the unit periodically. Inspect every two weeks if stored in a dry location, or once per week (or after heavy rain, high humidity, or high heat) if stored in a humid location (at a minimum), and perform the following checks:
   a. Check overall unit condition.
   b. Check for any indication of refrigerant leaks.
   c. Check for dirt, debris, and rust.
   d. Check for signs of excess heat.
   e. Check for condensation on panels and electrical components.
   f. Rotate the fans. Mark the fan positions first to make sure they stop in a different position.

6. Follow the unloading guidance in "Step 2 — Unload Equipment" on page 9 when handling equipment in storage or for final installation.
7. Internal components, either powered in standby or unpowered, can be subject to storage conditions not suitable for subsequent operation and may require steps to return them to operation while avoiding damage. To prepare for operation after storage:
   a. Follow the pre-start-up and start-up checklists.
   b. Before operating any motors, compressors, fans, or heaters, make sure all devices are free from moisture in the windings or on circuit boards. Dry out the components if moisture is present.
   c. Make sure all bearings are properly lubricated. Check for any rust that may inhibit operation.
   d. Open any service or isolations valves and check pressures (see pre-startup and start-up checklists)
   e. Remove lockout/tagout applied during storage.
   f. Restore the power to all devices.

IMPORTANT: DO NOT ENABLE UNIT OPERATION OR TEST MODE. Allow the time suggested for Capacitor reforming in VFDs and crankcase heater operation. Close any motor protectors or breakers that prevent component power.

Carrier reserves the right to not assume responsibility for equipment damage resulting from improper storage or handling, accumulation of condensate on unit electrical components, abuse of the product when used for temporary heating or cooling, improper equipment operation (including application, airflows, or temperatures), operation when the proper pre-startup and start-up have not been completed, or damage caused by improper operation or lack of maintenance. See the Carrier Applied Rooftop Warranty Card for additional details.

INSTALLATION

Step 1 — Perform Jobsite Survey

Complete the following checks before installation.

1. Consult NEC (National Electrical Code) (ANSI/NFPA [American National Standards Institute/National Fire Protection Association] 70), CEC (Canadian Electric Code), and local codes for installation requirements.
2. Determine unit location (from project plans or from existing unit) or select unit location.
   a. Provide clearance around and above unit for airflow, safety, and service access. See certified drawings on page 29 for service clearance requirements.
   b. Do not install unit in an indoor location.
   c. Do not locate air inlets near exhaust vents or other sources of contaminated air.
   d. Do not locate condenser coils near sources of contaminated air.
   e. Do not restrict top (area above condenser fans).
   f. Although unit is weatherproof, guard against water from higher level runoff and overhangs.
   g. Ensure access and clearance complies with code requirements.
3. Develop a plan for unit utilities and ducting system.
4. Ensure unit operating conditions are within specified tolerances for airflow, temperature, and pressure. Unit is rated for operation with up to 4 in. of application static pressure.
5. Develop a plan for unit support, such as a curb mount, structure/beam mount, or slab mount.
6. Develop a rigging plan. Check for possible overhead obstructions which may interfere with unit lifting or rigging.
7. Develop a plan for installation steps. Installation steps may vary between new construction or replacement applications.

Step 2 — Install Unit Support

Plan for unit support. See Tables 4-7 for physical data. See Fig. 4 for rigging label dimensions.

ROOF CURB

Assemble and install roof curb as described in instructions shipped with the accessory. Accessory roof curb and information required to field fabricate a roof curb is shown in Fig. 5-12. Install insulation, cant strips, roofing and counter flashing as required. For unit condensate drain to function properly, curb must be level or within tolerances shown in Fig. 5-12.

STEEL BEAMS

If roof curb is not used, support unit with steel beams along its entire length and then support steel as required. For unit condensate drain to function properly, beams must be level or within tolerances shown in Fig. 5-12.

The steel beams can be under the unit basepan (recommended), just inside the base rail, or under the base rail. Ductwork must be externally supported. Do not screw ductwork to the basepan.

For units without double wall bottom construction, provide weather protection for the basepan exterior insulation.

SLAB MOUNT UNIT

Provide a level concrete slab that extends beyond unit cabinet at least 6 inches. Make a slab 8 in. thick with 4 in. above grade. Use gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow. Ensure that slab is of sufficient height to allow for condensate trap as described in "Connect Secondary Condensate Drain (Sizes 54-98)" on page 28. Ensure slab is level or within tolerances on Fig. 5-12 to ensure proper condensate drainage. If the unit is not equipped with the double wall basepan option, protection for the basepan exterior insulation is recommended.

RETROFIT UNIT

For retrofit applications, verify that the new unit will fit the existing unit support structure (curb or beams). If a curb adapter is being used, verify the adapter dimensions to the new unit and existing curb. Install the curb adapter per manufacturer's instructions. Never use more than one curb adapter at a time.

NOTE: Ductwork may be attached to the old unit, instead of a roof curb. Be careful not to damage ductwork when removing old unit. Attach ductwork to roof curb instead of new unit.

Step 3 — Install Field-Fabricated Ductwork

⚠ WARNING

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree elbow in the supply and 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. Failure to follow these instructions could result in personal injury or property damage due to falling objects.

The 50V2,V3 units are designed for vertical supply/return only. Field-fabricated ductwork must be attached to the roof curb, or to the support steel, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in Fig. 5-12.

To attach ductwork to roof curb, insert duct approximately 10 to 11 in. up into roof curb. Connect ductwork to 14-gauge roof curb material with sheet metal screws driven from inside the duct.

The 50V4,V5 units are designed for horizontal supply/return only. Connect to the unit with a single duct for all supply openings and with a single duct for all return openings. Splitting of the airflow into branch ducts should not be done at the unit.

Field fabricated ductwork connects to the factory-provided flanges on the supply and return openings of the unit. Refer to certified drawings on page 29 for the flange sizes and locations. Remove shipping covers before installing ductwork.

Develop a plan for servicing outdoor air screens with horizontal ducts, as the duct can obstruct screen access. Ensure sufficient spacing is left between the return duct and bottom of the outdoor air hoods.

Follow AMCA (Air Movement and Control Association) guidelines relating to ductwork connections to the unit. These guidelines recommend a minimum 2-1/2 equivalent duct diameters of straight duct connected to supply air inlet and outlet openings before any transitions, fittings, dampers, etc. Failure to adhere to these guidelines may result in system effects which can impact the unit's ability to achieve published performance.

For units with horizontal return, barometric relief and power exhaust are field installed in the return duct. Review accessory installation instructions for details and dimensional requirements.

Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. Outlet grilles must not lie directly below unit discharge. Design supply duct strong enough to handle expected static pressures.

⚠ CAUTION - NOTICE TO RIGGERS:

ALL PANELS MUST BE IN PLACE WHEN RIGGING.

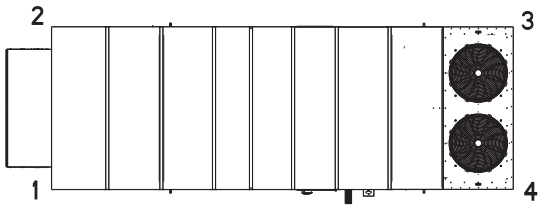
NOTE: Rig with four cables and spread with two 96 inch (2438 mm) spreader bars.

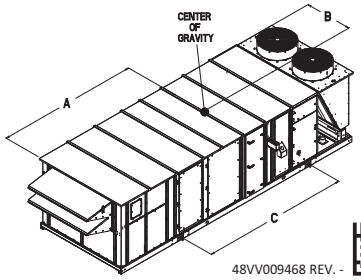
MODEL NUMBER POSITION(S)				CORNER WEIGHT								TOTAL WEIGHT		CENTER OF GRAVITY DIMS.				LIFTING LUG DIMS.	
				1		2		3		4				A		B		C	
1-3	4	5	9	LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KG	IN	MM	IN	MM	IN	MM
48V	2, 3	C, E	A	1631	741	1982	901	1575	716	1338	608	6526	2966	145.3	3692	41.6	1057	145.2	3688
		D, F		1647	749	1997	908	1623	738	1389	631	6656	3025	143.7	3651	41.7	1060	145.2	3688
	4, 5	C, E		1650	750	2006	912	1596	725	1354	615	6606	3003	145.3	3691	41.6	1057	145.2	3688
		D, F		1666	757	2021	919	1644	747	1405	639	6736	3062	143.7	3650	41.7	1059	145.2	3688
50V	2, 3	A		1550	705	1914	870	1329	604	1083	492	5876	2671	140.3	3562	41.0	1041	116.4	2956
		B, C, D, E, F, G, H		1562	710	1926	875	1390	632	1148	522	6026	2739	137.7	3498	41.1	1045	116.4	2956
	4, 5	A		1569	713	1939	881	1349	613	1099	500	5956	2707	140.1	3559	41.0	1041	116.4	2956
		B, C, D, E, F, G, H		1581	719	1951	887	1410	641	1164	529	6106	2775	137.6	3496	41.1	1044	116.4	2956
48V	2, 3	C, E	F	1770	805	2147	976	1692	769	1418	645	7027	3194	160.4	4073	41.5	1054	170.3	4326
		D, F		1791	814	2166	985	1736	789	1465	666	7158	3254	159.1	4040	41.6	1057	169.6	4309
	4, 5	C, E		1789	813	2171	987	1714	779	1434	652	7108	3231	160.3	4072	41.5	1054	170.3	4326
		D, F		1810	823	2190	995	1758	799	1481	673	7239	3290	159.0	4039	41.6	1057	169.6	4309
50V	2, 3	A		1668	758	2059	936	1467	667	1182	537	6376	2898	153.7	3903	40.9	1038	139.7	3548
		B, C, D, E, F, G, H		1694	770	2083	947	1544	702	1265	575	6586	2994	150.8	3830	41.1	1044	139.7	3548
	4, 5	A		1686	766	2083	947	1488	676	1198	545	6455	2934	153.5	3899	40.9	1038	139.7	3548
		B, C, D, E, F, G, H		1712	778	2107	958	1565	711	1281	582	6665	3030	150.6	3826	41.1	1043	139.7	3548
50V	2, 3	A	L	1686	766	2083	947	1489	677	1199	545	6457	2935	153.5	3899	40.9	1038	145.2	3688
		B, C, D, E, F, G, H		1712	778	2107	958	1566	712	1282	583	6667	3030	150.6	3826	41.1	1044	145.2	3688
	4, 5	A		1709	777	2113	960	1515	689	1219	554	6556	2980	153.3	3893	40.9	1038	145.2	3688
		B, C, D, E, F, G, H		1735	789	2137	971	1592	724	1302	592	6766	3075	150.5	3822	41.1	1043	145.2	3688
50V	2, 3	A	R	1807	821	2232	1015	1633	742	1305	593	6977	3171	166.6	4230	40.8	1036	170.3	4326
		B, C, D, E, F, G, H		1840	836	2263	1029	1703	774	1381	628	7187	3267	164.2	4172	41.0	1041	170.3	4326
	4, 5	A		1825	830	2256	1025	1655	752	1322	601	7058	3208	166.4	4226	40.8	1036	170.3	4326
		B, C, D, E, F, G, H		1858	845	2287	1040	1725	784	1398	635	7268	3304	164.1	4168	41.0	1041	170.3	4326

NOTES:

The weight distribution and center of gravity information are representative of a standard unit and include the impact of...

- High static indoor fans
- Hail guard
- Medium Static Power Exhaust
- Humidimizer
- Economizer w/barometric relief
- NFD and factory C/O
- DX service pack
- M15 cartridge filters
- UV-C kit





48VV009468 REV. -

Fig. 4 — Rigging Label (Sizes 28-34 Shown)

Table 4 — 50V Physical Data — Sizes 28, 30, 34

UNIT 50V2,V3,V4,V5	28		30		34	
NOMINAL CAPACITY (TONS)	27.5		30		35	
OPERATING WEIGHT (lb, Med Static IDF, Vertical/Vertical)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
No Heat Base Unit (50V) lb	4165	4765	4165	4765	4290	4890
COMPRESSOR	Variable Speed + Fixed Speed		Variable Speed + Fixed Speed		Variable Speed + Fixed Speed	
Refrigerant Circuits	1		1		1	
Circuit A Type (A1 / A2)	Variable Speed / Fixed Speed		Variable Speed / Fixed Speed		Variable Speed / Fixed Speed	
Circuit A, Qty...Model (A1/ A2)	1…VZH117 / 1… DSH140		1…VZH117 / 1… DSH140		1…VZH117 / 1… DSH184	
Circuit A Oil Charge (oz.) (A1/A2)	139 / 111		139 / 111		139 / 128	
Circuit B Type (B1 / B2)	—		—		—	
Circuit B, Qty...Model (B1/ B2)	—		—		—	
Circuit B Oil Charge (oz.) (B1/B2)	—		—		—	
System Capacity Steps (%)	13 to 51%, 62 to 100%		13 to 53%, 60 to 100%		13 to 47%, 64 to 100%	
REFRIGERANT	Puron Advance™ (R-454B)		Puron Advance™ (R-454B)		Puron Advance™ (R-454B)	
Circuit A Operating Charge (lb) Circuit A / Circuit B	35.7 / —		32.8 / —		34.6 / —	
Circuit A Operating Charge with Humidi-MiZer (lb) Circuit A / Circuit B	50.4 / —		46.3 / —		48.3 / —	
High Pressure Switch Auto-Reset (psig)	500		500		500	
High Pressure Switch Cutout (psig)	650		650		650	
CONDENSER COIL	Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)	
Quantity	2		2		2	
Total Face Area (sq ft)	53.3		53.3		53.3	
EVAPORATOR COIL	Al/Cu RTPF		Al/Cu RTPF		Al/Cu RTPF	
Quantity	1		1		1	
Total Face Area (sq ft)	32.1		32.1		32.1	
Rows...Fins (in.)	4...15		4...15		4...15	
Fin Type	Double Wavy		Double Wavy		Double Wavy	
Tube Type	Enhanced		Enhanced		Enhanced	
Circuit A/B, Metering Device Quantity...Type	2...EXV / —		2...EXV / —		2...EXV / —	
HUMIDI-MIZER SYSTEM (OPTIONAL)	Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)	
Coil Quantity	1		1		1	
Coil Total Face Area (sq ft)	26.5		26.5		26.5	
Reheat Valve Qty...Type	1...On/Off Three-Way		1...On/Off Three-Way		1...On/Off Three-Way	
Bypass Valve Qty...Type	1...Modulating Three-Way		1...Modulating Three-Way		1...Modulating Three-Way	
STANDARD CONDENSER FANS	Metal Propeller, Direct Drive		Metal Propeller, Direct Drive		—	
Qty...Diameter (in.)	2...30		2...30		—	
Motor Qty...Type	2...AC		2...AC		—	
Motor HP...rpm	2.0-2.5… 1140		2.0-2.5… 1140		—	
Nominal cfm	18,000		18,000		—	
LOW SOUND CONDENSER FANS (OPTIONAL, except Size 34)	Composite AeroAcoustic™, Direct Drive		Composite AeroAcoustic™, Direct Drive		Composite AeroAcoustic™, Direct Drive	
Qty...Diameter (in.)	2...30		2...30		2...30	
Motor Qty...Type	2...AC		2...AC		2...AC	
Motor HP...rpm	1.5-1.75… 850		1.5-1.75… 850		1.5-1.75… 850	
Nominal cfm	18,000		18,000		18,000	
INDOOR FAN	Backward Curve, Direct Drive		Backward Curve, Direct Drive		Backward Curve, Direct Drive	
Fan Qty...Diameter (in.)	3...17.7		3...17.7		3...17.7	
Motor Qty...Type	3...EC		3...EC		3...EC	
Standard/Medium/High Static Total Power (kW)[a]	8.4/11.7/16.8		8.4/11.7/16.8		8.4/11.7/16.8	
Nominal cfm	8,250		9,000		10,500	
LOW STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	Aluminum Propeller, Direct Drive		Aluminum Propeller, Direct Drive		Aluminum Propeller, Direct Drive	
Fan Qty...Diameter (in.)	2...26	2...30	2...26	2...30	2...26	2...30
Motor Qty...Type	2...EC		2...EC		2...EC	
Total Motor Power (kW)	1.5	2.2	1.5	2.2	1.5	2.2
Nominal cfm	10,500	15,000	10,500	15,000	10,500	15,000

Table 4 — 50V Physical Data — Sizes 28, 30, 34 (cont)

UNIT 50V2,V3,V4,V5	28		30		34	
NOMINAL CAPACITY (TONS)	27.5		30		35	
STANDARD STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	—	Backward Curve	—	Backward Curve	—	Backward Curve
Fan Qty...Diameter (in.)	—	2...19.7	—	2...19.7	—	2...19.7
Motor Qty...Type	—	2...EC	—	2...EC	—	2...EC
Total Motor Power (kW)	—	5.4	—	5.4	—	5.4
Nominal cfm	—	8,250	—	9,000	—	10,500
MEDIUM STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	—	Backward Curve	—	Backward Curve	—	Backward Curve
Fan Qty...Diameter (in.)	—	2.19.7	—	2.19.7	—	2.19.7
Motor Qty...Type	—	2...EC	—	2...EC	—	2...EC
Total Motor Power (kW)	—	14.0	—	14.0	—	14.0
Nominal cfm	—	8,250	—	9,000	—	10,500
STANDARD PRE-FILTERS	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
2 in.Throwaway	Fiberglass		Fiberglass		Fiberglass	
Qty...Size (in.)	12...20" x 20" X 2"		12...20" x 20" X 2"		12...20" x 20" X 2"	
Outdoor Air Screen	Metal Mesh		Metal Mesh		Metal Mesh	
Qty...Size (in.)	8...16" x 25" x 1"		8...16" x 25" x 1"		8...16" x 25" x 1"	
OPTIONAL PRE-FILTERS	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
2 in. MERV 8	Pleated		Pleated		Pleated	
Qty...Size (in.)	12...20" X 20" X 2"		12...20" X 20" X 2"		12...20" X 20" X 2"	
4 in. MERV 8 and 13	Pleated		Pleated		Pleated	
Qty...Size (in.)	12...20" X 20" X 4"		12...20" X 20" X 4"		12...20" X 20" X 4"	
2 in. MERV 8 and 4 in. MERV 13	Pleated		Pleated		Pleated	
Qty...Size (in.)	12…20" X 20" X 2 and 12…20" X 20" X 4"		12…20" X 20" X 2 and 12…20" X 20" X 4"		12…20" X 20" X 2 and 12…20" X 20" X 4"	
12 in. MERV 14 Bag	—	Pleated / Bag	—	Pleated / Bag	—	Pleated / Bag
Qty...Size (in.)	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"
12 in. MERV 15 Cartridge	—	Pleated / High Velocity Cartridge	—	Pleated / High Velocity Cartridge	—	Pleated / High Velocity Cartridge
Qty...Size (in.)	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"	—	6…20" X 20" X 2", 6…20" X 24" X 2" / 6…20" X 20" X 12", 6…20" X 24" X 12"
HOT WATER COIL (50V) (OPTIONAL)	Al/Cu RTPF, Steel Header		Al/Cu RTPF, Steel Header		Al/Cu RTPF, Steel Header	
Coil Quantity	1		1		1	
Total Face Area (sq ft)	22.6		22.6		22.6	
Coil Rows...Fins Per Inch	2...8		2...8		2...8	
Tube Size (in.)...Circuiting	1/2" OD Half Circuit		1/2" OD...Half Circuit		1/2" OD...Half Circuit	
Supply Connection Qty...Size (in.)	1...2-1/2 NPT		1...2-1/2 NPT		1...2-1/2 NPT	
Return Connection Qty...Size (in.)	1...2-1/2 NPT		1...2-1/2 NPT		1...2-1/2 NPT	
Total Coil Internal Volume (gal)	6.36		6.36		6.36	

NOTE(S):

a. kW Maximums are voltage dependent. Please see specific fan tables.

Table 5 — 50V Physical Data — Sizes 40 and 50

UNIT 50V2,V3,V4,V5	40		50	
NOMINAL CAPACITY (TONS)	40		50	
OPERATING WEIGHT (lb, Med Static IDF, Vertical/Vertical)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
No Heat Base Unit (50V) lb	5425	6025	5575	6175
COMPRESSOR	Variable Speed + Fixed Speed		Variable Speed + Fixed Speed	
Refrigerant Circuits	1		2	
Circuit A Type (A1/ A2)	Variable Speed / Fixed Speed		Variable Speed / —	
Circuit A, Qty...Model (A1/ A2)	1…VZH170 / 1… DSH184		1…VZH170 / —	
Circuit A Oil Charge (oz.) (A1/A2)	260 / 128		260 / —	
Circuit B Type (B1/ B2)	—		Fixed Speed/Fixed Speed	
Circuit B, Qty...Model (B1/ B2)	—		1… DSH140 / 1… DSH090	
Circuit B Oil Charge (oz.) (B1/ B2)	—		111 / 101	
System Capacity Steps (%)	14 to 57%, 58 to 100%		13 to 100%	
REFRIGERANT	Puron Advance™ (R-454B)		Puron Advance™ (R-454B)	
Circuit A Operating Charge (lb) Circuit A / Circuit B	40.4 / —		29.1 / 29.4	
Circuit A Operating Charge with Humidi-MiZer (lb) Circuit A / Circuit B	55.5 / —		44.2 / 29.4	
High Pressure Switch Auto-Reset (psig)	500		500	
High Pressure Switch Cutout (psig)	650		650	
CONDENSER COIL	Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)	
Quantity	2		2	
Total Face Area (sq ft)	65.6		65.6	
EVAPORATOR COIL	Al/Cu RTPF		Al/Cu RTPF	
Quantity	1		1	
Total Face Area (sq ft)	38.3		38.3	
Rows...Fins (in.)	4… 16		6… 16	
Fin Type	Double Wavy		Double Wavy	
Tube Type	Enhanced		Enhanced	
Circuit A/B, Metering Device Quantity... Type	2...EXV / —		2...EXV / 2...EXV	
HUMIDI-MIZER SYSTEM (OPTIONAL)	Aluminum, Novation (MCHX)		Aluminum, Novation (MCHX)	
Coil Quantity	1		1	
Coil Total Face Area (sq ft)	26.5		26.5	
Reheat Valve Qty...Type	1...On/Off Three-Way		1...On/Off Three-Way	
Bypass Valve Qty...Type	1...Modulating Three-Way		1...Modulating Three-Way	
STANDARD CONDENSER FANS	Metal Propeller, Direct Drive		Metal Propeller, Direct Drive	
Qty...Diameter (in.)	3...30		4...30	
Motor Qty...Type	3...AC		4...AC	
Motor HP...rpm	2.0-2.5… 1140		2.0-2.5… 1140	
Nominal cfm	27,000		36,000	
LOW SOUND CONDENSER FANS (OPTIONAL)	Composite AeroAcoustic™, Direct Drive		Composite AeroAcoustic™, Direct Drive	
Qty...Diameter (in.)	3...30		4...30	
Motor Qty...Type	3...AC		4...AC	
Motor HP...rpm	1.5-1.75… 850		1.5-1.75… 850	
Nominal cfm	27,000		36,000	
INDOOR FAN	Backward Curve, Direct Drive		Backward Curve, Direct Drive	
Fan Qty...Diameter (in.)	3...17.7 (Std and Med.) /19.7 High		3...17.7 (Std and Med.) /19.7 High	
Motor Qty...Type	3...EC		3...EC	
Standard/Medium/High Static Total Power (kW)[a]	10.8/13.5/21		10.8/13.5/21	
Nominal cfm	12,000		15,000	
LOW STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	Aluminum Propeller, Direct Drive		Aluminum Propeller, Direct Drive	
Fan Qty...Diameter (in.)	2...30	2...30	2...30	2...30
Motor Qty...Type	2...EC		2...EC	
Total Motor Power (hp)	2.2	2.2	2.2	2.2
Nominal cfm	15,000	15,000	15,000	15,000
STANDARD STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	—	Backward Curve	—	Backward Curve
Fan Qty...Diameter (in.)	—	2...19.7	—	2...19.7
Motor Qty...Type	—	2...EC	—	2...EC
Total Motor Power (kW)	—	8.0	—	8.0
Nominal cfm	—	12,000	—	15,000

Table 5 — 50V Physical Data — Sizes 40 and 50 (cont)

UNIT 50V2,V3,V4,V5	40		50	
NOMINAL CAPACITY (TONS)	**40**		**50**	
MEDIUM STATIC EXHAUST (OPTIONAL)	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
Fan Type	—	Backward Curve	—	Backward Curve
Fan Qty...Diameter (in.)	—	2.19.7	—	2.19.7
Motor Qty...Type	—	2...EC	—	2...EC
Total Motor Power (kW)	—	14.0	—	14.0
Nominal cfm	—	12,000	—	15,000
STANDARD PRE-FILTERS	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
2 in.Throwaway	Fiberglass		Fiberglass	
Qty...Size (in.)	12...20" x 24" x 2"		12...20" x 24" x 2"	
Outdoor Air Screen	Metal Mesh		Metal Mesh	
Qty...Size (in.)	8...16" x 25" x 1"		8...16" x 25" x 1"	
OPTIONAL PRE-FILTERS	Compact Chassis	Standard Chassis	Compact Chassis	Standard Chassis
2 in. MERV 8	Pleated		Pleated	
Qty...Size (in.)	12...20" x 24" x 2"		12...20" x 24" x 2"	
4 in. MERV 8 & 13	Pleated		Pleated	
Qty...Size (in.)	12...20" X 24" X 4"		12...20" x 24" x 4"	
2 in. MERV 8 & 4 in. MERV 13	Pleated		Pleated	
Qty...Size (in.)	12…20" X 24" X 2: and 12…20" X 24" X 4"		12…20" X 24" X 2: and 12…20" X 24" X 4"	
12 in. MERV 14 Bag	—	Pleated / Bag	—	Pleated / Bag
Qty...Size (in.)	—	6…20" X 24" X 2", 6…24" X 24" X 2" / 6…20" X 24" X 12", 6…24" X 24" X 12"	—	6…20" X 24" X 2", 6…24" X 24" X 2" / 6…20" X 24" X 12", 6…24" X 24" X 12"
12 in. MERV 15 Cartridge	—	Pleated / High Velocity Cartridge	—	Pleated / High Velocity Cartridge
Qty...Size (in.)	—	6…20" X 24" X 2", 6…24" X 24" X 2" / 6…20" X 24" X 12", 6…24" X 24" X 12"	—	6…20" X 24" X 2", 6…24" X 24" X 2" / 6…20" X 24" X 12", 6…24" X 24" X 12"
HOT WATER COIL (50V) (OPTIONAL)	Al/Cu RTPF, Steel Header		Al/Cu RTPF, Steel Header	
Coil Quantity	1		1	
Total Face Area (sq ft)	22.6		22.6	
Coil Rows...Fins Per Inch	2...8		2...8	
Tube Size (in.)...Circuiting	1/2" OD...Half Circuit		1/2" OD...Half Circuit	
Supply Connection Qty...Size (in.)	1...2-1/2 NPT		1...2-1/2 NPT	
Return Connection Qty...Size (in.)	1...2-1/2 NPT		1...2-1/2 NPT	
Total Coil Internal Volume (gal)	6.36		6.36	

NOTE(S):

a. kW Maximums are voltage dependent. Please see specific fan tables.

Table 6 — 50V Physical Data — Sizes 54 -74

UNIT 50V2,V3,V4,V5	54	60	70	74
NOMINAL CAPACITY (TONS)	**55**	**60**	**70**	**75**
OPERATING WEIGHT (lb, Med Static IDF, Vertical/Vertical)				
No Heat Base Unit (50V)	7058	7058	7405	8638
COMPRESSOR	Variable Speed + Fixed Speed	Variable Speed + Fixed Speed	Variable Speed + Fixed Speed	Variable Speed + Fixed Speed
Refrigerant Circuits	2	2	2	2
Circuit A Type (A1 / A2)	Variable Speed / —	Variable Speed / —	Variable Speed / Fixed Speed	Variable Speed / Fixed Speed
Circuit A, Qty...Model (A1 / A2)	1… VZH170 / —	1… VZH170 /—	1… VZH117 / 1… DSH184	1… VZH117 / 1… DSH184
Circuit A Oil Charge (oz, A1 / A2)	260 /—	260 / —	139 / 122	139 / 122
Circuit B Type (B1 / B2)	Fixed Speed / Fixed Speed	Fixed Speed / Fixed Speed	Fixed Speed / Fixed Speed	Fixed Speed / Fixed Speed
Circuit B, Qty...Model (B1, B2)	1… DSH161 / 1… DSH161	1… DSH184 / 1… DSH184	1… DSH184 / 1… DSH161	1… DSH240 / 1… DSH184
Circuit B Oil Charge (oz, B1,/B2)	112 / 112	122 / 122	122 / 112	206 / 122
System Capacity Steps (%)	14-39%, 39-74%, 74-100%	13-40%, 40-73%, 73-100%	8-36%, 36-58%, 58-100%	7-36%, 36-59%, 59-100%
REFRIGERANT	Puron Advance™ (R-454B)	Puron Advance™ (R-454B)	Puron Advance™ (R-454B)	Puron Advance™ (R-454B)
Circuit A Operating Charge (lb) Circuit A / Circuit B	29.2 / 29.7	29.8 / 30.7	36.3 / 35.7	46.0 / 46.3
Circuit A Operating Charge with Humidi-MiZer (lb) Circuit A / Circuit B	40.0 / 29.7	40.6 / 30.7	47.1 / 35.7	56.8 / 46.3
High Pressure Switch Auto-Reset (psig)	500	500	500	500
High Pressure Switch Cutout (psig)	650	650	650	650
CONDENSER COIL	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)
Quantity	2	2	4	4
Total Face Area (sq ft)	65.8	65.8	105.4	105.4
EVAPORATOR COIL	Al/Cu RTPF	Al/Cu RTPF	Al/Cu RTPF	Al/Cu RTPF
Quantity	2	2	2	2
Total Face Area (sq ft)	62	62	62	62
Rows...Fins/in.	4...15	4...15	4...15	6… 16
Fin Type	Double Wavy	Double Wavy	Double Wavy	Double Wavy
Tube Type	Enhanced	Enhanced	Enhanced	Enhanced
Circuit A/B, Metering Device Quantity, Type	2...EXV / 2…EXV	2...EXV / 2…EXV	2...EXV / 2…EXV	2...EXV / 2…EXV
HUMIDI-MIZER SYSTEM (OPTIONAL)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)
Coil Quantity	1	1	1	1
Coil Total Face Area (sq ft)	27	27	27	27
Reheat Valve Qty...Type	1...On/Off Three-Way	1...On/Off Three-Way	1...On/Off Three-Way	1...On/Off Three-Way
Bypass Valve Qty...Type	1...Modulating Three-Way	1...Modulating Three-Way	1...Modulating Three-Way	1...Modulating Three-Way
STANDARD CONDENSER FANS	Metal Propeller, Direct Drive	Metal Propeller, Direct Drive	Metal Propeller, Direct Drive	Metal Propeller, Direct Drive
Qty...Diameter (in.)	4...30	4...30	4...30	4...30
Motor Qty...Type	4...AC	4...AC	4...AC	4...AC
Motor HP...rpm	2.0-2.5… 1140	2.0-2.5… 1140	2.0-2.5… 1140	2.0-2.5… 1140
Nominal cfm	36,000	36,000	36,000	36,000
LOW SOUND CONDENSER FANS (OPTIONAL)	Composite AeroAcoustic™, Direct Drive	Composite AeroAcoustic™, Direct Drive	Composite AeroAcoustic™, Direct Drive	Composite AeroAcoustic™, DirectDrive
Qty...Diameter (in.)	4...30	4...30	4...30	4...30
Motor Qty...Type	4...AC	4...AC	4...AC	4...AC
Motor HP...rpm	1.5-1.75… 850	1.5-1.75… 850	1.5-1.75… 850	1.5-1.75… 850
Nominal cfm	36,000	36,000	36,000	36,000
INDOOR FAN	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive
Fan Qty...Diameter (in.)	4...17.7	4...17.7	4...17.7 (Std and Med.) /6 High	4...17.7 (Std and Med.) /6 High
Motor Qty...Type	4...EC	4...EC	4...EC	4...EC
Standard/Medium/High Static Total Power (HP)[a]	19.2/23.6/37.6	19.2/23.6/37.6	25.6/37.6/37.4	25.6/37.6/37.4
Nominal cfm	16,500	18,000	21,000	22,500

Table 6 — 50V Physical Data — Sizes 54 -74 (cont)

UNIT 50V2,V3,V4,V5	54	60	70	74	
NOMINAL CAPACITY (tons)	**55**	**60**	**70**	**75**	
STANDARD STATIC EXHAUST (OPTIONAL)	Standard Static Exhaust	Standard Static Exhaust	Standard Static Exhaust	Standard Static Exhaust	
Fan Type	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive	
Fan Qty…Diameter (in.)	2...19.7	2...19.7	2...19.7	2...19.7	
Motor Qty…Type	2...EC	2...EC	2...EC	2...EC	
Total Motor Power (kW)	12	12	12	12	
Nominal cfm	16,000	16,000	16,000	16,000	
MEDIUM STATIC EXHAUST (OPTIONAL)	Medium Static Exhaust	Medium Static Exhaust	Medium Static Exhaust	Medium Static Exhaust	
Fan Type	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive	Backward Curve, Direct Drive	
Fan Qty…Diameter (in.)	3...19.7	3...19.7	3...19.7	3...19.7	—
Motor Qty…Type	3...EC	3...EC	3...EC	3...EC	—
Total Motor Power (kW)	18	18	18	18	
Nominal cfm	23,000	23,000	23,000	23,000	
STANDARD PRE-FILTERS					
2 in.Throwaway	Fiberglass	Fiberglass	Fiberglass	Fiberglass	
Qty...Size (in.)	12…20x25x2, 12...20x20x2	12…20x25x2, 12...20x20x3	12…20x25x2, 12...20x20x4	12…20x25x2, 12...20x20x5	
Outdoor Air Screen	Metal Mesh	Metal Mesh	Metal Mesh	Metal Mesh	
Qty...Size (in.)	15...16" x 25" x 1"	15...16" x 25" x 1"	15...16" x 25" x 1"	15...16" x 25" x 1"	
OPTIONAL PRE-FILTERS					
2 in. Standard	Throwaway	Throwaway	Throwaway	Throwaway	
Qty...Size (in.)	12…20x25x2, 12...20x20x2	12…20x25x2, 12...20x20x3	12…20x25x2, 12...20x20x4	12…20x25x2, 12...20x20x5	
2 in. MERV 8	Pleated	Pleated	Pleated	Pleated	
Qty...Size (in.)	12…20x25x2, 12...20x20x2	12…20x25x2, 12...20x20x2	12…20x25x2, 12...20x20x2	12…20x25x2, 12...20x20x2	
4 in. MERV 8 & 13	Pleated	Pleated	Pleated	Pleated	
Qty...Size (in.)	12…20x25x4, 12...20x20x4	12…20x25x4, 12...20x20x4	12…20x25x4, 12...20x20x4	12…20x25x4, 12...20x20x4	
12 in. MERV 8 & 4 in. MERV 13	Pleated / High Velocity Cartridge	Pleated / High Velocity Cartridge	Pleated / High Velocity Cartridge	Pleated / High Velocity Cartridge	
Qty...Size (in.)	6… 24x24x2, 6… 20x24x2, 6… 24x24x12, 6… 24x20x12	6… 24"x24"x2", 6… 20x24x2, 6… 24x24x12, 6… 24x20x12	6… 24"x24"x2", 6… 20x24x2, 6… 24x24x12, 6… 24x20x12	6… 24"x24"x2", 6… 20x24x2, 6… 24x24x12, 6… 24x20x12	
12 in. MERV M14 Bag	Pleated / Bag	Pleated / Bag	Pleated / Bag	Pleated / Bag	
Qty...Size (in.)	6… 24x24x2, 6… 20x24x2, 6… 24x24x12, 6… 20x24x12	6… 24x24x2, 6… 20x24x2, 6… 24x24x12, 6… 20x24x12	6… 24x24x2, 6… 20x24x2, 6… 24x24x12, 6… 20x24x12	6… 24x24x2, 6… 20x24x2, 6… 24x24x12, 6… 20x24x12	
HOT WATER COIL (50V) (OPTIONAL)	Al/Cu RTPF, Steel Header	Al/Cu RTPF, Steel Header	Al/Cu RTPF, Steel Header	Al/Cu RTPF, Steel Header	
Coil Quantity	2	2	2	2	
Total Face Area (sq ft)	45.2	45.2	45.2	45.2	
Coil Rows...Fins Per Inch	2...8	2...8	2...8	2...8	
Tube Size (in.)...Circuiting	1/2" OD Half Circuit	1/2" OD...Half Circuit	1/2" OD...Half Circuit	1/2" OD...Half Circuit	
Supply Connection Qty...Size (in.)	2...2-1/2 NPT	2...2-1/2 NPT	2...2-1/2 NPT	2...2-1/2 NPT	
Return Connection Qty...Size (in.)	2...2-1/2 NPT	2...2-1/2 NPT	2...2-1/2 NPT	2...2-1/2 NPT	
Total Coil Internal Volume (gal)	12.72	12.72	12.72	12.72	

NOTE(S):

a. kW Maximums are voltage dependent. Please see specific fan tables.

Table 7 — 50V Physical Data — Sizes 90, 98

UNIT 50V2,V3,V4,V5	90	98
NOMINAL CAPACITY (tons)	**90**	**100**
OPERATING WEIGHT (lb, Med Static IDF, Vertical/Vertical)		
No Heat Base Unit (50V)	10,303	10,303
COMPRESSOR	Variable Speed + Fixed Speed	Variable Speed + Fixed Speed
Refrigerant Circuits	2	2
Circuit A Type (A1 / A2)	Variable Speed / Fixed Speed	Variable Speed / Fixed Speed
Circuit A, Qty...Model (A1 / A2)	1… VZH170 / 1… DSH184	1… VZH170 / 1… DSH240
Circuit A Oil Charge (oz, A1 / A2)	260 / 122	260 / 206
Circuit B Type (B1 / B2)	Fixed Speed / Fixed Speed	Fixed Speed / Fixed Speed
Circuit B, Qty...Model (B1/B2)	1… DSH295 / 1… DSH184	1… DSH240 / 1… DSH240
Circuit B Oil Charge (oz, B1/B2)	206 / 122	206 / 206
System Capacity Steps (%)	8-28%, 29-36%, 36-53%, 55-58%, 58-78%, 79-100%	8-30%, 32-53%, 55-77%, 78-100%
REFRIGERANT	Puron Advance™ (R-454B)	Puron Advance™ (R-454B)
Circuit A Operating Charge (lb) Circuit A / Circuit B	56.0 / 57.0	58.0 / 59.0
Circuit A Operating Charge with Humidi-MiZer (lb) Circuit A / Circuit B	68.0 / 57.0	70.0 / 59.0
High Pressure Switch Auto-Reset (psig)	500	500
High Pressure Switch Cutout (psig)	650	650
CONDENSER COIL	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)
Quantity	6	6
Total Face Area (sq ft)	158.1	158.1
EVAPORATOR COIL	Al/Cu RTPF	Al/Cu RTPF
Quantity	2	2
Total Face Area (sq ft)	62	62
Rows...Fins/in.	6… 16	6… 16
Fin Type	Double Wavy	Double Wavy
Tube Type	Enhanced	Enhanced
Circuit A/B, Metering Device (Quantity...Type)	2...EXV / 2…EXV	2...EXV / 2…EXV
HUMIDI-MIZER SYSTEM (OPTIONAL)	Aluminum, Novation (MCHX)	Aluminum, Novation (MCHX)
Coil Quantity	1	1
Coil Total Face Area (sq ft)	33	33
Reheat Valve (Qty...Type)	1...On/Off Three-Way	1...On/Off Three-Way
Bypass Valve (Qty...Type)	1...Modulating Three-Way	1...Modulating Three-Way
STANDARD CONDENSER FANS	Metal Propeller, Direct Drive	Metal Propeller, Direct Drive
Qty...Diameter (in.)	6...30	6...30
Motor Qty...Type	6...AC	6...AC
Motor HP...RPM	2.0-2.5… 1140	2.0-2.5… 1140
Nominal cfm	54,000	54,000
LOW SOUND CONDENSER FANS (OPTIONAL)	Composite AeroAcoustic™, Direct Drive	Composite AeroAcoustic™, Direct Drive
Qty...Diameter (in.)	6...30	6...30
Motor Qty...Type	6...AC	6...AC
Motor HP...RPM	1.125-1.75… 850	1.5-1.75… 850
Nominal cfm	54,000	54,000
INDOOR FAN	Backward Curve, Direct Drive	Backward Curve, Direct Drive
Fan Qty...Diameter (in.)	6...17.7 (Std and Med.)/19.7 (High)	6...17.7 (Std and Med.)/19.7 (High)
Motor Qty...Type	6...EC	6...EC
Standard/Medium/High Static Total Power (HP)[a]	38.4 / 56.4 / 58.2	38.4 / 56.4 / 58.2
Nominal cfm	27,000	30,000

Table 7 — 50V Physical Data — Sizes 90, 98 (cont)

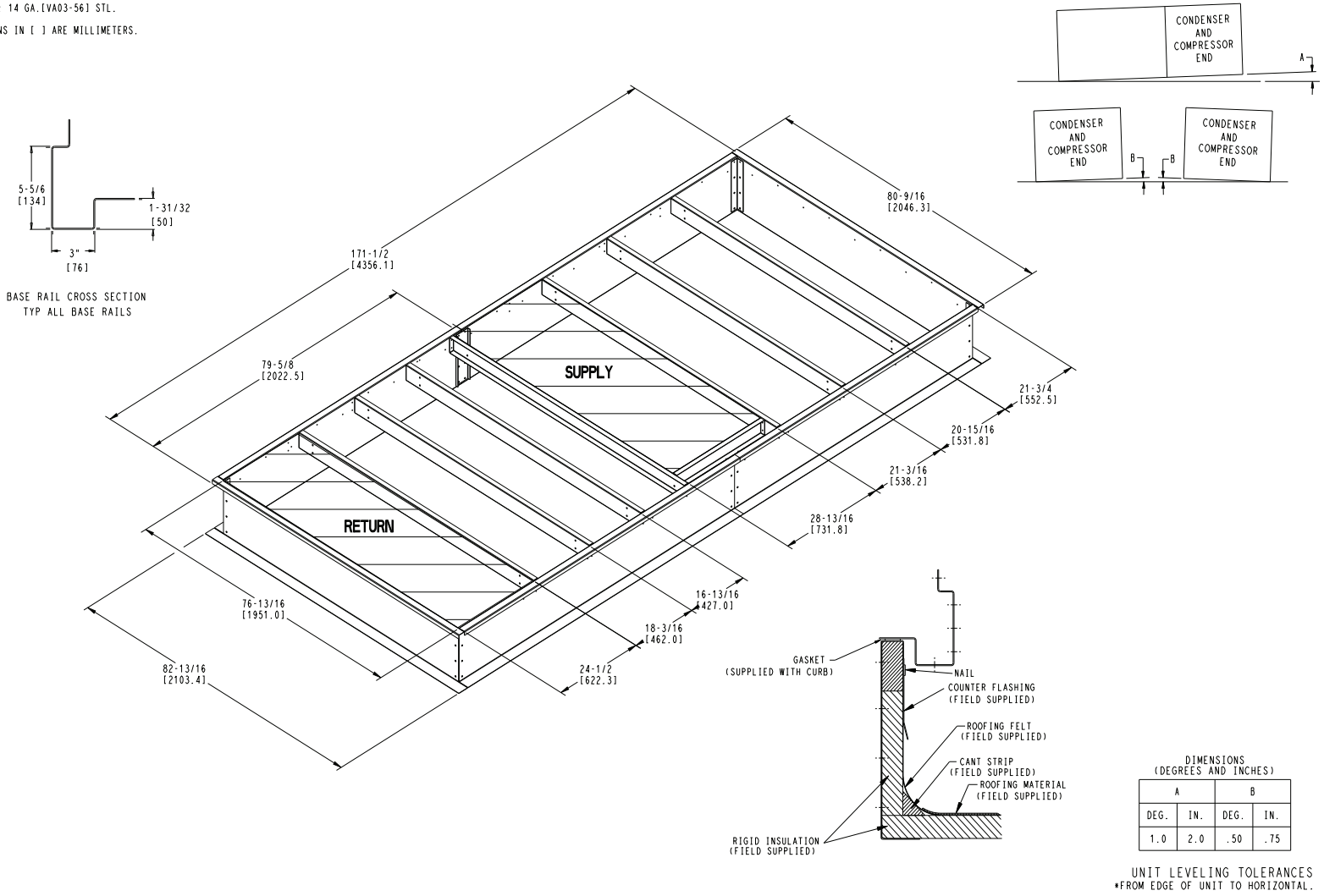
UNIT 50V2,V3,V4,V5	90	98
NOMINAL CAPACITY (tons)	**90**	**100**
STANDARD STATIC EXHAUST (OPTIONAL)	Standard Static Exhaust	Standard Static Exhaust
Fan Type	Backward Curve, Direct Drive	Backward Curve, Direct Drive
Fan Qty...Diameter (in.)	2...19.7	2...19.7
Motor Qty...Type	2...EC	2...EC
Total Motor Power (HP)	19	19
Nominal cfm	16,000	16,000
MEDIUM STATIC EXHAUST (OPTIONAL)	Medium Static Exhaust	Medium Static Exhaust
Fan Type	Backward Curve, Direct Drive	Backward Curve, Direct Drive
Fan Qty...Diameter (in.)	3...19.7	3...19.7
Motor Qty...Type	3...EC	3...EC
Total Motor Power (kW)	29	29
Nominal cfm	23,000	23,000
STANDARD PRE-FILTERS		
2 in.Throwaway	Fiberglass	Fiberglass
Qty...Size (in.)	12…20x25x2 and 12...20x20x2	12…20x25x2 and 12...20x20x2
Outdoor Air Screen	Metal Mesh	Metal Mesh
Qty...Size (in.)	15...16" x 25" x 1"	15...16" x 25" x 1"
OPTIONAL PRE-FILTERS		
2 in. MERV 8	Pleated	Pleated
Qty...Size (in.)	12…20x25x2, and 12...20x20x2	12…20x25x2, and 12...20x20x2
4 in. MERV 8 and MERV 13	Pleated	Pleated
Qty...Size (in.)	12…20x25x4, & 12...20x20x4	12…20x25x4, & 12...20x20x4
2 in. MERV 8 and 12 in. MERV 14 Bag	Pleated / Bag	Pleated / Bag
Qty...Size (in.)	6… 24x24x2/ 6… 24x20x2/ 6… 24x24x12/ 6… 24x20x12	6… 24x24x2/ 6… 24x20x2/ 6… 24x24x12/ 6… 24x20x12
2 in. MERV 8 and 12 in. MERV 15 Cartridge	Pleated / High Velocity Cartridge	Pleated / High Velocity Cartridge
Qty...Size (in.)	6… 24x24x2/ 6… 20x24x2/ 6… 24x24x12/ 6… 24x20x12	6… 24x24x2/ 6… 20x24x2/ 6… 24x24x12/ 6… 24x20x12
HOT WATER COIL (50V) (OPTIONAL)	Al/Cu RTPF, Steel Header	Al/Cu RTPF, Steel Header
Coil Quantity	2	2
Total Face Area (sq ft)	45.2	45.2
Coil Rows...Fins Per Inch	2...8	2...8
Tube Size (in.)...Circuiting	1/2" OD...Half Circuit	1/2" OD...Half Circuit
Supply Connection Qty...Size (in.)	1...2-1/2 NPT	1...2-1/2 NPT
Return Connection Qty...Size (in.)	1...2-1/2 NPT	1...2-1/2 NPT
Coil Internal Volume (gal)	12.72	12.72

NOTE(S):

a. kW Maximums are voltage dependent. Refer to specific fan tables.

NOTES:

1. ROOF CURB ACCESSORY CRRFCURB040A00 IS SHIPPED DISASSEMBLED.
2. ROOFCURB: 14 GA.[VA03-56] STL.
3. DIMENSIONS IN [ ] ARE MILLIMETERS.



DIMENSIONS
(DEGREES AND INCHES)

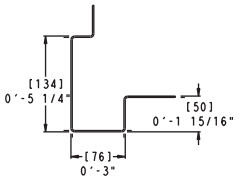
A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

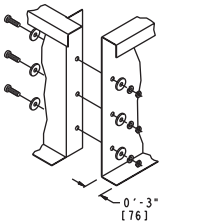
UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL.

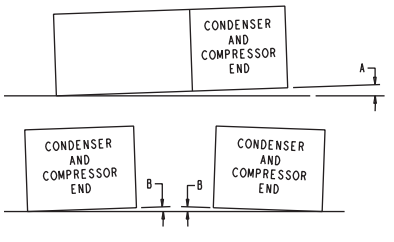
Accessory Part No.	Unit Type
CRRFCURB040A00	48/50V Compact Chassis

Fig. 5 — Roof Curb — 50V 27.5-35 Ton Compact Chassis

NOTES:
1. Roof curb is shipped disassembled.
2. Roofcurb: 14ga (VA03-56) STL.
3. Dimensions are inches (millimeters).



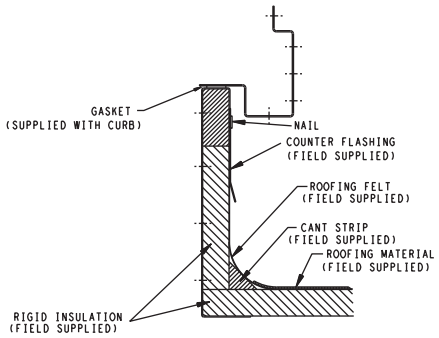




DIMENSIONS
(degrees and inches)

A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.

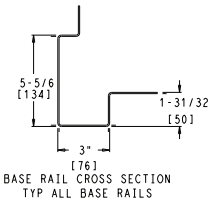


Accessory Part No.	Unit Type	Dimension	Unit Size (28-34)
CRRFCURB064A00	50V Standard Chassis	A	19' 2-3/8"
		B	10' 10-3/8"
CRRFCURB065A00	50V Extended Standard Chassis	A	21' 3-9/16"
		B	12' 11-9/16"
CRRFCURB057A00	48V Standard Chassis 50V Standard Chassis w/ Plenum	A	20' 9-1/16"
		B	13' 3-11/16"
CRRFCURB058A00	48V Extended Standard Chassis 50V Extended Standard Chassis w/ Plenum	A	22' 10-1/4"
		B	15' 4-7/8"

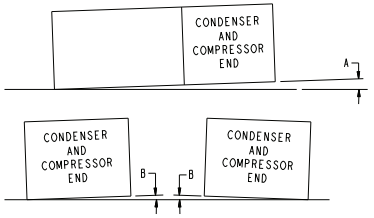
Fig. 6 — Roof Curb — 50V 27.5-35 Ton Standard Chassis

NOTES:

1. ROOF CURB ACCESSORY CRRFCURB042A00 IS SHIPPED DISASSEMBLED.
2. ROOFCURB: 14 GA.[VA03-56] STL.
3. DIMENSIONS IN [ ] ARE MILLIMETERS.



BASE RAIL CROSS SECTION
TYP ALL BASE RAILS



DIMENSIONS
(DEGREES AND INCHES)

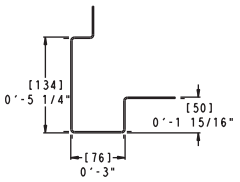
A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL..

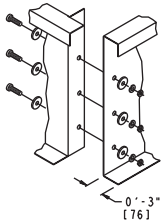
Accessory Part No.	Unit Type
CRRFCURB042A00	48/50V Compact Chassis

Fig. 7 — Roof Curb — 50V 40-50 Ton Compact Chassis

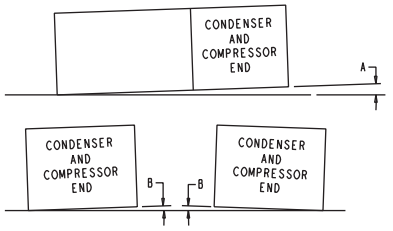
NOTES:
1. Roof curb is shipped disassembled.
2. Roofcurb: 14ga (VA03-56) STL.
3. Dimensions are inches (millimeters).



BASE RAIL CROSS SECTION
TYP ALL BASE RAILS



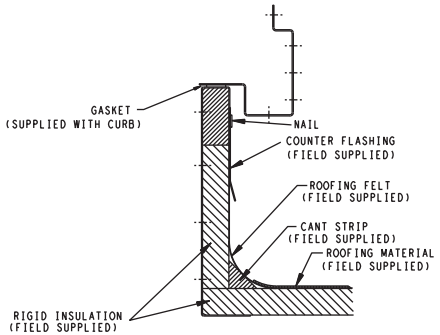
(CORNER CONNECTIONS AND
SPLICE PLATE CONNECTIONS)



DIMENSIONS
(degrees and inches)

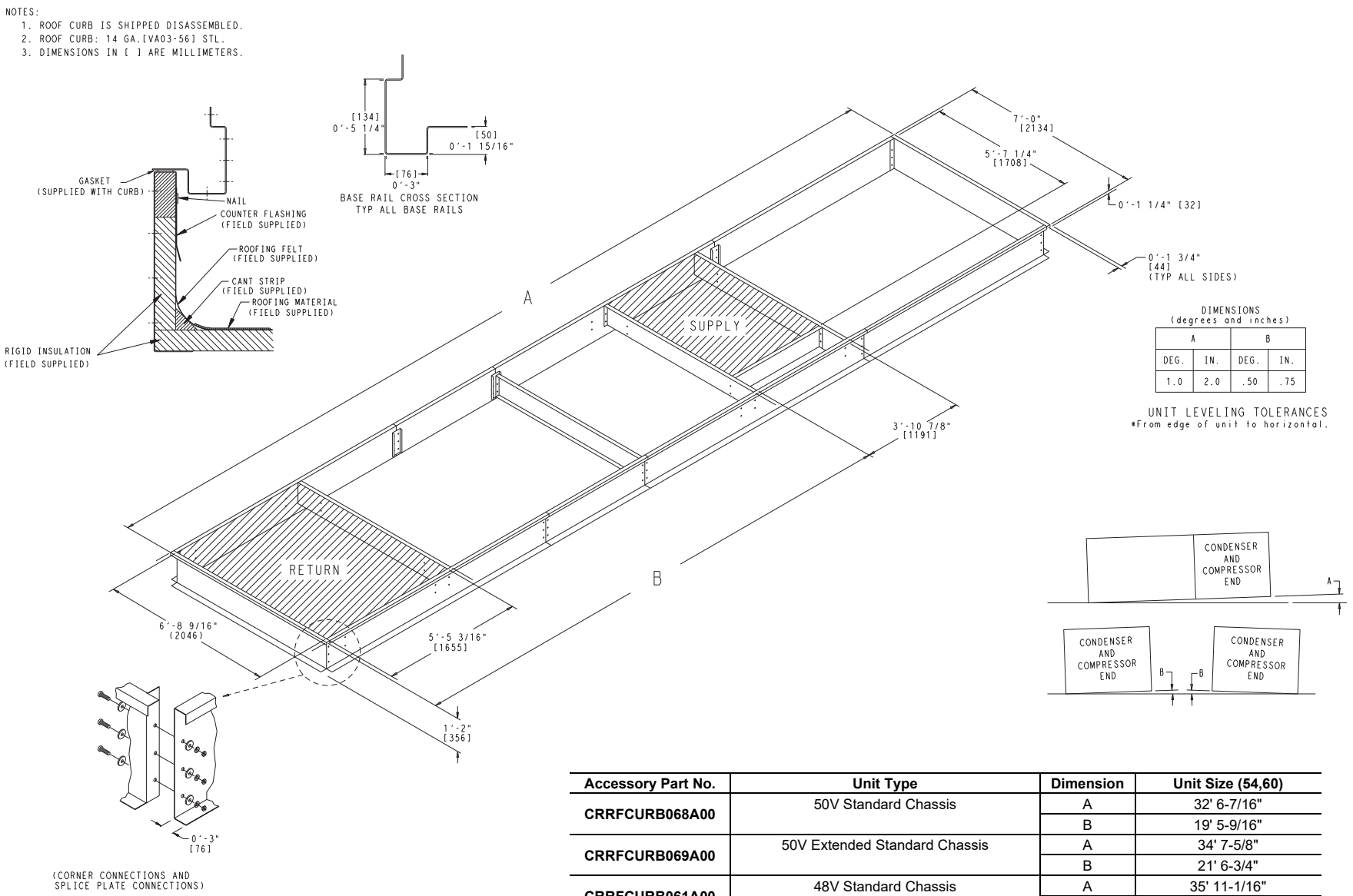
A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.



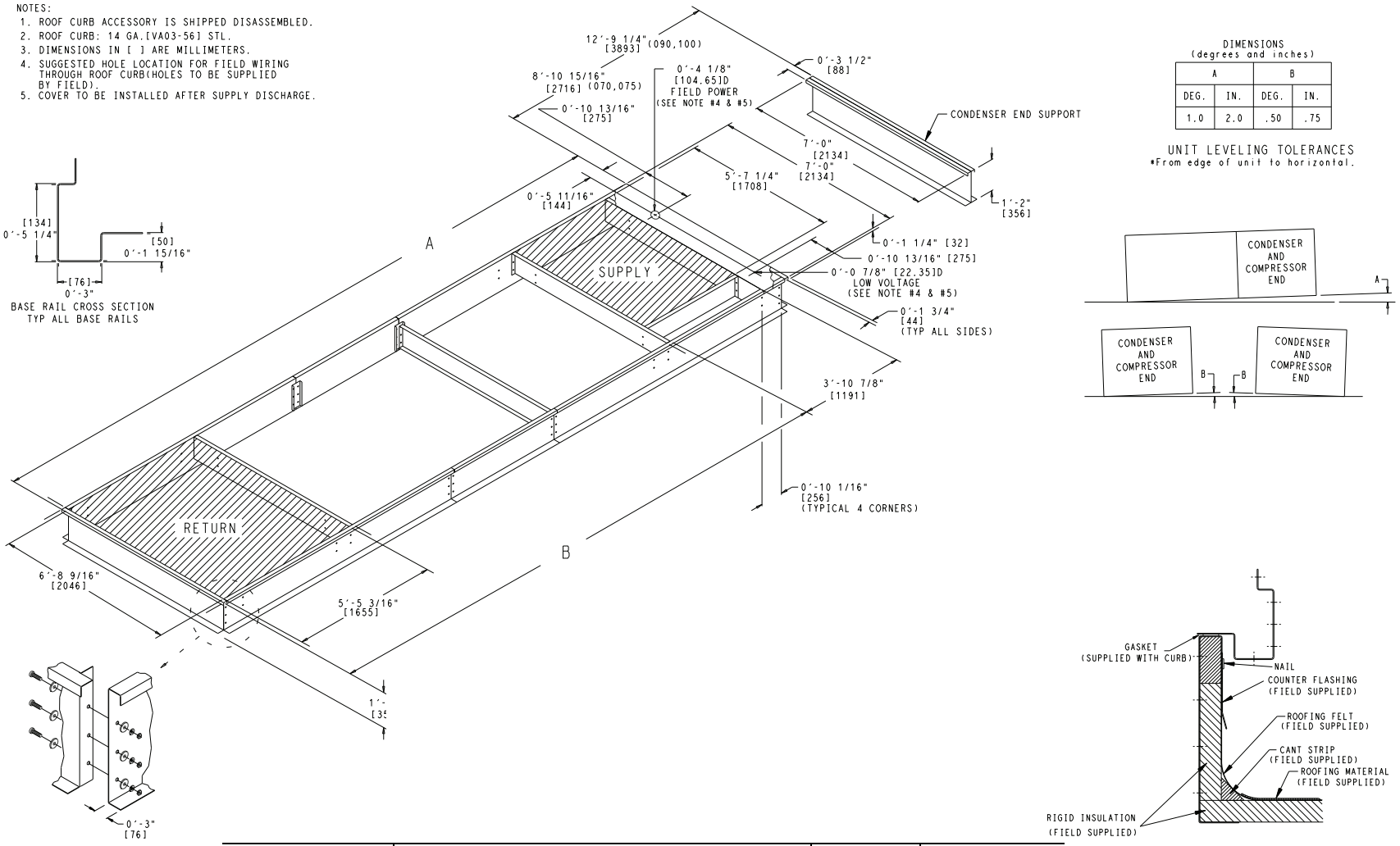
Accessory Part No.	Unit Type	Dimension	Unit Size (40-50)
CRRFCURB066A00	50V Standard Chassis	A	25' 9-5/8"
		B	13' 7-1/16"
CRRFCURB067A00	50V Extended Standard Chassis	A	27' 10-13/16"
		B	15' 8-7/32"
CRRFCURB059A00	48V Standard Chassis 50V Standard Chassis w/ Plenum	A	27' 4-9/16"
		B	16' 0-5/8"
CRRFCURB060A00	48V Extended Standard Chassis 50V Extended Standard Chassis w/ Plenum	A	29' 5-13/16"
		B	18' 1-7/8"

Fig. 8 — Roof Curb — 50V 40-50 Ton Standard Chassis



Accessory Part No.	Unit Type	Dimension	Unit Size (54,60)
CRRFCURB068A00	50V Standard Chassis	A	32' 6-7/16"
		B	19' 5-9/16"
CRRFCURB069A00	50V Extended Standard Chassis	A	34' 7-5/8"
		B	21' 6-3/4"
CRRFCURB061A00	48V Standard Chassis 50V Standard Chassis with Plenum	A	35' 11-1/16"
		B	22' 10-3/16"
CRRFCURB062A00	48V Extended Standard Chassis 50V Extended Standard Chassis with Plenum	A	38' 0-1/4"
		B	24' 11-3/8"

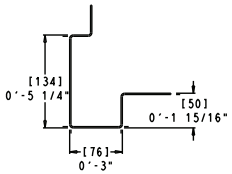
Fig. 9 — Roof Curb — 50V 55-60 Ton Standard Chassis



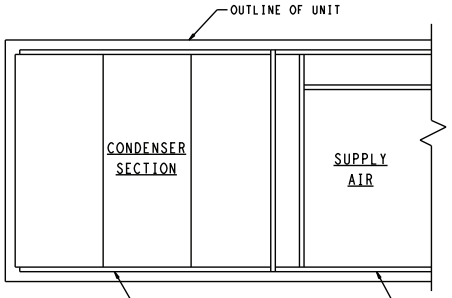
Accessory Part No.	Unit Type	Dimensions	Unit Size 70-98
50DJ-901---001	50V Standard Chassis (70 Ton)	A	24' 5-1/16"
		B	19' 5-9/16"
50DJ-902---641	50V Extended Standard Chassis (70 Ton)	A	26' 6-1/4"
		B	21' 6-3/4"
50DJ-901---011	48V Standard Chassis 50V Standard Chassis (70 Ton) 50V Standard Chassis with Plenum (75-100 Ton)	A	27' 9-11/16"
		B	22' 10-3/16"
50DJ-902---631	48V Extended Standard Chassis 50V Extended Standard Chassis (70 Ton) 50V Extended Standard Chassis with Plenum (75-100 Ton)	A	29' 10-7/8"
		B	24' 11-3/8"

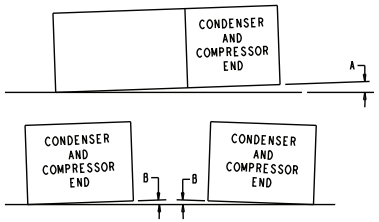
Fig. 10 — Roof Curb — 50V 70-100 Ton Standard Chassis

NOTES:
1. ROOF CURB ACCESSORY CRRFCURB070A00 IS SHIPPED DISASSEMBLED.
2. DIMENSIONS IN [ ] ARE MILLIMETERS.
3. ROOF CURB: 14 GA.[VA03-56] STL.
   ROOF CURB PANS: 16 GA.[VA03-56] STL.



BASE RAIL CROSS SECTION
TYP ALL BASE RAILS

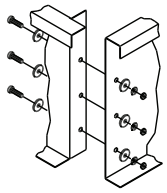


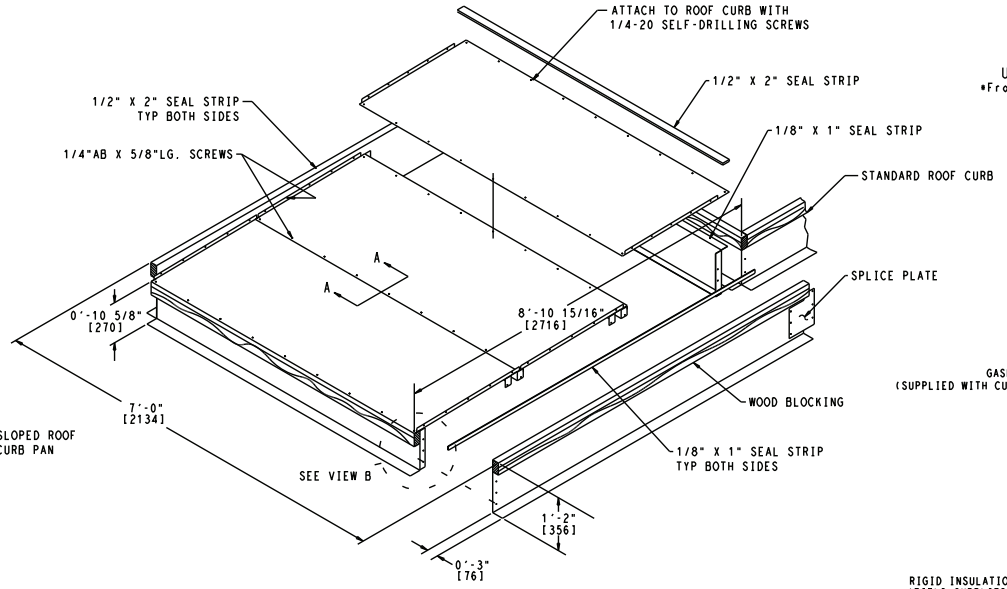


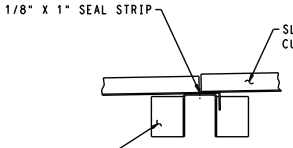
DIMENSIONS
(degrees and inches)

A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

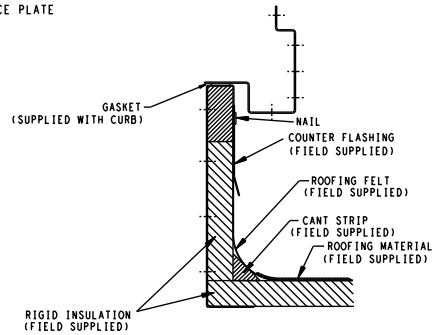
UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.


VIEW B
(CORNER CONNECTIONS AND SPLICE PLATE CONNECTIONS)





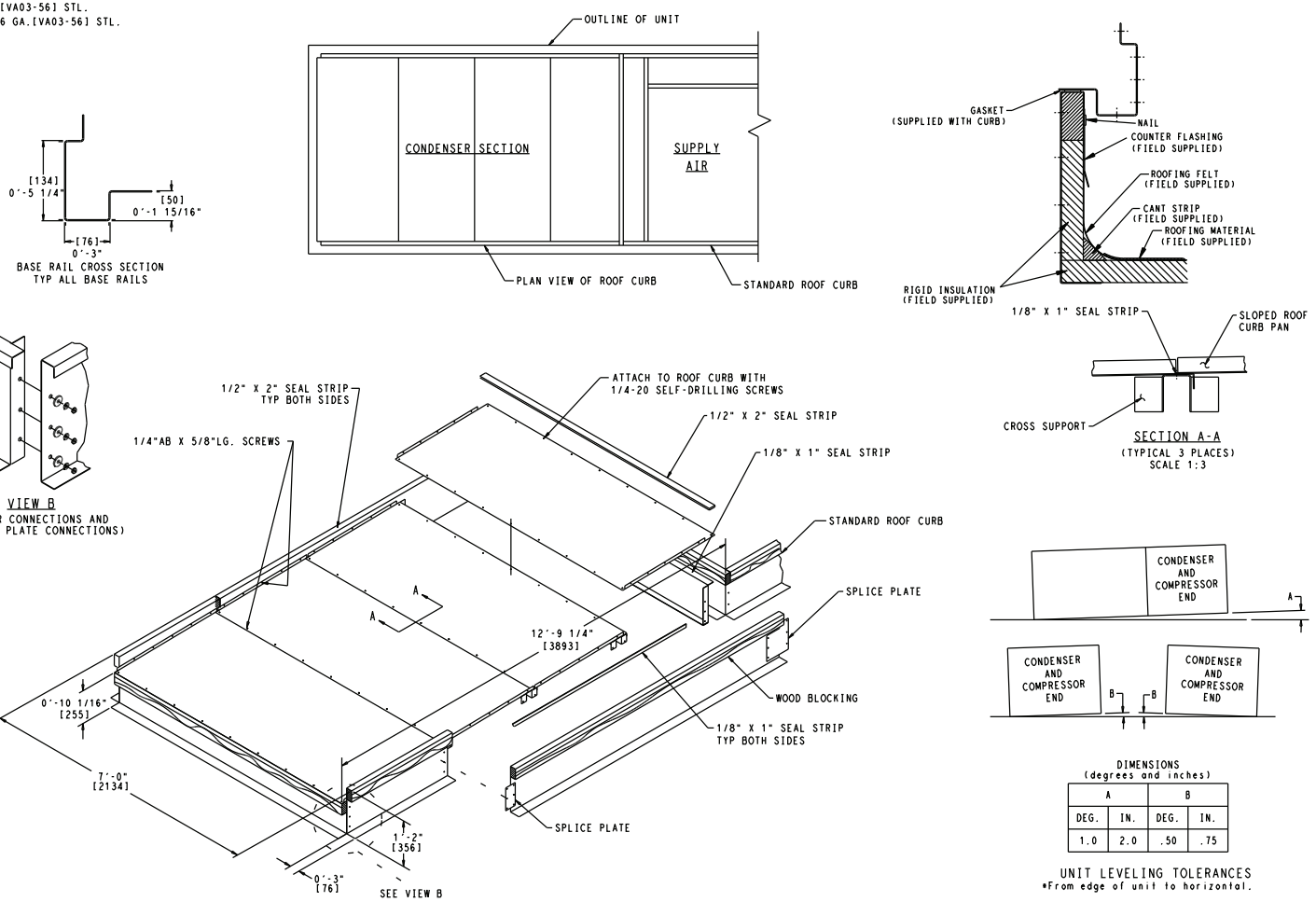
SECTION A-A
(TYPICAL 2 PLACES)



SHEET	DATE	SUPERCEDES			
1 OF 1	08/27/24	02/19/09	50P AND 50V CONDENSER SECTION 70-75 TON	48ZZ501983	B.2

Fig. 11 — Roof Curb — 50V 70-75 Ton Full Perimeter Curb Conversion Kit

NOTES:
1. ROOF CURB ACCESSORY CRRFCURB071A00 IS SHIPPED DISASSEMBLED.
2. DIMENSIONS IN [ ] ARE MILLIMETERS.
3. ROOF CURB: 14 GA.[VA03-56] STL.
   ROOF CURB PANS: 16 GA.[VA03-56] STL.



DIMENSIONS
(degrees and inches)

A		B	
DEG.	IN.	DEG.	IN.
1.0	2.0	.50	.75

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.

Accessory Part No.	Unit Type	Dimensions	Unit Size 70-98
50DJ-901---001	50V Standard Chassis (70 Ton)	A	24' 5-1/16"
		B	19' 5-9/16"
50DJ-902---641	50V Extended Standard Chassis (70 Ton)	A	26' 6-1/4"
		B	21' 6-3/4"
50DJ-901---011	48V Standard Chassis 50V Standard Chassis (75 Ton) 50V Standard Chassis with Plenum (70 Ton)	A	27' 9-11/16"
		B	22' 10-3/16"
50DJ-902---631	48V Extended Standard Chassis 50V Extended Standard Chassis (75 Ton) 50V Extended Standard Chassis with Plenum (70 Ton)	A	29' 10-7/8"
		B	24' 11-3/8"

Fig. 12 — Roof Curb — 50V 90-100 Ton Full Perimeter Curb Conversion Kit

Step 4 — Install Field-Fabricated Ductwork

⚠ WARNING

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree elbow in the supply and 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. Failure to follow these instructions could result in personal injury or property damage due to falling objects.

The 50V2,V3 units are designed for vertical supply/return only. Field-fabricated ductwork must be attached to the roof curb, or to the support steel, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in Fig. 5-12.

To attach ductwork to roof curb, insert duct approximately 10 to 11 in. up into roof curb. Connect ductwork to 14-gauge roof curb material with sheet metal screws driven from inside the duct.

50V4,V5 units are designed for horizontal supply/return only. Field fabricated ductwork connects to the factory-provided flanges on the supply and return openings of the unit. Review the certified drawing for the flange sizes and locations. Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. Outlet grilles must not lie directly below unit discharge.

Design supply duct strong enough to handle expected static pressures.

Step 5 — Install Curb Gasketing (Vertical Supply or Return Units Only)

Gasket material is required to prevent air and water leaks for curb, curb adapter, or structure mounted units.

After ductwork has been connected to the roof curb or support structure, attach adhesive-backed gasketing on all end rails, cross rails, and duct rails of roof curb or curb adapter. Gasket material is included with Carrier accessory knock-down curbs. Otherwise, gasket material is field supplied. Be sure all joints and corners of gasket are square and flush to prevent possible air or water leaks. Follow all applicable building codes.

IMPORTANT: For steel beam mounted-units, install gasketing around the supply and return openings, at a minimum.

Step 6 — Rig Unit

NOTE: All lifting lugs must be engaged when lifting.

Units are designed to be lifted overhead using the lifting lugs on the unit base rail. A spreader bar must be used when lifting the unit. Not using a spreader bar will cause damage to the unit top. Ensure lifting straps do not contact side of unit. For units without hail guards, use coil covers to protect coils during lifting.

Do not drop unit. Keep unit upright. Lift unit with all panels/doors in place and secured. Do not install external accessories or options, such as power exhaust or flue vents, prior to lifting.

Refer to the unit rigging label for lifting requirements, worst case corner weights, and center of gravity. Refer to Fig. 4 for rigging label example.

NOTE: Do not lift unit with forklift truck. Move unit with overhead rigging only.

Align unit with the ductwork openings when setting the unit on the support structure. Ensure support structure gasket material is not damaged when setting the unit.

Step 7 — Connect Primary Condensate Drain

The primary drain is a 2 in. female NPS pipe connection located on the right-hand side of the unit looking at the unit from the return air end. See Fig. 15-34 for unit drawings to locate the drain connection.

With field-supplied fittings and pipe sections, plumb the primary condensate drain to the 2 in. female NPS connector on the base rail. Use a trap height of at least 4 in., increasing the height for applications with high static pressure. See Fig. 13 and 14 for connection details. Apply a bead of RTV or similar sealant around the pipe joint at the connector in the base rail.

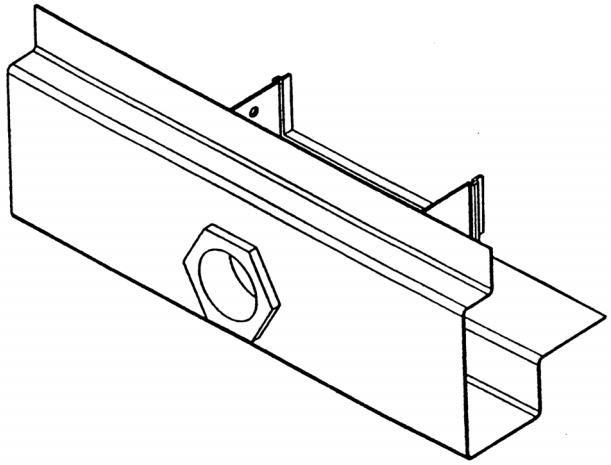
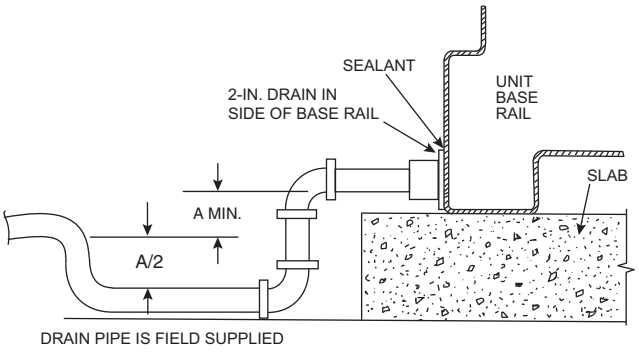


Fig. 13 — Primary Drain Connection



A = 4 in. (102 mm) min

Fig. 14 — Primary Condensate Drain Piping Details (Slab and Curb Mounted)

Step 8 — Connect Secondary Condensate Drain (Sizes 54-98)

The base pan is used as a secondary drain pan in the event of primary drain pan overflow. A 1-1/4 in. NPS secondary drain coupling is included on the base rail on the left side of the unit. See the unit certified drawings (Fig. 15-34) for secondary drain connection location.

For applications without a factory installed condensate overflow switch, it is recommended that the secondary drains be utilized. Use field-supplied fittings and pipe sections to plumb to the 1-1/4 in. female NPS fitting. Use a trap height of at least 4 in, increasing the trap height for applications with high static pressure. Apply a bead of RTV or similar sealant around the pipe joint at the connector in the base rail.

For applications with a factory installed condensate overflow switch, the secondary drain connections can be plugged with field supplied plug. Apply a bead of RTV or similar sealant around the plug joint at the connector in the base rail.

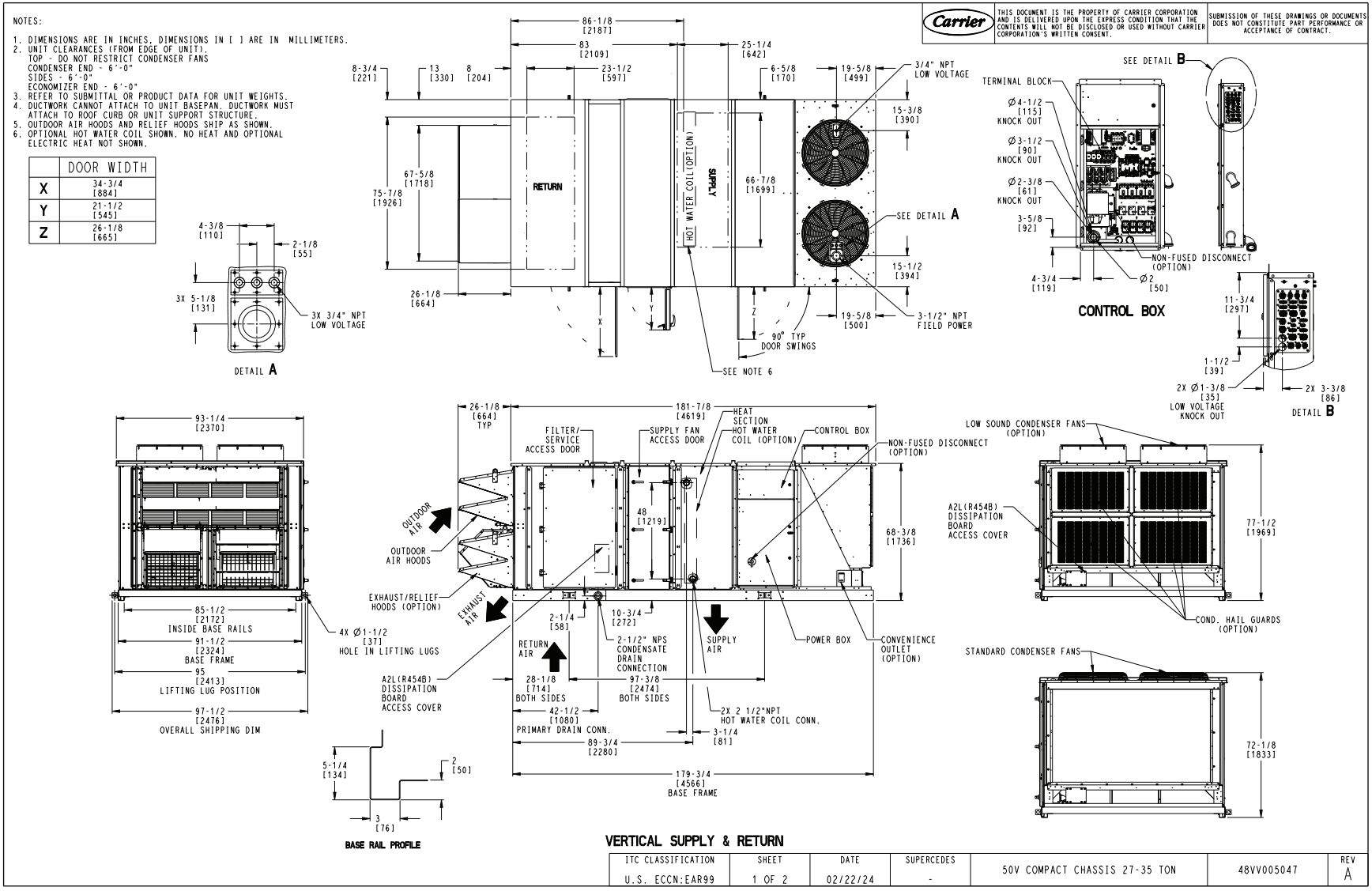


Fig. 15 — 50V 27.5-35 Ton Compact Chassis

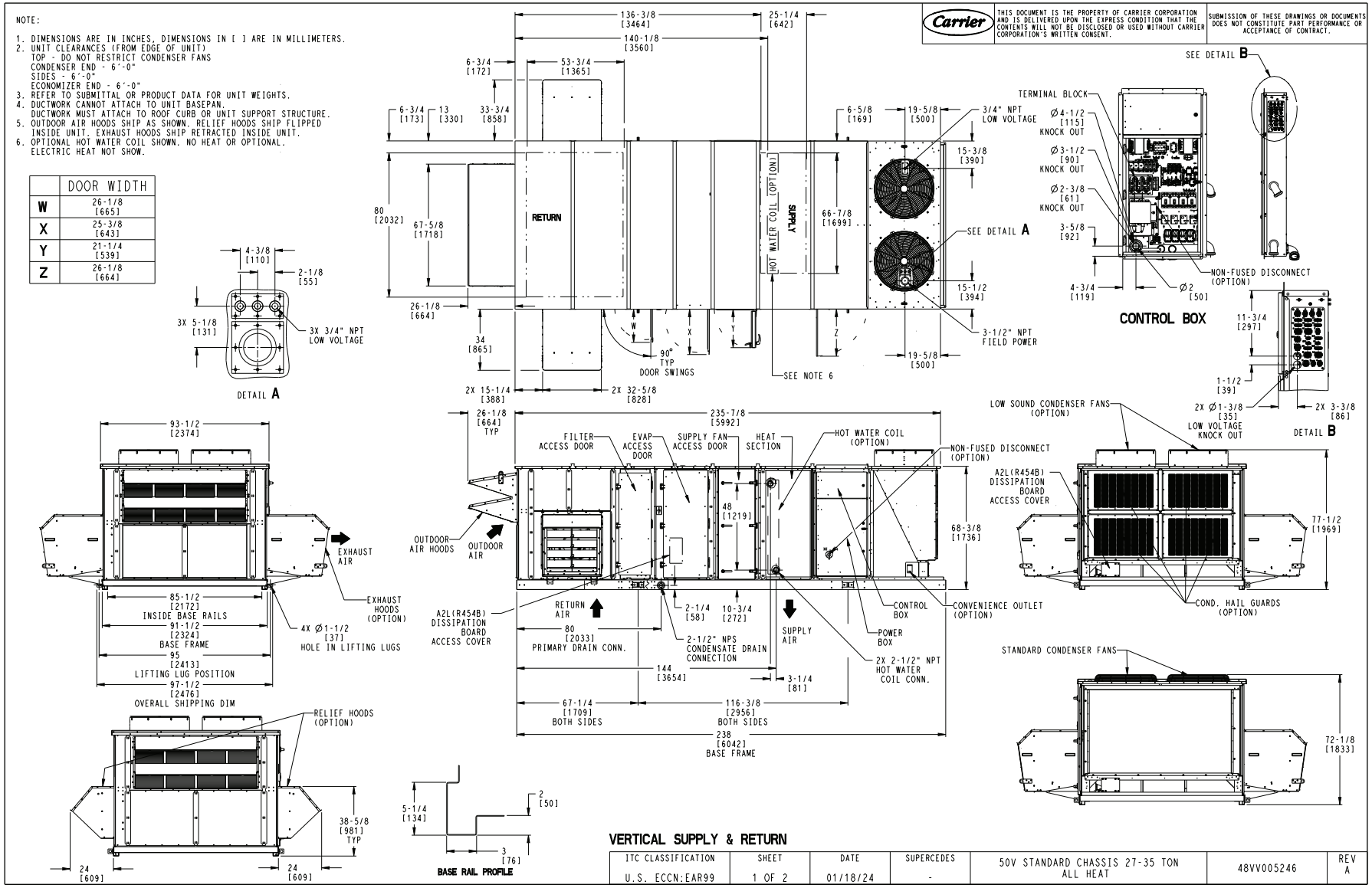


Fig. 16 — 50V 27.5-35 Ton Standard Chassis

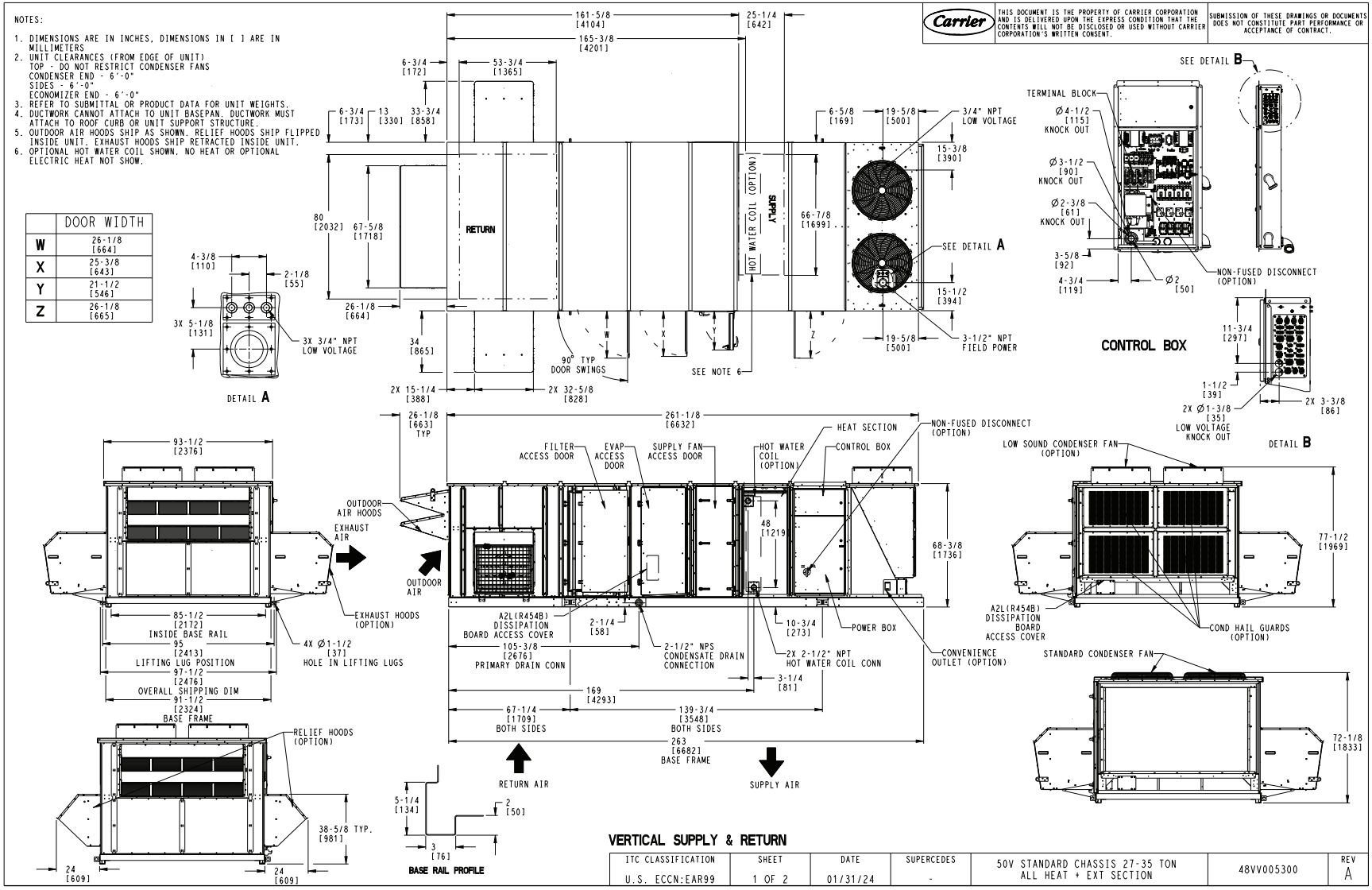


Fig. 17 — 50V 27.5-35 Ton Extended Standard Chassis

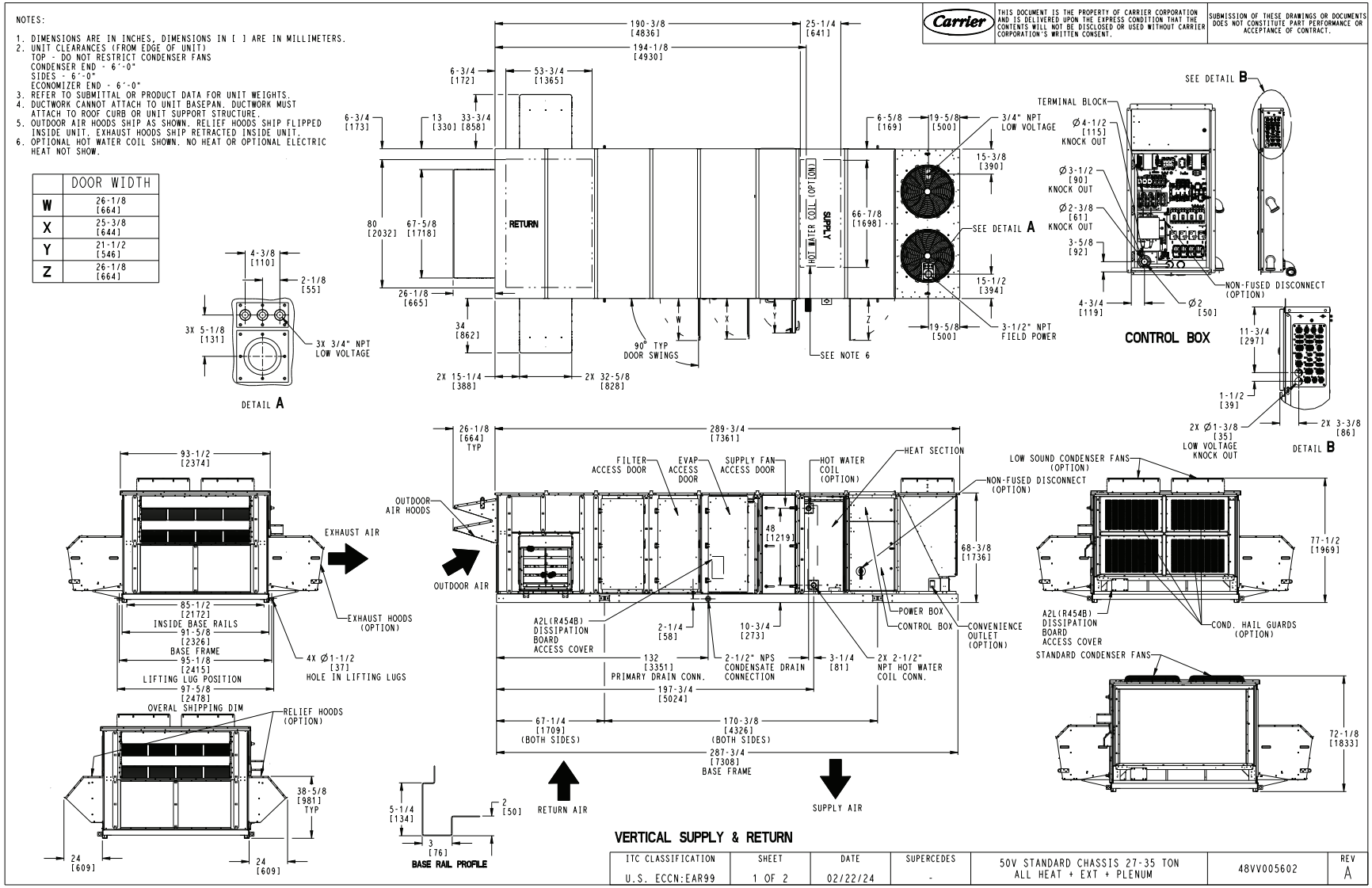


Fig. 18 — 50V 27.5-35 Ton Extended Standard Chassis with Plenum Section

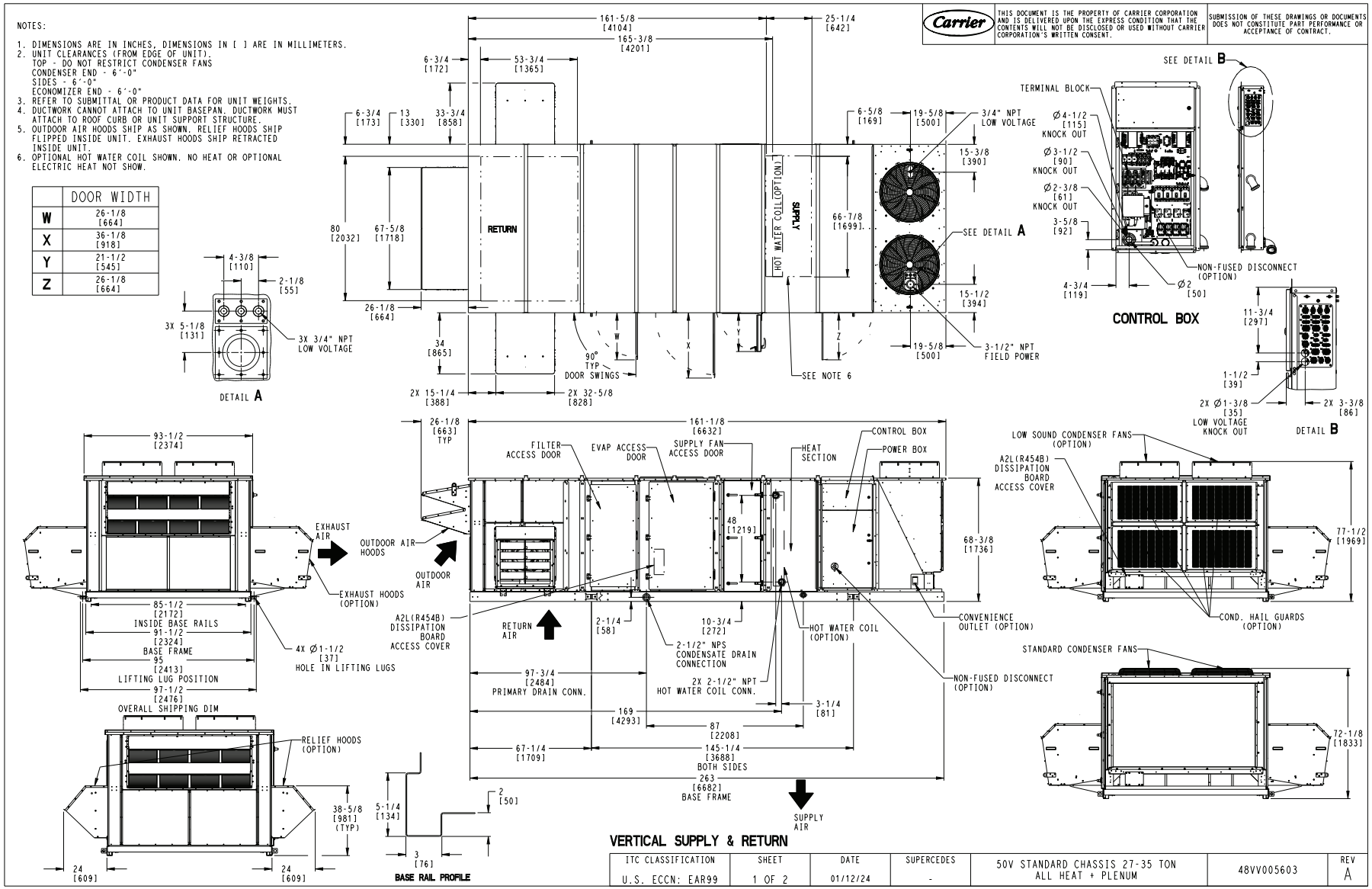


Fig. 19 — 50V 27.5-35 Ton Standard Chassis with Plenum Section

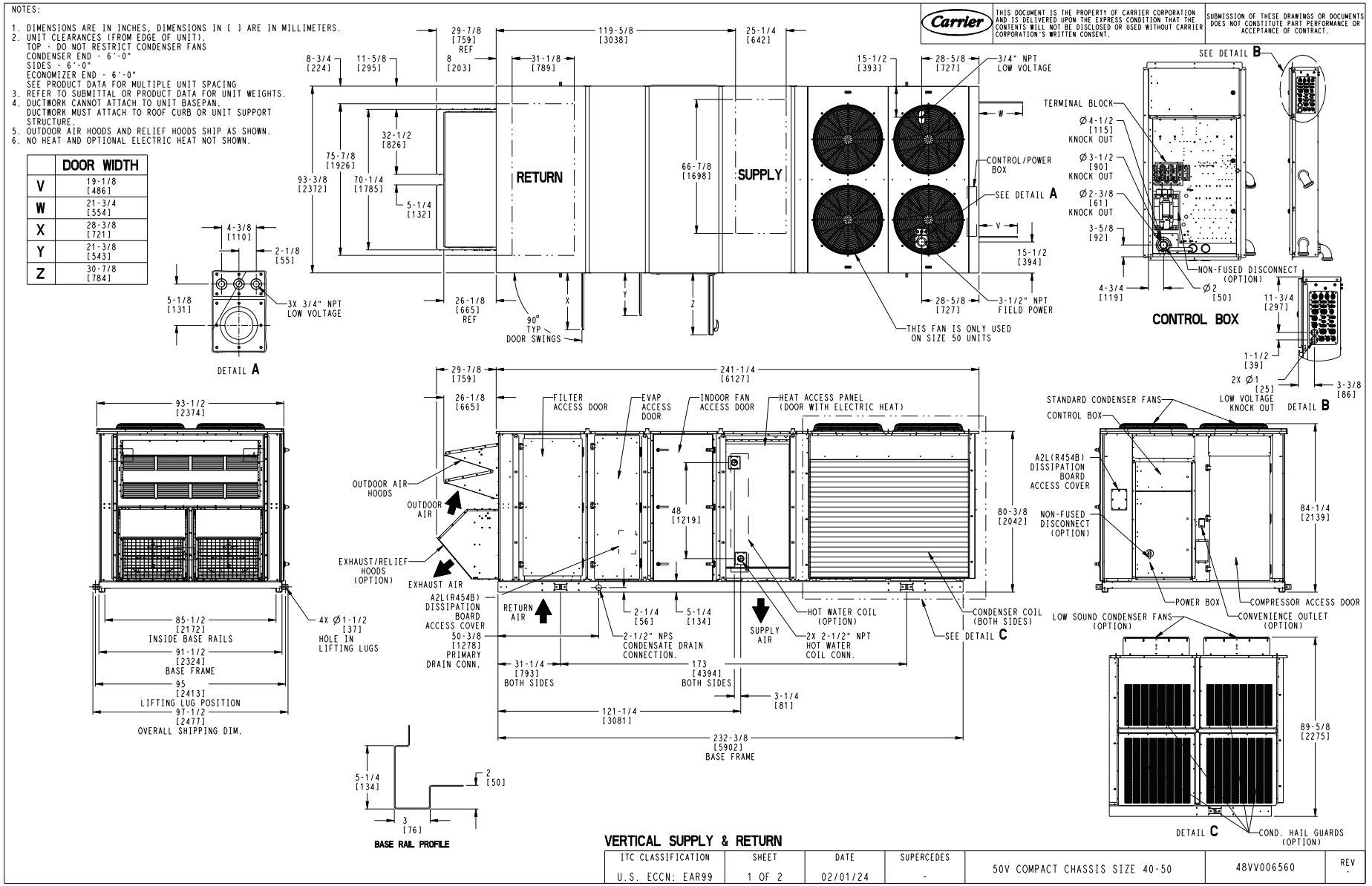


Fig. 20 — 50V 40-50 Ton Compact Chassis

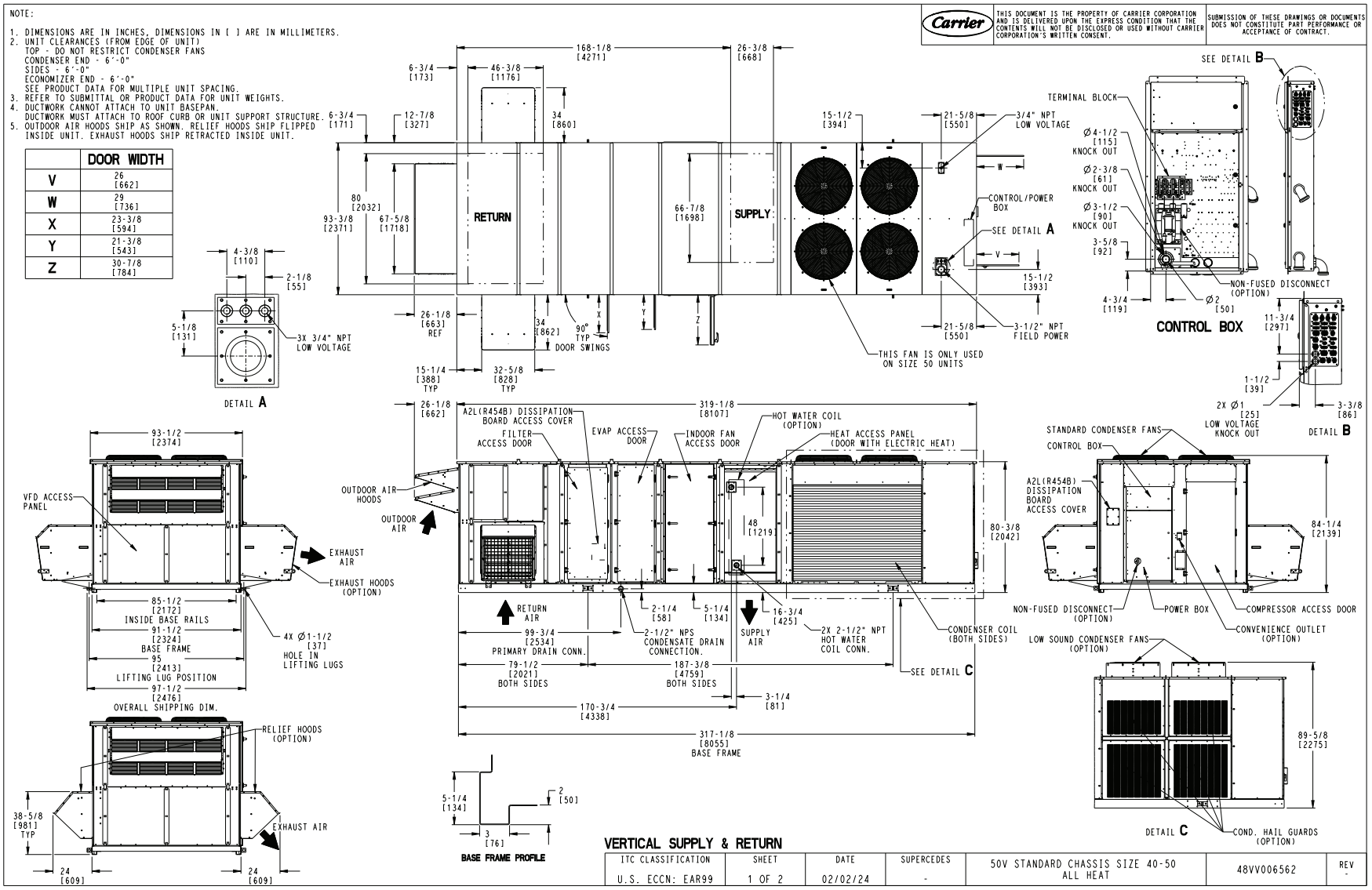


Fig. 21 — 50V 40-50 Ton Standard Chassis

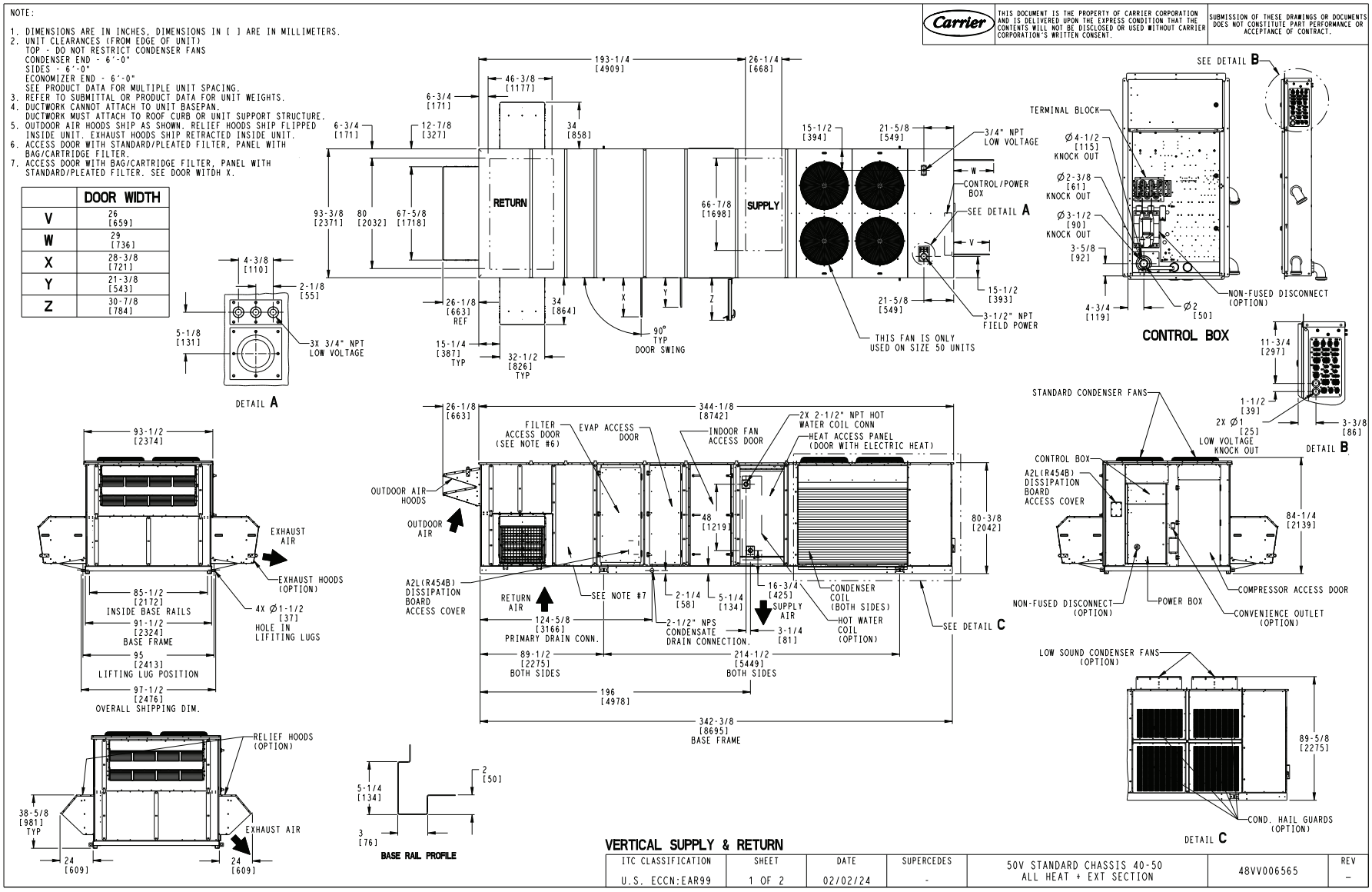


Fig. 22 — 50V 40-50 Ton Extended Standard Chassis

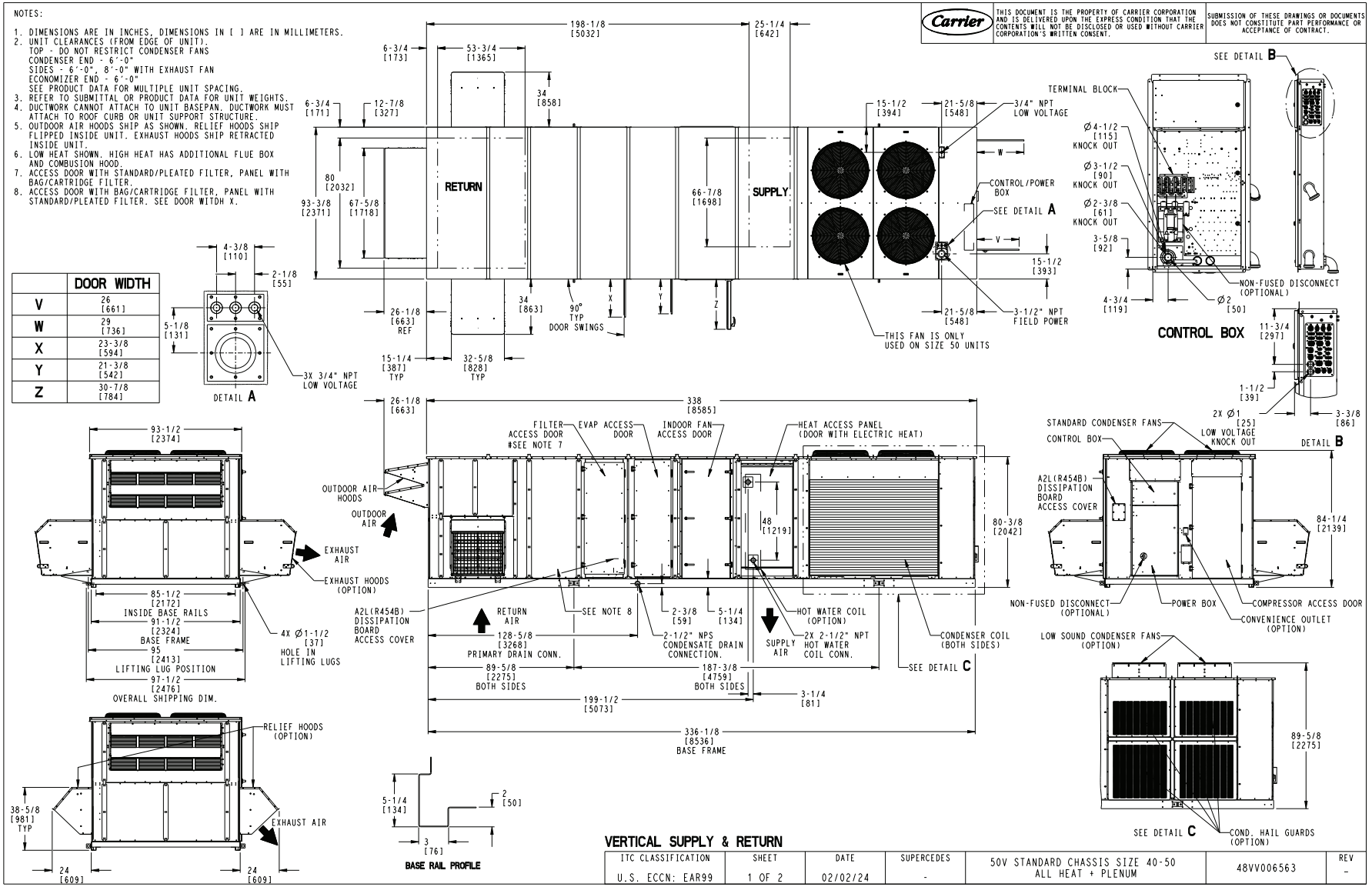


Fig. 23 — 50V 40-50 Ton Standard Chassis with Plenum Section

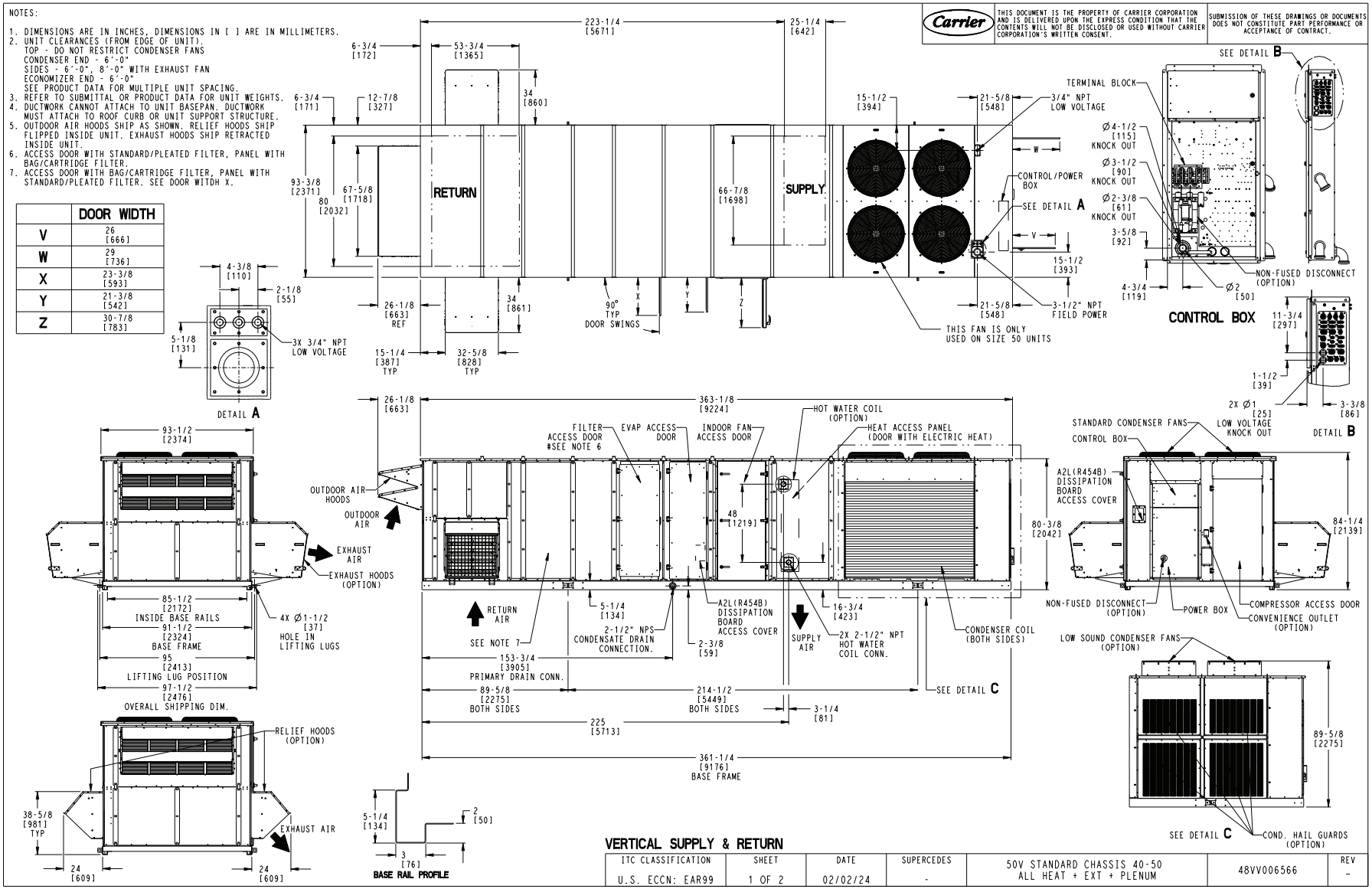


Fig. 24 — 50V 40-50 Ton Extended Standard Chassis with Plenum Section

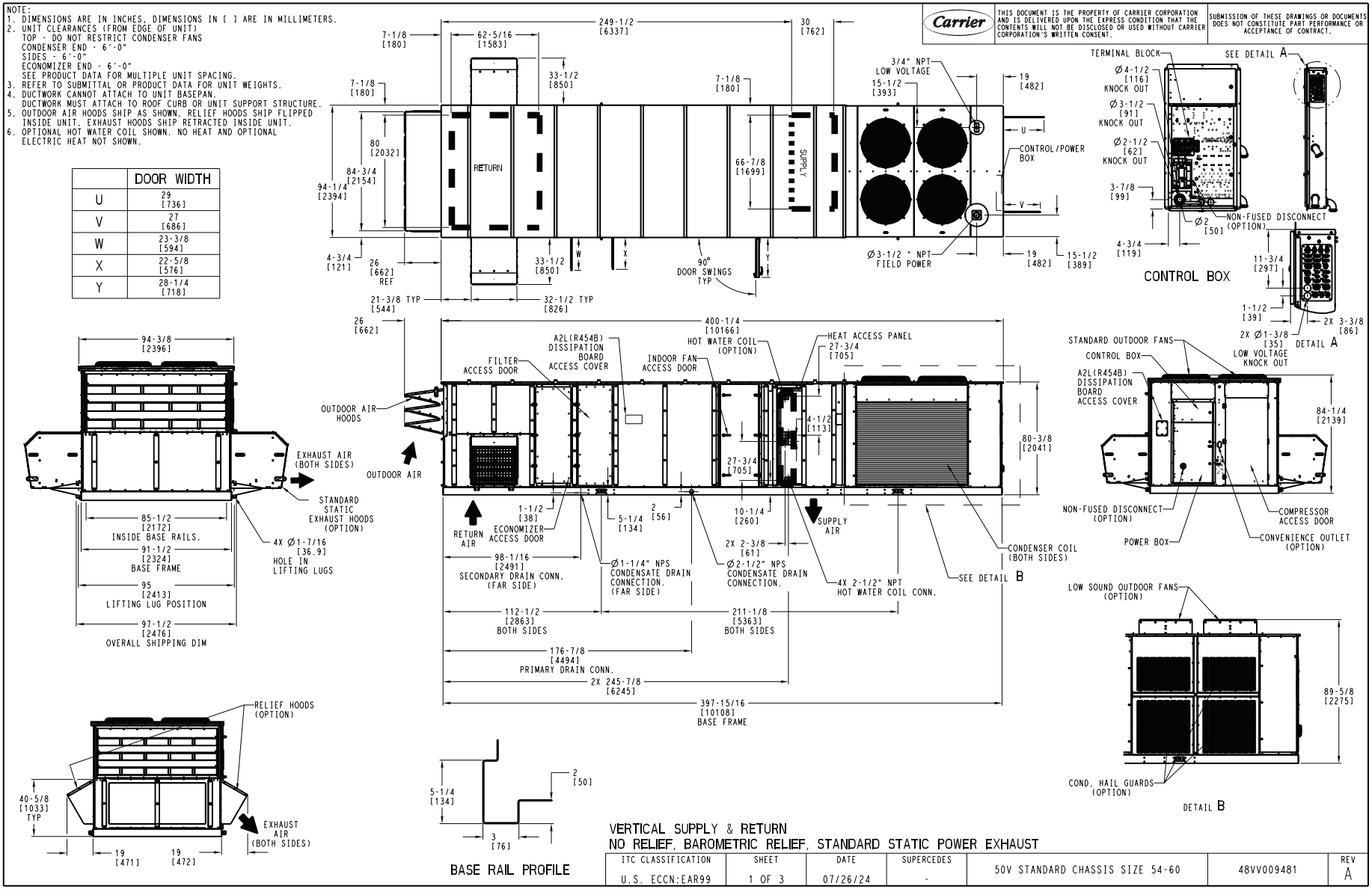


Fig. 25 — 50V 55-60 Ton Standard Chassis

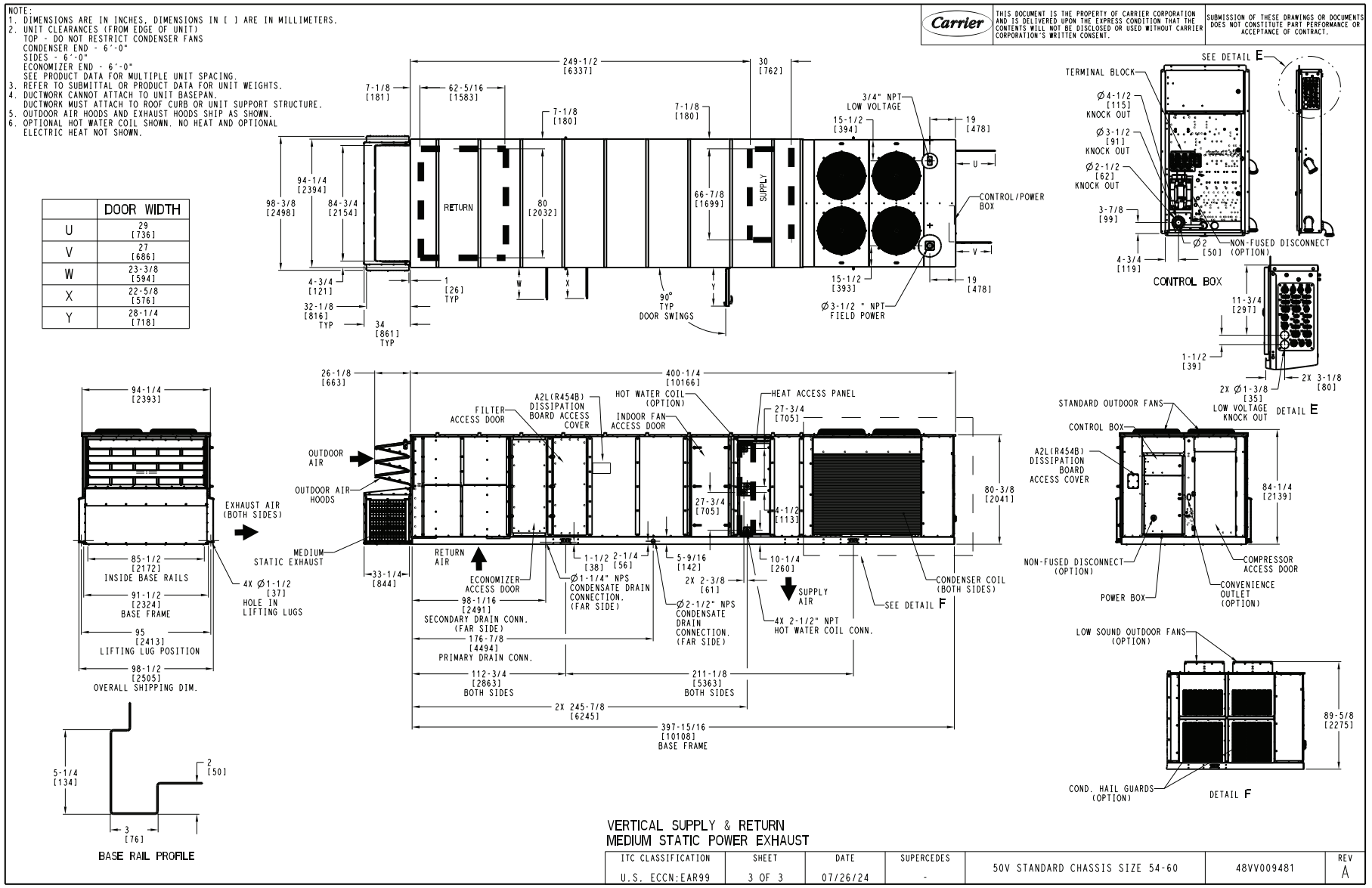


Fig. 25 — 50V 55-60 Ton Standard Chassis (cont)

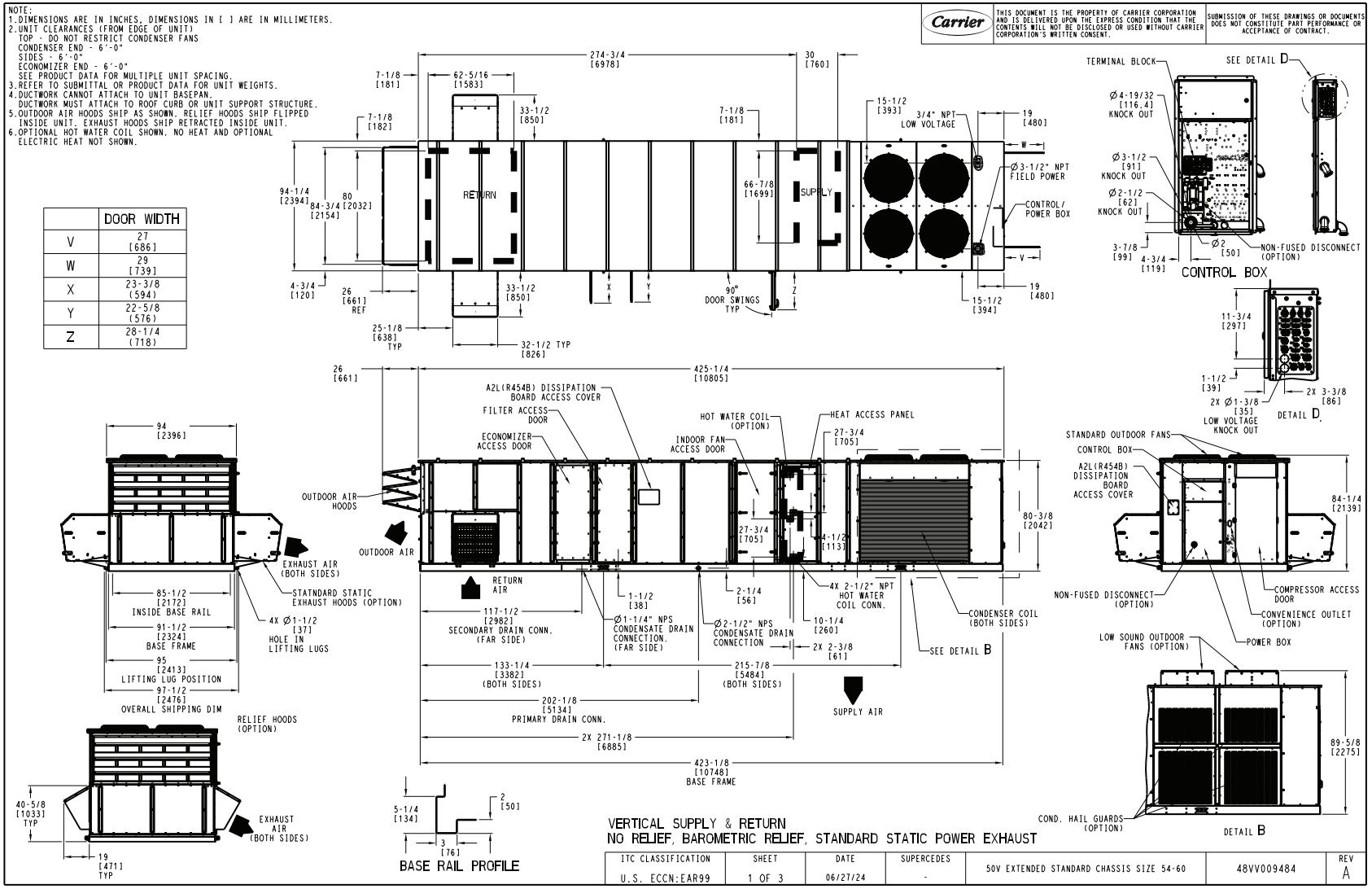


Fig. 26 — 50V 55-60 Ton Extended Standard Chassis

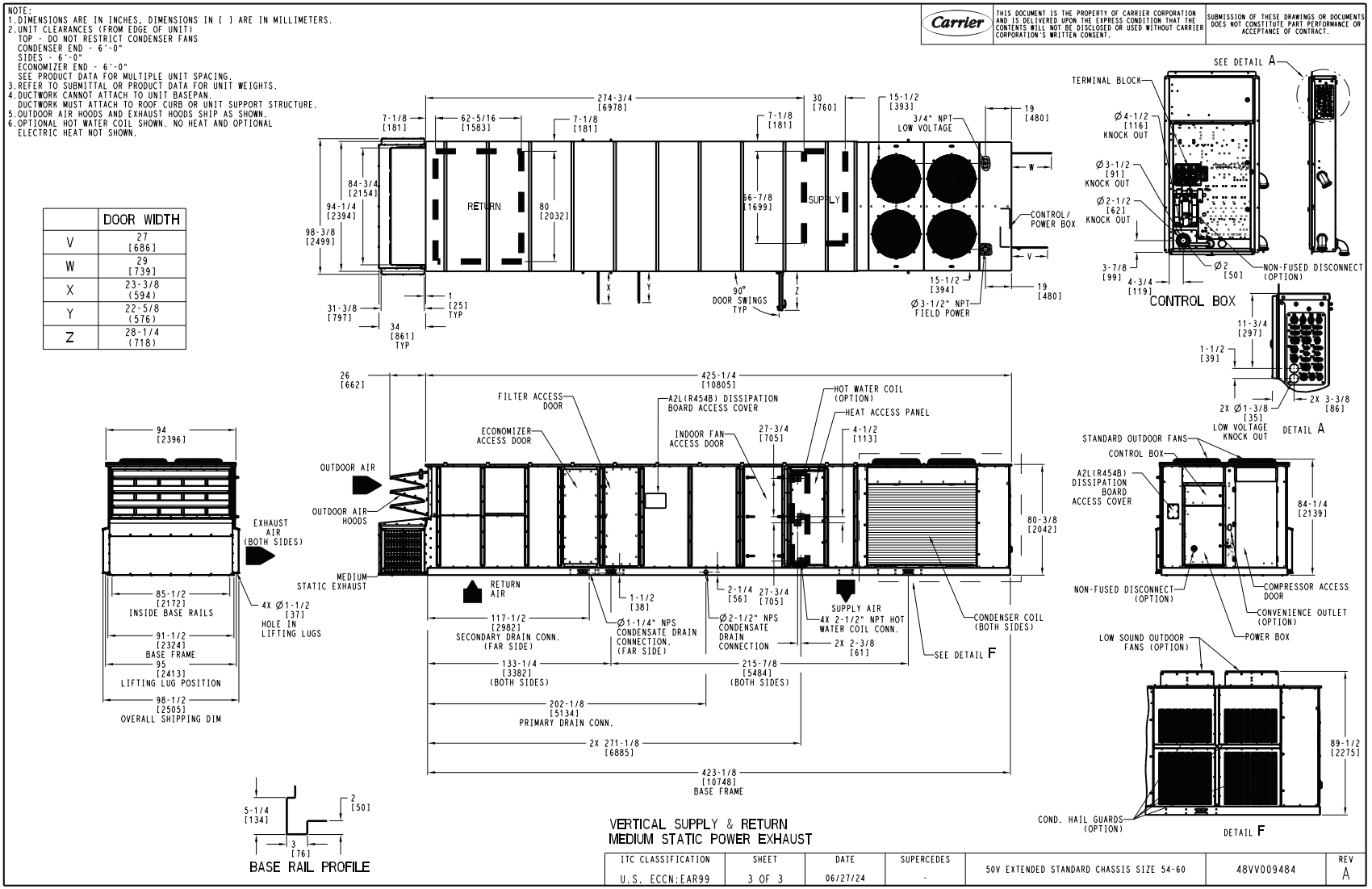


Fig. 26 — 50V 55-60 Ton Extended Standard Chassis (cont)

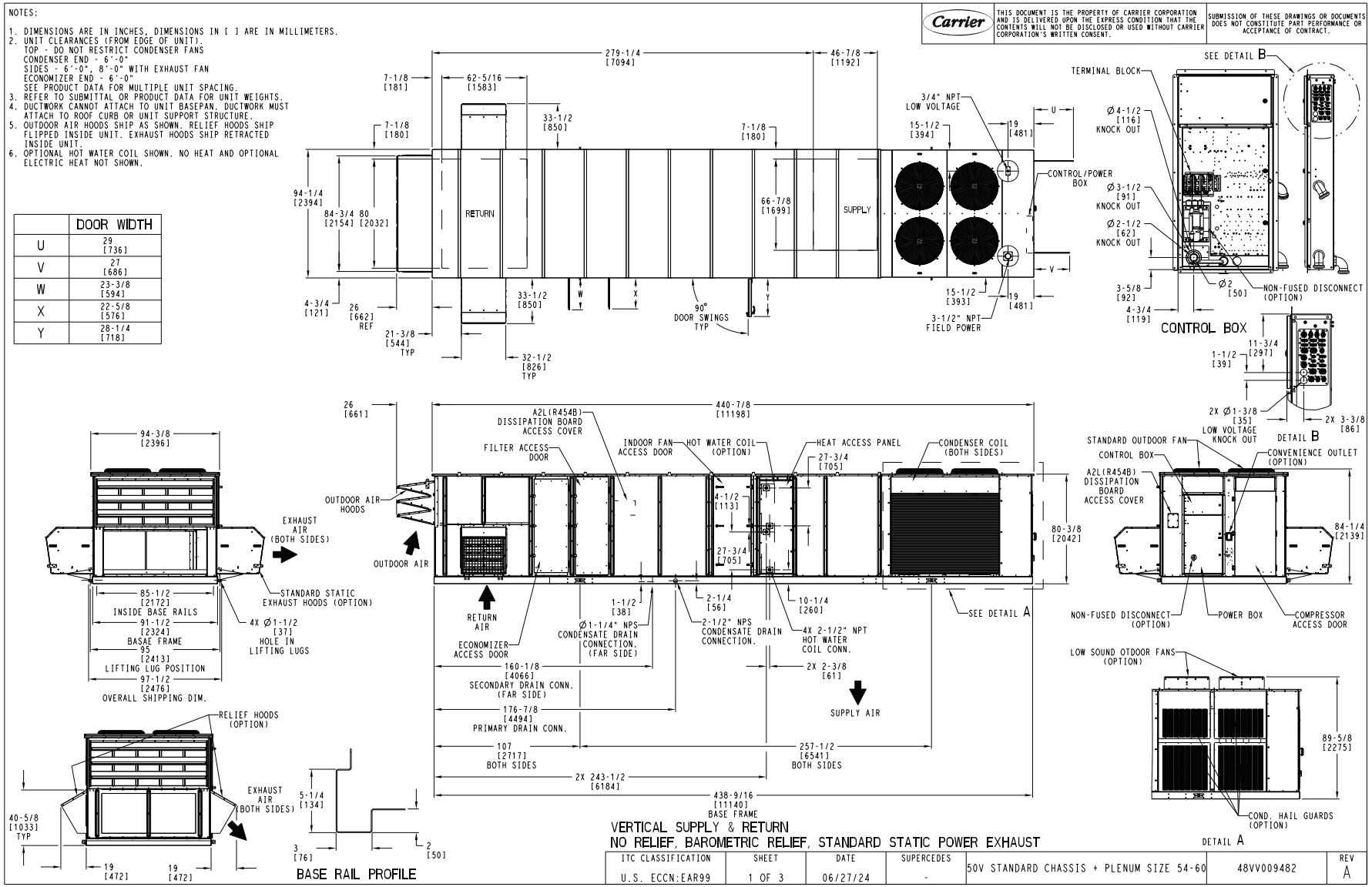


Fig. 27 — 50V 55-60 Ton Standard Chassis with Plenum Section

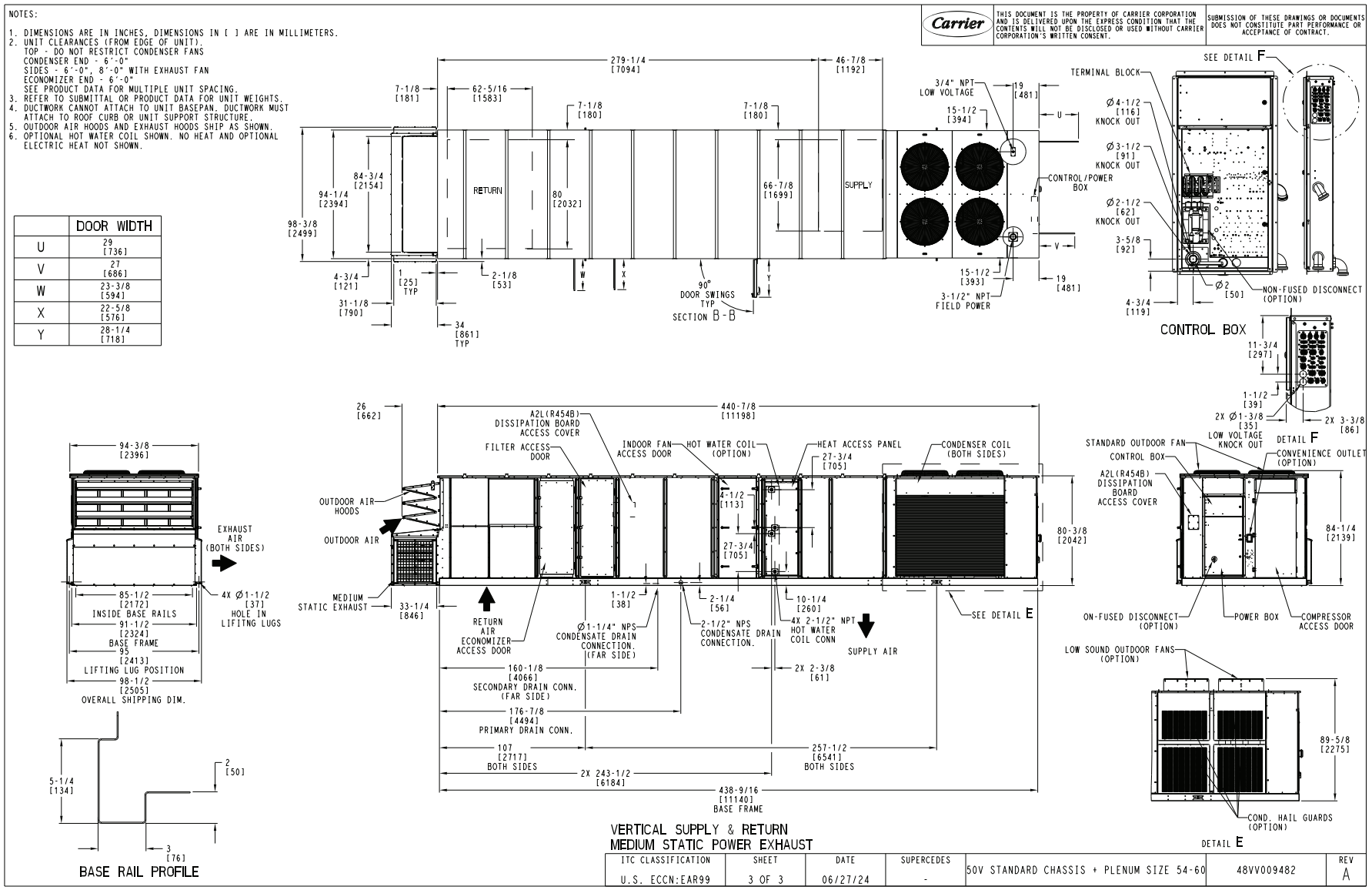


Fig. 27 — 50V 55-60 Ton Standard Chassis with Plenum Section (cont)

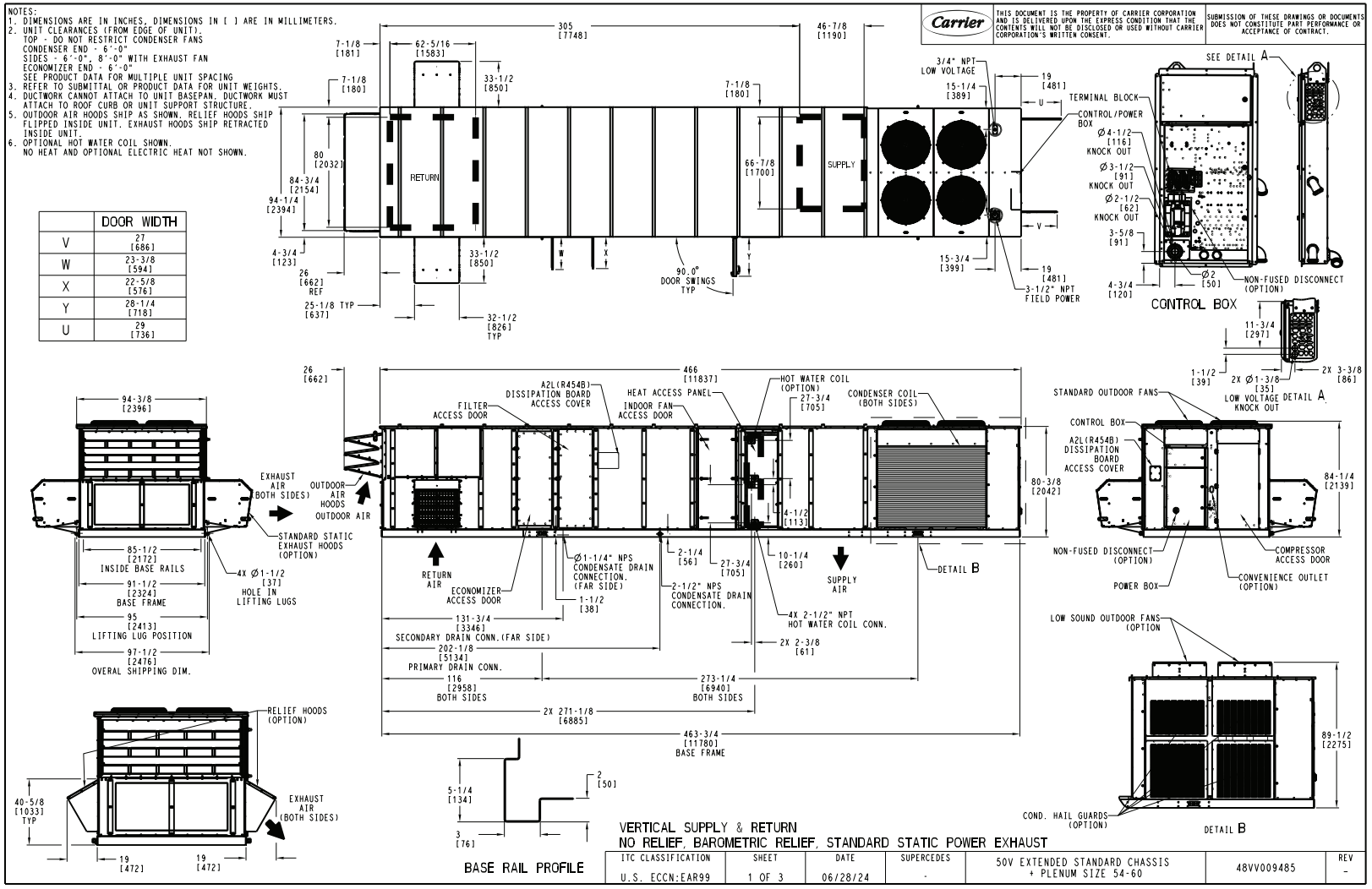


Fig. 28 — 50V 55-60 Ton Extended Standard Chassis with Plenum Section

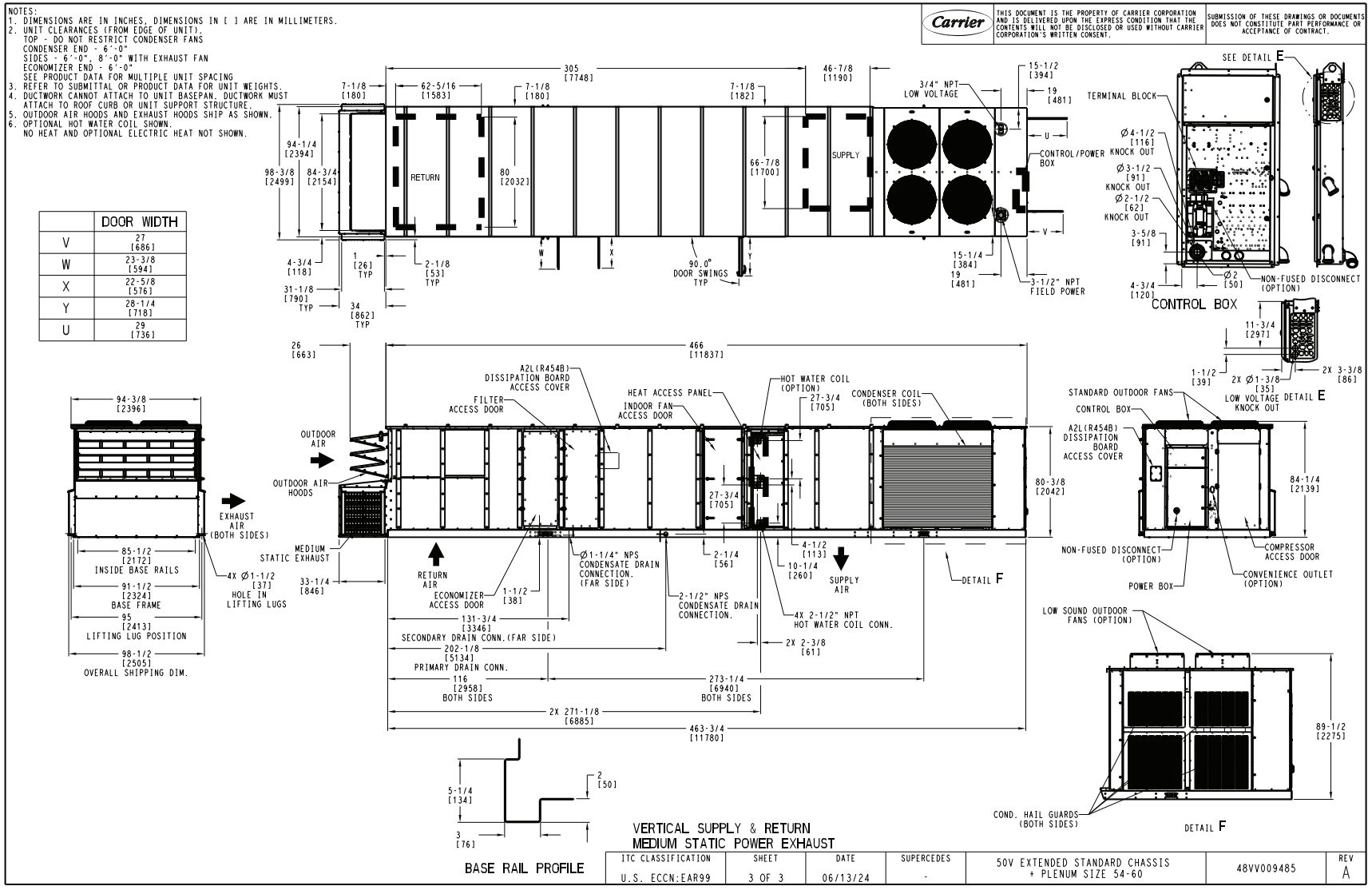


Fig. 28 — 50V 55-60 Ton Extended Standard Chassis with Plenum Section (cont)

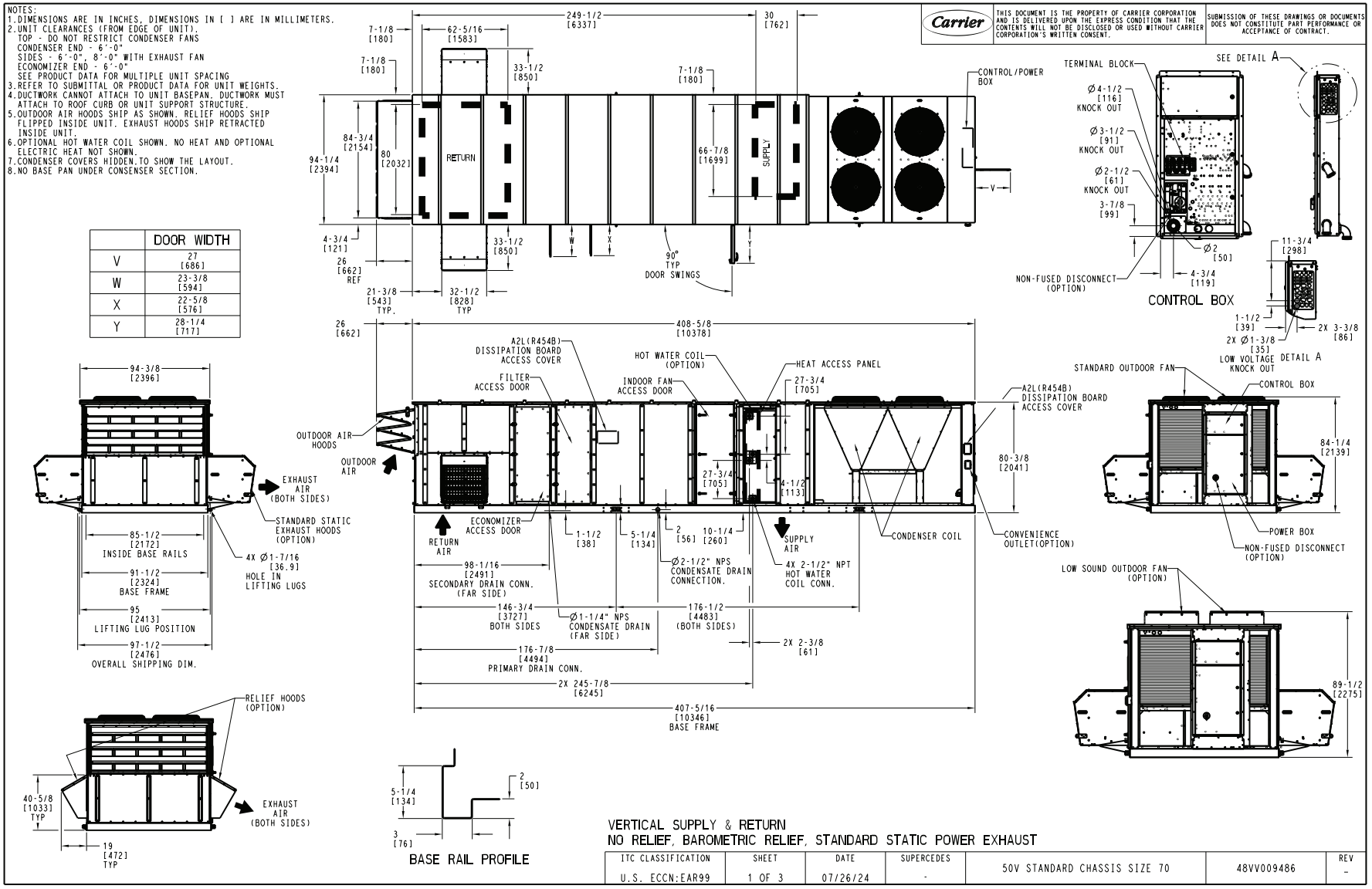


Fig. 29 — 50V 70 Ton Standard Chassis

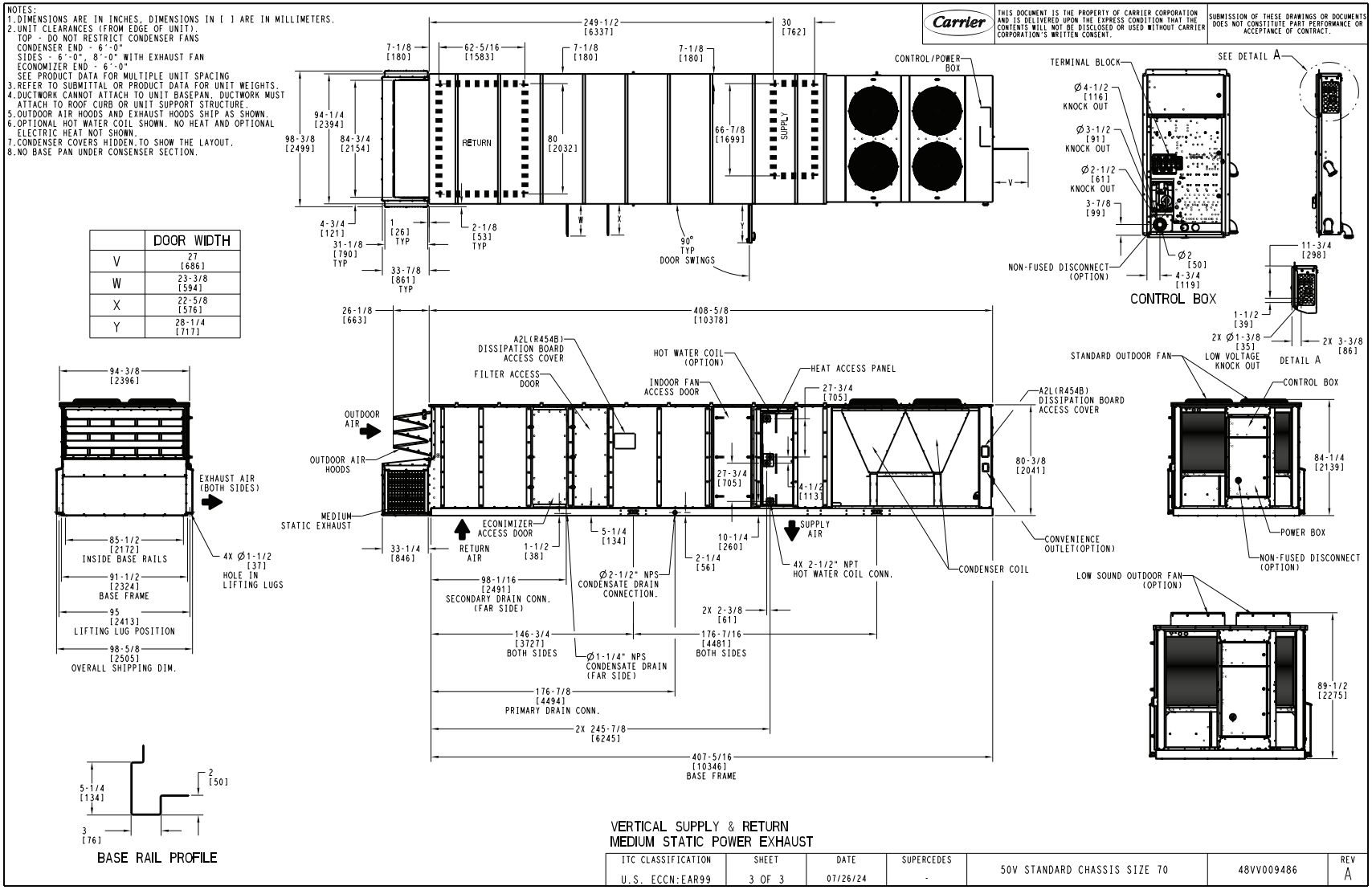


Fig. 29 — 50V 70 Ton Standard Chassis (cont)

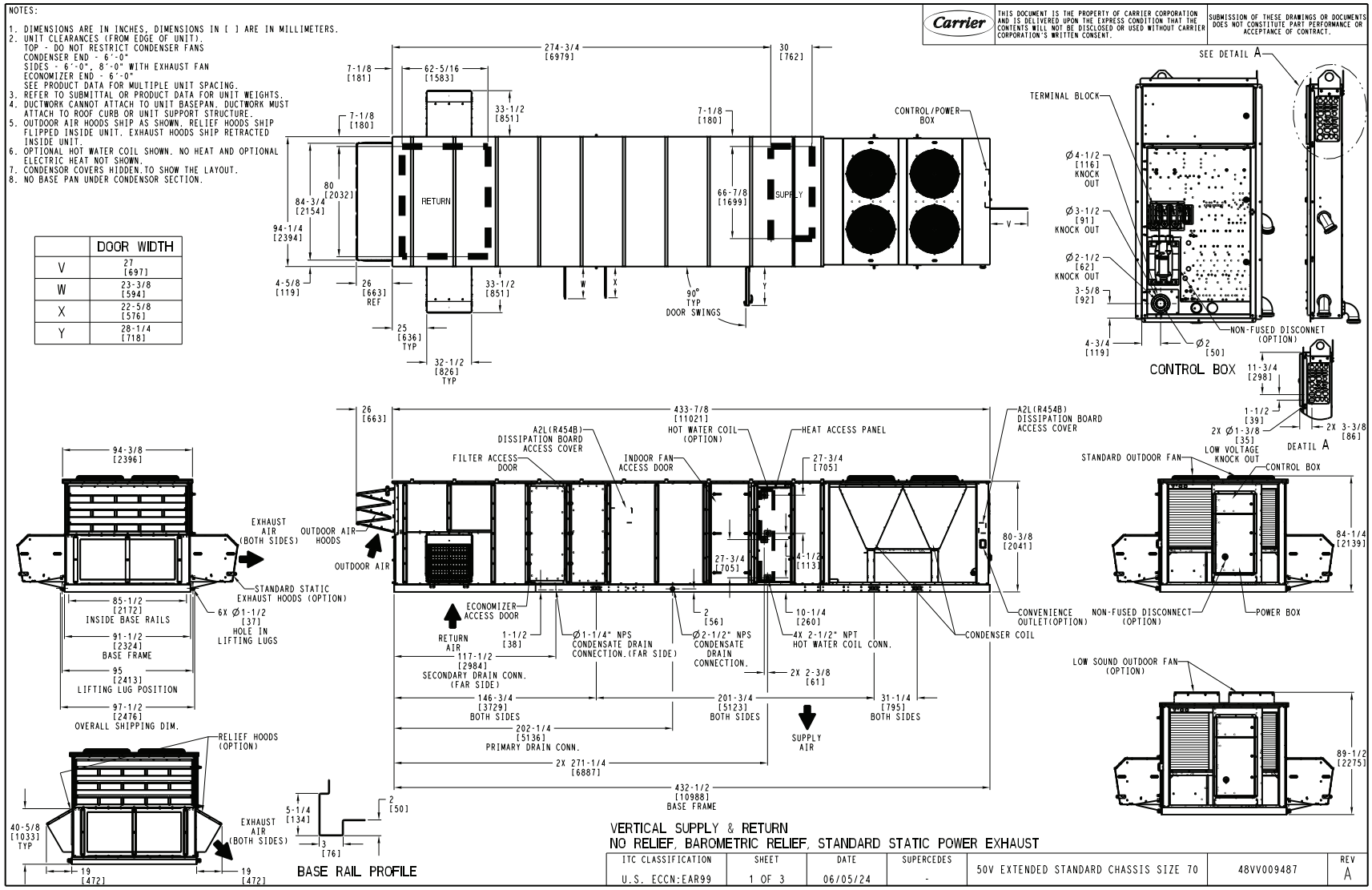


Fig. 30 — 50V 70 Ton Extended Standard Chassis

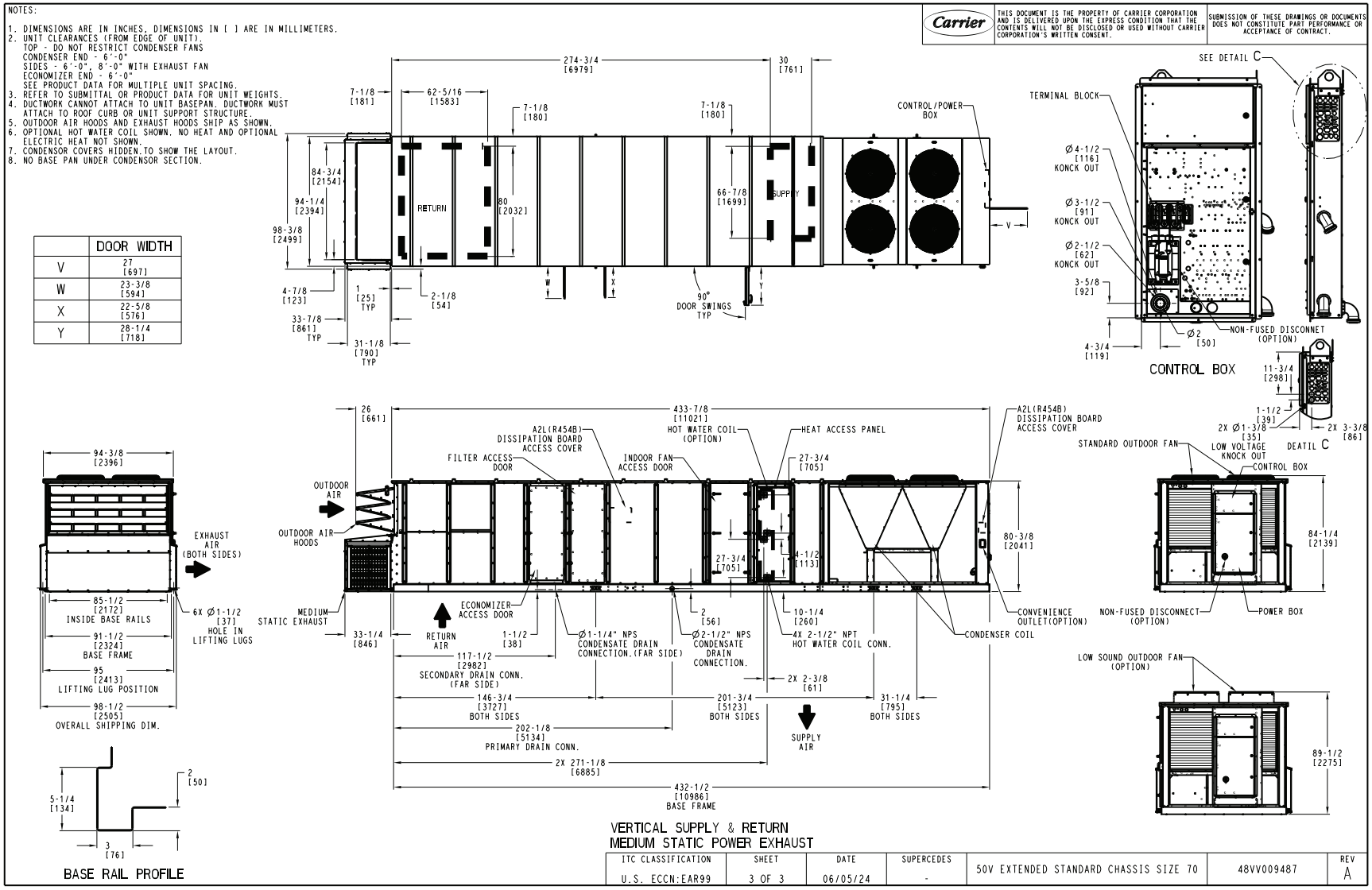


Fig. 30 — 50V 70 Ton Extended Standard Chassis (cont)

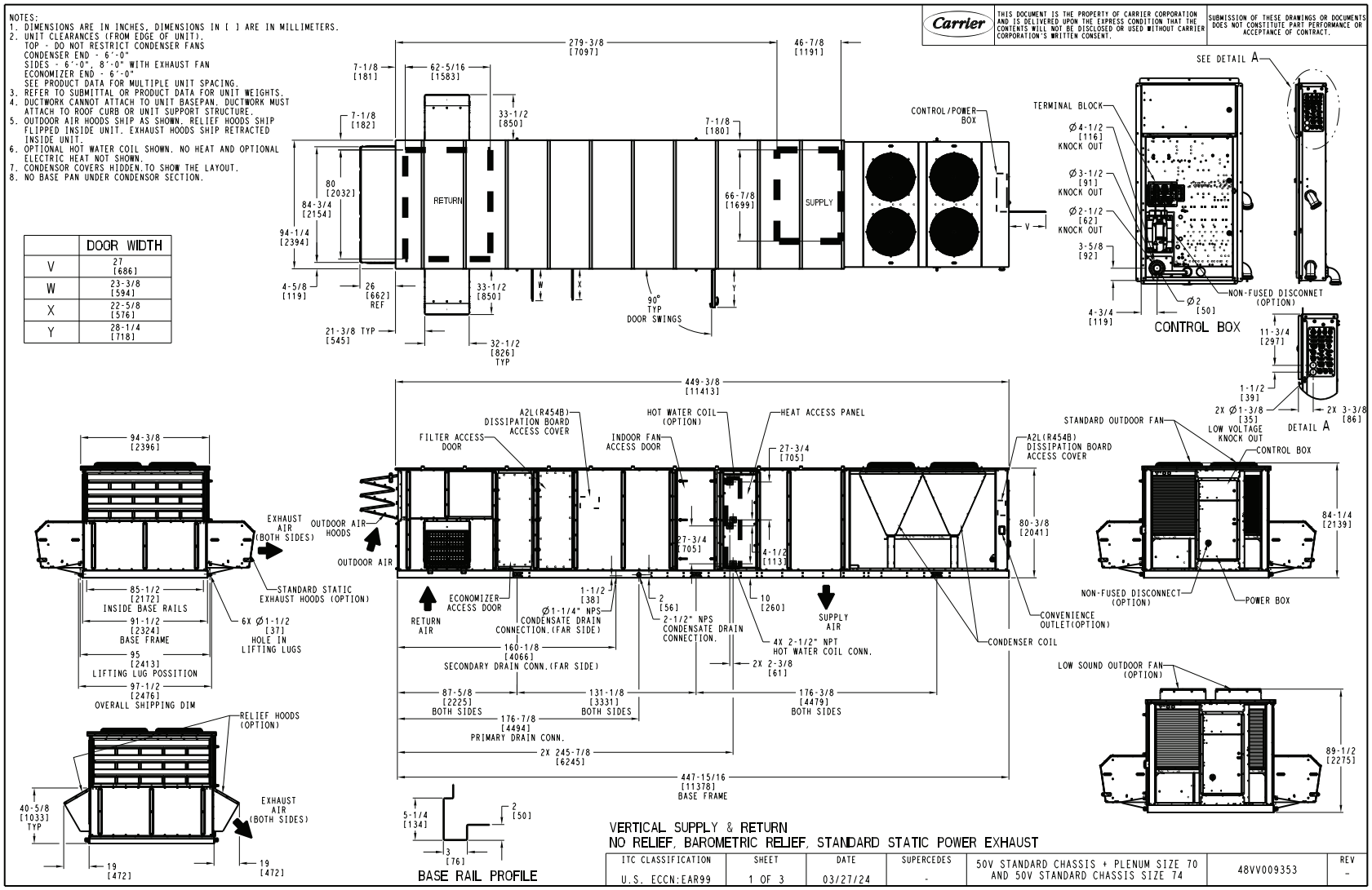


Fig. 31 — 50V 70 Ton Standard Chassis with Plenum Section and 50V 75 Ton Standard Chassis

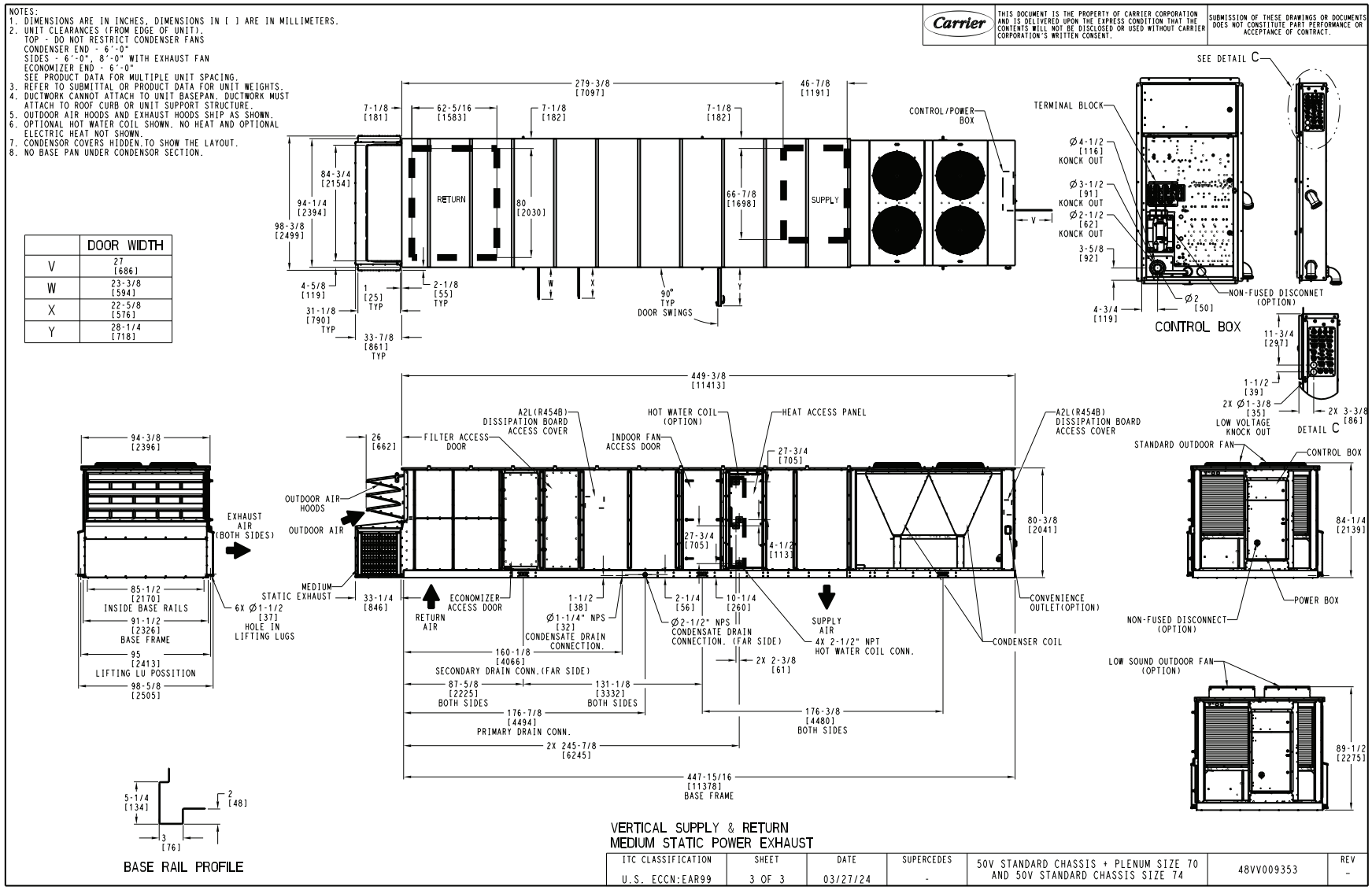


Fig. 31 — 50V 70 Ton Standard Chassis with Plenum Section and 50V 75 Ton Standard Chassis (cont)

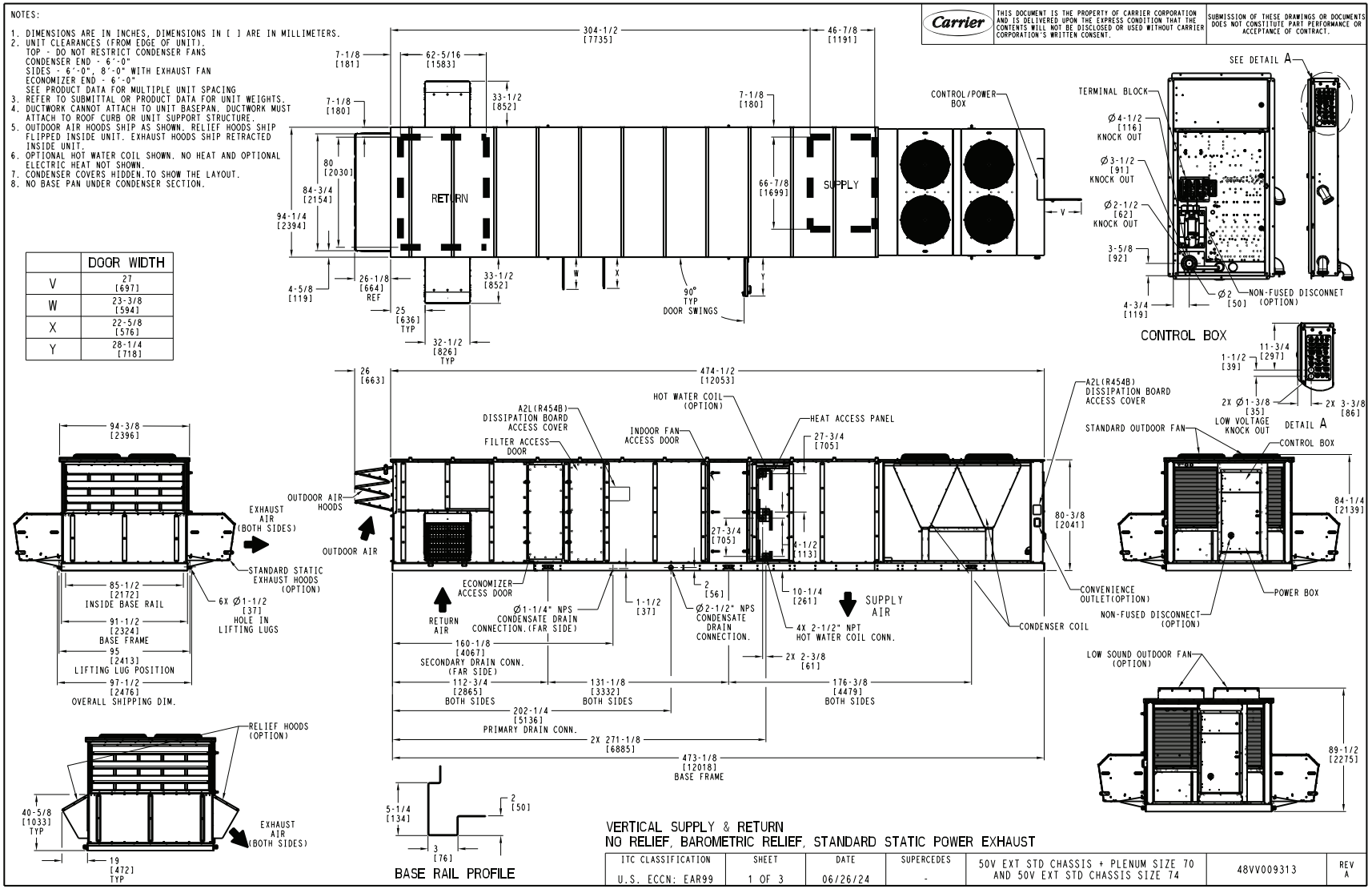


Fig. 32 — 50V 70 Ton Extended Standard Chassis with Plenum and 50V 75 Ton Extended Standard Chassis

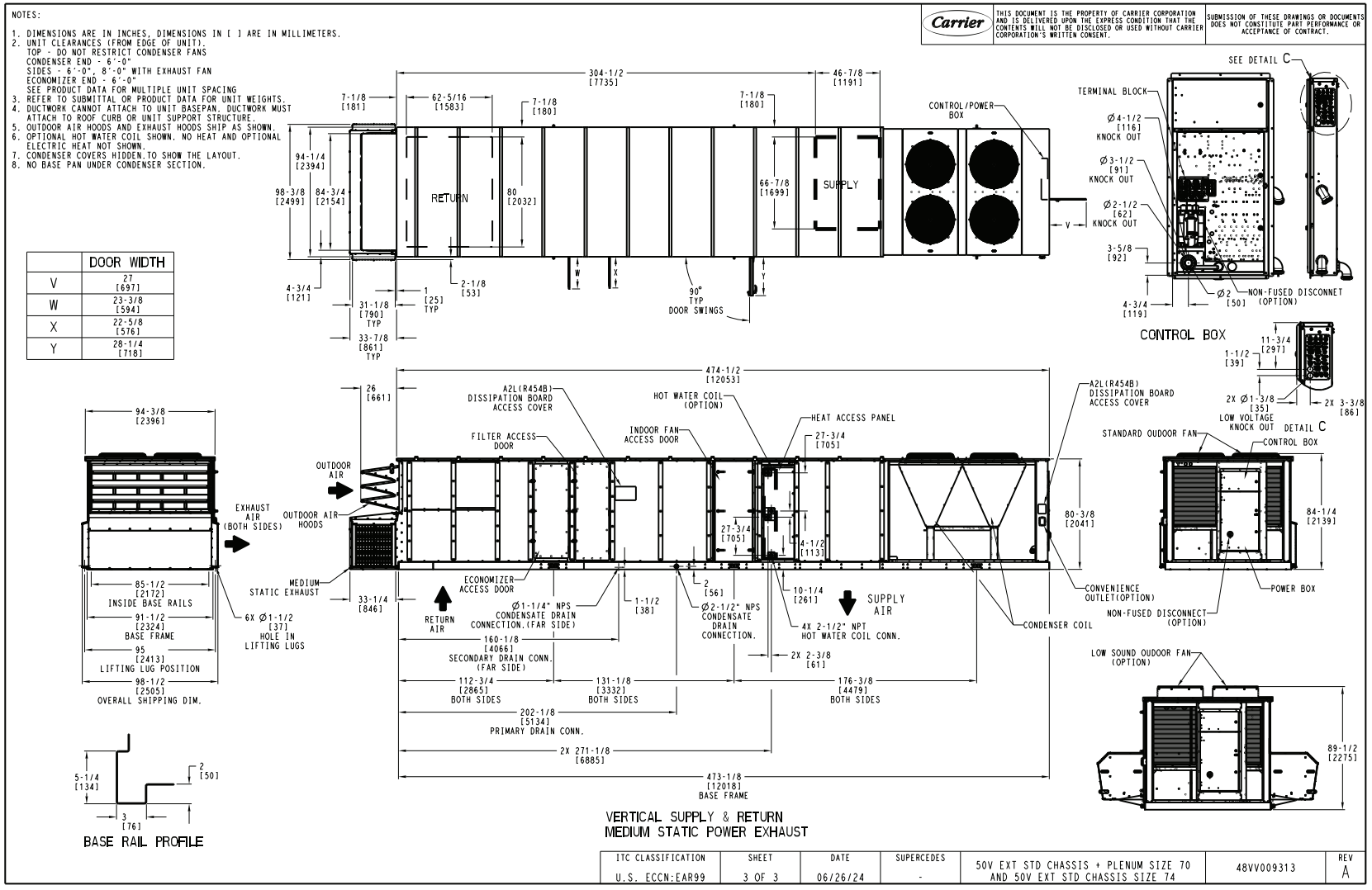


Fig. 32 — 50V 70 Ton Extended Standard Chassis with Plenum and 50V 75 Ton Extended Standard Chassis (cont)

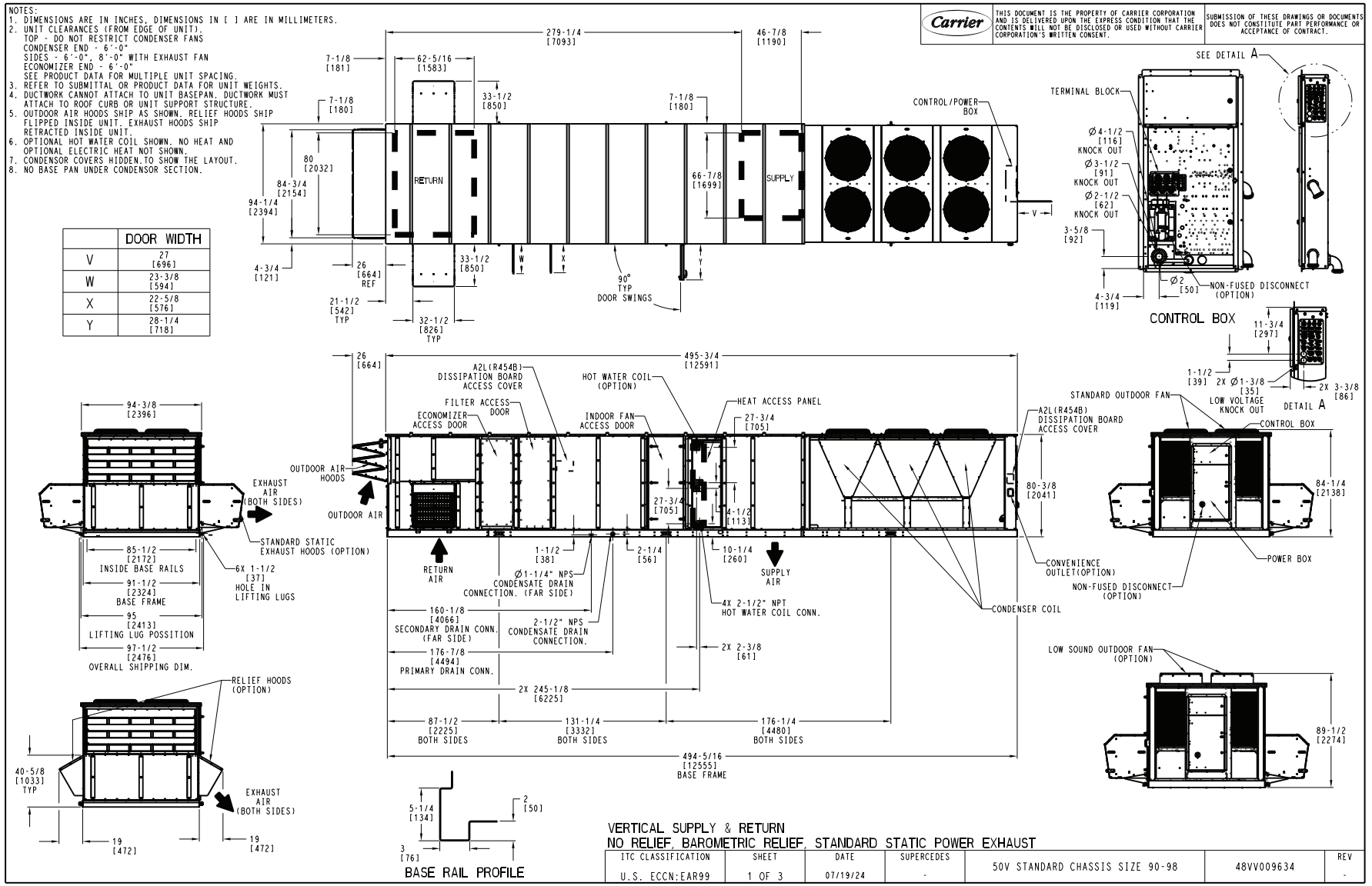


Fig. 33 — 50V 90-100 Ton Standard Chassis

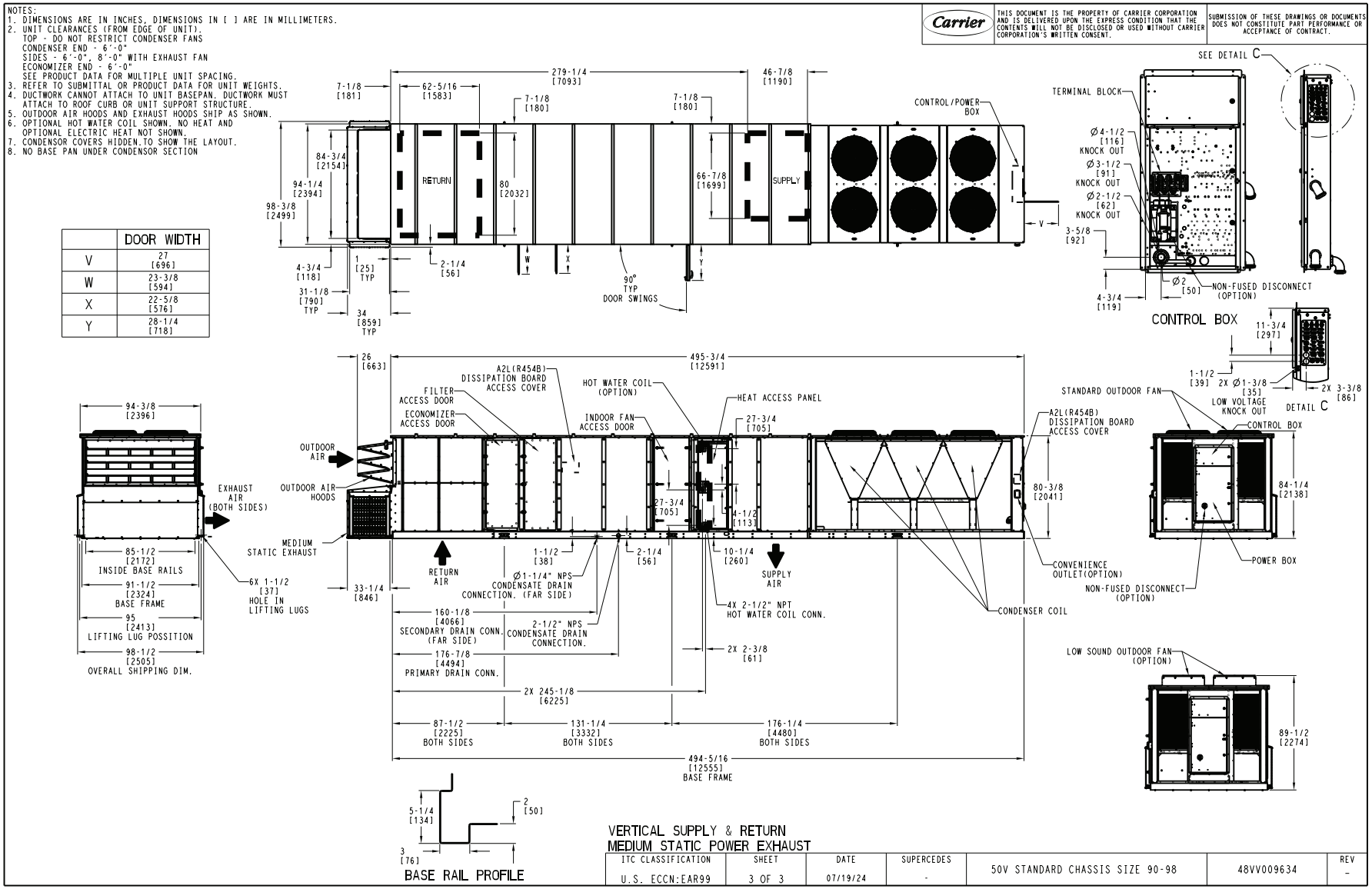


Fig. 33 — 50V 90-100 Ton Standard Chassis (cont)

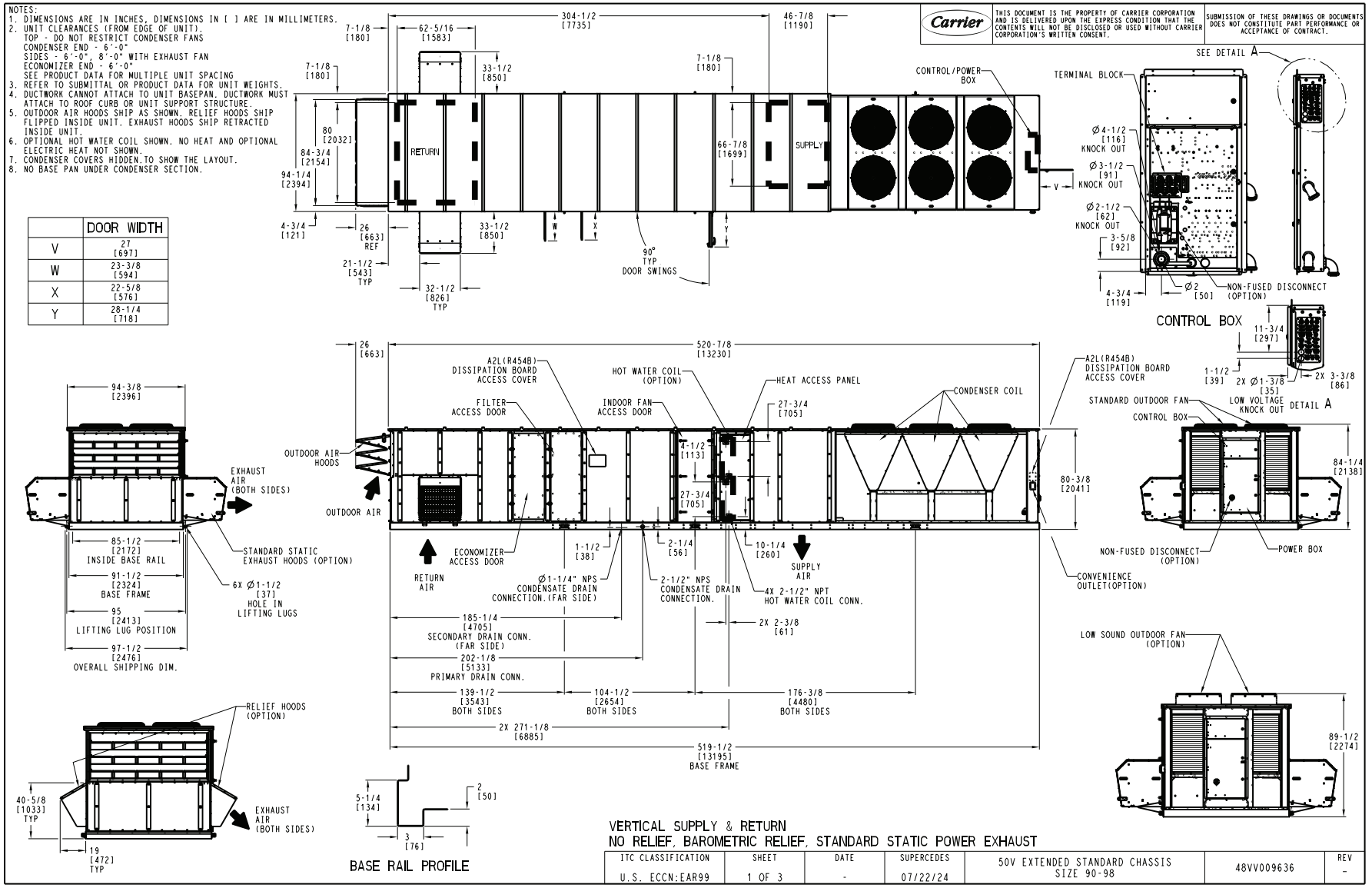


Fig. 34 — 50V 90-100 Ton Extended Standard Chassis

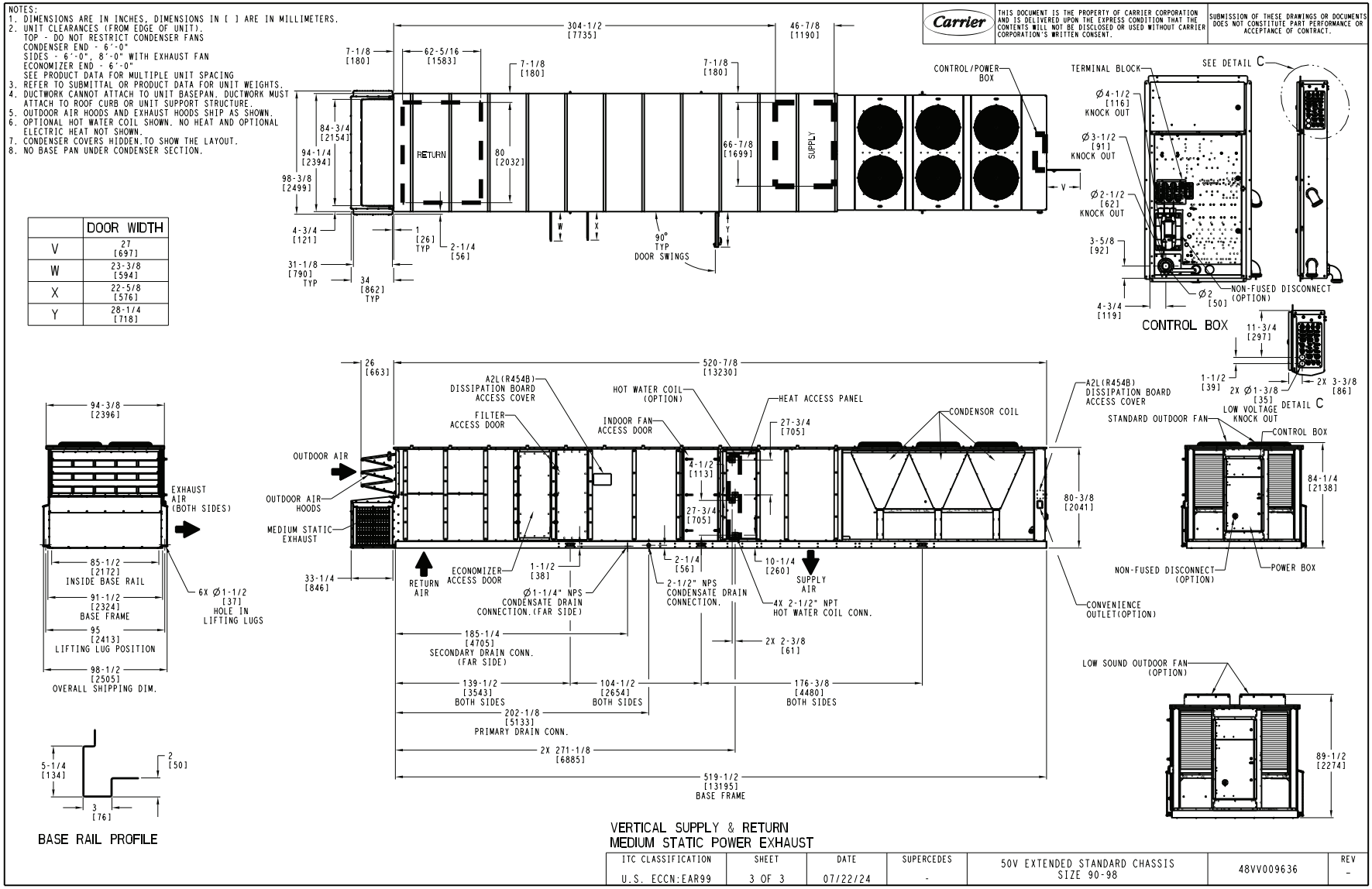


Fig. 34 — 50V 90-100 Ton Extended Standard Chassis (cont)

Step 9 — Install Barometric Relief Hoods (Standard or Extended Chassis with Barometric Relief Only)

Standard chassis units with the barometric relief option ship with the reliefs rotated inside the unit. There is one relief assembly on each side of the unit. See Fig. 35 for the barometric relief shipping position and Fig. 36 for the operating position. Follow the steps below to put the barometric relief in the operating position.

1. Remove and save the screws securing each barometric relief assembly in place.
2. Pull out the assembly
3. Rotate the assembly so that the hood is facing the outside of the unit.
4. Place the assembly against the opening in the side of the unit.
5. Use the screws from Step 1 to secure the assembly to the side of the unit, using the same screw holes.
6. Repeat Steps 1-5 on the second assembly on the other side of the unit.

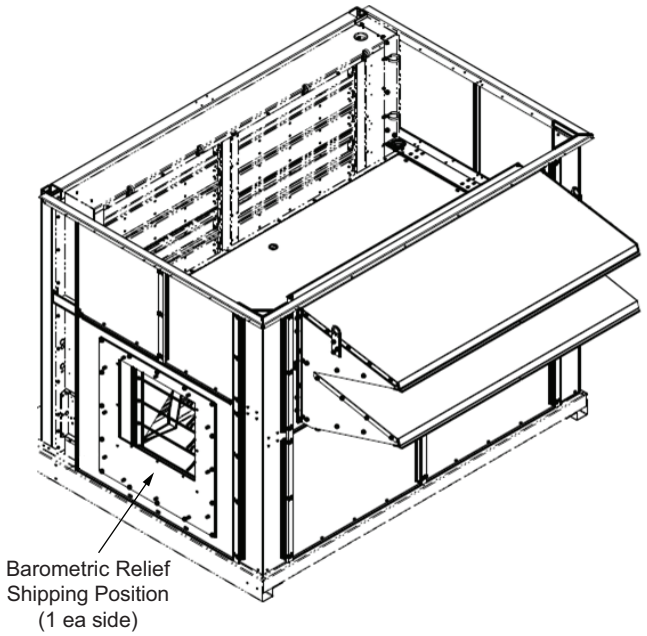


Fig. 35 — Barometric Relief Hood Shipping Position

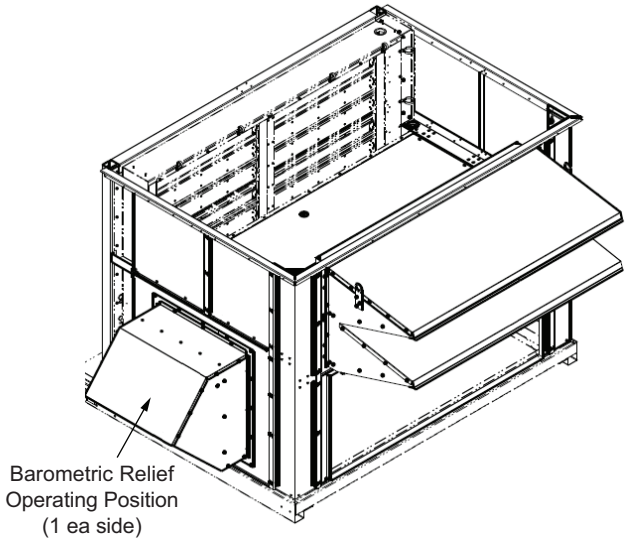


Fig. 36 — Barometric Relief Hood Operating Position

Step 10 — Set Up Power Exhaust (Size 28-98 with Standard Static Power Exhaust or Size 28-50 with Medium Static Power Exhaust Only)

Standard chassis units with the slide-out power exhaust option ship with exhaust fans retracted inside the unit. There is one exhaust assembly on each side of the unit. See Fig. 37 for the power exhaust shipping position and Fig. 38 for the operating position. Follow the steps to put the power exhaust in the operating position.

⚠ CAUTION

Exhaust section may be over an open return duct for vertical return units. Cover open ducts to prevent parts, tools, debris, or people from falling into the open duct.

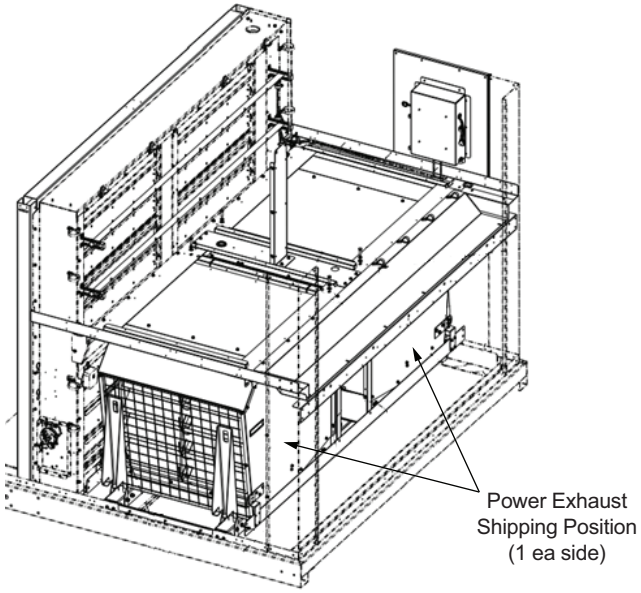


Fig. 37 — Power Exhaust Shipping Position

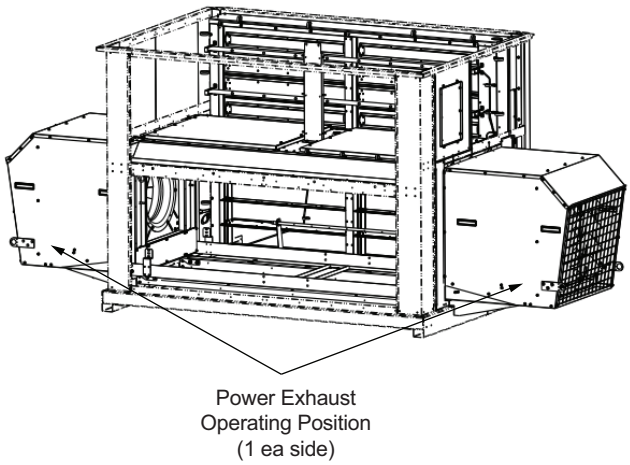


Fig. 38 — Power Exhaust Operating Position

1. Remove panel on the end of the unit below the outdoor air hoods. Save panel and screws.
2. Remove the 2 small panels on the sides of the exhaust opening. Save panels and screws.
3. Remove the small top rail above the exhaust opening. Save rail and screws.
4. Remove the panel above the power exhaust section (in the outdoor air intake section). Save panel and screws.
5. Remove the 6 bolts securing the exhaust panel in place (2 on top, 2 on each side). Save bolts and hardware. See Fig. 39.
6. Remove the shipping bracket. See Fig. 40.
7. Remove the inside bolts for the 2 support brackets and save the bolts. See Fig. 41.
8. Rotate the 2 support brackets down to the operating position and re-install the bolts. See Fig. 41.
9. Pull out the exhaust assembly so that it is flush with the side of the unit.
10. Install the screws to attach the exhaust hood to the support bracket.
11. Inspect power and control wiring harnesses for loose connections or broken wires. Secure harnesses to cross rail.
12. Install the bolts removed in Step 3 to secure the exhaust panel in place.
13. Re-install the panel above the power exhaust section. See Fig. 42.
14. Re-install the panels surrounding the power exhaust. See Fig. 42.
15. Repeat Steps 1-14 on the second assembly on the other side of the unit.

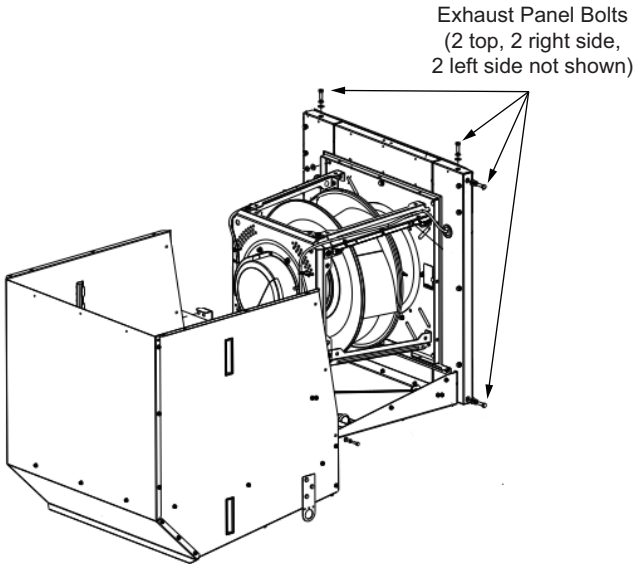


Fig. 39 — Power Exhaust Panel Bolt Positions

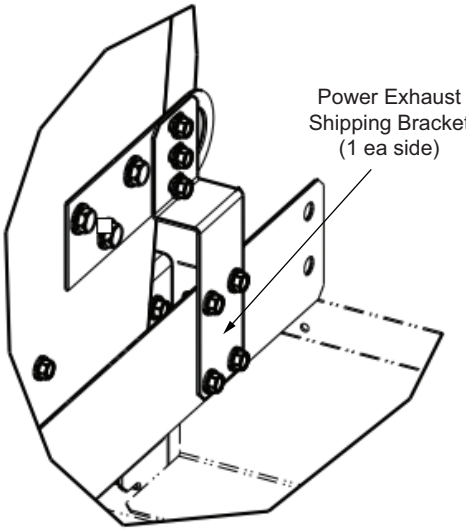


Fig. 40 — Power Exhaust Shipping Bracket

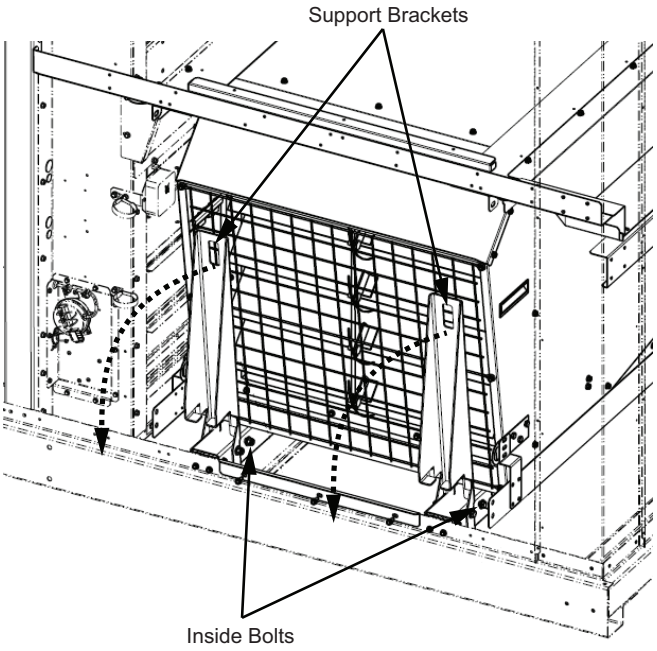


Fig. 41 — Power Exhaust Support Bracket and Inside Bolt Locations

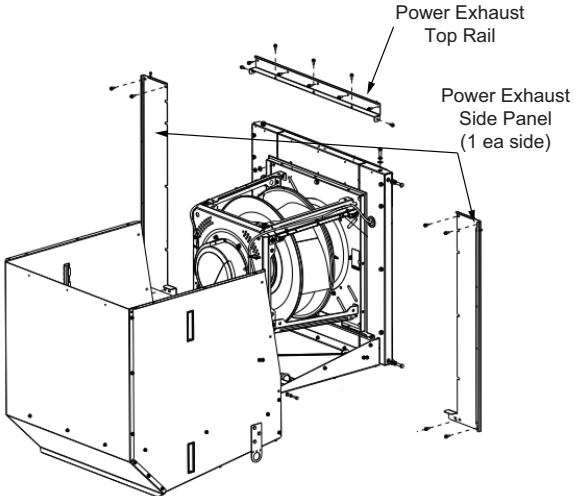


Fig. 42 — Power Exhaust Top Rail and Side Panel Locations

Step 11 — Route Field Wiring

IMPORTANT: Units with VFD (variable frequency drive) generate, use, and can radiate radio frequency energy. Units not installed and used in accordance with these instructions may cause radio interference. Units have been tested and found to comply with limits of a Class A computing device as defined by the FCC (Federal Communications Commission) regulations, Subpart J of Part 15, which are designed to provide reasonable protection against interference when operated in a commercial environment.

UNIT POWER FEED

Units are single point power as standard. Refer to Fig. 15-34 unit wiring diagrams and nameplate for power wiring details. Units may be special ordered for dual point power feeds with terminal block connections. Refer to the unit wiring diagram and supplemental nameplate for dual point power feed information.

UNPOWERED CONVENIENCE OULET

Units with unpowered convenience outlet require a separate 115-v, 15A power feed to power the outlet. The convenience outlet is typically located near the unit power box. The field power connection is made at the outlet. Refer to the Fig. 15-34 unit certified drawings for convenience outlet location. Follow code requirements for receptacle wiring. Ensure that a warning label is present, noting that the outlet is powered separate from the unit power feed.

ULTRA-VIOLET LIGHT (UV-C) FIXTURES

Units with UV-C fixtures require a separate 115-v, 15A power feed to power the fixtures. A factory-installed disconnect is provided for the UV-C fixtures, typically located near the UV-C access door. The field power connection is made at the UV-C disconnect switch. The UV-C disconnect switch is typically located by the indoor fan access door. Refer to the unit wiring diagrams for details. Ensure that a warning label is present, noting that the UV-C is powered separate from the unit power feed.

POWER WIRE SIZING

All power wiring must comply with NEC and all local codes. Size wire based on the MCA (minimum circuit amps) on the unit information plate and a maximum temperature rating of 167°F (75°C). Units are compatible with copper or aluminum power wire.

See Table 8 for wire size range by unit power termination device (terminal block or non-fused disconnect). Where the application wire size is smaller than the minimum wire size for the unit power termination device, increase the wire size, use field-supplied lug adapters, or other method of adapting wire sizes, as appropriate.

Units without Factory-Installed Non-Fused Disconnect

Power wire terminations are made at a terminal block in the power box. See Fig. 43. Terminal block wire size range is 4 AWG (American Wire Gauge) to 500 MCM (maximum circular mils).

See Fig. 43 for allowable field-mounted disconnect location on unit side panel.

NOTE: Refer to the label on the terminal block for the torque specifications.

Units with Factory-Installed Disconnect

Power wire terminations are made at the non-fused disconnect in the power box. See Fig. 44. Non-fused disconnects are nominally sized to meet or exceed the minimum disconnect size. See Table 8 for minimum and maximum wire size by non-fused disconnect amperage.

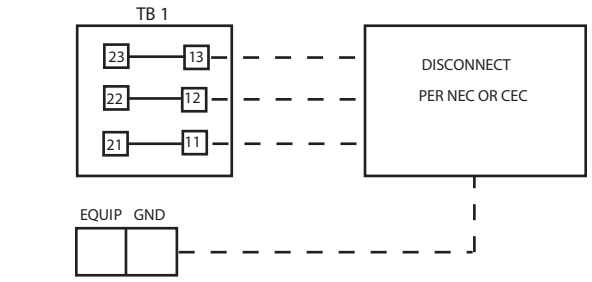
NOTE: Refer to the label on the disconnect for the torque specifications.

Table 8 — Non-Fused Disconnect Wire Size Range

DISCONNECT SIZE	QTY...MAX WIRE SIZE (MCM)	QTY...MIN WIRE SIZE (AWG)
250 Amps	1...350	1...6
400 Amps	2...500	2...3/0
600 Amps	2...500	2...3/0

LEGEND

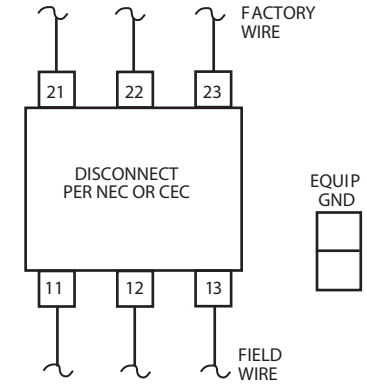
AWG — American Wire Gauge
MCM — Maximum Circular Mils



LEGEND

CEC — Canadian Electrical Code
EQUIP — Equipment
GND — Ground
NEC — National Electrical Code
TB — Terminal Block

Fig. 43 — Terminal Block Field Wiring Connections



LEGEND

CEC — Canadian Electrical Code
EQUIP — Equipment
GND — Ground
NEC — National Electrical Code

Fig. 44 — Non-Fused Disconnect Field Wiring Connections

OPERATING VOLTAGE

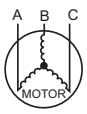
Units are factory wired for the voltage shown on the unit nameplate. Operating voltage to the unit must be within the voltage range indicated on the unit nameplate. Voltages between phases must be balanced within 2%, and the current must be balanced within 10%. See Table 9 for component amp draws by unit configuration.

IMPORTANT: Unit failure due to operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

Use the following formula to determine the percentage of voltage imbalance.

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

Example: Supply voltage is 460-3-60



AB = 452-v

BC = 464-v

AC = 455-v

$$\text{Average Voltage} = \frac{(455 + 464 + 455)}{3} = \frac{1371}{3} = 457$$

Determine maximum deviation from average voltage.

(AB) 457 – 452 = 5-v

(BC) 464 – 457 = 7-v

(AC) 457 – 455 = 2-v

Maximum deviation is 7-v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100x \frac{7}{457} = 1.53\%$$

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.

GROUND WIRING

All units must be grounded. Grounding must be in compliance with NEC, CEC, and local codes. Units include two ground lugs in the power box. Both ground lugs must be used when parallel power wires are used. The ground lug wire size range is 6 AWG (American Wire Gauge) to 250 MCM (thousands of circular mils). Refer to Fig. 43 and 44 for typical ground lug wiring.

NOTE: Tighten the ground lugs to 275 in.-lb (31 Nm).

OVERCURRENT PROTECTION

All units require overcurrent protection, such as fuses or breakers. Overcurrent protection must comply with NEC, CEC, and all local codes. Size the overcurrent protection based on the MOCP (maximum overcurrent protection) on the unit nameplate. Overcurrent protection must not exceed the unit rated overcurrent protection. Overcurrent protection can be lower than the listed MOCP, but that can lead to nuisance trips. Overcurrent protection should not be lower than the unit MCA.

IMPORTANT: Non-fused disconnects, including the factory-installed non-fused disconnect, do not provide overcurrent protection.

SHORT CIRCUIT CURRENT PROTECTION

Units with Standard Short Circuit Current Rating (SCCR)

Standard units are rated for 10kA short current rating protection.

Units with High Short Circuit Current Rating (High SCCR)

When current limiting (J-type) fuses are used, units with the high short circuit current rating option are rated for 65 kA for 208/230/460-v units and 25 kA for 575-v. All High SCCR units include a terminal block for power connection.

Current limiting fuses must be field-provided and installed in a field-provided and installed fusible disconnect or fuse holder wired before the unit terminal block. Fuses must be sized no higher than 600A. Fuses can be sized per the unit MOCP.

ROUTE FIELD WIRING

Check that wiring will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects.

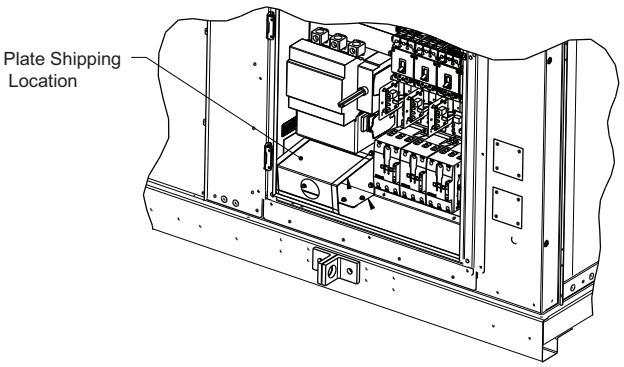
Ensure the wiring is properly secured when connected to or near a moving component, including compressors and fan motors, to prevent wear or loosening from vibration.

Power Box Cover Plate

All units include two power box cover plates. The factory-installed cover plate includes knockouts that allow power wire to enter through the rear of the power box. If the knockout cover plate is used, the alternate cover plate can be discarded.

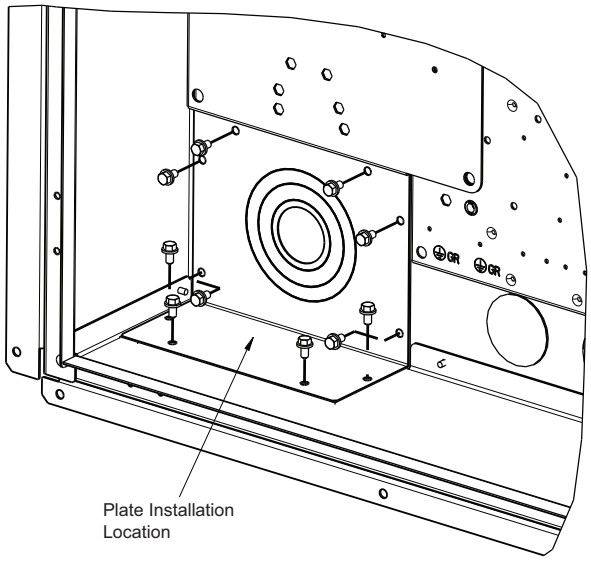
The alternate cover plate without knockouts ships in the power box. This plate has a bottom hole to allow power wire to enter through the bottom of the power box and is recommended for units with factory-installed non-fused disconnects or for through the basepan wiring, where the high voltage coupling is partially obstructed. See Fig. 45 for the alternate cover plate shipping location. To install the alternate cover plate:

1. Remove the alternate cover plate from the shipping location.
2. Remove and save the ten (10) screws from the factory installed cover plate. See Fig. 46.
3. Remove the cover plate with knockouts and discard (not used).
4. Install the alternate cover plate in the installation location using the saved screws. Ensure the hole faces the bottom of the power box.



NOTE: The no knockout CB plate is shipped inside the control box and installed in the field only.

Fig. 45 — Alternate Cover Plate Shipping Location



NOTE: Install CB plate into the control box with the seal strip facing the back wall of the box. Secure it in place using 10 screws.

Fig. 46 — Cover Plate Installation Location

Thru-the-Base Wiring

All units include a 3-1/2 in. FPT coupling in the condenser section for thru-the-base high voltage wiring and knockouts for thru-the-side high voltage wiring penetrations. See Fig. 47 for typical basepan high voltage coupling and side knockout locations.

For units with a factory-installed disconnect

Pass the wiring through the high voltage basepan coupling and into the power box, through the power box cover plate. Make wire terminations at the non-fused disconnect and ground lug(s). See Fig. 48 for power box layout.

For units without a factory-installed disconnect

Pass the wiring through the high voltage basepan coupling and outside the unit, through a high voltage knockout in the corner post by the power box, to a field-provided disconnect. Carrier recommends mounting the disconnect on a support structure and not to the side of the unit. Make line side power and ground connections at the line side of the disconnect.

Make load side power and ground connections at the load side of the disconnect. Pass the wiring back into the unit, through the second high voltage knockout in the corner post, and into the power box, through the power box cover plate. Make wire terminations at the terminal block and ground lug(s). See Fig. 47 for corner post side knockout locations and Fig. 48 for power box layout.

IMPORTANT: Couplings and knockouts must be sealed to prevent water and dirt ingress after wire is installed or if coupling is not used.

Thru-The-Side Wiring

All units include knockouts for thru-the-side high voltage wiring penetrations. See Fig. 47 for side knockout locations.

For units with a factory-installed disconnect

Pass the wiring through a high voltage knockout in the corner post and into the power box, through the power box cover plate. Make wire terminations at the non-fused disconnect and ground lug(s). See Fig. 48 for power box layout.

For units without a factory-installed disconnect

Pass the wiring to a field-provided disconnect. Carrier recommends mounting the disconnect on a support structure and not to the side of the unit. Make line side power and ground connections at the line side of the disconnect.

Make load side power and ground connections at the load side of the disconnect. Pass the wiring into the unit, through a high voltage knockout in the corner post, and into the power box, through the power box cover plate. Make wire terminations at the terminal block and ground lug(s). See Fig. 47 for corner post high voltage knockout locations and Fig. 48 for power box layout.

IMPORTANT: Couplings and knockouts must be sealed to prevent water and dirt ingress after wire is installed or if coupling is not used.

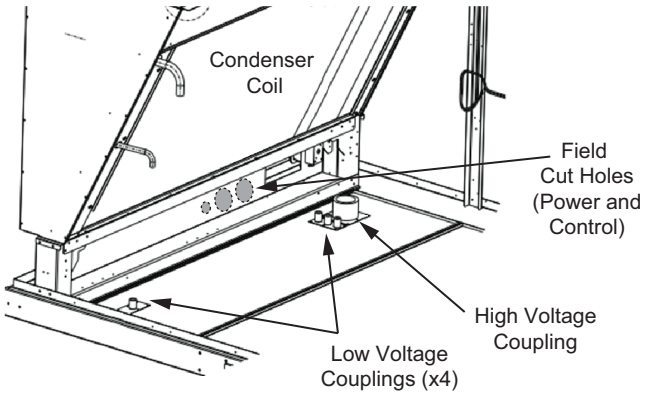


Fig. 47 — Basepan Coupling Locations and Side Knockouts for Power and Control Wiring

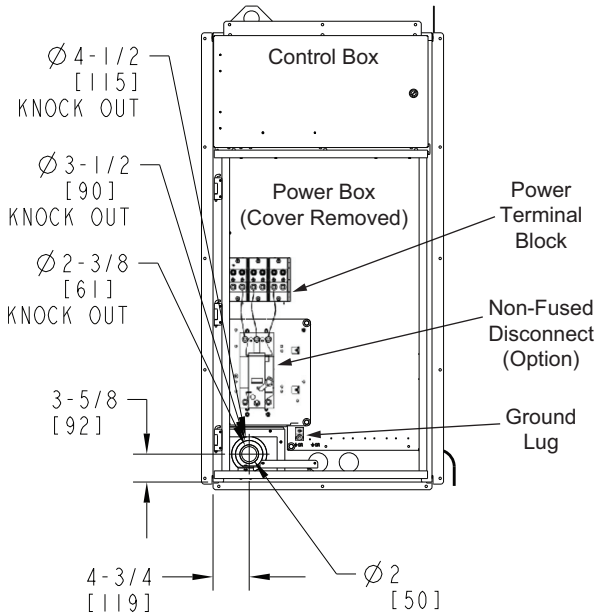


Fig. 48 — Power Box Layout and Knockouts

Table 9 — 50V Electrical Data[a]

50V UNIT SIZE	V-Ph-Hz	VOLTAGE RANGE		COMPRESSOR								OUTDOOR FAN MOTOR				CONTROLS	PWRED C/O
				A1 High Cap	A1 Std Cap	A2		B1		B2		STD		LOW SOUND			
		Min.	Max.	MRC	MRC	RLA	LRA	RLA	LRA	RLA	LRA	Qty	MOC (ea)	Qty	MOC (ea)	FLA	FLA
28	208-3-60	187	253	59.7	57.8	41	304	—	—	—	—	2	6.8	2	5.8	5.3	4.8
	230-3-60	187	253	59.7	57.8	41	304	—	—	—	—	2	6.8	2	5.8	4.8	4.8
	460-3-60	414	506	27.0	26.2	19.2	147	—	—	—	—	2	3.4	2	2.8	2.4	2.2
	575-3-60	518	633	21.6	21.0	16.7	122	—	—	—	—	2	3.3	2	2.4	2.0	1.7
30	208-3-60	187	253	64.2	61.1	41	304	—	—	—	—	2	6.8	2	5.8	5.3	4.8
	230-3-60	187	253	64.2	61.1	41	304	—	—	—	—	2	6.8	2	5.8	4.8	4.8
	460-3-60	414	506	29.0	27.6	19.2	147	—	—	—	—	2	3.4	2	2.8	2.4	2.2
	575-3-60	518	633	23.2	22.1	16.7	122	—	—	—	—	2	3.3	2	2.4	2.0	1.7
34	208-3-60	187	253	—	66.5	48.1	351	—	—	—	—	2	6.8	2	5.8	5.3	4.8
	230-3-60	187	253	—	66.5	48.1	351	—	—	—	—	2	6.8	2	5.8	4.8	4.8
	460-3-60	414	506	—	30.1	24.7	197	—	—	—	—	2	3.4	2	2.8	2.4	2.2
	575-3-60	518	633	—	24.1	22.4	135	—	—	—	—	2	3.3	2	2.4	2.0	1.7
40	208-3-60	187	253	85.5	69.4	48.1	351	—	—	—	—	3	6.8	3	5.8	5.3	4.8
	230-3-60	187	253	85.5	69.4	48.1	351	—	—	—	—	3	6.8	3	5.8	4.8	4.8
	460-3-60	414	506	40.2	31.4	24.7	197	—	—	—	—	3	3.4	3	2.8	2.4	2.2
	575-3-60	518	633	32.2	25.2	22.4	135	—	—	—	—	3	3.3	3	2.4	2.0	1.7
50	208-3-60	187	253	94.5	74.8	—	—	41.0	304	27.6	203	4	6.8	4	5.8	5.3	4.8
	230-3-60	187	253	94.5	74.8	—	—	41.0	304	27.6	203	4	6.8	4	5.8	4.8	4.8
	460-3-60	414	506	42.8	33.8	—	—	19.2	147	14.1	98	4	3.4	4	2.8	2.4	2.2
	575-3-60	518	633	34.2	27.1	—	—	16.7	122	11.5	84	4	3.3	4	2.4	2.0	1.7
54	208-3-60	187	253	90.5	69	—	—	44.2	315	44.2	315	4	6.8	4	5.8	5.3	4.8
	230-3-60	187	253	90.5	69	—	—	44.2	315	44.2	315	4	6.8	4	5.8	4.8	4.8
	460-3-60	414	506	40.9	31.2	—	—	22.4	158	22.4	158	4	3.4	4	2.8	2.4	2.2
	575-3-60	518	633	32.7	25	—	—	18.6	136	18.6	136	4	3.3	4	2.4	2	1.7
60	208-3-60	187	253	83.2	68.2	—	—	48.1	351	48.1	351	4	6.8	4	5.8	5.3	4.8
	230-3-60	187	253	83.2	68.2	—	—	48.1	351	48.1	351	4	6.8	4	5.8	4.8	4.8
	460-3-60	414	506	37.6	30.8	—	—	24.7	197	24.7	197	4	3.4	4	2.8	2.4	2.2
	575-3-60	518	633	30.1	24.7	—	—	22.4	135	22.4	135	4	3.3	4	2.4	2	1.7
70	208-3-60	187	253	66.4	61.1	48.1	351	48.1	351	44.2	315	4	6.8	4	5.8	5.3	4.8
	230-3-60	187	253	66.4	61.1	48.1	351	48.1	351	44.2	315	4	6.8	4	5.8	4.8	4.8
	460-3-60	414	506	33.2	27.6	24.7	197	24.7	197	22.4	158	4	3.4	4	2.8	2.4	2.2
	575-3-60	518	633	24	22.1	22.4	135	22.4	135	18.6	136	4	3.3	4	2.4	2	1.7
74	208-3-60	187	253	66.4	63.9	48.1	351	66.7	485	48.1	351	4	6.8	4	5.8	5.3	4.8
	230-3-60	187	253	66.4	63.9	48.1	351	66.7	485	48.1	351	4	6.8	4	5.8	4.8	4.8
	460-3-60	414	506	34.7	28.9	24.7	197	29.5	227	24.7	197	4	3.4	4	2.8	2.4	2.2
	575-3-60	518	633	24	23.1	22.4	135	25	175	22.4	135	4	3.3	4	2.4	2	1.7
90	208-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	230-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	460-3-60	414	506	49.2	38.9	24.7	197	24.7	197	39.7	260	6	3.4	6	2.8	2.4	2.2
	575-3-60	518	633	39.3	31.2	22.4	135	22.4	135	28.2	210	6	3.3	6	2.4	2	1.7
98	208-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	230-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	460-3-60	414	506	49.2	38.9	29.5	227	29.5	227	29.5	227	6	3.4	6	2.8	2.4	2.2
	575-3-60	518	633	39.3	31.2	25	175	25	175	25	175	6	3.3	6	2.4	2	1.7

NOTE(S):

a. Data is preliminary and subject to change.

LEGEND

FLA — Full Load Amps
LRA — Locked Rotor Amps
MOC — Maximum Operating Current
MRC — Maximum Run Current
RLA — Run Load Amps

Table 9 — 50V Electrical Data[a] (cont)

50V UNIT SIZE	V-Ph-Hz	INDOOR FAN MOTOR									ELECTRIC HEAT (50V ONLY)						POWER EXHAUST											
		STD STATIC			MED STATIC			HIGH STATIC			LOW		MED		HIGH		LOW STAT (CPT)			LOW STAT (STD)			STD STATIC			MED STATIC		
		Qty	HP (ea)	MOC (ea)	Qty	HP (ea)	MOC (ea)	Qty	HP (ea)	MOC (ea)	kW	FLA	kW	FLA	kW	FLA	Qty	HP (ea)	MOC (ea)	Qty	HP (ea)	MOC (ea)	Qty	HP (ea)	MOC (ea)	Qty	HP (ea)	MOC (ea)
28	208-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	2	1	3.6	2	1.5	3.9	2	5.1	10.2	2	9.7	19.2
	230-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	36	86.6	72.0	173.2	108.0	259.8	2	1	3.3	2	1.5	3.5	2	5.1	10.2	2	9.7	19.2
	460-3-60	3	4.4	5.0	3	5.9	6.8	3	9.1	10.3	36	43.3	72.0	86.6	108.0	129.9	2	1	2.0	2	1.5	2.3	2	5.1	5.3	2	9.7	10.1
	575-3-60	3	3.6	3.3	3	6.3	5.3	3	8.2	7.1	36	34.6	72.0	69.3	108.0	103.9	2	1	1.8	2	1.5	2.0	2	5.1	4.4	2	7.2	6.2
30	208-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	2	1	3.6	2	1.5	3.9	2	5.1	10.2	2	9.7	19.2
	230-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	36	86.6	72.0	173.2	108.0	259.8	2	1	3.3	2	1.5	3.5	2	5.1	10.2	2	9.7	19.2
	460-3-60	3	4.4	5.0	3	5.9	6.8	3	9.1	10.3	36	43.3	72.0	86.6	108.0	129.9	2	1	2.0	2	1.5	2.3	2	5.1	5.3	2	9.7	10.1
	575-3-60	3	3.6	3.3	3	6.3	5.3	3	8.2	7.1	36	34.6	72.0	69.3	108.0	103.9	2	1	1.8	2	1.5	2.0	2	5.1	4.4	2	7.2	6.2
34	208-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	2	1	3.6	2	1.5	3.9	2	5.1	10.2	2	9.7	19.2
	230-3-60	3	3.8	8.3	3	5.2	11.6	3	7.5	16.5	36	86.6	72.0	173.2	108.0	259.8	2	1	3.3	2	1.5	3.5	2	5.1	10.2	2	9.7	19.2
	460-3-60	3	4.4	5.0	3	5.9	6.8	3	9.1	10.3	36	43.3	72.0	86.6	108.0	129.9	2	1	2.0	2	1.5	2.3	2	5.1	5.3	2	9.7	10.1
	575-3-60	3	3.6	3.3	3	6.3	5.3	3	8.2	7.1	36	34.6	72.0	69.3	108.0	103.9	2	1	1.8	2	1.5	2.0	2	5.1	4.4	2	7.2	6.2
40	208-3-60	3	4.8	10.8	3	7.5	16.5	3	9.7	19.2	27	75.1	54.1	150.1	81.1	225.2	2	1.5	3.9	2	1.5	3.9	2	5.1	10.2	2	9.7	19.2
	230-3-60	3	4.8	10.8	3	7.5	16.5	3	9.7	19.2	36	86.6	72.0	173.2	108.0	259.8	2	1.5	3.5	2	1.5	3.5	2	5.1	10.2	2	9.7	19.2
	460-3-60	3	4.8	5.5	3	5.8	6.8	3	9,7	10.1	36	43.3	72.0	86.6	108.0	129.9	2	1.5	2.3	2	1.5	2.3	2	5.1	5.3	2	9.7	10.1
	575-3-60	3	4.8	4.0	3	6.3	5.3	3	7.2	6.2	36	34.6	72.0	69.3	108.0	103.9	2	1.5	2.0	2	1.5	2.0	2	5.1	4.4	2	7.2	6.2
50	208-3-60	3	4.8	10.8	3	7.5	16.5	3	9.7	19.2	27	75.1	54.1	150.1	81.1	225.2	2	1.5	3.9	2	1.5	3.9	2	5.1	10.2	2	9.7	19.2
	230-3-60	3	4.8	10.8	3	7.5	16.5	3	9.7	19.2	36	86.6	72.0	173.2	108.0	259.8	2	1.5	3.5	2	1.5	3.5	2	5.1	10.2	2	9.7	19.2
	460-3-60	3	4.8	5.5	3	5.8	6.8	3	9,7	10.1	36	43.3	72.0	86.6	108.0	129.9	2	1.5	2.3	2	1.5	2.3	2	5.1	5.3	2	9.7	10.1
	575-3-60	3	4.8	4.0	3	6.3	5.3	3	7.2	6.2	36	34.6	72.0	69.3	108.0	103.9	2	1.5	2.0	2	1.5	2.0	2	5.1	4.4	2	7.2	6.2
54	208-3-60	4	4.8	9.4	4	4.8	10.8	4	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	230-3-60	4	4.8	9.4	4	4.8	10.8	4	7.5	16.5	36	86.6	72	173.2	108	259.8	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	460-3-60	4	4.8	5	4	5.9	6.8	4	9.4	10	36	43.3	72	86.6	108	129.9	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	4	4.8	4	4	6.3	5.3	4	8.2	7.1	36	34.6	72	69.3	108	103.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2
60	208-3-60	4	4.8	9.4	4	4.8	10.8	4	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	230-3-60	4	4.8	9.4	4	4.8	10.8	4	7.5	16.5	36	86.6	72	173.2	108	259.8	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	460-3-60	4	4.8	5	4	5.9	6.8	4	9.4	10	36	43.3	72	86.6	108	129.9	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	4	4.8	4	4	6.3	5.3	4	8.2	7.1	36	34.6	72	69.3	108	103.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2
70	208-3-60	4	6.4	13.5	4	7.5	16.5	6	7.5	16.5	27	75.1	54.1	150.1	81.1	225.2	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	230-3-60	4	6.4	13.5	4	7.5	16.5	6	7.5	16.5	36	86.6	72	173.2	108	259.8	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	460-3-60	4	6.4	6.8	4	9.4	10	6	9.4	10	36	43.3	72	86.6	108	129.9	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	4	6.4	5.5	4	8.2	7.1	6	8.2	7.1	36	34.6	72	69.3	108	103.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2
74	208-3-60	4	6.4	13.5	4	7.5	16.5	6	7.5	16.5	54.1	150.1	81.1	225.2	—	—	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	230-3-60	4	6.4	13.5	4	7.5	16.5	6	7.5	16.5	72	173.2	108	259.8	—	—	—	—	—	—	—	—	2	9.7	19.2	3	9.7	19.2
	460-3-60	4	6.4	6.8	4	9.4	10	6	9.4	10	72	86.6	108	129.9	216	259.8	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	4	6.4	5.5	4	8.2	7.1	6	8.2	7.1	72	69.3	108	103.9	216	207.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2
90	208-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	230-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	460-3-60	6	6.4	6.8	6	9.4	10	6	9.7	10.1	108	129.9	—	—	216	259.8	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	6	6.4	5.5	6	8.2	7.1	6	7.2	6.2	108	103.9	—	—	216	207.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2
98	208-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	230-3-60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	460-3-60	6	6.4	6.8	6	9.4	10	6	9.7	10.1	108	129.9	—	—	216	259.8	—	—	—	—	—	—	2	9.7	10.1	3	9.7	10.1
	575-3-60	6	6.4	5.5	6	8.2	7.1	6	7.2	6.2	108	103.9	—	—	216	207.9	—	—	—	—	—	—	2	7.2	6.2	3	7.2	6.2

NOTE(S):

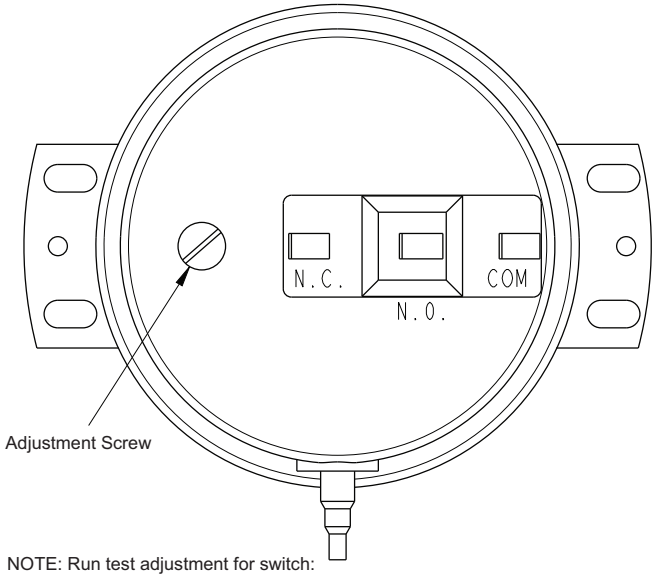
a. Data is preliminary and subject to change.

LEGEND

FLA — Full Load Amps
LRA — Locked Rotor Amp
MOC — Maximum Operating Current
MRC — Maximum Run Current
RLA — Run Load Amps

Step 12 — Set Up Pre-Filter Status Switch (Optional)

For units with the accessory or optional factory installed pre-filter status switch, the switch trip pressure must be field set using the adjustment screw. See Fig. 49. When the filter pressure drop detected by the status switch is below the trip pressure, the switch opens and the control will indicate a clean filter. When the filter pressure drop detected by the status switch exceeds the trip pressure, the switch closes and the control will indicate a dirty filter.



NOTE: Run test adjustment for switch:
a. Set the unit in "Fan Only" mode.
b. WIth filters installed, use a flat head screwdriver to rotate the adjustment screw until pressure switch closes.

Fig. 49 — Pre-Filter Status Switch Adjustment Screw

To set the switch trip pressure:

1. Review filter manufacturer's guidance for recommended final resistance pressure (typically 1-1.5 in. wg).
   a. Review the unit submittal and the unit fan tables to verify that the additional trip pressure does not exceed the fan operating limits (RPM or BHP).
2. Use a flat head screwdriver to turn the adjustment screw counterclockwise until turning stops.
3. Turn the adjustment screw five complete turns to engage the spring.
4. Every additional full turn will add approximately .25 in. wg to the trip point. Up to eight turns are possible (2 in. wg).

Step 13 — Connect Air Pressure Tubing

NOTE: Supply and building pressure transducers are located in the condenser section on the back of the power and control box behind a cover. Pneumatic tubing must be field installed to the sensing location from the high side port of the transducer. Replace the cover once installation of tubing is complete. See Fig. 50 for transducer location details.

Pressure transducers are located on the back of the power and control box behind a cover. Remove the cover to access the transducers and replace the cover once installation of tubing is complete. See Fig. 50 for transducer location details.

Before options such as the VAV indoor fan for multi-zone applications and/or power exhaust with building pressure control can operate properly, the pneumatic tubing for pressure sensing must be installed.

Use fire-retardant plenum tubing (field-supplied). All pressure transducers have barb fittings for 1/4 in. tubing, and 1/4 in. tubing can be used for applications up to 100 ft. For applications over 100 ft. consider larger tubing with adapters for the 1/4 in. barb fittings. Tubing must be run from the appropriate sensing location (in the duct or the building space) to the pressure transducer. Use pressure pickup ports (field-supplied) where appropriate.

All tubing connections are made at the high-side pressure pickup port. The low side pressure pickup port is left open to atmosphere for gauge pressure sensing. The low-pressure pickup port can be connected to tubing for pressure sensing at an alternate location, if necessary. Remove any barb covers on the pressure pickup ports before installing tubing.

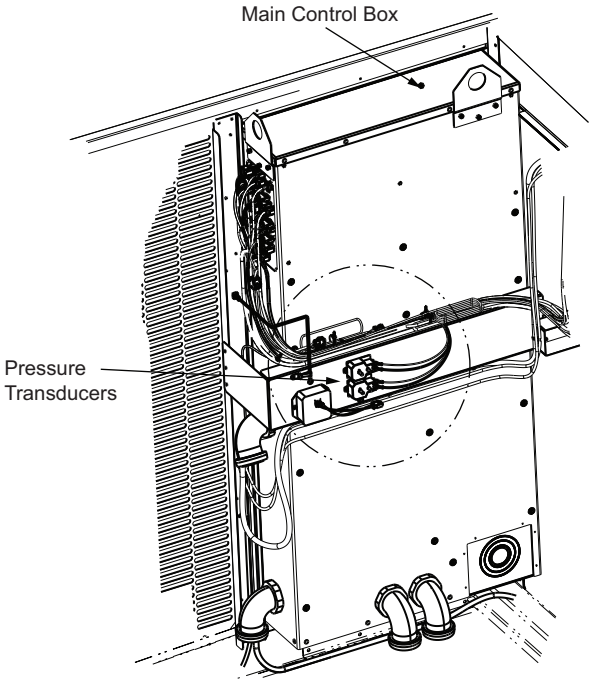


Fig. 50 — Pressure Transducer Location (Cover Removed)

VAV INDOOR FAN

The tubing for the multi-zone VAV duct supply pressure (SP) control option should sample supply duct pressure approximately 2/3 of the way out from the unit in the main trunk duct, at a location where a constant duct pressure is desired. Connect the other end of the tubing to the high side pressure pickup port on the SP transducer. See Fig. 51 for supply pressure transducer layout

POWER EXHAUST BUILDING PRESSURE CONTROL

The tubing for the building pressure (BP) control should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to design pressures as possible. Keep the pressure pickup port away from exhaust inlets, supply grills, return grills, or other locations that can affect the sensor reading. Connect the other end of the tubing to the high side pressure pickup port on the BP transducer. See Fig. 51 for building pressure transducer layout.

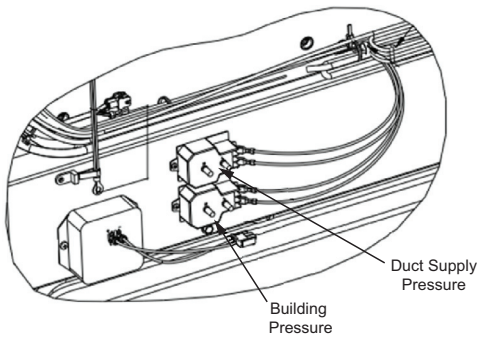


Fig. 51 — Pressure Transducer Layout (Cover Removed)

Step 14 — Set Up Return Air Smoke Detector (Optional)

The optional return air smoke detector ships in the shipping orientation and must be field assembled to the final operating position. Follow the steps below to put the smoke detector in the operating position.

1. Remove the smoke sampling tube from the shipping location (see Fig. 52).
2. Remove and save the 2 screws securing the smoke detector bracket in the shipping position. (See Fig. 52.)
3. Rotate the shipping bracket outward 90 degrees so that the smoke detector is in the operating position. The back of the detector should be facing the air stream (see Fig. 53).
4. Use the screws removed in Step 2 to secure the smoke detector bracket in place.
5. Insert the closed end of the sampling tube into the sampling tube support bracket (see Fig. 53).
6. Insert the open end of the smoke sampling tube through the opening in the smoke detector bracket and into the back of the smoke detector sampling pickup port.

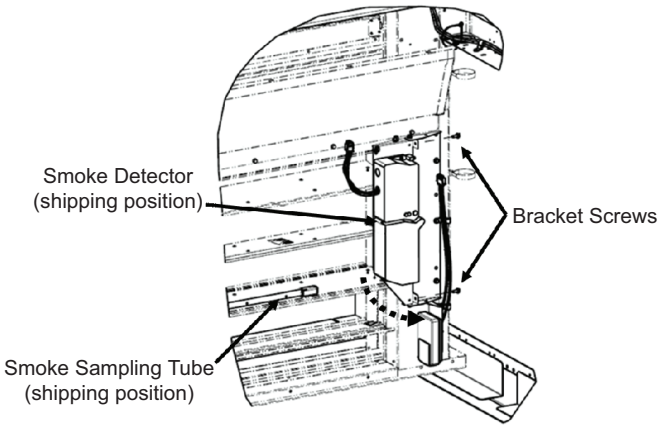


Fig. 52 — Smoke Detector Shipping Position

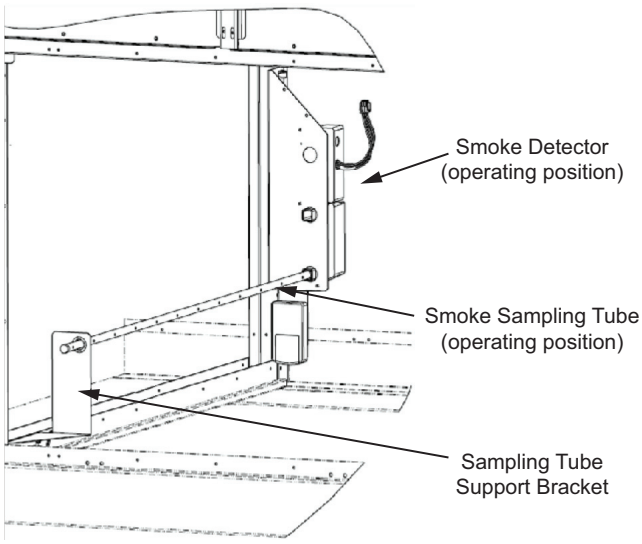


Fig. 53 — Smoke Detector Operating Position

Step 15 — Connect Hot Water Piping and Accessories (Hot Water Coil Units Only — Optional)

Refer to unit certified drawings (Fig. 15-34) for hot water coil connection size and location. The hot water coil is in the post-heat position (after the indoor fan). Coil connection stubs are in the heat vestibule area. The bottom connection is the water inlet, and the top connection is the water outlet. Size hot water piping based on flow rate and use adapters to fit coil connections. Ensure all hot water piping inside or outside of the unit is properly insulated.

Hot water piping penetrations into the heat section are field cut. Penetrations can be cut in the heat access side panel or in the unit base pan in the heat vestibule area. Insulate piping passing through field cut holes and seal the holes afterwards. See Fig. 54 for coil connection location and field cut base pan penetration location. Do not cut into the unit base rail.

The hot water control valve and associated hot water piping accessories (strainers, vents, shut off valves, pressure gauges, etc.) are field provided and installed. The control valve and piping accessories can be installed in the hot water coil vestibule area. See Step 16 “Wire Hot Water Control Valve (Units with Hot Water Coil Only)” on page 68 for hot water valve wiring instructions.

⚠ CAUTION

Follow safety instructions when cutting into panels or base pan. Wear appropriate safety equipment. If cutting into side panel, remove side panel from unit to perform cutting.

Fig. 54 — Hot Water Coil Piping and Penetrations

Step 16 — Wire Hot Water Control Valve (Units with Hot Water Coil Only)

The Carrier SmartVu controls provides a 2-10v output for hot water valve actuator modulation. The hot water control valve and actuator are field provided and installed. See Fig. 55 for hot water (hydronic) valve actuator control and power wiring. 24vac power and ground for the actuator can be taken from TB-4 terminals 1 (power) and 6 (ground). See Fig. 59 for TB-4 layout. Plug 45 is provided in the heat vestibule for the hot water valve modulating signal. See Fig. 56 for plug 45 location.

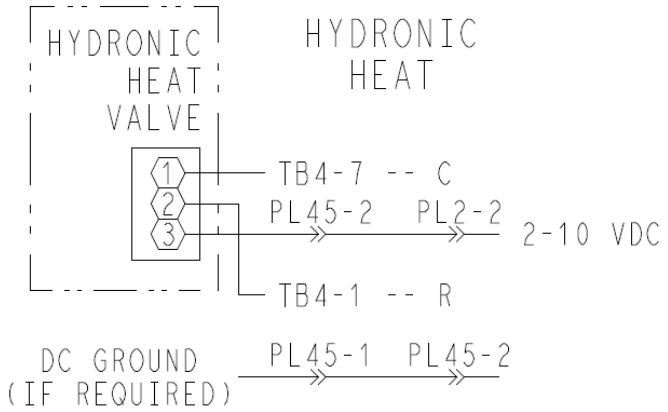


Fig. 55 — Hot Water Valve Wiring Details

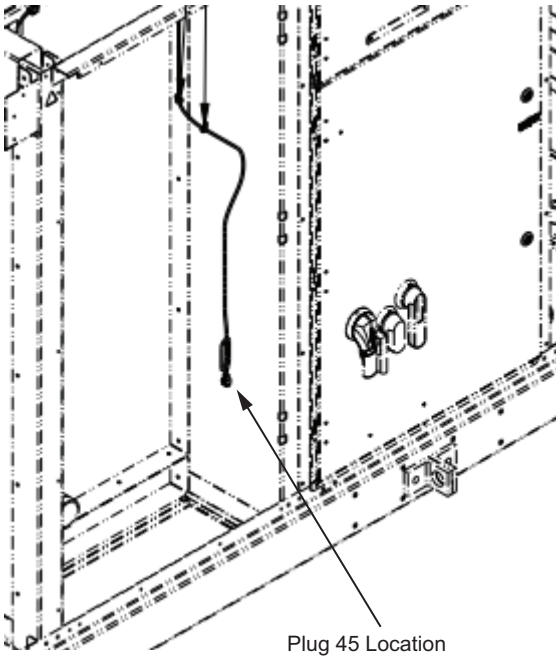


Fig. 56 — Plug 45 Location

Step 17 — Install Supply-Air Temperature Sensor (Modulating Heat Units Only)

NOTE: The supply air temperature (SAT) sensor is shipped from the factory behind the power box in the condenser section and must be field installed in the supply duct work for proper unit operation. See Fig 15-34 for power box location by unit size and configuration. See Fig. 57 for SAT sensor shipping location.

The SAT sensor is only factory provided on units with modulating electric heat or hot water coil for supply air temperature control during heater operation. When a SAT exists, it's also used for supply air temperature control of the cooling system and HumidiMizer system, instead of DXLAT.

The SAT sensor is a probe style sensor with a junction box and a wire harness. If the included wiring harness length is not sufficient, new wiring can be spliced into the wire harness. If the probe style SAT sensor is not suited for the application or to add an SAT sensor to a unit that did not include one, a field-provided 10K-2 thermistor can be used instead.

Mount the SAT sensor using two no. 10 sheet metal screws. The SAT sensor should be installed in the supply duct per the following criteria:

- at least 10 feet away from the unit supply air opening
- where the SAT sensor is not within sight of the heat exchanger cells
- in a position where a good portion of the air is mixed supply air
- where the sensing element is not obstructed (insulation)

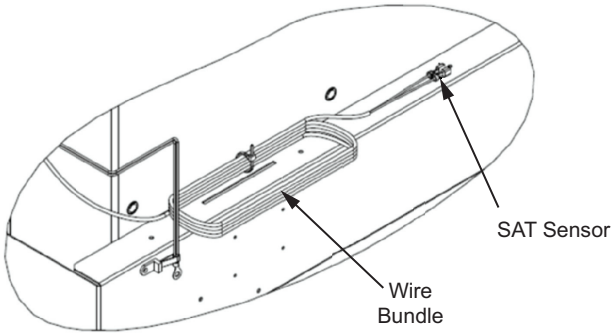


Fig. 57 — SAT Sensor Shipping Location

Step 18 — Install Unit Accessories

For applications requiring accessories, the following packages are available:

All units:

- flue extension kit
- UV emitters
- roof curbs
- filter status switch
- smoke detector

Refer to the individual accessory installation instructions in each accessory package for information on installing accessories.

Step 19 — Install Control Wiring (Optional)

Refer to the accessory or sensor installation instructions for wiring. Refer to the advanced control, operation, and troubleshooting manual for advanced control guidance.

CONFIGURE CONTROL TRANSFORMER (208V UNITS ONLY)

On 208/230-v units, transformers 1-2 are wired for 230-v. If 208/230-v unit is to be run with 208-v power supply, the transformers must be rewired by moving the wire connected to terminal H3 and connect it to terminal H2.

ROUTE WIRING

IMPORTANT: Keep low voltage wiring separated from high voltage wiring.

All units include a 3/4 in. FPT coupling in the unit base pan for thru-the-base low voltage wiring and a knockout in the corner post by the power box for thru-the-side low voltage wiring penetrations. Refer to Fig. 47 for low voltage basepan coupling and side knockout locations.

Two 1-3/8 in. knockouts are provided in the side of the control box plug panel for control or communication wiring to enter the control panel. See Fig. 58 for knockout locations (shown with cover

removed). Remove the two thumb screws at the top of the cover to detach cover.

FIELD USE TERMINAL STRIPS

Terminal strips for field use control devices and sensors are includes for each wiring to the unit controls. See “Typical Control Box Layout” on page 74 for control terminal strip location.

Terminal Block 4 (TB)

See Fig. 59 and Table 10 for TB4 layout and input/output descriptions.

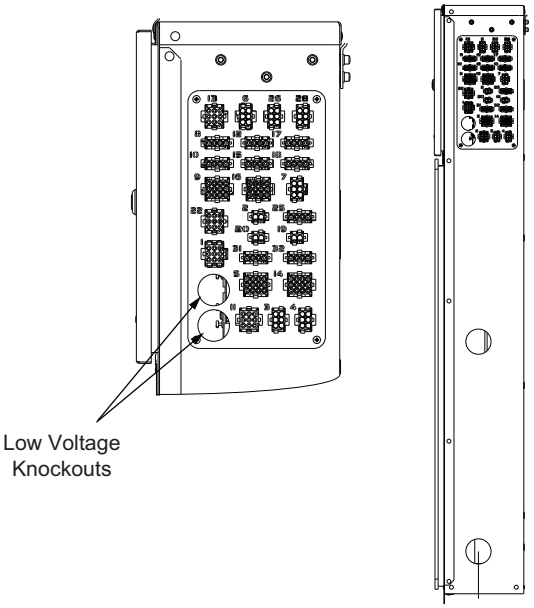


Fig. 58 — Control Knockouts Locations

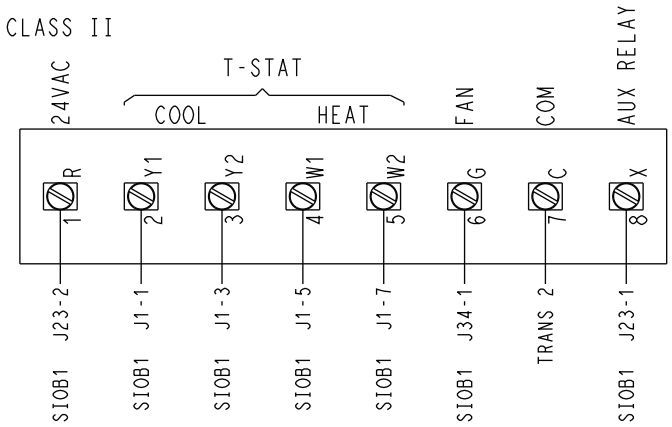


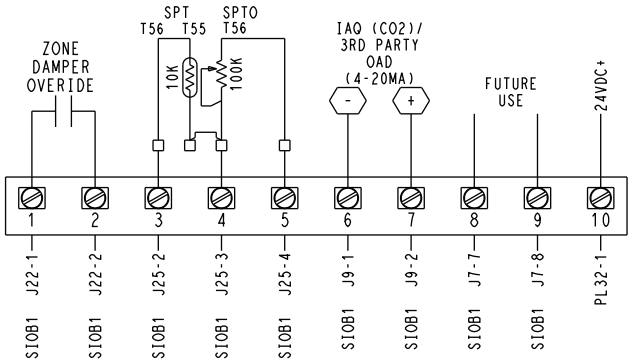
Fig. 59 — TB4 Layout

Table 10 — TB4 Details

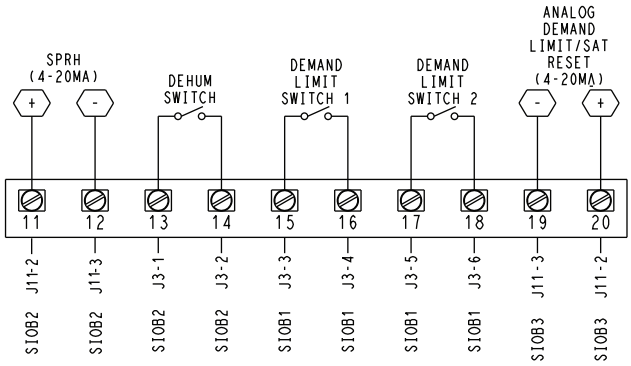
INPUTS AND OUTPUTS	LABEL	DESCRIPTION
1	R	24 vac to power field-use devices, such as thermostats (1A max. between C and R).
2	Y1	Low Cool Input: Used with TSTAT cool/heat demand source. A low cool demand is initiated when the low cool input is shorted (normally open).
3	Y2	High Cool Input: Used with TSTAT cool/heat demand source. A high cool demand is initiated when the high cool input is shorted (normally open).
4	W1	Low Heat Input: Used with TSTAT cool/heat demand source. A heat/cool demand is initiated when the low heat input is shorted (normally open).
5	W2	High Heat Input: Used with TSTAT cool/heat demand source. A high heat demand is initiated when the high heat input is shorted (normally open).
6	G	Fan Input: Used with intermittent indoor fan control and TSTAT cool/heat demand source or third-party indoor fan modulation. When configured for intermittent indoor fan operation or third-party indoor fan modulation, the indoor fan is commanded on when the fan input is shorted. When used for TSTAT cool/heat demand, a Vent demand is triggered when the indoor fan input is shorted (normally open).
7	C	24 vac common power field-use devices, such as thermostats (1A max. between C and R).
8	X	Auxiliary Relay: Configurable to indicate alarm status (alarm active when contact is closed) or occupancy status (occupied period when contact is closed) (normally open).

Terminal Block 5 (TB5)

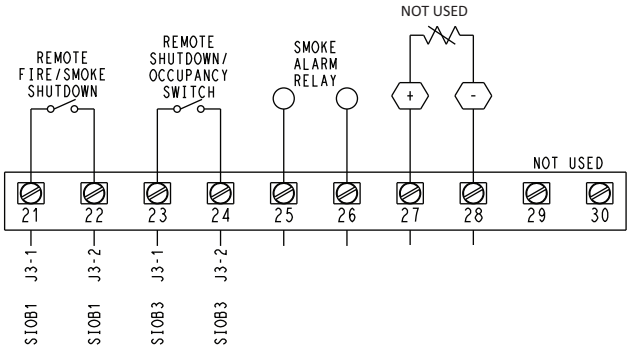
See Fig. 60 and Table 11 for TB5 layout and sensor accessory options.



TB5 (Terminals 1-10)



TB5 (Terminals 11-20)



TB5 (Terminals 21-30)

Fig. 60 — TB5 Layout

Table 11 — TB5 Details

TERMINALS	DEVICE	DESCRIPTION
1 and 2	**Zone Damper Override Relay (ZDOR)**	Used to command zone dampers to an override position. The relay closes when heating capacity is above 50% (adjustable), a dehumidification is being performed, smoke pressurization/evacuation/purge is active, or the indoor fan is on during the unoccupied period (temperature compensated start, unoccupied cool/heat/dehumidify/vent, or pre-occupancy purge) or during test mode (normally open).
3 and 4	**Space Temp. Sensor (SPT)**	Used for space temperature sensing with SPT cool/heat demand source and unoccupied SPT recirculation with RAT cool/heat demand source. Must be 10K-2 thermistor.
4 and 5	**Space Temp. Offset (SPTO)**	Used to adjust the cooling and heating control temperatures from the local sensor with SPT cool/heat demand source. Must be 100K thermistor.
6 and 7	**Indoor Air Quality (IAQ) Input/Third-Party (OAD)**	Configurable for indoor air quality sensor or third-party OAD control input (4-20mA). Used for IAQ sensing for ventilation reset (demand-controlled ventilation) or IAQ mapping or third-party input ventilation control.
8 and 9	**Not Used**	N/A
10	**24 vdc**	Provides 24 vdc to power field use devices, such as thermostats (max 1A).
11 and 12	**Space Relative Humidity (SPRH)**	Used for SPRH dehumidify demand source for units with Humidi-MiZer dehumidification or field configured dehumidification. Requires 4-20mA input.
13 and 14	**Dehumidify Switch (HSTAT)**	Used for HSTAT dehumidify demand source for units with Humidi-MiZer dehumidification or field configured dehumidification dehumidify demand is initiated when switch input is shorted (normally open).
15 and 16	**Demand/Capacity Limit Switch 1**	Can be configured for demand limit or capacity limit. A demand/capacity limit 1 is triggered when the switch input is shorted, and capacity or demand limiting is configured for limit switch (normally open).
17 and 18	**Demand/Capacity Limit Switch 2**	Can be configured for demand limit or capacity limit. A demand/capacity limit 2 is triggered when the switch input is shorted, and capacity or demand limiting is configured for limit switch (normally open).
19 and 20	**Analog Demand/Capacity Limit**	Can be configured for demand limit, capacity limit, or supply air temperature reset. Requires input 4-20mA.
21 and 22	**Smoke Detector/Fire Shutdown**	An emergency Smoke/fire shutdown is triggered when switch input is shorted (normally open).
23 and 24	**Remote Switch**	Configurable for shutdown or occupancy control, shutdown or occupied when switch input is shorted (normally open).
25 and 26	**Smoke Alarm Relay**	Used to indicate when the smoke detector contact is closed (normally open).
27 and 28	**Not Used**	N/A
29 and 30	**Not Used**	N/A

Terminal Block (TB6)

See Fig. 61 and Table 12 for TB6 layout and input options.

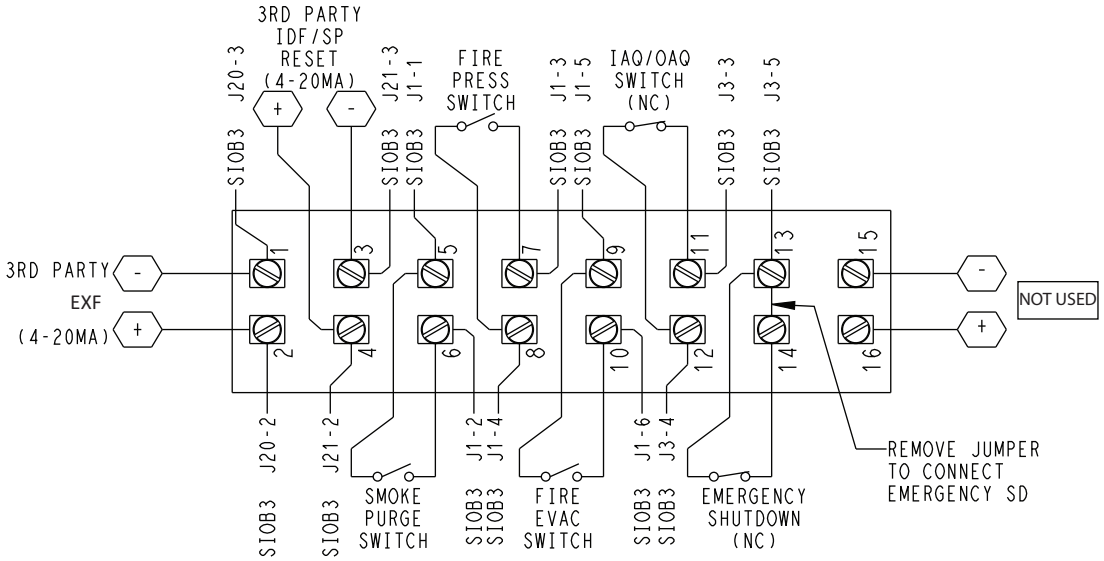


Fig. 61 — TB6 Layout

Table 12 — TB6 Input Options

TERMINALS	DEVICE	DESCRIPTION
1 and 2	**Third-Party Exhaust Fan Modulation**	Used for third-party modulation of exhaust fan speed. Requires input (4-20mA). Only available with High Capacity Power Exhaust (HCPE) accessory.
3 and 4	**Third-Party Indoor Fan Modulation/Static Pressure (SP) Reset**	Configurable for third-party modulation of indoor fan speed or for third-party supply duct static pressure reset. Requires input (4-20 mA).
5 and 6	**Smoke Purge Switch**	Smoke purge mode is triggered when smoke input is shorted (normally opened).
7 and 8	**Fire Pressurization Switch**	Fire pressurization mode is triggered when fire evacuation input is shorted (normally opened).
9 and 10	**Fire Evacuation Switch (EVAC)**	Fire evacuation mode is triggered when fire evacuation input is shorted (normally opened).
11 and 12	**Indoor Air Quality (IAQ) / Outdoor Air Quality (OAQ) Switch**	Can be configured for ventilation reset based on indoor air quality or ventilation disable based on outdoor air quality (normally open).
13 and 14	**Emergency Shutdown (EMER SD)**	Emergency shutdown is triggered when emergency shutdown switch input is opened (normally open).
15 and 16	**Not Used**	N/A

Step 20 — Install Communication Wiring (Optional)

IMPORTANT: Keep low voltage wiring separate from high voltage wiring.

The 50V series can be connected to a CCN, BACnet MS/TP, or BACnet IP network for communication with a building automation system. Communication wiring is field provided and installed. See the SmartVu RTU Control Integration guide for communication setup. See below for wiring details based on the protocol.

NOTE: Only one communication protocol can be used at a time.

CARRIER COMFORT NETWORK® CCN

CCN communication bus wiring consists of shielded, 3-conductor cable with shield wire.

The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system element on either side of it, the negative pins must be wired to the negative pins, and the signal pins must be wired to common pins. Wiring connections for the CCN system should be made at the communication board terminal block 3 (TB3) using the screw terminals. The board also contains an RJ14 CCN plug that can be used to connect a field service computer.

NOTE: Conductors and drain wire must be 20 AWG minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon®[1], or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –4 to 140°F (–20 to 60°C) is required.

See Table 13 for cables that meet the requirements.

Table 13 — CCN Communication Bus Wiring

MANUFACTURER	PART NUMBER	
	Regular Wiring	Plenum Wiring
Alpha	1895	—
American	A21451	A48301
Belden	8205	884421
Columbia	D6451	—
Manhattan	M13402	M64430
Quabik	6130	—

IMPORTANT: When connecting the CCN communication bus to a system element, use a color coding system for the entire network to simplify installation and checkout.

The following color code is recommended:

SIGNAL TYPE	CCN BUS CONDUCTOR INSULATION COLOR	COMM1 PLUG PIN NO.
+	RED	1
COMMON	WHITE	2
–	BLACK	3

NOTE: If a cable with a different color scheme is selected, a similar color code should be adopted for the entire network.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous field must be connected to a ground at one point only. If the communication bus cable exits from one building and enters another, the shields must be connected to grounds at the lightning suppressor in each building where the cable enters or exits the building (one point per building only).

To connect the unit to the network:

1. Turn off power to the control box.
2. Cut the CCN wire and strip the ends of the red (+), white (common) and black (–) conductors. (If a different network color scheme is used, substitute appropriate colors.)
3. Wire the CCN to the screw terminals on the COMM board (TB3) as follows (Fig. 65):
   a. Secure the red (+) wire to CCN screw terminal (+) on the COMM board.
   b. Secure the white (common) wire to CCN screw terminal C on the COMM board.
   c. Secure the black (–) wire to CCN screw terminal — on the COMM board.
   d. Secure shield wire to CCN screw terminal SHIELD on the COMM board.

IMPORTANT: A shorted CCN bus cable will prevent some routines from running and may prevent unit from starting. If abnormal conditions occur, unplug the connector. If conditions return to normal, check CCN connector, and run new cable if necessary. A short in one section of the bus can cause problems with all system elements on the bus.

BACNET MS/TP WIRING RECOMMENDATIONS

Recommendations are shown in Tables 14 and 15. The wire jacket and UL temperature rating specifications list 2 acceptable alternatives. The Halar®[1] specification has a higher temperature rating and a tougher outer jacket than the SmokeGard™[1] specification, and it is appropriate for use in applications where the user is concerned about abrasion. The Halar jacket is also less likely to crack in extremely low temperatures.

NOTE: Use the specified type of wire and cable for maximum signal integrity. Use J8 4-pin on bottom of display. Left pin is (+), right pin is (–). Floating common for three wire is next to (+) MS/TP BACnet. See Fig. 62.

BACNET IP/ETHERNET COMMUNICATION

50V units are standard with BACnet Internet Protocol (IP) communication using Ethernet. The cabling for this is standard CAT 5 (minimum) cable with RJ45 connector. See Fig. 63 for Ethernet port locations. See Table 16 for ethernet addresses.

NON-CCN COMMUNICATION WIRING

50V units offer several non-CCN translators. Refer to the separate installation instructions for additional wiring steps.

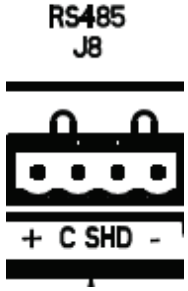


Fig. 62 — J8 Connector

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

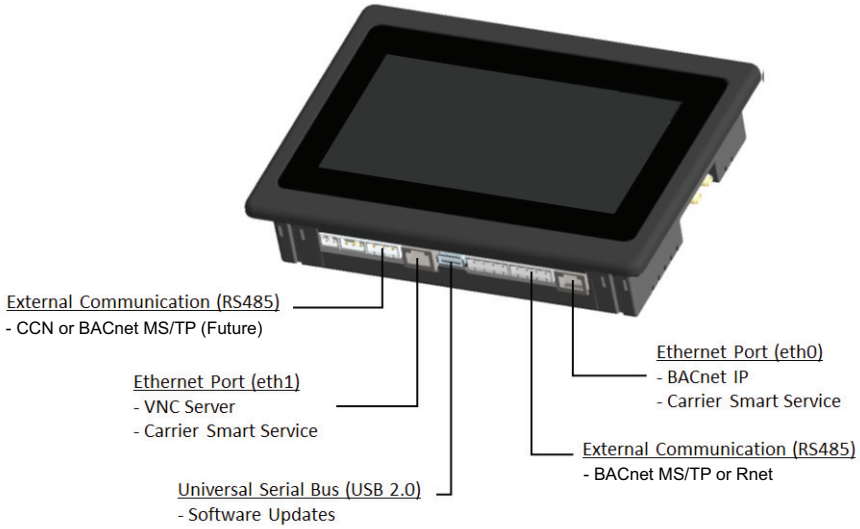


Fig. 63 — Carrier SmartVu™ Touchscreen Display Interface and Connections

Table 14 — MS/TP Wiring Recommendations

SPECIFICATION	RECOMMMENDATION
Cable	Single twisted pair, low capacitance, CL2P, 22 AWG (7x30), TC foam FEP, plenum rated cable
Conductor	22 or 24 AWG stranded copper (tin plated)
Insulation	Foamed FEP 0.015 in. (0.381 mm) wall 0.060 in. (1.524 mm) O.D.
Color Code	Black/White
Twist Lay	2 in. (50.8 mm) lay on pair 6 twists/foot (20 twists/meter) nominal
Shielding	Aluminum/Mylar shield with 24 AWG TC drain wire
Jacket	SmokeGard Jacket (SmokeGard PVC) 0.021 in. (0.5334 mm) wall 0.175 in. (4.445 mm) O.D. Halar Jacket (E-CTFE) 0.010 in. (0.254 mm) wall 0.144 in. (3.6576 mm) O.D.
DC Resistance	15.2 Ohms/1000 feet (50 Ohms/km) nominal
Capacitance	12.5 pF/ft (41 pF/meter) nominal conductor to conductor
Characteristic Impedance	100 Ohms nominal
Weight	12 lb/1000 feet (17.9 kg/km)
UL Temperature Rating	SmokeGard 167°F (75°C) Halar –40 to 302°F (–40 to 150°C)
Voltage	300 vac, power limited

LEGEND

AWG — American Wire Gauge
CL2P — Class 2 Plenum Cable
DC — Direct Current
FEP — Fluorinated Ethylene Polymer
O.D. — Outside Diameter
TC — Tinned Copper
UL — Underwriters Laboratories

Table 15 — Open System Wiring Specifications and Recommended Vendors

WIRING SPECIFICATIONS		RECOMMENDED VENDORS AND PART NUMBERS			
Wire Type	**Description**	**Connect Air International**	**Belden**	**RMCORP**	**Contractors Wire and Cable**
MS/TP Network (RS-485)	22 AWG, single twisted shielded pair, low capacitance, CL2P, TC foam FEP, plenum rated. See MS/TP Installation Guide for specifications.	W221P-22227	—	25160PV	CLP0520LC
	24 AWG, single twisted shielded pair, low capacitance, CL2P, TC foam FEP, plenum rated. See MS/TP Installation Guide for specifications.	W241P-2000F	82841	25120-OR	—

LEGEND

AWG — American Wire Gauge
CL2P — Class 2 Plenum Cable
CMP — Communications Plenum Rated
FEP — Fluorinated Ethylene Polymer
TC — Tinned Copper

CONTROLS OPERATION AND QUICK SETUP

Introduction

The WeatherMaster® 50V features the Carrier SmartVu™ control system, which controls and monitors the unit operation. This manual provides basic, step by step guidance on control set-up 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. 64 and Fig. 15-34 for control box location. See Fig. 65 for typical control box layout. The SmartVu controls include multiple standard and optional factory-installed sensors. See Table 17 for air sensor listing.

Fig. 64 — Control Box Location

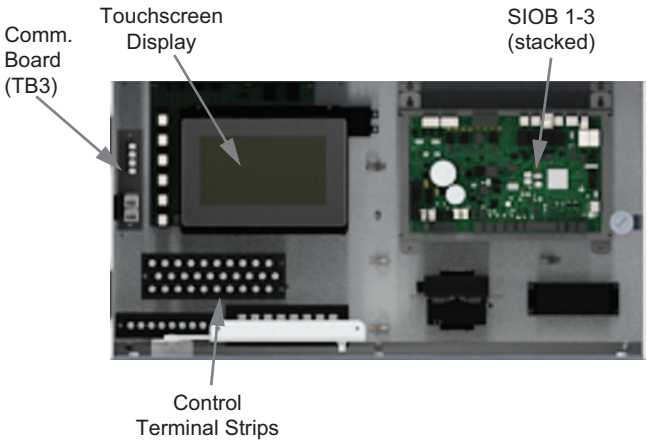


Fig. 65 — Typical Control Box Layout

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 18 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 2 or more. Pressing the page up/down button will scroll through the available pages. See Fig. 66 for an example of a screen with multiple pages.

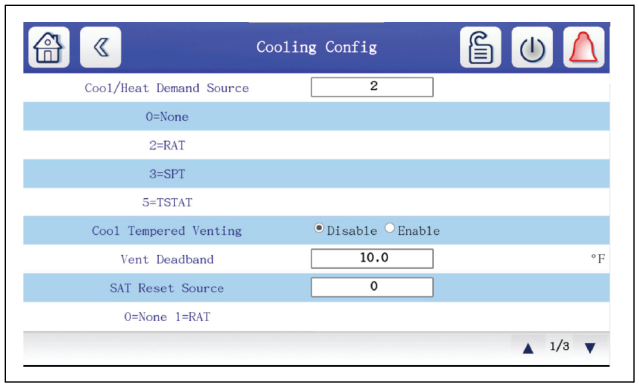


Fig. 66 — Page Up/Down Buttons

TOUCHSCREEN DISPLAY

The SmartVu touchscreen display is the primary method of interfacing with the controls for set up and equipment start-up. The touchscreen is a capacitive 7 in. LCD that can be activated with a finger, touch compatible gloves, or stylus. Refer to Fig. 63 for display layout and port locations.

VNC VIEWER

The SmartVu controls can be accessed using a hardwired ethernet connection at ethernet port 0 (on the bottom right side of the touchscreen display) and a VNC Viewer, such as RealVNC. Refer to Fig. 63 (SmartVu touchscreen display) for ethernet port 0 port locations. See Table 16 for default IP addresses ethernet port 0.

Once the hardwired connection is established between the computer and the control, open a VNC Viewer, and add a new connection using the IP address for enternet port 0 control. The user interface should appear on the web browser.

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 16 — Ethernet Addresses

PORT NAME	LOCATION	DEFAULT ADDRESSES
ETH0	Bottom right side of display	169.254.1.1

Table 17 — Factory-Installed Air Sensors

NAME	DESCRIPTION	LOCATION	PART NUMBER	INCLUDED
BP	Building Pressure	In condenser section on back of power box.	HK05ZG022	Exhaust with BP Option
CCT[a]	Cooling Coil Temperature	After evaporator	HH79NZ039 x4	Humidi-Mizer Option
IAQ	Return Air Carbon Dioxide (CO_2)	Return Section	HH99ZZ019	RA CO_2 Sensor Option
DX LAT[a]	DX Leaving Air Temperature	Indoor Fan Section	HH79NZ039	Standard
OAT[a]	Outdoor Air Temperature	Condenser Section	HH79NZ039	Standard
OARH	Outdoor Air Relative Humidity	Condenser Section	HL39ZZ021	Humidity Sensor Option
RAT	Return Air Temperature	Return Section	HH79NZ039	Standard
RARH	Return Air Relative Humidity	Return Section	HL39ZZ021	Humidity Sensor Option
SAT[b]	Supply Air Temperature	In condenser section on back of power box. Field-installed in supply duct.	HH79NZ043	Modulating/Multi-stage Heat Option
SP	Supply Duct Pressure	In condenser section on back of power box.	HK05ZG019	VAV Option

NOTE(S):

a. Sensor is an eyelet/ring style thermistor.
b. SAT sensors are only factory provided with modulating heat.

Table 18 — 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. 67 for the screen views and click points for this example. NOTE: Sufficient access level (user or higher) is required to access certain screens.

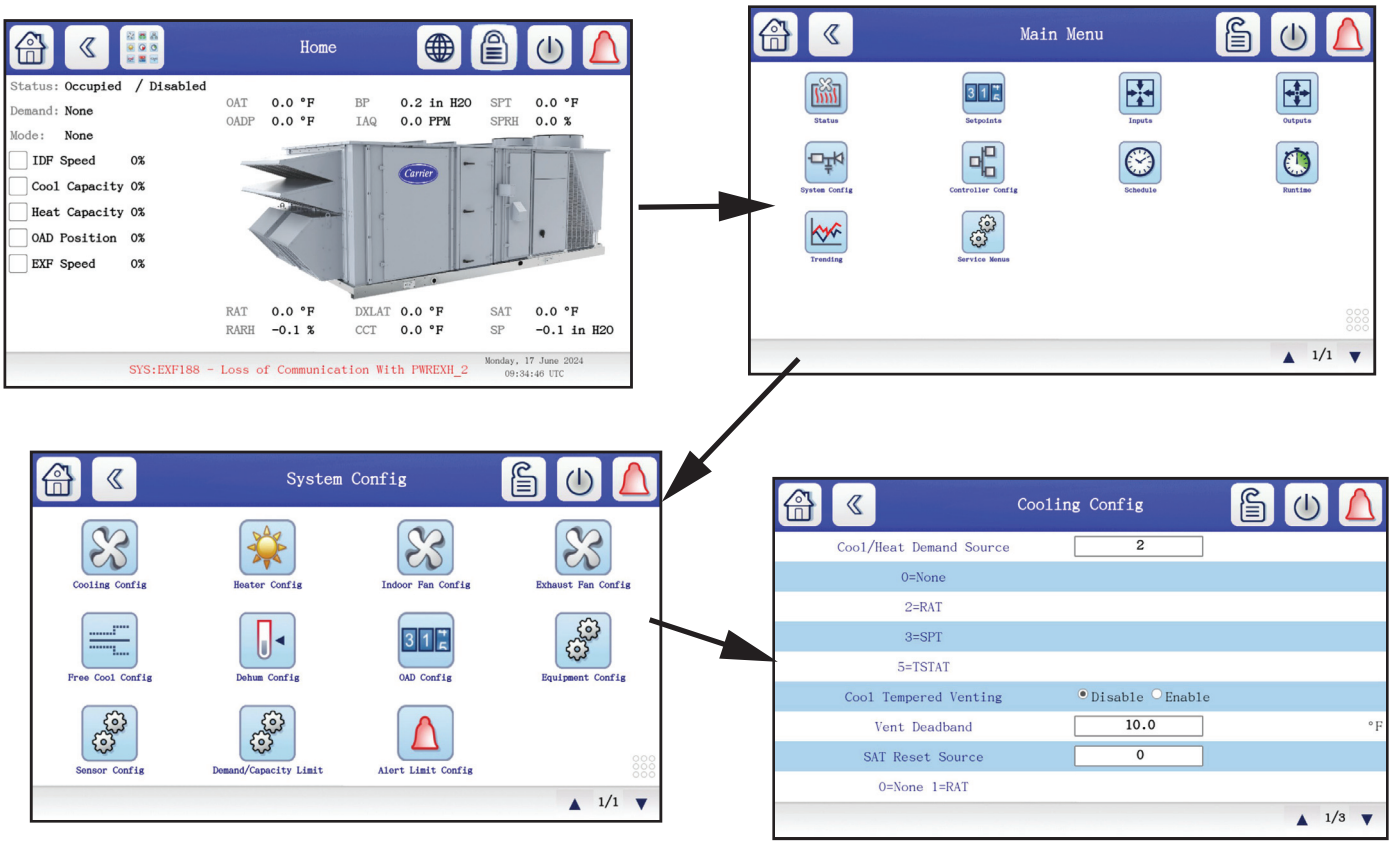


Fig. 67 — Equipment Configuration Screen Navigation Example

DATA ENTRY

Most screens contain data that is editable or selectable between multiple options, such as setpoints and configurations. See Table 19 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. 68 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. 69 for keyboard touchscreen layout.

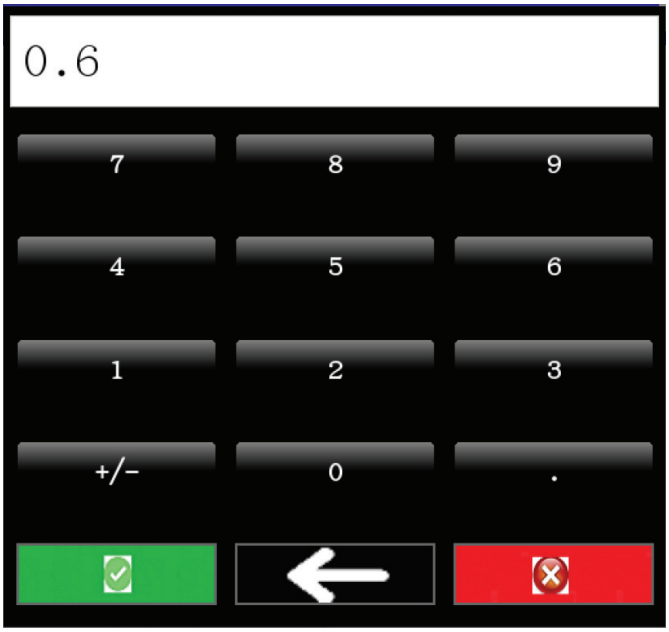


Fig. 68 — Keypad Layout

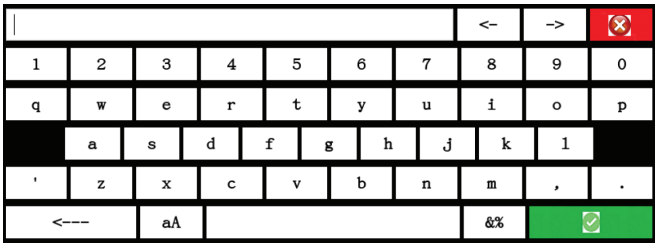


Fig. 69 — Keyboard Layout Touchscreen

For settings that have 2 configurations options, bubbles are used to indicate the configuration. See Fig. 70 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. 71 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).

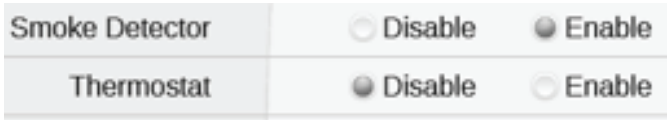


Fig. 70 — Enable/Disable Configuration Example

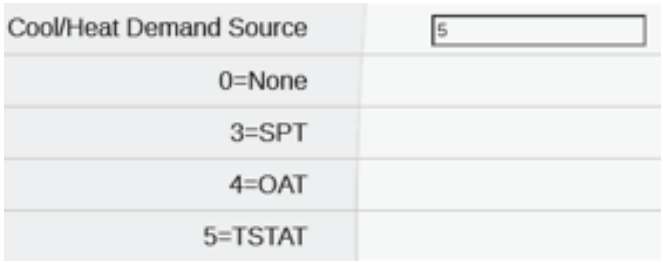
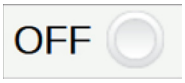


Fig. 71 — Configured Device Example

Table 19 — 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 2-3 minutes. See Fig. 72. 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. 73 for login screen layout.

PASSWORDS

There are multiple user access levels. See Table 20 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. 74 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. 75 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. 76 for typical home screen layout.

Fig. 72 — Welcome Screen Example

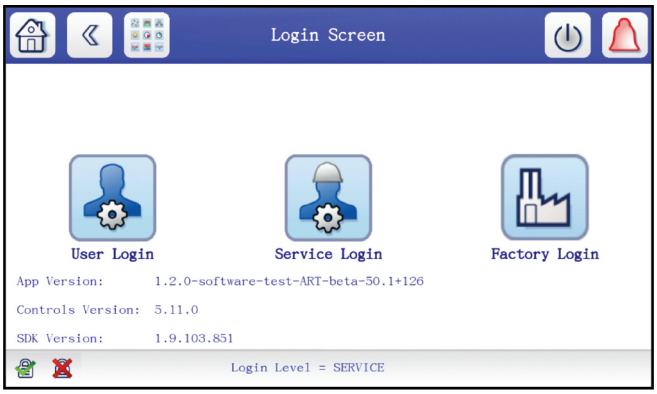


Fig. 73 — Login Screen

Fig. 74 — User Login Screen

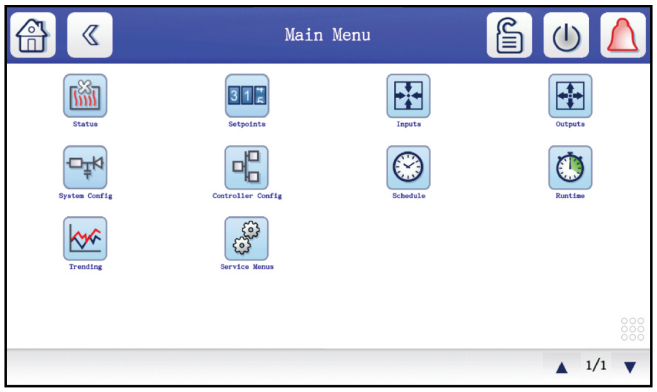


Fig. 75 — Main Menu Screen

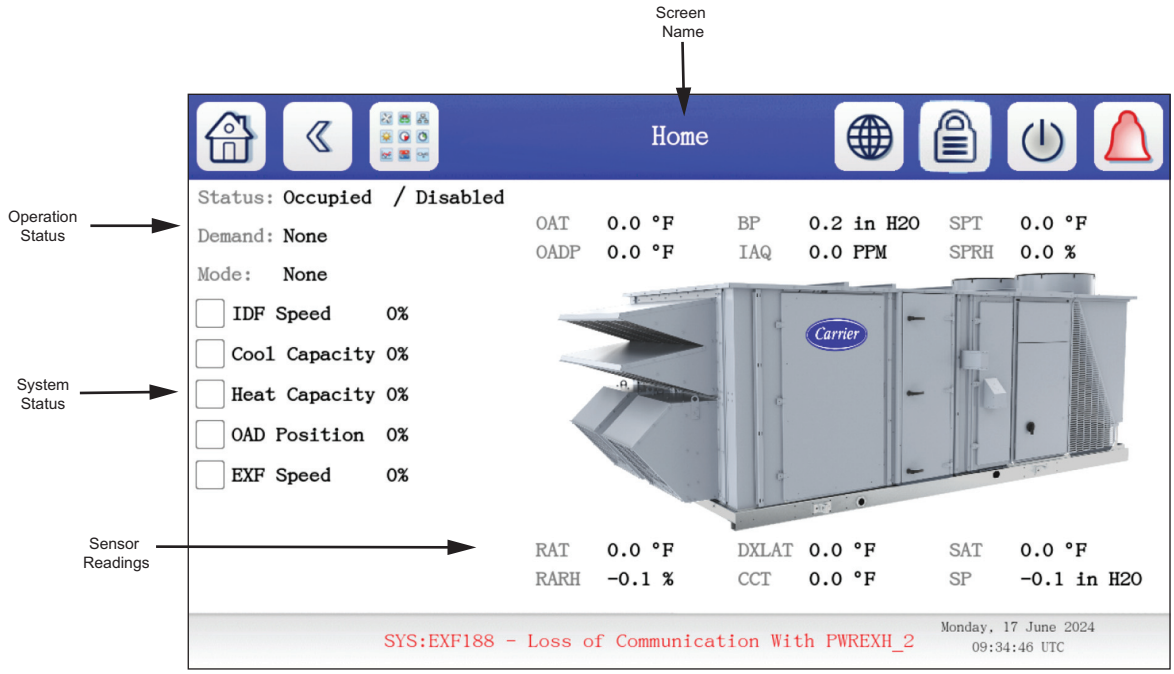


Fig. 76 — Home Screen Example

Table 20 — 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	Contact factory support.	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. 77 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. 78 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. 79 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. 80 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. 81 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. 82 for the start/stop screen layout (shown with user access level in Service Run mode). See Table 21 for the start/stop screen functions.

Fig. 77 — Status Screen

Fig. 78 — Setpoint Screen

Fig. 79 — System Configuration Screen

Fig. 80 — Controller Configuration Screen

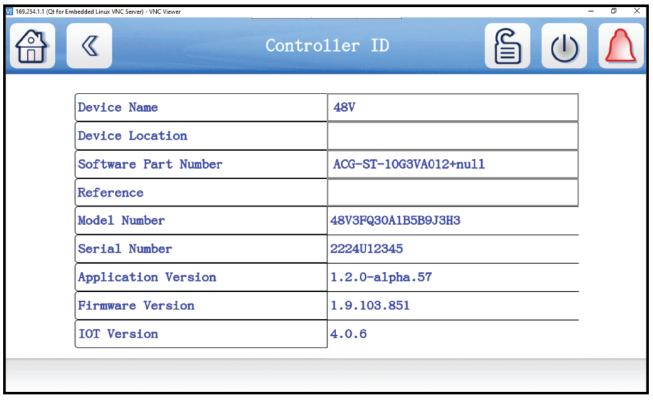


Fig. 81 — Controller ID Screen

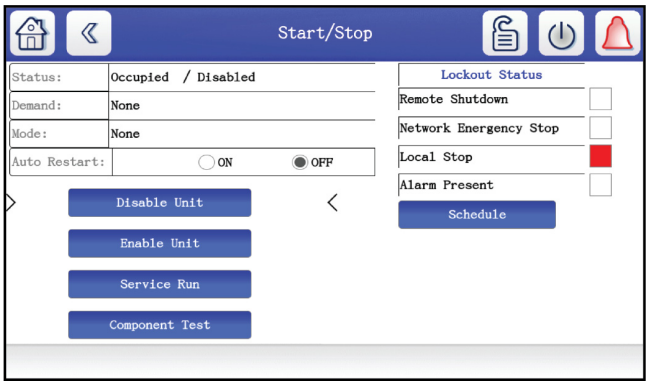


Fig. 82 — Start/Stop Screen

Table 21 — 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 Set Up

The 50V units can be used in a wide variety of applications. The remainder of the control section provides step by step directions and actions for control set up for typical applications, including single- zone air conditioning (single-zone) and multi-zone air conditioning (multi-zone) with air terminal units. See Table 22 for an overview of the typical control quick set-up steps. See the Control, Operation, and Troubleshooting Guide for further instructions.

Table 22 — Control Quick Set-up Steps

	QUICK SET-UP STEPS
A	Power on the control.
B	Login with the user access level.
C	Optional: Set daylight savings time.
D	Set date and time.
E	Configure the equipment for field-installed devices (sensors or accessories).
F	Configure the equipment for field-installed sensors.
G	Configure indoor fan.
H	Optional: configure the outdoor air damper (only units with economizer).
I	Configure the cooling system (only units with heating) .
J	Optional: configure the dehumidification system (only units with Humidi-MiZer).
K	Configure the heating system.
L	Optional: configure the exhaust fan (only units with exhaust fan).
M	Optional: configure free cooling.
N	Optional: set indoor fan setpoints (only SP indoor fan control).
O	Set cooling setpoints.
P	Optional: set dehumidify setpoints (only units with Humidi-MiZer).
Q	Set heating setpoints (only units with heating).
R	Optional: set exhaust fan setpoint (BP exhaust fan control only).
S	Set up occupancy control method or schedule.

IMPORTANT: Changing the unit model number will reset all control configurations and settings back to their defaults. If a model number change is required, such as configuring a special order unit, change the model number first. See the advanced controls, operation, and troubleshooting guide for changing the unit model number.

STEP A — 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 B.

If the unit does start up (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.

STEP B — 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 set-up steps and start-up.

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

STEP C — 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. 83 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 23 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 D — SET DATE AND TIME

Navigate to the Manual Time Sync screen (***Main Menu→ Controller Config→Time Sync→Manual Time Sync***). See Fig. 84 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. 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. 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 E — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED DEVICES

NOTE: Some equipment configuration changes require a reboot. A reboot button will appear on the bottom of the screen when required. Perform the reboot after all configuration changes are made. You do not need to reboot after each configuration.

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. 85 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 24 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).

Table 23 — 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	60 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	60 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.

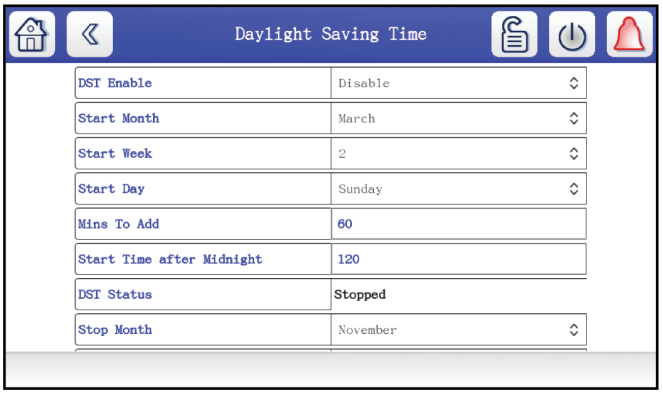


Fig. 83 — Daylight Savings Time Screen

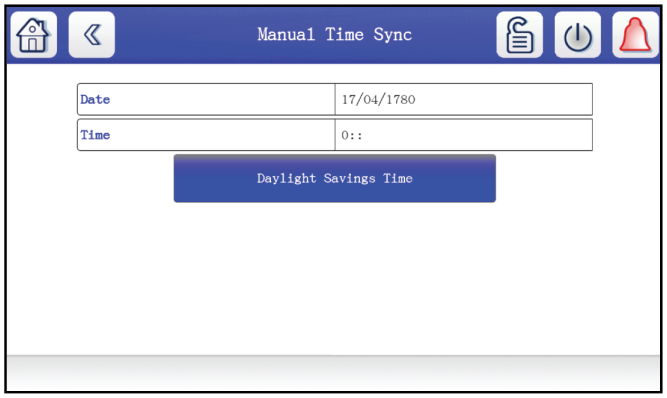


Fig. 84 — Manual Time Sync Screen

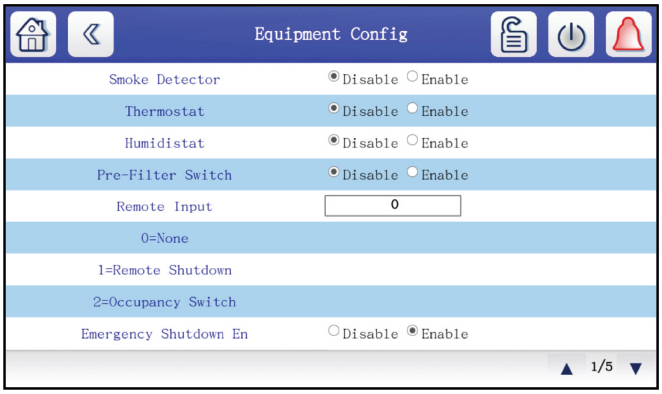


Fig. 85 — Equipment Configuration Screen

Table 24 — 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.	Single Zone
	Disable	The system does not monitor the local thermostat inputs.	Any
Humidistat	Enable	The system monitors the local humidistat (dehumidify switch) input. Used with the HSTAT dehumidify demand source to establish dehumidify demand.	Single Zone
	Disable	The system does not monitor the local humidistat input.	Any
Pre-filter Switch	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 an emergency shutdown command that requires manual shutdown.	Any
	2= Remote Occupancy	The system monitors the local remote switch input to determine occupancy status.	Any
Emergency Shutdown	Enable	The system monitors the input for emergency shutdown.	Any
	Disable	The system does not monitor the local emergency shutdown 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 third-party OAD control type.	Any
	Disable	The system does not monitor the third-party outdoor air damper position analog input.	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.	Any
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.	Any
Auxiliary Relay	0=Not Used	Auxiliary relay is not used.	Any
	1-Alarm Status	The auxiliary relay indicates alarm status.	Any
	2= Occ Status	The auxiliary relay indicates occupancy status.	Any

STEP F — 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. 86 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 25 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 G — 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. 87 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 26 for indoor fan control configurations by application.

NOTE: Fan speed configurations are in percent 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.

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

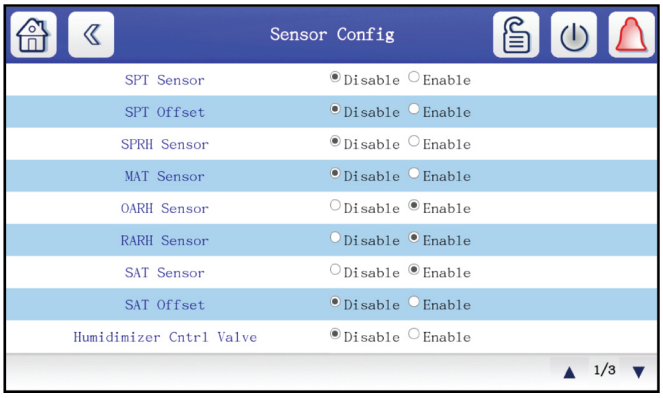


Fig. 86 — Sensor Configuration Screen Layout

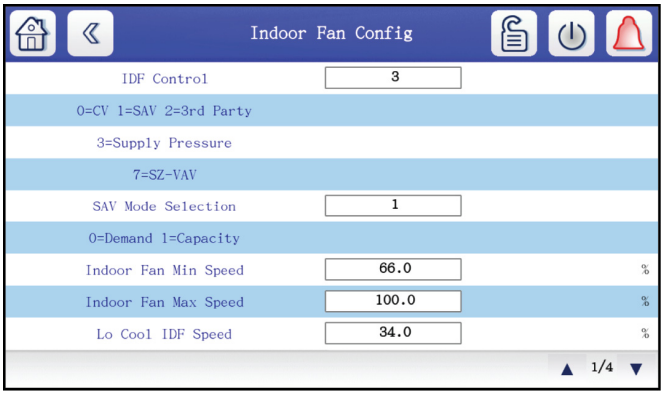


Fig. 87 — Indoor Fan Configuration Screen

Table 25 — Sensor Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SPT Sensor	Enable	The system monitors a local space temperature (SPT) sensor input. Required for applications where the cool/heat demand source is configured for SPT.	Single Zone
	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.	Single Zone
	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.	Single Zone
	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.	Single Zone
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.	Single Zone
	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.	Single Zone
MAT Sensor	Enable	The system monitors a local mixed air temperature (MAT) sensor. Use for mixed air applications for more accurate cooling or heating mode processing based on MAT.	Single Zone
	Disable	The system does not monitor the local MAT sensor.	Any
OARH Sensor	Enable	The system monitors a local outdoor air relative humidity (OARH) 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. Enabled by defaults on units with the humidity and enthalpy sensing option.	Any
	Disable	The system does not monitor the local OARH sensor. Disabled by default for units without the humidity and enthalpy sensing option.	Any
RARH Sensor	Enable	The system monitors a local return air relative humidity (RARH) sensor. RARH is used to calculate return air enthalpy for differential enthalpy free cooling or RARH dehumidify demand source. Enabled by defaults on units with the humidity and enthalpy sensing option.	Any
	Disable	The system does not monitor the local RARH sensor. Disabled by default for units without the humidity and enthalpy sensing option.	Any
SAT Sensor	Enable	The system monitors a local supply air temperature (SAT) sensor. SAT is required for unit operation. SAT sensor is enabled by default for units with modulating with no heat or hot water heat.	Any
	Disable	The unit will not monitor the local SAT sensor input. The direct expansion leaving air temperature (DX LAT) sensor is used instead of SAT. Disabled by default for units with no heat or 2-stage heat.	Any
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 multi-zone VAV applications. SP control can also be used for true constant volume applications to account for pressure drop from filter loading. Enabled by default for VAV units.	Multi-zone
	Disable	The system does not monitor a local duct supply pressure sensor. Disabled by default for SAV units.	Any
BP Sensor	Enable	The system monitors a local building pressure sensor. Building pressure is used for exhaust fan control based on building pressure (BP). Enabled by default for units with power exhaust with building pressure control.	Any
	Disable	The system does not monitor a local building pressure sensor. Disabled by default for units without power exhaust with building pressure control.	Any

Table 26 — Indoor Fan Configurations by Application

<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 process applications, can be used in select single zone applications (where code allows).</td><td>Single Zone</td></tr>
<tr><td>1 = Staged Air Volume (SAV™)</td><td>Default configuration for SAV units. 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>Single Zone</td></tr>
<tr><td>2 = Third-Party IDF Modulation[a]</td><td>The indoor fan speed modulates between minimum and maximum 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)[a]</td><td>Default configuration for VAV units. The indoor fan speed modulates between minimum and maximum speed to maintain the supply pressure at the supply pressure setpoint. Most common for multi-zone VAV applications with air terminal units or true constant volume operation (compensates for filter loading). Requires the local or supply pressure sensor or network supply pressure reading.</td><td>Multi-zone</td></tr>
<tr><td>7 = Single Zone VAV (SZVAV)[a]</td><td>The indoor fan speed modulates between minimum and maximum speed based on space temperature. Requires SPT cool/heat demand source.</td><td>Single Zone</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>Single Zone</td></tr>
<tr><td>1 = Capacity (Default)</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 Min 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>During free cooling mode, integrated free cooling mode, or heat tempered venting mode, the IDF speed will follow the demand level (IDF Low Cool Speed with Low Cool Demand or IDF High Cool Speed with High Cool Demand). 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>Single Zone</td></tr>
<tr><td>IDF Min. Speed</td><td>0 to 100%
34% 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%,
40% default</td><td>IDF low cool speed is only used as part of SAV demand or SAV capacity IDF control.</td><td>Single Zone</td></tr>
<tr><td>IDF Med. Cool Speed</td><td>0 to 100%,
40% default</td><td>IDF med. cool speed is only used as part of SAV capacity IDF control.</td><td>Single Zone</td></tr>
<tr><td>IDF High Cool Speed</td><td>0 to 100%,
70% 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 26 — Indoor Fan Configurations by Application (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SAV Low Cool Cap. Threshold	0 to 100%, 0% default	SAV low cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
SAV Med. Cool Cap. Threshold	0 to 100%, 50% default	SAV med. cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
SAV High. Cool Cap. Threshold	0 to 100%, 75% default	SAV high cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
IDF Low Heat Speed	0 to 100%, 67% default	IDF lo heat speed is only used as part of SAV demand or SAV capacity IDF control for units with a heat source.	Single Zone
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 (Default)	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.	Single Zone
	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 (Default)	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.	Single Zone

NOTE(S):

a. For units with 2-stage heat, the IDF speed is set to the low heat IDF speed with a low heat demand or the IDF high heat speed with a high heat demand.

STEP H — CONFIGURE OUTDOOR AIR DAMPER (OPTIONAL)

For units with economizer, 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. 88 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 27 for outdoor air damper configurations by application.

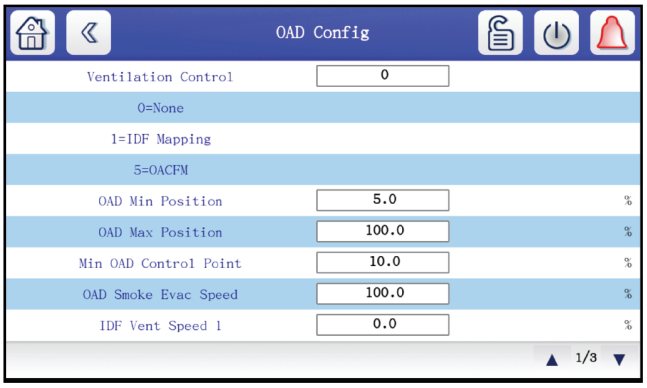


Fig. 88 — Outdoor Air Damper Configuration Screen

Table 27 — 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="4">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>Any</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 1-4 configurations. See below for IDF mapping OAD position details.To achieve a constant ventilation rate, the OAD position has to increase as the IDF speed decreases.
<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 2 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>Any</td></tr>
<tr><td>2 = Third-Party Full</td><td>The OAD position modulates between the minimum and maximum 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>Any</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>Any</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>Any</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>Any</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>Any</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>Any</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>Any</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>Any</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>Any</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>Any</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 minimum OAD position or above the vent OAD position 3.</td><td>Any</td></tr>
</table>

NOTE(S):

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

STEP I — CONFIGURE THE COOLING SYSTEM

Navigate to the Cooling Configuration screen (***Main Menu*** → ***System Config*** → ***Cooling Config***). Configure the cool/heat demand source based on application requirements. See Fig. 89 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 return air temperature (RAT) 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.

SAV units default to SPT cool/heat demand source and can be field-configured to TSTAT. VAV units default to RAT cool/heat demand.

See Table 28 for cooling configurations by application.

STEP J — CONFIGURE THE DEHUMIDIFICATION SYSTEM (OPTIONAL)

For units with Humidi-MiZer dehumidification, navigate to the Dehumidify Configuration screen ***(Main Menu →System Config →Dehum Config***). Configure the dehumidify demand source based on application requirements. See Fig. 90 for dehumidify configuration 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 and multi-zone 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.

See Table 29 for dehumidification configurations by application.

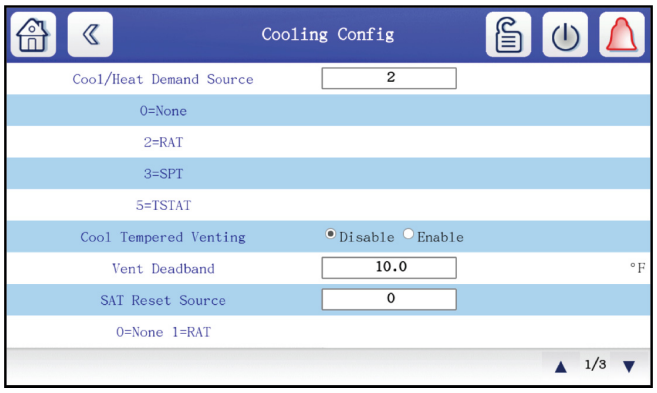


Fig. 89 — Cooling Configuration Screen

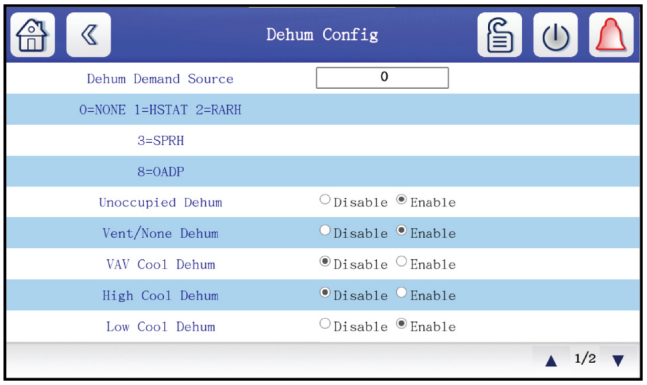


Fig. 90 — Dehumidification Configuration Screen

Table 28 — Cooling Configurations by Application[a]

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="5">Cool/Heat Demand Source</td><td>0 = None (Default)</td><td>Cooling and heating is disabled.</td><td>None</td></tr>
<tr><td>1 = SPT</td><td>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 applications. Requires a local SPT sensor or network SPT value</td><td>Single Zone</td></tr>
<tr><td>2 = RAT</td><td>During the occupied period, the control compares the return air temperature (RAT) reading to the occupied heating setpoint to determine if there is a cool or heat demand. During the unoccupied period, the control compares the RAT to the unoccupied cooling and heating setpoints to determine if there is a cool or heat demand. Commonly used for multi-zone applications. Requires a local RAT sensor or network RAT value.</td><td>Multi-zone</td></tr>
<tr><td>4 = TSTAT</td><td>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:
<table>
<tr><th>ACTIVE INPUT</th><th>DEMAND LEVEL</th></tr>
<tr><td>Y1</td><td>Low Cool</td></tr>
<tr><td>Y2</td><td>High Cool</td></tr>
<tr><td>W1</td><td>Low Heat</td></tr>
<tr><td>W2</td><td>High Heat</td></tr>
<tr><td>G</td><td>Vent</td></tr>
</table>
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.</td><td>Single Zone</td></tr>
<tr><td rowspan="2">Cool Tempered Venting</td><td>Enable</td><td>The system monitors the mixed air temperature (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.
NOTE: The system calculates MAT based on OAD%, OAT, and RAT if a MAT sensor isn't present.</td><td>Any</td></tr>
<tr><td>Disable</td><td>Cool tempered venting is disabled.</td><td>Any</td></tr>
<tr><td>Vent Deadband</td><td>10 to 20°F, Default 10°F</td><td>Used as part of cool tempered venting and heat tempered venting.</td><td>Any</td></tr>
</table>

NOTE(S):

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

Table 29 — Dehumidification Configurations by Application[a]

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="4">Dehumidify Demand Source</td><td>0 = None (Default)</td><td>Dehumidification is not performed.</td><td>None</td></tr>
<tr><td>1 = HSTAT</td><td>The unit monitors the dehumidify switch input to determine a dehumidify demand. Used for single-zone A/C applications humidistat or 2-stage cooling/heating thermostat with dehumidification output. Requires the equipment configuration for humidistat to be enabled. See below for demand mapping based on input:
<table>
<tr><th>DEHUM SWITCH INPUT STATUS</th><th>DEHUM DEMAND</th></tr>
<tr><td>Inactive</td><td>No</td></tr>
<tr><td>Active</td><td>Yes</td></tr>
</table></td><td>Single Zone</td></tr>
<tr><td>2 = RARH</td><td>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.</td><td>Any</td></tr>
<tr><td>3 = SPRH</td><td>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.</td><td>Any</td></tr>
<tr><td rowspan="2">Unoccupied Dehum.</td><td>Enable</td><td>Dehumidification can occur during the unoccupied period.</td><td>Any</td></tr>
<tr><td>Disable</td><td>Dehumidification is prevented the unoccupied period.</td><td>Any</td></tr>
<tr><td rowspan="2">Vent/None Dehum.</td><td>Enable</td><td>A dehumidify demand can exist with a vent or none demand. This configuration is recommended for most applications.</td><td>Any</td></tr>
<tr><td>Disable</td><td>A dehumidify demand is prevented with a vent or none demand.</td><td>Any</td></tr>
<tr><td rowspan="2">High Cool Dehum.</td><td>Enable</td><td>A dehumidify demand can exist with a high cool demand.</td><td>Any</td></tr>
<tr><td>Disable</td><td>A dehumidify demand is prevented with a high cool demand. This configuration is recommended for applications that prioritize space temperature over dehumidification.</td><td>Any</td></tr>
<tr><td rowspan="2">Low Cool Dehum.</td><td>Enable</td><td>A dehumidify demand can exist with a low cool demand.</td><td>Any</td></tr>
<tr><td>Disable</td><td>A dehumidify demand is prevented with a low cool demand.</td><td>Any</td></tr>
<tr><td rowspan="2">Low Heat Dehum.</td><td>Enable</td><td>A dehumidify demand can exist with a low heat demand. This configuration is only recommended for applications that prioritize dehumidification over space temperature.</td><td>Any</td></tr>
<tr><td>Disable</td><td>A dehumidify demand is prevented with a low heat demand.</td><td>Any</td></tr>
<tr><td rowspan="2">VAV Cool Dehum.</td><td>Enable</td><td>A dehumidify demand can exist with a VAV cool demand. This configuration is only recommended for applications that prioritize dehumidification over space temperature.</td><td rowspan="2">Multi-Zone</td></tr>
<tr><td>Disable</td><td>A dehumidify demand is prevented with a VAV cool demand.</td></tr>
</table>

NOTE(S):

a. Dehumidify demand is not allowed with a high heat demand.

STEP K — 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. 91 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 30 for heater configurations and applications.

STEP L — 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. 92 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 31 for exhaust fan control configurations and descriptions by application.

STEP M — CONFIGURE FREE COOLING (OPTIONAL)

For units with economizer that require 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. 93 for free cooling configuration screen layout. When finished, click the save changes button at the bottom of the screen. Basic control set up 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 32 for free cooling configurations.

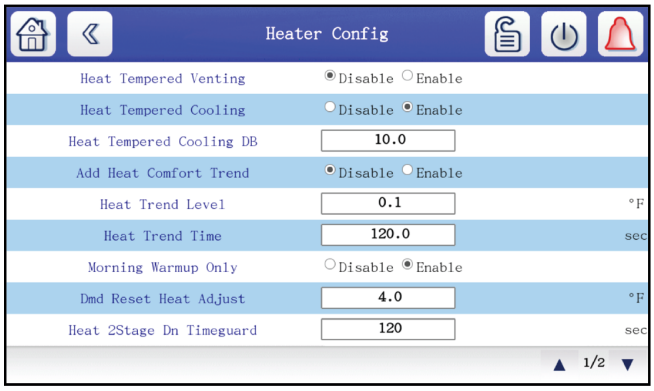


Fig. 91 — Heater Configuration Screen

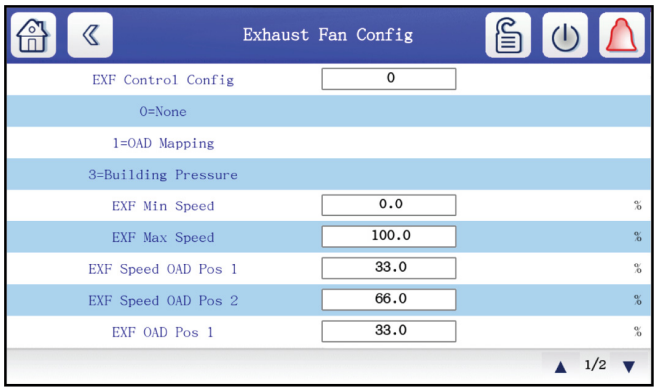


Fig. 92 — Exhaust Fan Configuration Screen

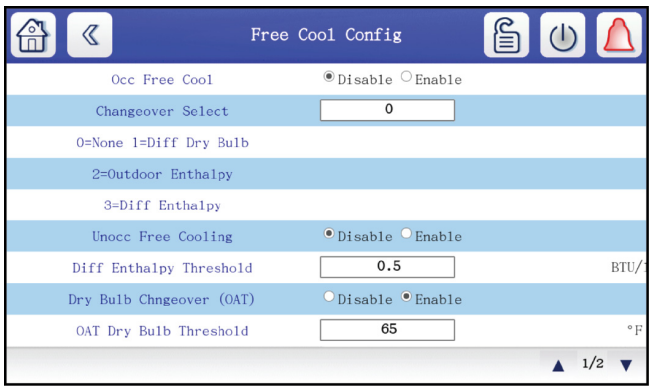


Fig. 93 — Free Cooling Configuration Screen

Table 30 — Heater Configurations by Application[a]

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Heat Tempered Venting	Enable	Requires modulating electric or hot water heat.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. NOTE: the system calculates MAT from the OAD%, OAT, and RAT if a MAT sensor isn't present.	Any
	Disable	Heat tempered vending is not performed.	Any
Heat Tempered Cooling	Enable	Requires modulating electric or hot water heat. 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.	Any
	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.	Any

NOTE(S):

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

Table 31 — Exhaust Fan Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
EXF Control Configuration	0=None	Default configuration for units without power exhaust. The exhaust fan is disabled.	All
	1=OAD Mapping	**Low, Standard, or Medium Static Exhaust** Default configuration for units with low static power exhaust with two-stage control. When the OAD is below EXF OAD Pos 1, the EXF is off. When the OAD is at or above EXF OAD Pos 1, the EXF is at EXF SPEED OAD Pos 1. When the OAD is at or above EXF OAD Pos 2, the EXF is at EXF Speed OAD Pos 2. When the OAD is closed, the EXF is off.	Single Zone
	3=Building Pressure	**Low, Standard, or Medium Static Exhaust** Default configuration for units exhaust fan with building pressure (BP) control. If the building pressure is above the BP setpoint, the EXF turns on and modulates between the minimum and maximum EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF turns off. When the OAD is closed, the EXF is off.	All
	4=Third-Party EXF Control	**Low, Standard, or Medium Static Exhaust** The EXF modulates between off or between the minimum and maximum EXF speed based on a third-party signal. When the OAD is closed, the EXF is off.	All

Table 32 — Free Cooling Configurations

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Occ. Free Cooling	Enable (Default)	The system is allowed to perform free cooling during the occupied period.	Any
	Disabled	Free cooling is not performed at any time.	Any
Unoccupied Free Cooling	Enable	Free cooling is allowed during the unoccupied period.	Any
	Disable (Default)	Free cooling is not performed during the unoccupied period.	Any
Changeover Select	0 = None (Default)	Changeover check is not used.	Any
	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.	Dry Climate
	2 = Enthalpy	The system will check the OAE (Outdoor Air Enthalpy) versus the 28 btu/lb limit to see if free cooling is allowed.	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.	Humid Climate
Diff. Dry Bulb Threshold	0 to 10°F, Default 5°F	If the changeover select is set to differential dry bulb threshold, free cooling is prevented when the OAT > RAT minus differential dry bulb threshold for 1 minute.	Dry Climate
Diff. Enthalpy Threshold	0 to 2 btu/hr., Default 0.2 btu/hr.	If the changeover select is set to differential enthalpy threshold, free cooling is prevented when the OAE > RAE minus differential enthalpy threshold for 1 minute.	Humid Climate
OADP Limit Check	Enable	The system will check the differential between the OAT and RAT to see if free cooling is allowed.	Humid Climates
	Disable (Default)	The control does not check OADP to determine if free cooling is available.	Dry Climates
OADP Threshold	50 to 62°F, Default 55°F	If the OADP limit check is enabled, free cooling is prevented when the OADP is above the OADP threshold for 1 minute.	Humid Climate
OAT Dry Bulb Limit Check	Enable (Default)	The system will check the OAT versus the OAT dry bulb limit to see if free cooling is allowed.	Any
	Disable	The control does not check OAT to determine if free cooling is available.	Any
OAT Dry Bulb Threshold	–40 to 120°F, Default 70°F	If the OAT dry bulb limit check is enabled, free cooling is prevented when the OAT is above the OAT dry bulb threshold for 1 minute.	Any

STEP N — SET INDOOR FAN SETPOINTS (OPTIONAL)

If the unit is configured for SP 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. 94 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) control (IDF Control = 3), 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 33 for indoor fan setpoints.

STEP O — 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. 95 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 34 for setpoint information and descriptions by application type.

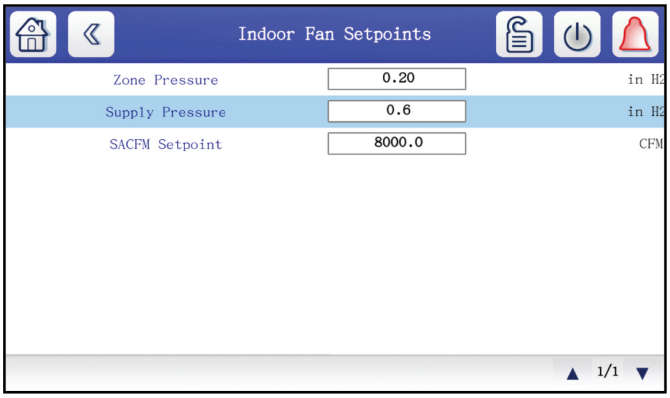


Fig. 94 — Indoor Fan Setpoints Screen

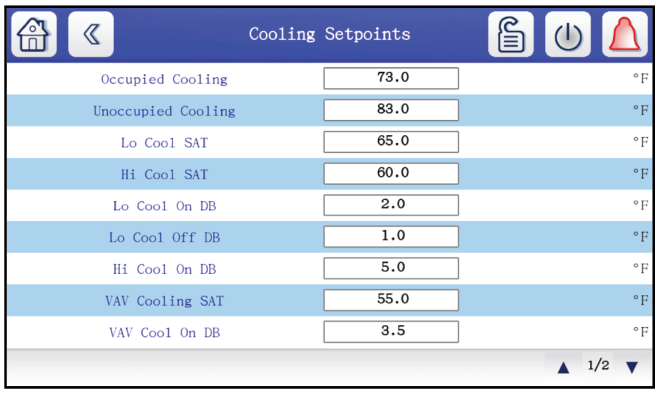


Fig. 95 — Cooling Setpoints Screen

Table 33 — Indoor Fan Setpoints

SETPOINT	RANGE	IDF CONTROL CONFIG.	DESCRIPTION
Supply Pressure	0 to 5 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.

Table 34 — Cooling Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Cooling	55 to 80°F, Default 72°F	SPT	In the occupied period, the system compares the demand source temperature to the occupied cooling setpoint and setpoint deadbands to determine cooling demands. For RAT demand source, the system uses the occupied heating setpoint during the occupied period to determine a cooling demand.
Unoccupied Cooling	55 to 110°F, Default 85°F	SPT or RAT	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, TSTAT, and unoccupied RAT	The effective SAT setpoint with a low cool demand.
High Cool SAT	45 to 75°F, Default 55°F	SPT, TSTAT, or RAT (unoccupied only)	The effective SAT setpoint with a high cool demand.
VAV Cool SAT	45 to 75°F, Default 55°F	RAT	The effective SAT setpoint with a VAV 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 unoccupied RAT	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	0.5 to 2°F, Default 1°F	SPT or unoccupied RAT	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	0.5 to 20°F, Default 2°F	SPT or unoccupied RAT	The amount that the demand source temperature needs to be above a low cool demand to initiate a high cool demand.
VAV Cool On DB	0 to 25ºF, Default 3ºF	RAT (occupied only)	The amount that the demand source temperature needs to be above the effective heating setpoint minus the low heat on deadband plus the high heat on deadband to initiate a VAV cool demand.
VAV Cool Off DB	1 to 25ºF, Default 2ºF	RAT (occupied only)	The amount that the demand source temperature needs to be below the effective heating setpoint minus the low heat on deadband, plus the high heat on deadband, plus the VAV cool on deadband initiate a VAV cool demand.

STEP P — SET DEHUMIDIFY SETPOINTS (OPTIONAL)

For units with Humidi-MiZer dehumidification, navigate to the Dehumidify Setpoints screen (***Main Menu→ Setpoints→ Dehum Setpoints***). Adjust the dehumidify setpoints based on application requirements. See Fig. 96 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 35 for setpoint information and descriptions.

STEP Q — 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. 97 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 36 for setpoint information and descriptions.

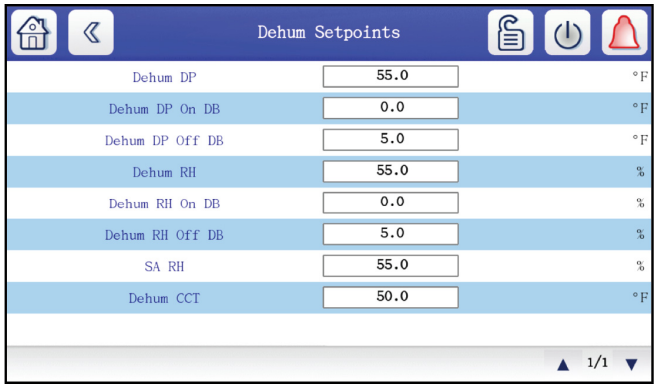


Fig. 96 — Dehumidify Setpoints Screen

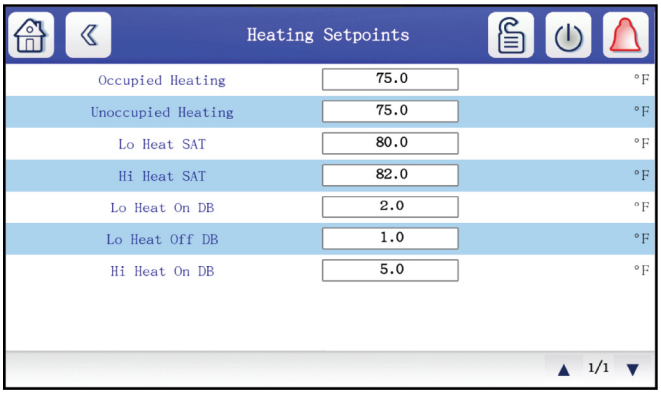


Fig. 97 — Heating Setpoints Screen

Table 35 — Dehumidify Setpoints

SETPOINT	RANGE	DEHUM DEMAND SOURCE CONFIG.	DESCRIPTION
Dehum. RH	40 to 100%, Default 60%	SPRH or RARH	The system 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 system 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 system 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 36 — Heating Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Heating	55 to 80°F, Default 68°F	SPT or RAT	The system compares the demand source temperature to the occupied heating setpoint to determine an occupied heating demand. If the demand source is set to RAT, the unit also uses the occupied heating setpoint to determine if there is a VAV cooling demand during the occupied period. See Fig. 100 for occupied RAT demand processing.
Unoccupied Heating	40 to 80°F, Default 60°F	SPT or RAT	The system compares the SPT to the occupied heating setpoint to determine an unoccupied heating demand. Only used if unoccupied indoor fan is configured for demand.
Low Heat SAT	60 to 115°F, Default 75°F	All	The effective SAT setpoint with a low heat demand.
High Heat SAT	60 to 125°F, Default 85°F	All	The effective SAT setpoint with a high heat demand.
Low Heat On DB	0 to 2°F, Default 1°F	SPT or RAT	The amount that the demand source temperature needs to be below the effective heating setpoint to initiate a low heat demand. Also used as part of VAV cooling determination during the occupied period with RAT demand source.
Low Heat Off DB	0.5 to 2°F, Default 1°F	SPT or RAT	The amount that the demand source temperature needs to be above the effective heating setpoint to stop a low heat demand. Also used as part of VAV cooling determination during the occupied period with RAT demand source.
High Heat On DB	0.5 to 20°F, Default 2°F	SPT or RAT	The amount that the demand source temperature needs to be below a low heat demand to initiate a high heat demand.

STEP R — SET EXHAUST FAN SETPOINTS (OPTIONAL)

For units with exhaust fans configured for building pressure control, 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. 98 for exhaust fan setpoint 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 37 for setpoint information and descriptions.

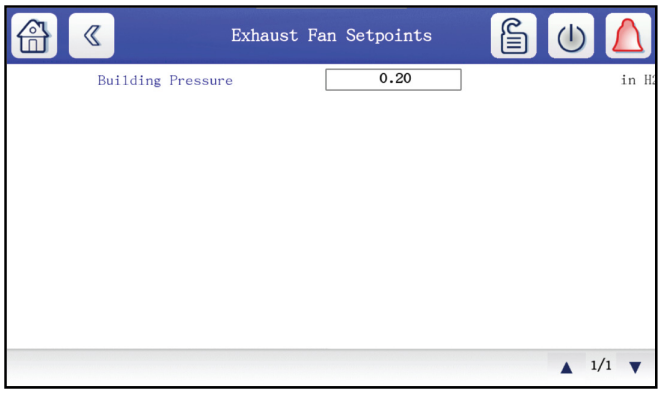


Fig. 98 — Exhaust Fan Setpoints Screen

STEP S — SET UP OCCUPANCY CONTROL

Set up 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 local schedule 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 8 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. 99, 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).

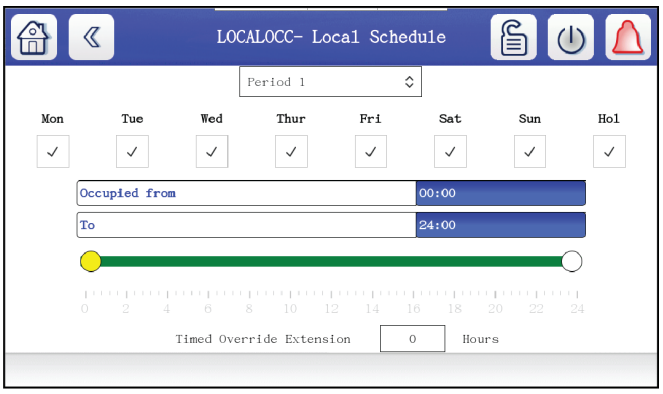


Fig. 99 — Local Schedule Screen

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 23 and 24 on TB5. Refer to Fig. 60 for TB5 wiring details. When the inputs show open, the unit is unoccupied. When the input show closed (short), the unit is occupied. See Table 38 for remote switch configuration details.

Table 37 — Exhaust Fan Setpoints

SETPOINT	RANGE	DEFAULT	DEMAND SOURCE	DESCRIPTION	APPLICATION
Building Pressure	–0.25 in. to 0.25 in.	0.03 in.	Building Pressure Control (BP)	The unit compares the building pressure reading to the building pressure setpoint for exhaust fan speed modulation.	All

Table 38 — Remote Switch Configuration

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

OPERATION

Prior to enabling full unit operation, Carrier recommends performing an air balance, completing the pre-start-up checklist, startup-checklist, and the start-up log. See CL-1 for detailed information.

Temporary Operation for an Under-Construction Building

This product is not designed to operate in a construction environment. Extensive equipment damage can be caused by operating this equipment while construction, renovation, or remodeling is occurring in the space or near the equipment. Carrier recommends using equipment designed for specific construction duty or specialized application duty based on the construction or application need.

Temporary Operation During Building Finishing

The unit heat source may be used for temporary operation during the finishing stages of construction. See "Temporary heater Operation POST-Construction" on page CL-10 for checklist.

Temporary Operation with a Generator

Due to the sensitive nature of the electronic devices uses on packaged HVAC systems, Carrier does not recommend powering the unit with a generator for extended periods. Generator power should only be used for temporary, emergency operation.

Temporary Operation for a Completed Building

Carrier does not recommend operating the supply fan, cooling, dehumidification, or heating systems of this equipment prior to equipment start-up and air balancing being performed. Operating the equipment prior to start-up can cause damage to the equipment. Damages caused by improper operation is not covered under Carrier's standard or extended warranties.

If temporary operation of equipment is required, Carrier recommends performing a start-up on the equipment system that requires temporary operation, such as heating or cooling. Performing a start-up on the system will help ensure proper operation. Consider the following if operating the unit before the system is full commissioned:

1. Ensure all duct systems are connected and complete.
2. Ensure all air terminal units (VAV or VVT boxes) and fire dampers are fully open.
3. Verify sufficient power and hot water (for hot water heat) service.
4. Verify the minimum cooling and heating airflows are achieved during operation. Refer to the unit product data and fan tables for fan speeds by unit size and type.
5. Verify the fan max. static pressure is not exceeding during operation. Refer to the unit product data and fan tables.
6. If the appropriate sensors have not been installed for normal operation, consider unit control using a field provided and installed thermostat or using the factory installed RAT sensor.
    a. Setup the cool/heat demand source for TSTAT or RAT. See "STEP I — CONFIGURE THE COOLING SYSTEM" on page 90 of the Control Quick Setup Section on page 81.
    b. For intermittent supply fan and no ventilation (outdoor air), leave the unit in the unoccupied period and configure the unoccupied IDF to demand. See "STEP G — CONFIGURE INDOOR FAN" on page 85 of the Control Quick Setup Section on page 81.
    c. For constant supply fan and ventilation (outdoor air), configure a unit schedule and configure the occupied IDF for continuous. See "STEP G — CONFIGURE INDOOR FAN" on page 85 of the Control Quick Setup Section on page 81.
    d. If cooling or heating are not required during temporary operation, lockout the operation using capacity limiting.
    a. Login with the user access level (1111).
    b. Navigate to the Demand/Capacity Limit screen ***((Main Menu → System Config→ Demand/Capacity Limit)***
    c. Set the Capacity Limit Source to 1 (Setpoint).
    d. Set the Max. Cool Capacity to 0 to lock out cooling or set the Max. Heat Capacity to 0 to lock out heating.
7. If the unit will be operating for extended periods, maintenance must be performed on the equipment to ensure proper operation. Damage or failures that can be attributed to improper maintenance or lack of maintenance is not covered under warranty.
8. The equipment warranty starts at the first period of unit operation, which includes temporary operation.

Normal Operation

To enable full unit operation:

1. Login using the user access password (1111).
2. Navigate to Start/Stop screen ( ).
3. Press Enable Unit to enable unit operation.
4. Set the Auto Restart configuration to On to automatically enable unit upon the next power on, or to Off to automatically disable unit upon next power on.

SEQUENCE OF OPERATION

50V Series units can provide cooling, heating, optional dehumidification, optional ventilation, and optional building pressure control for single-zone and multi-zone applications. The sequence of operation will depend on the operating period (occupied or unoccupied), the unit configuration, and the control configurations.

The system provides supply air temperature (SAT) based cooling and heating operation. For systems without a SAT sensor, the direct expansion leaving air temperature (DX-LAT) sensor is used instead. The unit monitors the control inputs and compares space conditions to user adjustable setpoints to determine if there is a demand for cooling or heating. Once a demand for cooling or heating is established, the control sets an effective supply air temperature control point based on the active demand level and user adjustable setpoints. Based on the current operating conditions, the control will enable a cooling or heating mode to achieve the supply air temperature control point.

For units with two-stage heating, operation is based directly on the demand level. The unit monitors the control inputs and compares space conditions to user adjustable setpoints to determine if there is a demand for heating. Once a demand for heating is established, the control select the heating stage based on the demand level.

For units with Humidi-MiZer dehumidification, operation is based on cooling coil leaving air temperature (CCT). The unit monitors the control inputs and compares space conditions to user adjustable setpoints to determine if there is a demand for dehumidification. Once a demand for dehumidification is established, the control sets an effective cooling coil temperature control point based on a user adjustable setpoint. Based on the current operating conditions, the control will enable cooling to achieve the cooling coil temperature control point. The Humidi-MiZer bypass valve is then modulated based on the active cooling or heating demand to maintain the supply air temperature at the supply air temperature control point.

Refer to the following for unit sequence of operation by period and configuration.

Cool/Heat Demand Sources

RETURN AIR TEMPERATURE (RAT)

The control monitors the RAT and compares the reading to the occupied heating and unoccupied cooling and heating setpoints to determine if there is a VAV Cool (occupied only), Low Cool (unoccupied only), High Cool (unoccupied only), Low Heat, or High Head demand. Deadbands are used to adjust when the demand starts and stops versus the cooling and heating setpoints. During the occupied period, if there is not a cool or heat demand and the IDF is on, the demand is set to Vent. If the IDF is off during the unoccupied period, the demand is set to None. RAT is recommended for multi-zone VAV applications. Can also be used for single-zone VAV applications (except single-zone VAV).

See Table 39 for available demands for the RAT cool/heat demand source, the start and stop conditions for each demand, and the applicable supply air temperature setpoint. See Fig. 100 and 101 for RAT demand processing.

SPACE TEMPERATURE (SPT)

The control monitors the SPT and compares the reading to the occupied and unoccupied cooling and heating setpoints to determine if there is a Low Cool, High Cool, Low Heat, or High Heat demand. Deadbands are used to adjust when the demand starts and stops versus the cooling and heating setpoints. During the occupied or unoccupied period, if there is not 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. SPT is recommended for single-zone applications with a space temperature sensor. SPT is required for single-zone VAV.

See Table 40 for available demands for the SPT cool/heat demand source. See Fig. 102 for SPT demand processing.

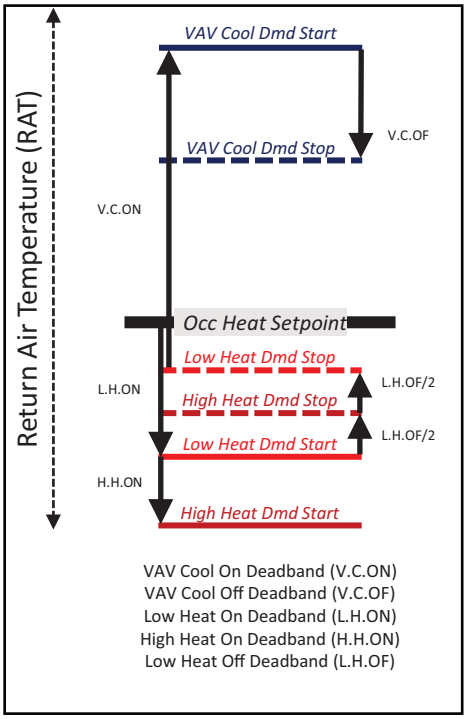


Fig. 100 — Occupied RAT Demand Processing

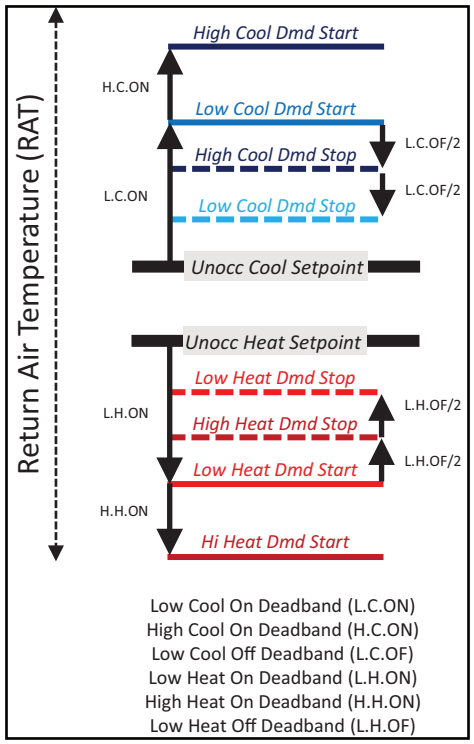


Fig. 101 — Unoccupied RAT Demand Processing

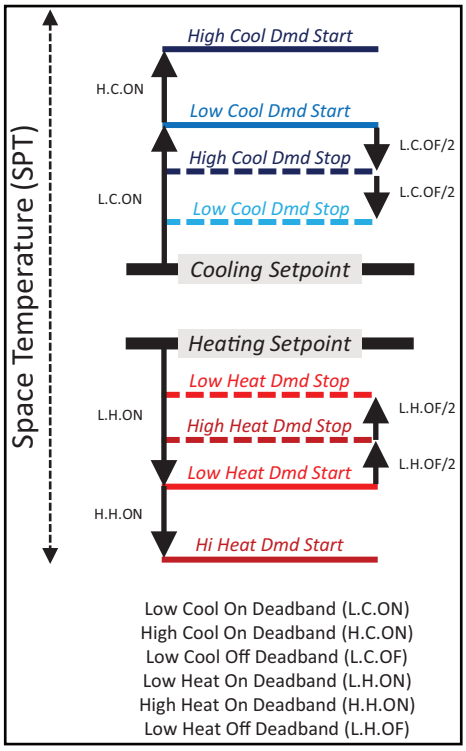


Fig. 102 — SPT Demand Processing

THERMOSTAT (TSAT)

The control monitors the thermostat inputs (Y1, Y2, W1, W2) to determine if there is a Low Cool, High Cool, Low Heat, or High Heat demand. During the occupied period, if there is not 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. TSTAT is recommended for single-zone applications with a thermostat or for third-party control of unit cooling and heating.

See Table 41 for available demands for the RAT cool/heat demand source.

Table 39 — RAT Demand Levels

DEMAND	START CONDITION	STOP CONDITION
None	Unoccupied only. There is no cool or heat demand.	Vent, VAV Cool, Low Cool, or Low Heat demand starts.
Vent	Occupied only. RAT is below the Occupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband and above the Occupied Heating setpoint minus the Low Heat On deadband.	VAV Cool or Low Heat demand starts.
VAV Cool	Occupied only. RAT rises above the Occupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband.	RAT drops below the Occupied or Unoccupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband, minus the VAV Cool Off deadband.
Low Cool	Unoccupied only. RAT rises above the Unoccupied Cooling setpoint plus the Low Cool On deadband.	RAT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband or a High Cool demand starts.
High Cool	Unoccupied only. RAT rises above the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband.	RAT 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.
Low Heat	RAT drops below the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	RAT rises above the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband plus the Low Heat Off deadband or High Heat demand starts.
High Heat	RAT drops below the Unoccupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband.	RAT 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 40 — SPT Demand Levels

DEMAND	START CONDITION	STOP CONDITION
	OCCUPIED PERIOD	
None	There is no cool or heat demand.	A Vent, Low Cool, or Low Heat demand starts.
Vent	SPT is below the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband, and above the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	Low Cool or Low Heat demand starts.
Low Cool	SPT rises above the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband.	SPT drops below the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband or a High Cool demand starts.
High Cool	SPT rises above the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband.	SPT drops below the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband.
Low Heat	SPT drops below the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	SPT rises above the Occupied or Unoccupied 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 Unoccupied 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 41 — TSAT Demand Levels

DEMAND	START CONDITION	STOP CONDITION
None	No thermostat inputs are active and the indoor fan is configured for demand during the occupied or unoccupied period or the indoor fan is configured for disabled during the occupied period.	Y1, Y2, W1, or W2 input becomes active.
Vent	The G input is active or the system is occupied and the unit is configured for continuous indoor fan during the occupied period.	Y1, Y2, W1, or W2 input become active.
Low Cool	Y1 input is active.	Y1 input deactivates.
High Cool	Y1 and Y2 inputs are active.	Y2 input deactivates.
Low Heat	W1 input is active.	W1 input deactivates.
High Heat	W1 and W2 inputs are active.	W2 input deactivates.

Dehumidify Demand Sources

RETURN AIR RELATIVE HUMIDITY (RARH)

The control monitors RARH and compares it to the dehumidify relative humidity 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. RARH is recommended for single or multi-zone applications. See Table 42 for RARH demand levels and Fig. 103 for RARH demand determination.

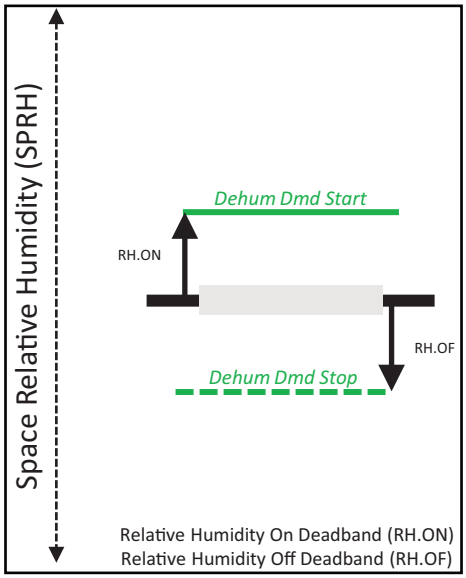


Fig. 103 — RARH Demand Processing

SPACE RELATIVE HUMIDITY (SPRH)

The control monitors SPRH and compares it to the dehumidify relative humidity 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. SPRH is recommended for single-zone applications. See Table 42 for SPRH demand levels and Fig. 104 for SPRH demand determination.

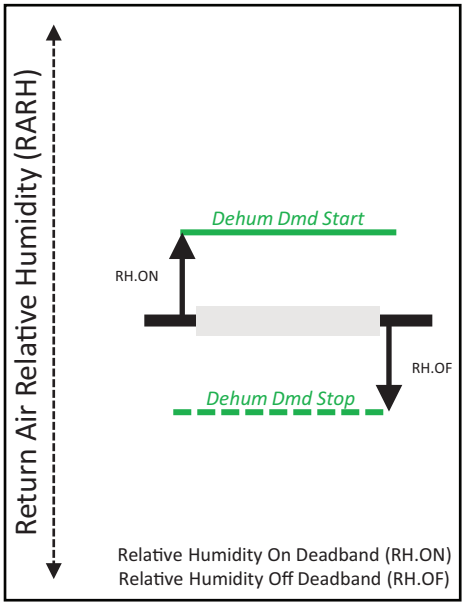


Fig. 104 — SPRH Demand Processing

HUMIDISTAT (HSTAT)

The control monitors the dehumidify input to determine if there is a dehumidify demand. A dehumidify demand can co-exist with a cool demand or a vent demand. A Dehumidify demand can co-exist with a VAV Cool, Low Cool, High Cool, Vent, or Low Heat demand. Recommended for single-zone applications or third-party control of unit dehumidification. See Table 43 for available demands for HSTAT demand source.

Indoor Fan

CONSTANT VOLUME (CV)

Constant volume indoor fan is recommended for sound sensitive or process applications, where allowed by code. See Table 44 for sequence of operation.

Table 42 — RARH and SPRH Demand Levels[a]

DEMAND	START CONDITION	STOP CONDITION
Vent/Dehum.	There is a Vent or None demand, and the RH rises above the Dehumidify RH setpoint by the Dehumidify RH deadband.	The RH drops below the Dehumidify RH setpoint minus the Dehumidify Off deadband or a VAV Cool, Low Cool, or Low Heat demand starts.
Low Cool/Dehum.	There is a Low Cool demand, and the RH rises above the Dehumidify RH setpoint by the Dehumidify RH deadband.	The RH drops below the Dehumidify RH setpoint minus the Dehumidify Off deadband or High Cool demand starts, or Low Cool demand stops.
High Cool/Dehum.	There is a High Cool demand, and the RH rises above the Dehumidify RH setpoint by the Dehumidify RH deadband.	The RH drops below the Dehumidify RH setpoint minus the Dehumidify Off deadband or High Cool demand stops.
VAV Cool/Dehum.	There is a VAV Cool demand, and the RH rises above the Dehumidify RH setpoint by the Dehumidify RH deadband.	The RH drops below the Dehumidify RH setpoint minus the Dehumidify Off deadband or VAV Cool demand stops.
Low Heat/Dehum.	There is a Low Heat demand, and the RH rises above the Dehumidify RH setpoint by the Dehumidify RH deadband.	The RH drops below the Dehumidify RH setpoint minus the Dehumidify Off deadband or Low Heat demand stops, or High Heat demand starts.

NOTE(S):

a. A dehumidification demand is prevented with a high heat demand.

Table 43 — HSTAT Demand Levels[a]

DEMAND	START CONDITION	STOP CONDITION
Vent/Dehum.	H input is active.	Y1 or W1 input activates **OR** H input deactivates.
Low Cool/Dehum.	Y1 and H inputs active.	Y2 input activates, **OR** Y1 or H input deactivates.
High Cool/Dehum.	Y1, Y2, and H inputs are active.	Y2 or H inputs deactivate.
Low Heat/Dehum.	W1 and H inputs active.	W1 input activates or H input deactivates **OR** W2 input activates.

NOTE(S):

a. A dehumidification demand is prevented with a high heat demand.

Table 44 — CV Indoor Fan Sequence of Operation

CCUPANCY	IDF CONFIG.	DEMAND	OPERATION
Occupied	Continuous Occupied IDF	Vent, Cool, or Dehum.	The IDF operates at the High Cool IDF speed.
		Heat	The IDF operates at the High Heat IDF speed.
	Occ IDF Intermittent	None	The IDF is off.
		Vent, Cool, or Dehum.	The IDF operates at the High Cool IDF speed.
		Heat	The IDF operates at the High Heat IDF speed.
Unoccupied	Disabled Unoccupied IDF	All	The IDF is off.
	Intermittent Unoccupied IDF[a]	None	
		Vent, Cool, or Dehum.	The IDF operates at the High Cool IDF speed.
		Heat	The IDF operates at the High Heat IDF speed.

NOTE(S):

a. For units configured for unoccupied RAT cool/heat demand, the indoor fan is turned on for 10 minutes to recirculate air though the space, once an unoccupied demand is initiated. If the demand persists after 10 minutes, a mode is selected to satisfy the demand. If the demand does not persist after 10 minutes, the indoor fan shuts off.

STAGED AIR VOLUME (SAV) CAPACITY

Staged air volume capacity indoor fan is recommended for single-zone applications with low sensible heat ratio. This is the default setting for units ordered as SAV. See Table 45 for sequence of operation.

SUPPLY PRESSURE CONTROL (SP)

Supply pressure indoor fan control is recommended for multi-zone applications with air terminal units. SP control can also be used for true constant volume operation to account for filter loading. This is the default setting for units ordered as VAV. See Table 46 for sequence of operation.

THIRD-PARTY INPUT CONTROL (THIRD-PARTY)

Third-party input control allows a third-party system to enable and disable the indoor fan and modulate the fan speed under most conditions. The G fan input is used to command the IDF on and off. The third-party IDF input is used for the fan speed control. See Table 47 for sequence of operation.

SINGLE ZONE VAV (SZ-VAV)

Single-zone VAV is recommended for single-zone applications with high sensible loads or that are sound sensitive to fan staging. See Table 48 for sequence of operation.

Table 45 — SAV Demand Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONDITION	OPERATION
Occupied	Continuous Occupied IDF	Vent	All	The IDF operates at the Min IDF Speed.
		Low Cool, High Cool, VAV Cool	Min. Cool Capacity	The IDF operates at the Min IDF Speed.
			Low Cool Capacity	The IDF operates at the Low Cool IDF Speed.
			Med. Cool Capacity	The IDF operates at the Med Cool IDF Speed.
			High Cool Capacity	The IDF operates at the High Cool IDF Speed.
		Low Cool	Free Cooling	The IDF operates at the Low Cool IDF Speed.
		High Cool, VAV Cool	Free Cooling	The IDF operates at the High Cool IDF Speed.
		Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	All	The IDF operates at the Low Heat IDF Speed.
		High Heat	All	The IDF operates at the High Heat IDF Speed.
	Intermittent Occupied IDF	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min IDF Speed.
		Low Cool, High Cool, VAV Cool	Min. Cool Capacity	The IDF operates at the Min IDF Speed.
			Low Cool Capacity	The IDF operates at the Low Cool IDF Speed.
			Med. Cool Capacity	The IDF operates at the Med Cool IDF Speed.
			High Cool Capacity	The IDF operates at the High Cool IDF Speed.
		Low Cool	Free Cooling	The IDF operates at the Low Cool IDF Speed.
		High Cool, VAV Cool	Free Cooling	The IDF operates at the High Cool IDF Speed.
		Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	All	The IDF operates at the Low Heat IDF Speed.
		High Heat	All	The IDF operates at the High Heat IDF Speed.
Unoccupied	Disabled Unoccupied IDF	All	All	The IDF is off.
	Intermittent Unoccupied IDF[a]	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min IDF Speed.
		Low Cool, High Cool, VAV Cool	Min. Cool Capacity	The IDF operates at the Min IDF Speed.
			Low Cool Capacity	The IDF operates at the Low Cool IDF Speed.
			Med. Cool Capacity	The IDF operates at the Med Cool IDF Speed.
			High Cool Capacity	The IDF operates at the High Cool IDF Speed.
		Low Cool	Free Cooling	The IDF operates at the Low Cool IDF Speed.
		High Cool, VAV Cool	Free Cooling	The IDF operates at the High Cool IDF Speed.
		Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	All	The IDF operates at the Low Heat IDF Speed.
		High Heat	All	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For units configured for RAT cool/heat demand, the indoor fan is turned on for 10 minutes to recirculate air though the space, once an unoccupied demand is initiated. If the demand persists after 10 minutes, a mode is selected to satisfy the demand. If the demand does not persist after 10 minutes, the indoor fan shuts off.

Table 46 — Supply Pressure Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONFIGURATION	OPERATION
Occupied	Continuous Occupied IDF	Vent Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF ramps between min. and max. IDF speed to maintain the supply pressure at the supply pressure control point.
		Low Heat, High Heat	Modulating/Multi-Stage Heat	The IDF ramps between min. and max. IDF speed to maintain the supply pressure at the supply pressure control point.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed.
Unoccupied	Disabled Unoccupied IDF	All	All	The IDF is off.
	Intermittent Unoccupied IDF[a]	Vent Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF ramps between min. and max. IDF speed to maintain the supply pressure at the supply pressure control point.
		Low Heat, High Heat	Modulating/Multi-Stage Heat	The IDF ramps between min. and max. IDF speed to maintain the supply pressure at the supply pressure control point.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For units configured for RAT cool/heat demand, the indoor fan is turned on for 10 minutes to recirculate air though the space, once an unoccupied demand is initiated. If the demand persists after 10 minutes, a mode is selected to satisfy the demand. If the demand does not persist after 10 minutes, the indoor fan shuts off.

Table 47 — Third-Party Input Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONFIGURATION	OPERATION
Occupied	Continuous or intermittent Occupied IDF	All	All	The IDF is off.
		Vent Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF ramps between min and max IDF speed based on a third-party input signal. The G input must be active to enable the IDF.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed. The G input must be active to enable the IDF.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed. The G input must be active to enable the IDF.
Unoccupied	Disabled Unoccupied IDF	All	All	The IDF is off.
	Intermittent Unoccupied IDF[a]	Vent Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF ramps between min and max IDF speed based on a third-party input signal. The G input must be active to enable the IDF.
		Low Heat, High Heat	Modulating/Multi-Stage Heat	The IDF ramps between min and max IDF speed based on a third-party input signal. The G input must be active to enable the IDF.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed. The G input must be active to enable the IDF.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed. The G input must be active to enable the IDF.

NOTE(S):

a. For units configured for RAT cool/heat demand, the indoor fan is turned on for 10 minutes to recirculate air though the space, once an unoccupied demand is initiated. If the demand persists after 10 minutes, a mode is selected to satisfy the demand. If the demand does not persist after 10 minutes, the indoor fan shuts off.

Table 48 — Single-Zone VAV Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONFIGURATION	OPERATION
Occupied	Continuous Occupied IDF	Vent	All	The IDF operates at the Min IDF Speed.
		Low Cool	All	The IDF modulates between the Low Cool IDF speed and the High Cool IDF speed based on the space temperature vs the effective cooling setpoint.
		High Cool, Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	Modulating/Multi-Stage Heat	The IDF modulates between the Low Heat IDF speed and the High Heat IDF speed based on the space temperature vs the effective cooling setpoint.
		High Heat	Modulating/Multi-Stage Heat	The IDF operates at the High Heat IDF Speed.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed.
	Intermittent Occupied IDF	None		The IDF is off.
		Vent		The IDF operates at the Min IDF Speed.
		Low Cool	All	The IDF modulates between the Low Cool IDF speed and the High Cool IDF speed based on the space temperature vs the effective cooling setpoint.
		High Cool, Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	Modulating/Multi-Stage Heat	The IDF modulates between the Low Heat IDF speed and the High Heat IDF speed based on the space temperature vs the effective cooling setpoint.
		High Heat	Modulating/Multi-Stage Heat	The IDF operates at the High Heat IDF Speed.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed.
Unoccupied	Disabled Unoccupied IDF	All	All	The IDF is off.
	Intermittent Unoccupied IDF[a]	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min IDF Speed.
		Low Cool	All	The IDF modulates between the Low Cool IDF speed and the High Cool IDF speed based on the space temperature vs the effective cooling setpoint.
		High Cool, Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	Modulating/Multi-Stage Heat	The IDF modulates between the Low Heat IDF speed and the High Heat IDF speed based on the space temperature vs the effective heating setpoint.
		High Heat	Modulating/Multi-Stage Heat	The IDF operates at the High Heat IDF Speed.
		Low Heat	2-Stage Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	2-Stage Heat	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For units configured for RAT cool/heat demand, the indoor fan is turned on for 10 minutes to recirculate air though the space, once an unoccupied demand is initiated. If the demand persists after 10 minutes, a mode is selected to satisfy the demand. If the demand does not persist after 10 minutes, the indoor fan shuts off.

Cooling and Heating Modes

All cooling, modulating heating, and venting modes operate to maintain the unit supply air temperature (SAT) at the SAT control point, which is selected based on the effective demand level SAT setpoint plus any applicable SAT resets. For example, if the current demand was VAV Cool, the VAV cool SAT setpoint was 55°F, and there was a 2°F active SAT reset, the SAT control point would be 57°F and the system would select a cooling mode based on the current operating conditions to bring the SAT to the SAT control point. For units without an SAT sensor (2-stage heat), the DX LAT sensor is used as the SAT.

NOTE: Two-stage heat modes operate based directly on the demand level.

NOTE: Cooling and heating will only occur during the unoccupied period if the indoor fan is configured for intermittent unoccupied operation.

MECHANICAL COOLING

Mechanical cooling mode uses the unit cooling circuit (compressors, evaporator, condenser fans, condenser, EXVs) to provide cooling. See Table 49 for mechanical cooling mode operation.

HEAT TEMPERED COOLING MODE

For units in cold climates in applications with constant cooling loads, the modulating/multi-stage heat source can be used to prevent delivery of very cold air to the space with a cooling demand. See Table 50 for heat tempered cooling mode operation.

VENTING MODES

Venting mode is intended to provide neutral ventilation air to the space when ventilation is required but there is no active cooling or heating demand. See Table 51 for venting mode operation.

MODULATING HEATING MODE

The modulating/multi-stage heat source is used to provide heating based on the effective SAT control point. See Table 52 for modulating heating mode operation.

TWO-STAGE HEATING MODE

The two-stage heat source is used to provide demand-based heating operation when there is a heat demand. See Table 53 for two-stage heating mode operation.

Table 49 — Mechanical Cooling Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Cool, High Cool, VAV Cool	Free cooling is unavailable, the cooling system is available, and the MAT is above the SAT control point.	Mechanical Cooling	The mechanical cooling system is enabled, and the compressors are modulated/staged to maintain the unit SAT at the SAT control point.

Table 50 — Heat Tempered Cooling Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Cool, High Cool, VAV Cool	The unit has modulating heat, heat is available, and the MAT is below the SAT control point minus the Heat Tempering deadband.	Heat Tempered Cooling	The heating system is enabled and modulates to maintain the unit SAT at the SAT control point.

Table 51 — Venting Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
None	All	None	None
Vent	The MAT is within the Vent SAT setpoint ± the Vent deadband **OR** if the unit has two-stage heat and the MAT is below the MAT control point minus the Vent deadband.	Fan Only Venting	Cooling and heating are disabled.
	Cooling is available and the MAT is above the Vent SAT setpoint plus the Vent deadband.	Cool Tempered Venting	The mechanical cooling system is enabled, and the compressors are modulated/staged to maintain the unit SAT at the Vent SAT setpoint.
	The unit has modulating heat, heating is available, and the MAT is below the Vent SAT setpoint minus the Vent deadband.	Heat Tempered Venting	The mechanical cooling system is enabled, and the compressors are modulated/staged to maintain the unit SAT at the Vent SAT setpoint.

Table 52 — Modulating Heating Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Heat, High Heat	The unit has modulating/multi-stage heat, heating is available, and the MAT is below the SAT control point.	Modulating Heating	The heating system is enabled and modulates to maintain the unit SAT at the SAT control point.

Table 53 — Two-Stage Heating Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Heat	The unit has two-stage heat and heating is available.	Two-Stage Heating	Heat stage 1 is enabled.
High Heat	The unit has two-stage heat and heating is available.	Two-Stage Heating	Heat stage 2 is enabled.

Dehumidification Modes

For units with Humidi-Mizer, the cooling system operates to maintain the air leaving the evaporator coil at the dehumidify cool coil temperature (CCT) control point and the supply air temperature (SAT) at the SAT control point based on the active cooling or heating demand. Configurations are provided to allow the user to select when dehumidification can be performed based on the active cool/heat demand and occupancy. Dehumidification is never performed with a high heat demand.

NOTE: Dehumidification will only occur during the unoccupied period if the indoor fan is configured for intermittent unoccupied operation. See Table 54 for dehumidification checks and Table 55 for sequence of operation.

Outdoor Air Damper

Units with an economizer include an actuated outdoor air damper (OAD) and return air damper (RAT). The economizer can be configured for ventilation control and free cooling operation.

VENTILATION

When the economizer is configured to provide ventilation, the outdoor air damper opens during the occupied period. The outdoor air damper is controlled to a ventilation position based on the selected configuration. The OAD typically does not provide ventilation during the unoccupied period and is closed. See Table 56 for a list of outdoor air damper ventilation control configurations and the associated sequence of operation.

FREE COOLING

The economizer can be configured to provide free cooling during the occupied or unoccupied periods. A series of user adjustable checks are available to determine if free cooling is available. If any of the enabled checks prevent free cooling, then free cooling is made unavailable. See Table 57 for a list of available free cooling checks. See Table 58 for free cooling sequence of operation.

Exhaust Fan

For units with an exhaust fan (EXF), the EXF can be configured to provide building pressure control based on OAD position, a third-party input signal, or a building pressure sensor. The EXF is on whenever the OAD is open. The EXF is off whenever the OAD is closed. See Table 59 for exhaust fan sequence of operation.

OTHER OPERATION FUNCTION

See the Controls, Operation, and Troubleshooting guide for guidance on additional operating functions and configurations.

Table 54 — Dehumidification Checks

NAME	ALLOW DEHUMIDIFICATION	PREVENT DEHUMIDIFICATION
Vent Dehum.	With Vent demand, if enabled.	With Vent demand, if disabled.
VAV Cool Dehum.	With VAV Cool demand, if enabled.	With VAV Cool demand, if disabled.
Low Cool Dehum.	With Low Cool demand, if enabled.	With Low Cool demand, if disabled.
High Cool Dehum.	With High Cool demand, if enabled.	With High Cool demand, if disabled.
Low Heat Dehum.	With Low Heat demand, if enabled.	With Low Heat demand, if disabled.
Unoccupied Dehum.	During unoccupied, if enabled.	During unoccupied, if disabled.

Table 55 — Humidi-MiZer Dehumidification Sequence of Operation

DEMAND	CONDITION	MODE	COOLING OPERATION	HUMIDI-MIZER OPERATION
Vent/ Dehumidify	If cooling and dehumidification are available.	Mechanical Dehumidification	Compressors are enabled and modulate/stage to maintain the CCT at the Dehum. CCT setpoint.	The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the Vent SAT setpoint.
Low Cool/Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the Low Cool setpoint.
High Cool/Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the High Cool setpoint.
VAV Cool/Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the VAV Cool SAT setpoint.
Low Heat/Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the Low Heat SAT setpoint.

Table 56 — Ventilation Control Sequence of Operation

VENTILATION	DEMAND	OPERATION
None	All	The OAD is closed.
IDF Mapping	None	The OAD is closed.
	All Other	The OAD ventilation position is modulated based on IDF speed and a linear curve for the OAD position, calculated from four user-adjustable configurations for IDF vent speeds and OAD vent positions. For example, when the indoor fan speed is at the IDF Vent Speed 2 configured speed, the OAD is set to the OAD Vent Position 2 configured position.
2=Third-Party Full	None	The OAD is closed.
	All Other	The OAD position is modulated between minimum and maximum OAD positions based on a third-party analog input. Free cooling and IAQ overrides are disabled and will not override the commanded OAD position.
3=Third-Party Vent Only	None	The OAD is closed.
	All Other	The OAD ventilation position is modulated between minimum and maximum OAD positions based on a third-party analog input. Free cooling and IAQ overrides can increase the OAD position above the ventilation position.

Table 57 — Free Cooling Checks

NAME	CHECK	ALLOW FREE COOL	PREVENT FREE COOL
Dry Bulb Limit	OAT vs Setpoint	OAT is at or below the OAT Dry Bulb Limit setpoint for 1 minute.	OAT is above the OAT Dry Bulb Limit setpoint.
Changeover (Select 1)	OAE	If OAE is at or below 28 btu/lb for 1 minute.	If OAE is above 28 btu/lb.
	Differential Enthalpy[a] (OAE vs RAE)	OAE is at or below the RAE minus the Diff. Enth. deadband for 1 minute.	OAE is above the RAE minus the Diff Enth deadband.
	Differential Dry Bulb (OAT vs RAT)	OAT is at or below the RAT minus the Diff DB deadband for 1 minute.	OAT is above the RAT minus the Diff DB deadband.
Dew Point Limit	OADP vs Setpoint[a]	OADP is at or below the Dew Point Limit configuration for 1 minute.	OADP is above the Dew Point Limit configuration.
Occupied Free Cooling	Occupancy period	If occupied free cooling is enabled and the current period is occupied.	If occupied free cooling is disabled and the current period is occupied.
Unoccupied Free Cooling	Occupancy period	If unoccupied free cooling is enabled and the current period is unoccupied.	If unoccupied free cooling is disabled and the current period is unoccupied.

NOTE(S):

a. Requires humidity and enthalpy sensing option for OARH and RARH sensors.

Table 58 — Free Cooling Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
All	Free cooling not available.	All	Free cooling is disabled, the OAD operates at the ventilation position.
Vent, Low Heat, High Heat, Dehumidify	Free cooling available.	All	Free cooling is disabled, the OAD operates at the ventilation position.
Low Cool, High Cool, VAV Cool	Free cooling is available, the OAT is below the SAT control point.	Free Cooling	The OAD modulates between the ventilation position and max position to maintain the SAT at the SAT control point.
Low Cool, High Cool, VAV Cool	Free cooling is available, the OAT is above the SAT control point.	Integrated Free Cooling	The lowest stage of compression is turned on and the OAD is modulated between the ventilation position and the max. position to maintain the SAT at the SAT control point. Once the OAD reaches the maximum position, the compressors are allowed to ramp up.

Table 59 — Exhaust Fan Sequence of Operation

EXF CONTROL	CONDITION	OPERATION
None	All	The EXF is off.
OAD Mapping	Low, Standard, or Medium Static Exhaust	When the OAD is below EXF OAD position1, the EXF if off. When the OAD is at or above EXF OAD position 1, the EXF is at EXF speed at OAD 1. When the OAD is at or above EXF OAD position 2, the EXF is at EXF speed at OAD 2. When the OAD is closed, the EXF is off.
Building Pressure	Low, Standard, or Medium Static Exhaust	If the building pressure is above the BP setpoint, the EXF turns on and modulates between the minimum and maximum EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF turns off. When the OAD is closed, the EXF is off.
Third-Party Input	Low, Standard, or Medium Static Exhaust	The EXF modulates between off and the max EXF speed based on a third-party signal. When the OAD is closed, the EXF is off.

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, EXVs, 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.

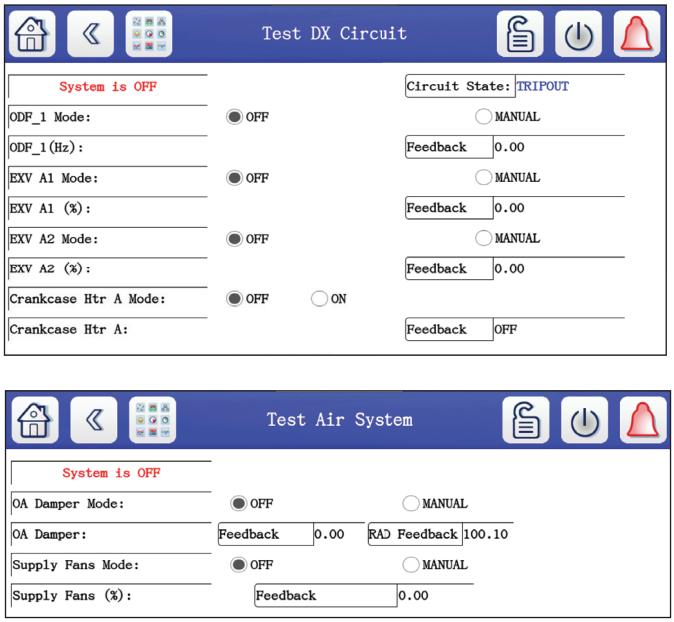


Fig. B — Test DX Circuit and Test Air System Screens (Component Test)

Fig. C — Crankcase Heater Test Example

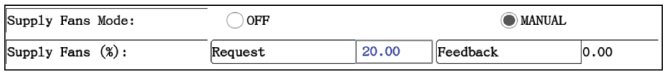


Fig. D — Indoor Fan Test Example

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, condenser fans) can be put into manual control mode for manual component modulation after the system is operational.

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 is in auto control and will behave as they would under normal operating conditions and their associated control configurations.

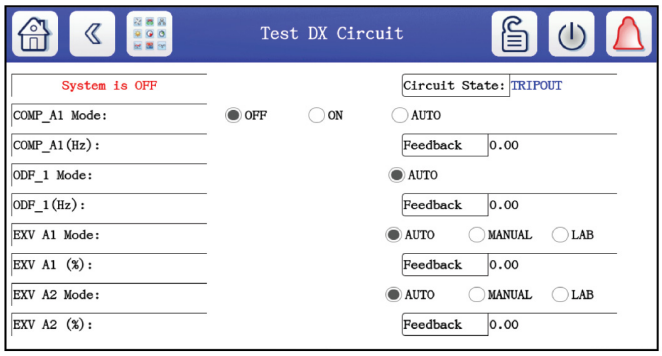
STOP SERVICE RUN

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.



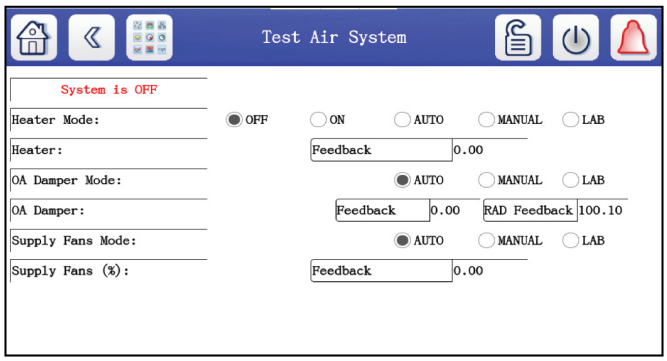


Fig. E — Test DX Circuit and Test Air System Screens (Service Run)

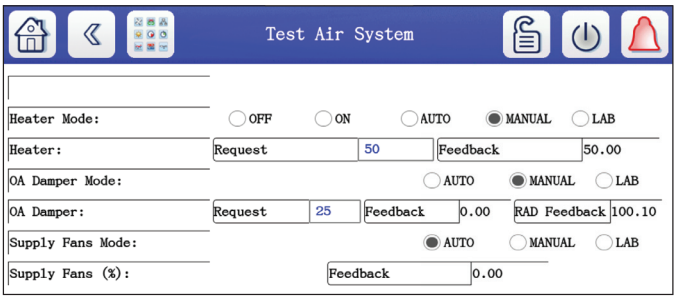


Fig. F — Test Air System Example (Service Run)

APPENDIX B — AIR BALANCE INSTRUCTIONS

Overview

The 50V unit uses a belt drive fan system. The fan motor speed is modulated using a variable frequency drive (VFD), which is modulated by the SmartVu control based on the fan control configuration and adjustable speed configurations.

NOTE: The VFD configurations and address are set by SmartVu at power up. Do not adjust the speed or frequency configurations in the VFD or attempt to control the VFD directly, as SmartVu will override the field set VFD configurations.

Review the unit submittal for application cooling and heating airflow requirements. If the required application airflow and static result in a fan speed (RPM) that is not on the unit fan performance tables, then the motor sheaves will need to be changed. Sheaves are field provided.

Refer to Tables 4-7 for unit physical data, including max fan rpm and fan drive system information. See the advanced controls, operation, and troubleshooting guide for fan performance tables and sheave information.

Controls Operation

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 start-up. 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 109 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.

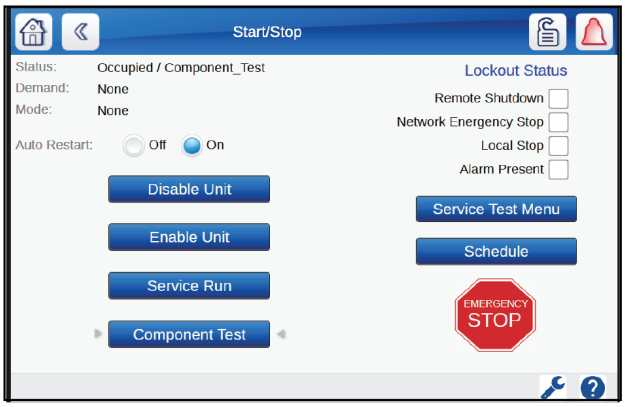


Fig. G — Start/Stop Screen in Test Mode

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 in manual mode 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 percent based on percent 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 will not exit the test mode.

Step 5 — 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.

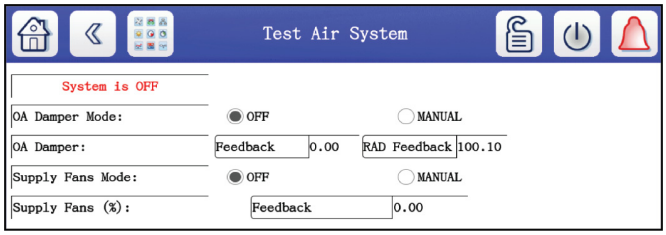


Fig. H — Test Air System Screens (Component Test)

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, SZ-VAV, 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 SZ-VAV, 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 SZ-VAV, 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 SZ-VAV, SAV demand, SAV capacity, or CV IDF control configurations. NOTE: Also used with SP or third-party control for units with 2-stage heat.
IDF High Heat Speed	%	IDF speed with a high heat demand or high heat capacity, typically the design heating airflow. Used with SZ-VAV, SAV demand, SAV capacity, or CV IDF control configurations. NOTE: Also used with SP or third-party control for units with 2-stage heat.

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.

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	%	Maximum 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 minimum and maximum 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 minimum and maximum 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 →EXF Config)		
EXF Min. Speed	%	The minimum speed the EXF operates at when on, typically based on the ventilation airflow or partial free cooling airflow. Used with OAD mapping, third-party, or building pressure exhaust fan control with high-capacity power exhaust only.
EXF Max. Speed	%	The maximum speed the EXF can operate at, based on the max design exhaust airflow (usually during free cooling). Used with OAD mapping, third-party, or building pressure exhaust fan control.
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 pos 1 is typically set to maintain neutral or slightly positive building pressure during normal ventilation operation or at partial free cooling. Only used with OAD mapping control.
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 pos 2 is typically set to maintain neutral or slightly positive building pressure during free cooling operation. Only used with OAD mapping control.

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.

APPENDIX C — 50V MODEL NUMBER NOMENCLATURE

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

Heat Type (1,2)
50 – Packaged Cooling Only/Electric Heat/Hydronic Heat

Model Series (3)
V – WeatherMaster® Applied Rooftop Unit

Application, Supply and Return (4)
2 – SAV, Vertical Supply and Return
3 – VAV, Vertical Supply and Return
4 – SAV, Horizontal Supply and Return
5 – VAV, Horizontal Supply and Return

50V Compact Chassis and Heat (5)
S – Compact Chassis, No Heat
T – Compact Chassis, Low Electric Heat, 2-Stage
U – Compact Chassis, Med Electric Heat, 2-Stage
V – Compact Chassis, High Electric Heat, 2-Stage
W – Compact Chassis, Low Electric Heat, Modulating
X – Compact Chassis, Med Electric Heat, Modulating
Y – Compact Chassis, High Electric Heat, Modulating
Z – Compact Chassis, Standard Hot Water Heat

50V Standard Chassis and Heat (5)
A – Standard Chassis, No Heat
B – Standard Chassis, Low Electric Heat, 2-Stage
C – Standard Chassis, Med Electric Heat, 2-Stage
D – Standard Chassis, High Electric Heat, 2-Stage
E – Standard Chassis, Low Electric Heat, SCR
F – Standard Chassis, Med Electric Heat, SCR
G – Standard Chassis, High Electric Heat, SCR
H – Standard Chassis, Standard Hot Water Coil

Direct Expansion System (6)
Q – Standard Efficiency, Low Ambient, Standard Capacity VSC
R – Standard Efficiency, Low Ambient, Standard Capacity VSC Humidi-MiZer
S – High Efficiency, Low Sound, Low Ambient, High Capacity VSC
T – High Efficiency, Low Sound, Low Ambient, High Capacity VSC, Humidi-MiZer
X – High Efficiency, Low Sound, Low Ambient, Standard Capacity VSC
Y – High Efficiency, Low Sound, Low Ambient, Standard Capacity VSC, Humidi-MiZer

Size and Refrigerant (7,8)

28 – 27.5 Ton, R-454B
30 – 30 Ton, R-454B
34 – 35 Ton, R-454B
40 – 40 Ton, R-454B
50 – 50 Ton, R-454B
54 – 55 Ton, R-454B
60 – 60 Ton, R-454B
70 – 70 Ton, R-454B
74 – 75 Ton, R-454B
90 – 90 Ton, R-454B
98 –100 Ton, R-454B

Construction (9)
A – Single Wall
C – Double Wall
D – Agion® Double Wall
F – Single Wall, Extended Standard Chassis
H – Double Wall, Extended Standard Chassis
J – Agion® Double Wall, Extended Standard Chassis
L – Single Wall, Standard Chassis with Plenum
N – Double Wall, Standard Chassis with Plenum
P – Agion® Double Wall, Standard Chassis with Plenum
R – Single Wall, Extended Standard Chassis with Plenum
T – Double Wall, Extended Standard Chassis with Plenum
U – Agion® Double Wall, Extended Standard Chassis with Plenum

Indoor Fan and Fan Measuring (10)
0 – Direct Drive Fan Array, Standard Static Motor
1 – Direct Drive Fan Array, Med Static Motor
2 – Direct Drive Fan Array, High Static Motor

Drain Pan and Coils (11)
- – Galvanized DP, Al/Cu Evap, MCHX Cond
A – Galvanized DP, Al/Cu Evap, E-Coat MCHX Cond
B – Stainless DP, Al/Cu Evap, MCHX Cond
C – Stainless DP, Al/Cu Evap, E-Coat MCHX Cond
D – Stainless DP, E-Coat Al/Cu Evap, E-Coat MCHX Cond
E – Galvanized DP, Al/Cu Evap, MCHX Cond, Hail Guard
F – Galvanized DP, Al/Cu Evap, E-Coat MCHX Cond, Hail Guard
G – Stainless DP, Al/Cu Evap, MCHX Cond, Hail Guard
H – Stainless DP, Al/Cu Evap, E-Coat MCHX Cond, Hail Guard
J – Stainless DP, E-Coat Al/Cu Evap, E-Coat MCHX Cond, Hail Guard

Voltage (12)
1 – 575V
5 – 208V/230V
6 – 460V

Design Series (13)
B – First Revision
S – ETO

Controls (14)
8 – Standard Controls
9 – Humidity Sensors
A – Return Air Carbon Dioxide Sensor (RA CO_2)
B – OA CFM
C – Humidity Sensors, RA CO_2
D – Humidity Sensors, OA CFM
E – RA CO_2 ,OA CFM
F – Humidity Sensors, RA CO_2 ,OA CFM

Outdoor Air and Relief (15)
A – Manual OA Damper, No Relief
B – Ultra Low Leak Economizer, No Relief
C – Ultra Low Leak Economizer, Barometric Relief
E – Ultra Low Leak Economizer, Low Static Power Exhaust (PE), Two-Stage Control
G – Ultra Low Leak Economizer, Low Static PE, Modulating Building Pressure (BP) Control
H – Ultra Low Leak Economizer, Standard Static PE, Modulating Building Pressure (BP) Control
J – Ultra Low Leak Economizer, Medium Static PE, Modulating BP Control

Electrical (16)
0 – Standard Electrical
1 – Powered Convenience Outlet (PCO)
2 – Unpowered Convenience Outlet (UCO)
3 – Non-Fused Disconnect (NFD)
4 – NFD + PCO
5 – NFD + UCO
6 – Phase Monitor (PM)
7 – PM + PCO
8 – PM + UCO
9 – PM + Non-Fused Disconnect (NFD)
A – PM + NFD + PCO
B – PM + NFD + UCO
C – High SCCR (Terminal Block)
E – High SCCR + UCO
F – High SCCR + Field Wired C/O
H – High SCCR + UCO + PM

Service and Safety (17)
A – Standard Service and Safety
B – Condensate Overflow Switch (COFS)
C – Pre-Filter Status Switch + Access Door Retainer (FSS + ADR)
D – Return Air Smoke Detector (RASD)
E – Service Pack (Comp Isolation Valve, Replicable Core Filter Drier)
F – COFS, FSS + ADR
G – COFS, RASD
H – COFS, Service Pack
J – FSS + ADR, RASD
K – FSS + ADR, Service Pack
L – RASD, Service Pack
M – COFS, FSS + ADR, RASD
N – COFS, FSS + ADR, Service Pack
P – COFS, RASD, Service Pack
Q – RASD, FSS + ADR, Service Pack
R – COFS, FSS + ADR, RASD, Service Pack
S – Chicago Relief Valve (CRV), COFS, FSS + ADR, RASD, Service Pack
T – Filter Measuring (FFM) + ADR, COFS
U – FM + ADR, COFS, RASD
V – FM + ADR, COFS, Service Pack
W – FM + ADR, COFS, RASD, Service Pack
X – CRV, FM + ADR, COFS, RASD, Service Pack

Indoor Air Quality (18)
0 – 4" Pre-Filter Rack with 2" Throwaway Filter
1 – 4" Pre-Filter Rack with 2" M8 Filter
2 – 4" Pre-Filter Rack with 4" M8 Filter
3 – 4" Pre-Filter Rack with 4" M13 Filter
4 – 4" Pre-Filter Rack with 4" M13 Filter, Ultraviolet Light (UV-C) Fixture
5 – 6" Pre-Filter Rack with 2" M8 and 4" M13 Filter
6 – 6" Pre-Filter Rack with 2" M8 and 4" M13 Filter, UV-C Fixture
7 – Pre-Filter Rack with 2" M8 and 12" M15 Cartridge Filter
8 – Pre-Filter Rack with 2" M8 and 12" M15 Cartridge Filter, UV-C Fixture
9 – Pre-Filter Rack with 2" M8 and 12" M14 Bag Filter
A – Pre-Filter Rack with 2" M8 and 12" M14 Bag Filter, UV-C Fixture

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

APPENDIX D — CHARGING CHARTS

Table F — Refrigerant Charges (R-454B)

V Series Refrigerant Charge (lb) - Standard Capacity Evaporator, Without Humidi-Mizer®									
SIZE	**28**	**30**	**34**	**40**	**50**	**54**	**60**	**70**	**74**
CIRCUIT A	35.7	32.8	34.6	40.4	29.1	29.2	30.5	36.3	46.0
CIRCUIT B	N/A	N/A	N/A	N/A	29.4	29.7	31.00	35.70	46.30

V Series Refrigerant Charge (lb) - Standard Capacity Evaporator, With Humidi-Mizer®									
SIZE	**28**	**30**	**34**	**40**	**50**	**54**	**60**	**70**	**74**
CIRCUIT A	50.4	46.3	48.3	55.5	44.2	40.0	40.6	47.1	56.8
CIRCUIT B	N/A	N/A	N/A	N/A	29.4	29.7	31.00	35.7	46.3

V Series Refrigerant Charge (lb) - Optional Replacement Filter/Drier, Without Humidi-Mizer®									
SIZE	**28**	**30**	**34**	**40**	**50**	**54**	**60**	**70**	**74**
CIRCUIT A	37.5	34.5	36.3	42.1	30.8	30.9	32.2	38.0	47.7
CIRCUIT B	N/A	N/A	N/A	N/A	31.1	31.40	32.7	37.4	48.00

V Series Refrigerant Charge (lb) - Optional Replacement Filter/Drier, With Humidi-Mizer®									
SIZE	**28**	**30**	**34**	**40**	**50**	**54**	**60**	**70**	**74**
CIRCUIT A	52.2	48.0	50.0	57.2	45.9	41.7	42.3	48.8	58.5
CIRCUIT B	N/A	N/A	N/A	N/A	31.1	31.4	32.7	37.4	48.00

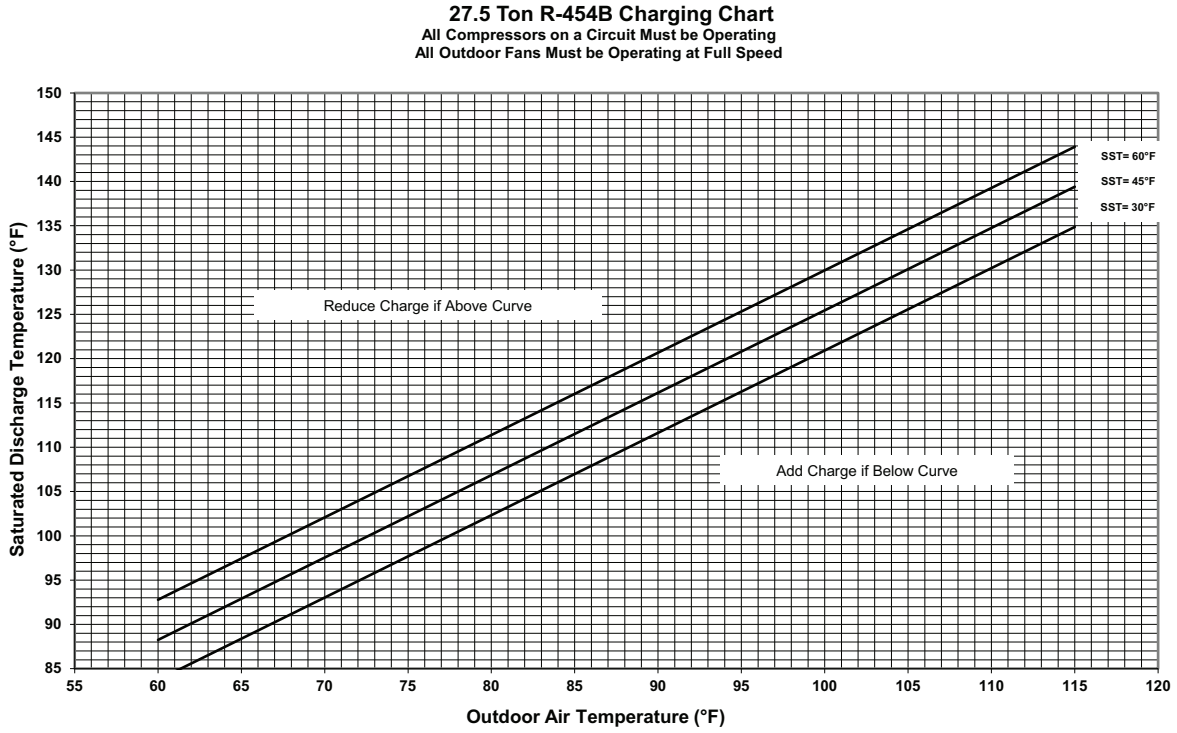


Fig. J — 50V Refrigerant Charging Charts (R-454B) 27 Ton

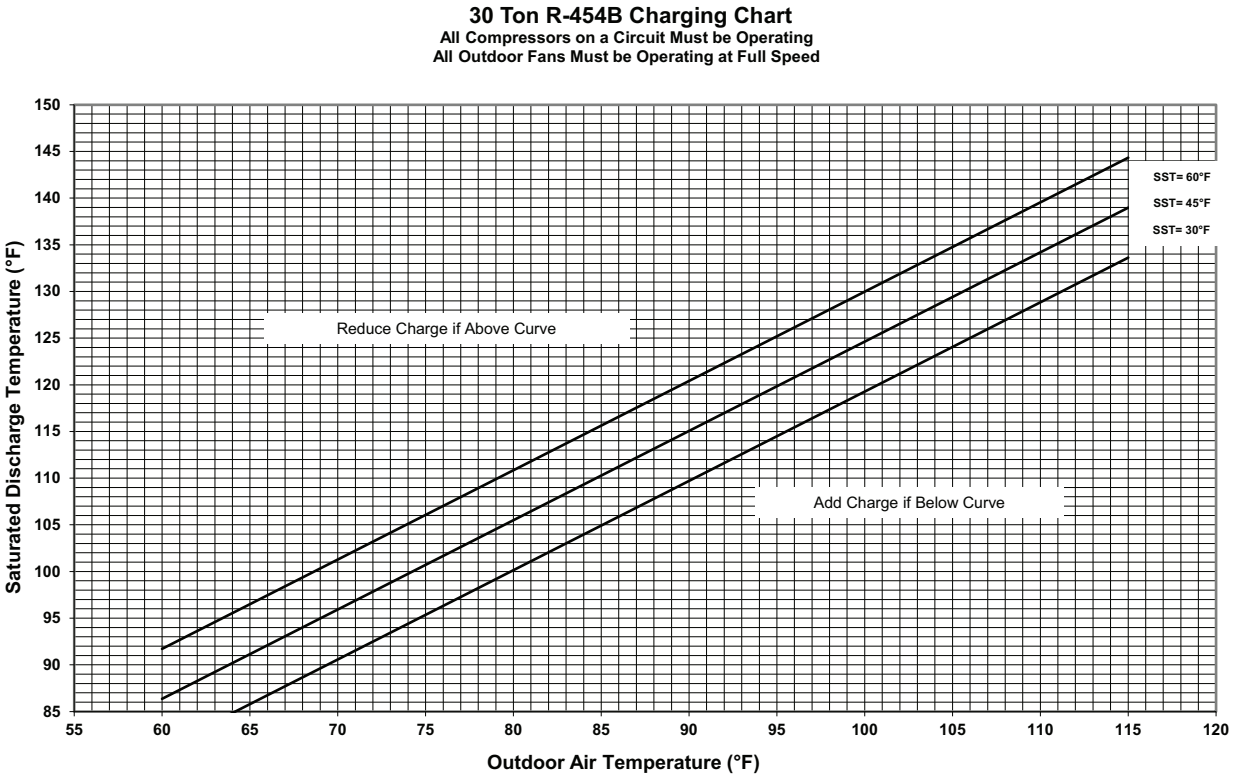


Fig. K — 50V Refrigerant Charging Charts (R-454B) 30 Ton

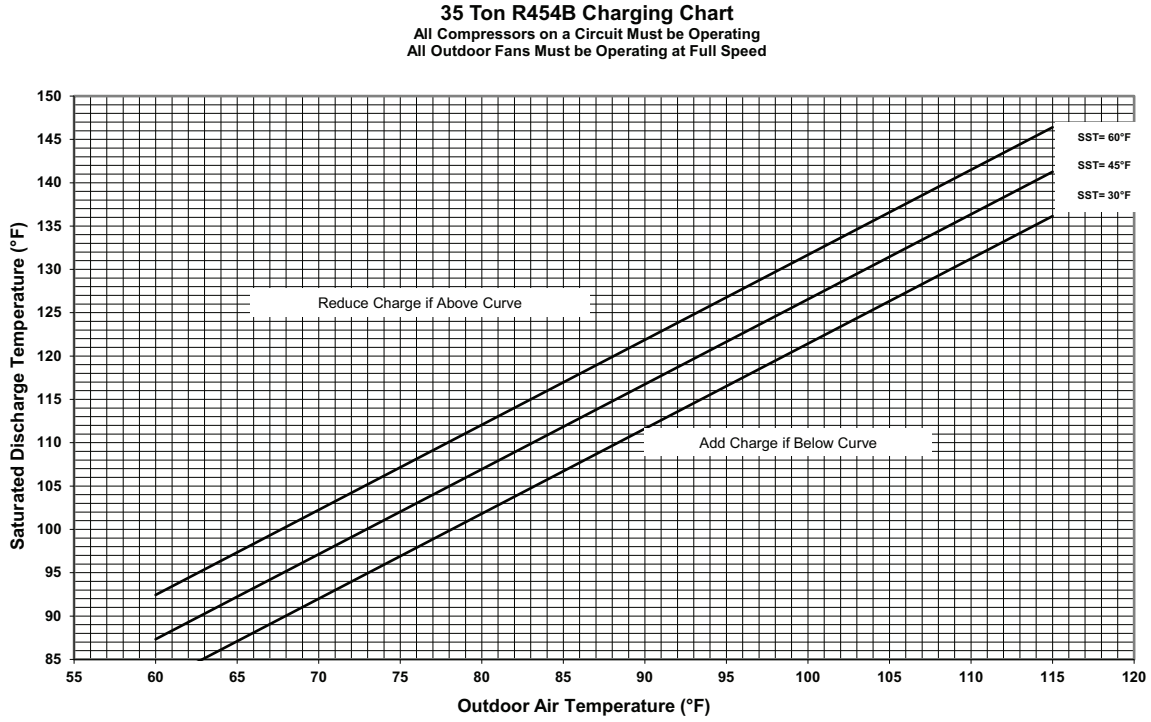


Fig. L — 50V Refrigerant Charging Charts (R-454B) 35 Ton

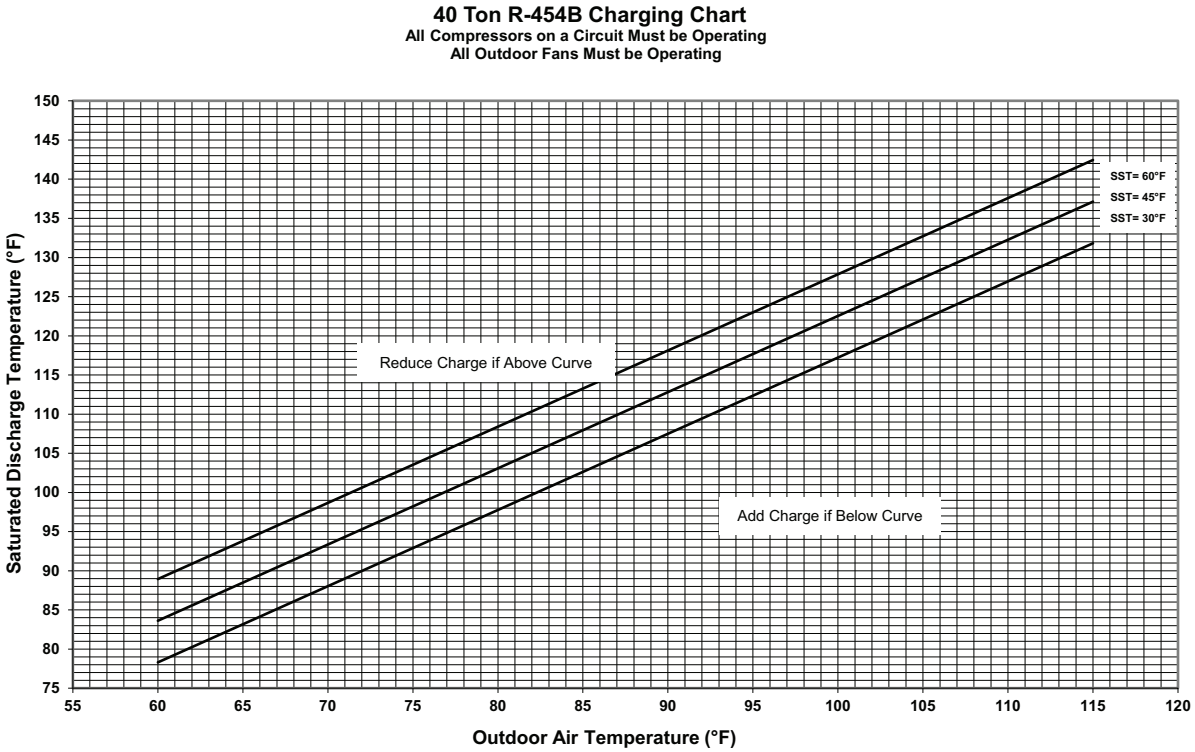


Fig. M — 50V Refrigerant Charging Charts (R-454B) 40 Ton

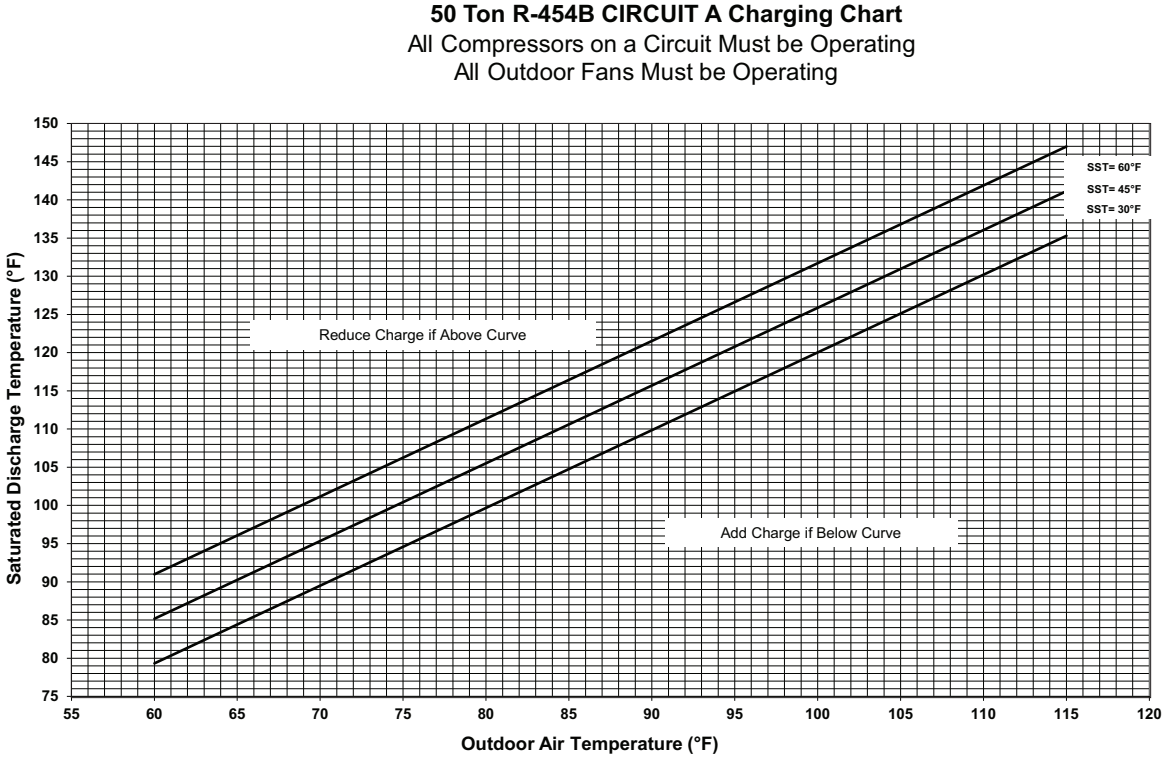


Fig. N — 50V Refrigerant Charging Charts (R-454B) 50 Ton, Circuit A

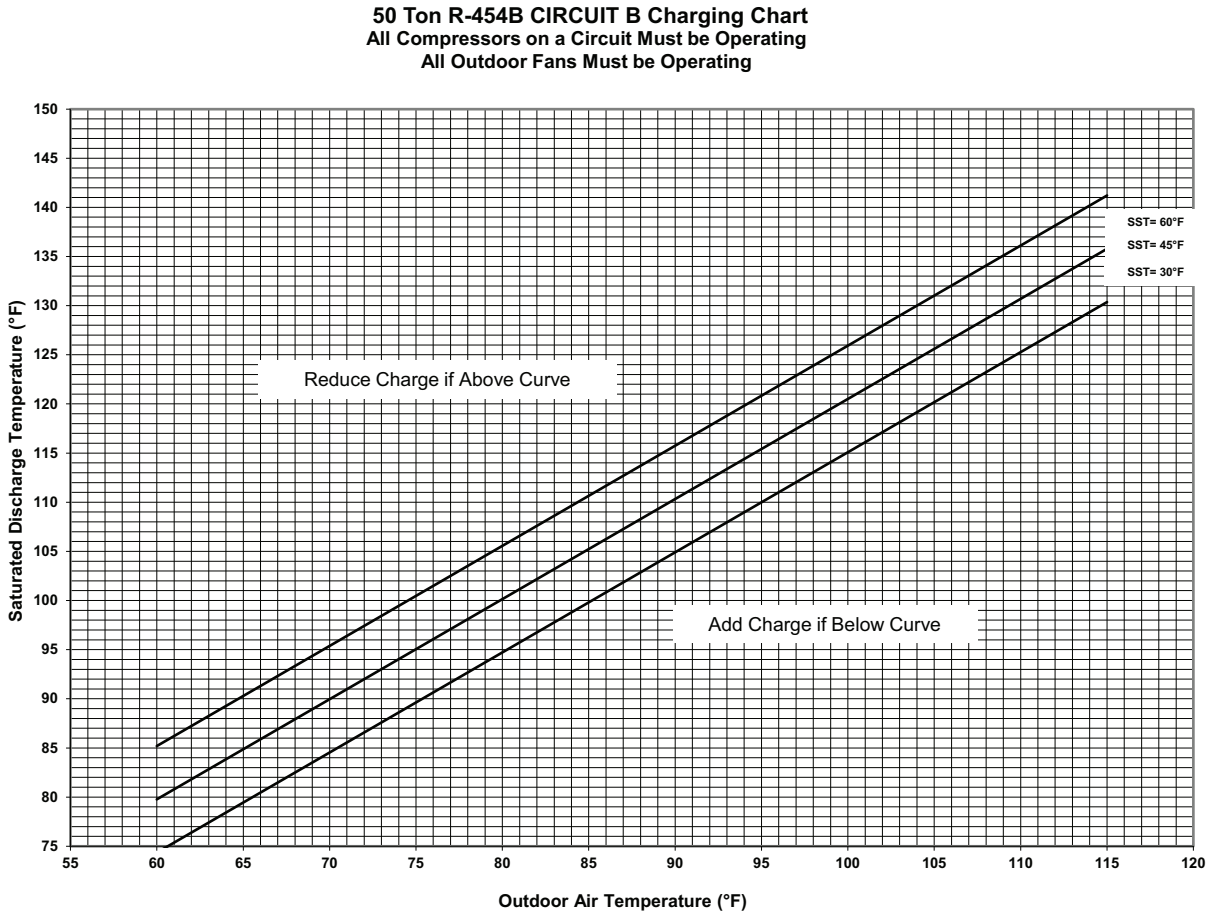


Fig. O — 50V Refrigerant Charging Charts (R-454B) 50 Ton, Circuit B

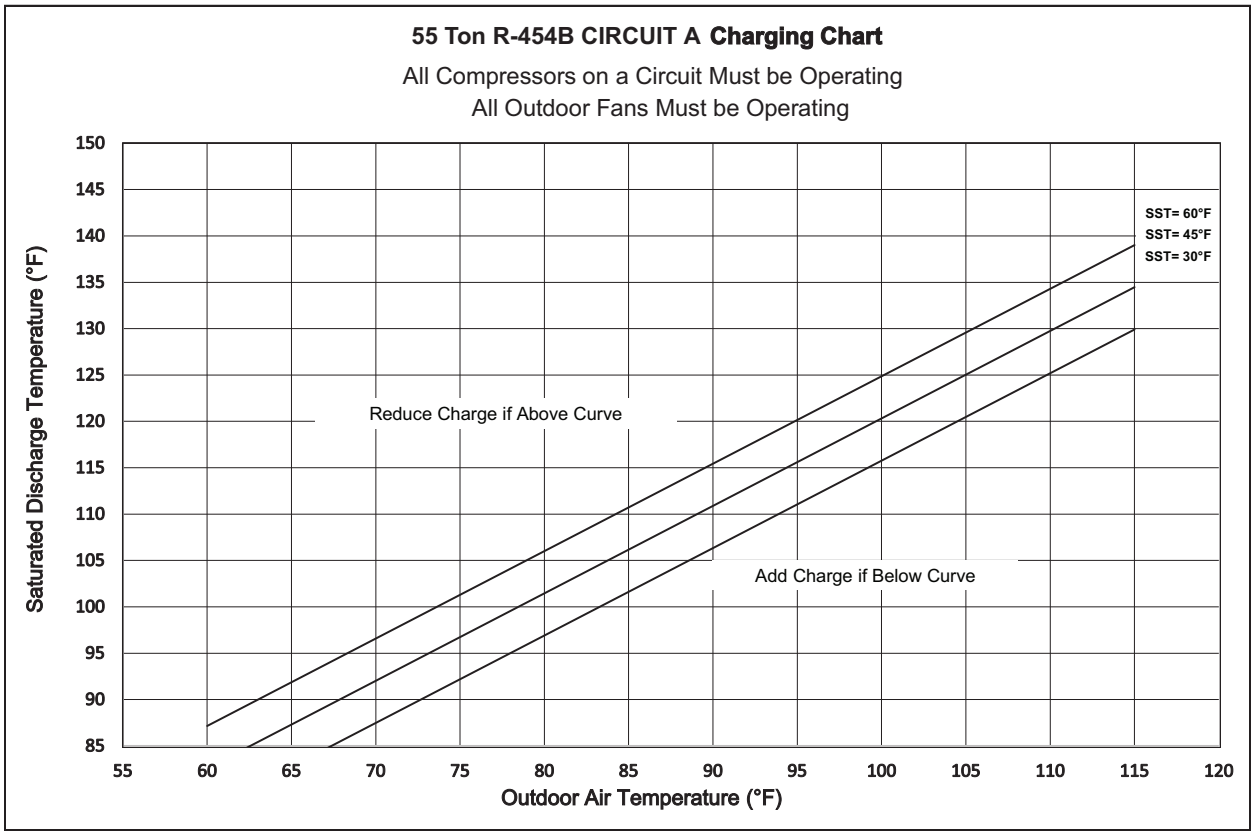


Fig. P — 50V Refrigerant Charging Charts (R-454B) 55 Ton, Circuit A

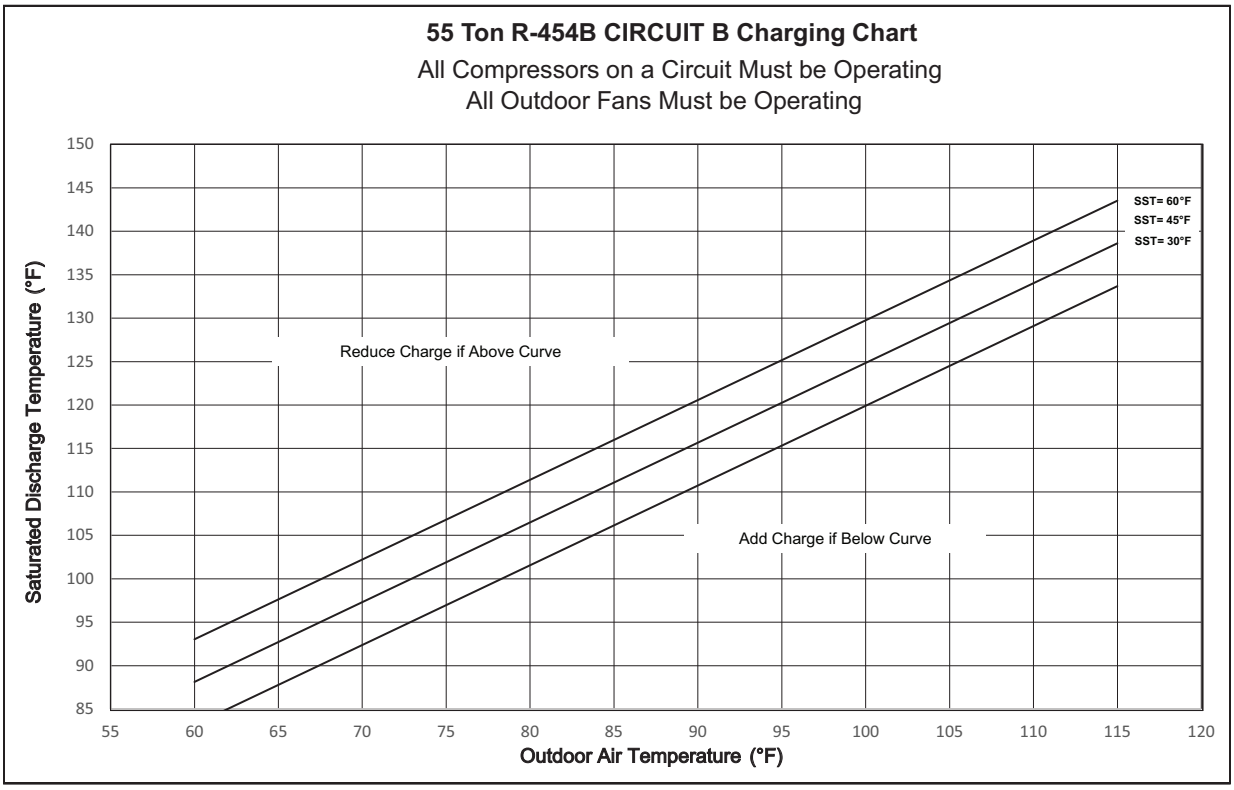


Fig. Q — 50V Refrigerant Charging Charts (R-454B) 55 Ton, Circuit B

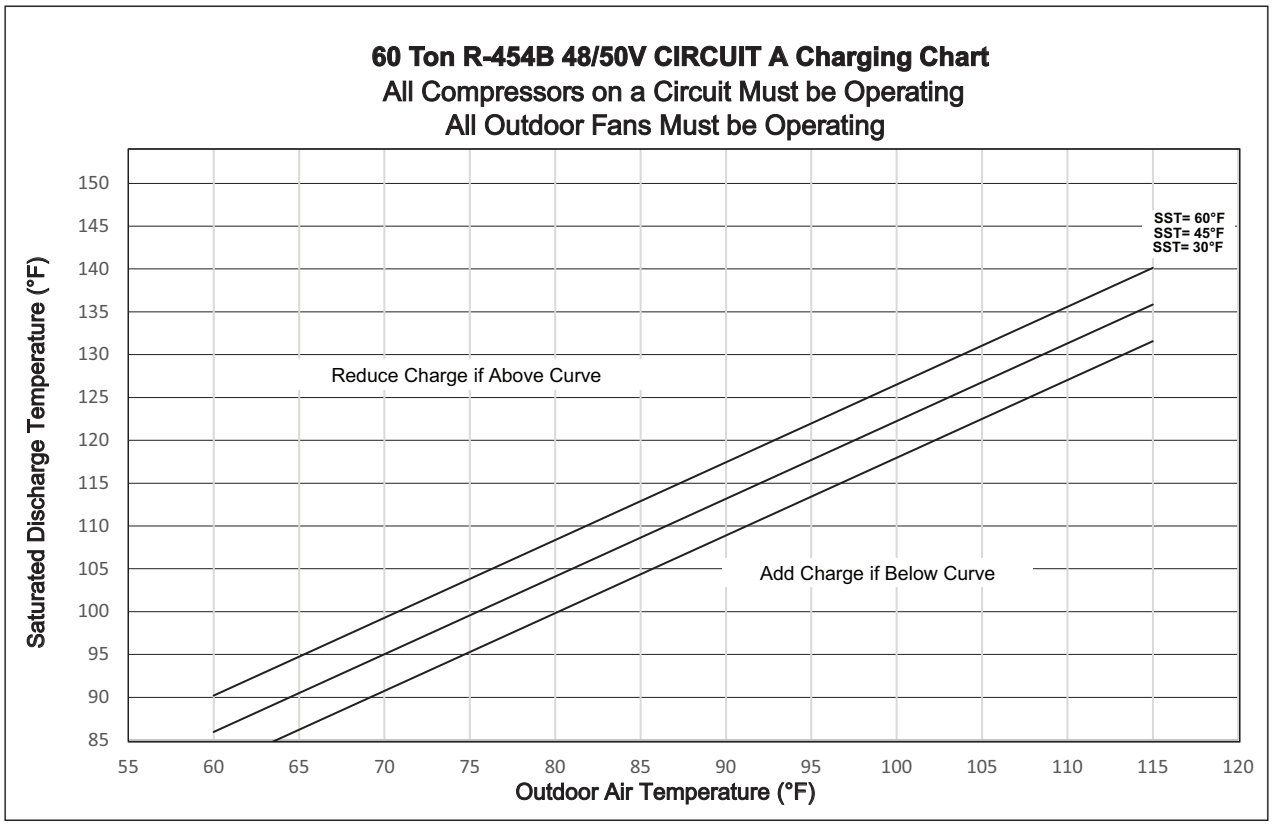


Fig. R — 50V Refrigerant Charging Charts (R-454B) 60 Ton, Circuit A

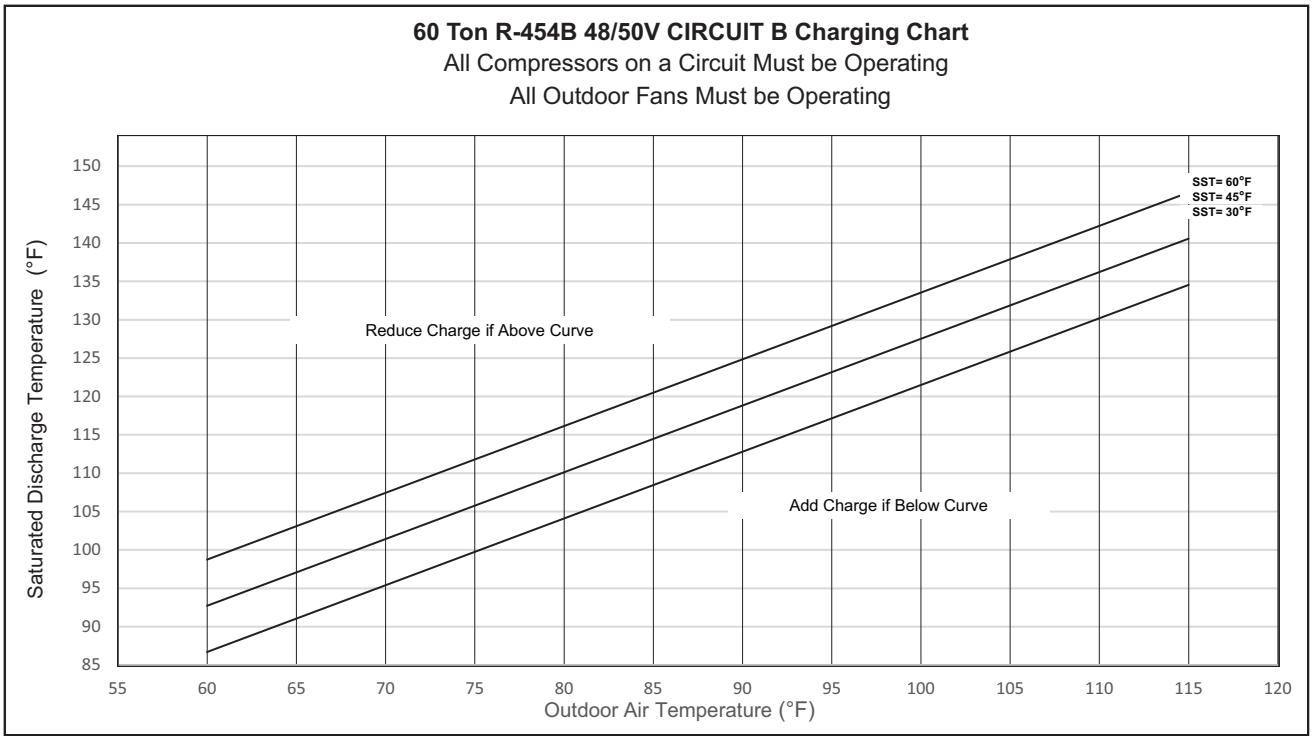


Fig. S — 50V Refrigerant Charging Charts (R-454B) 60 Ton, Circuit B

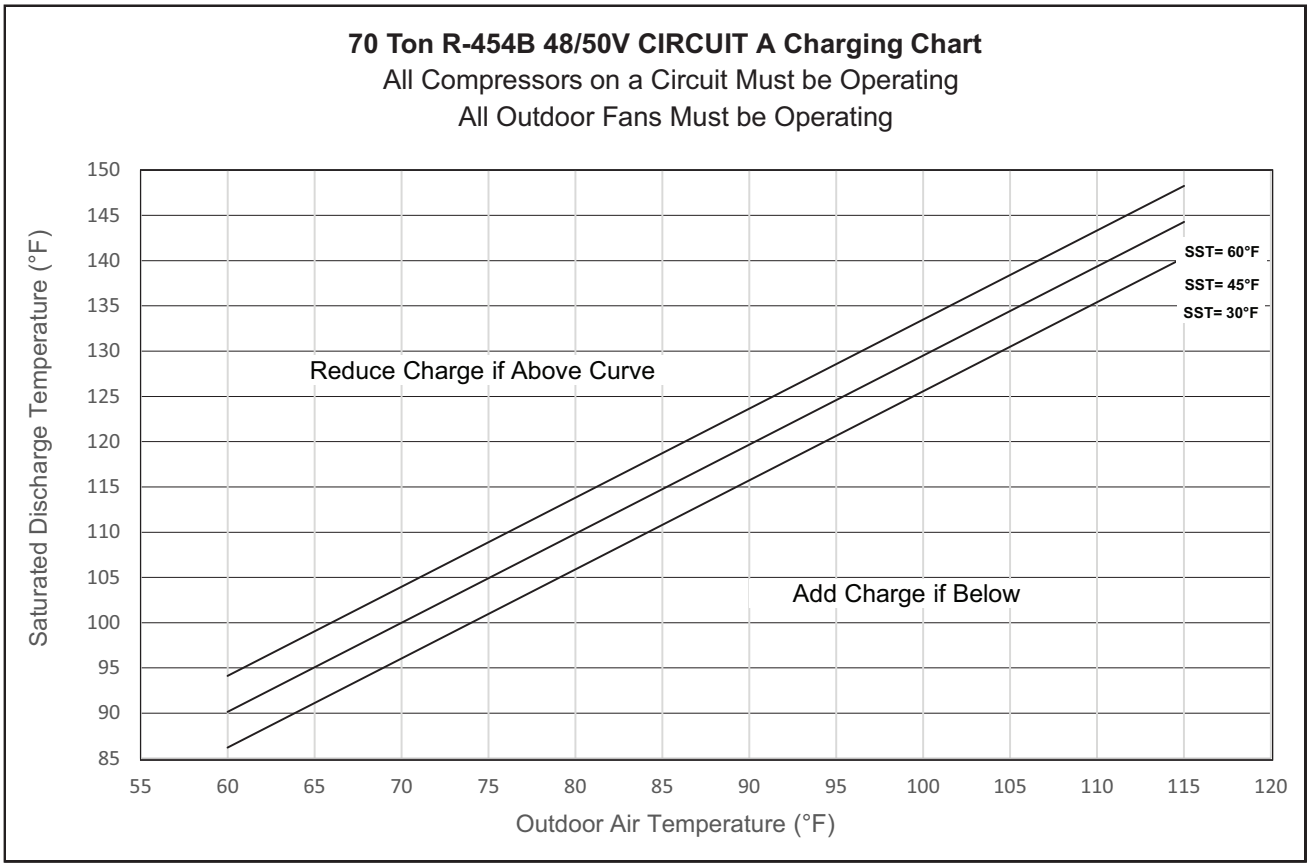


Fig. T — 50V Refrigerant Charging Charts (R-454B) 70 Ton, Circuit A

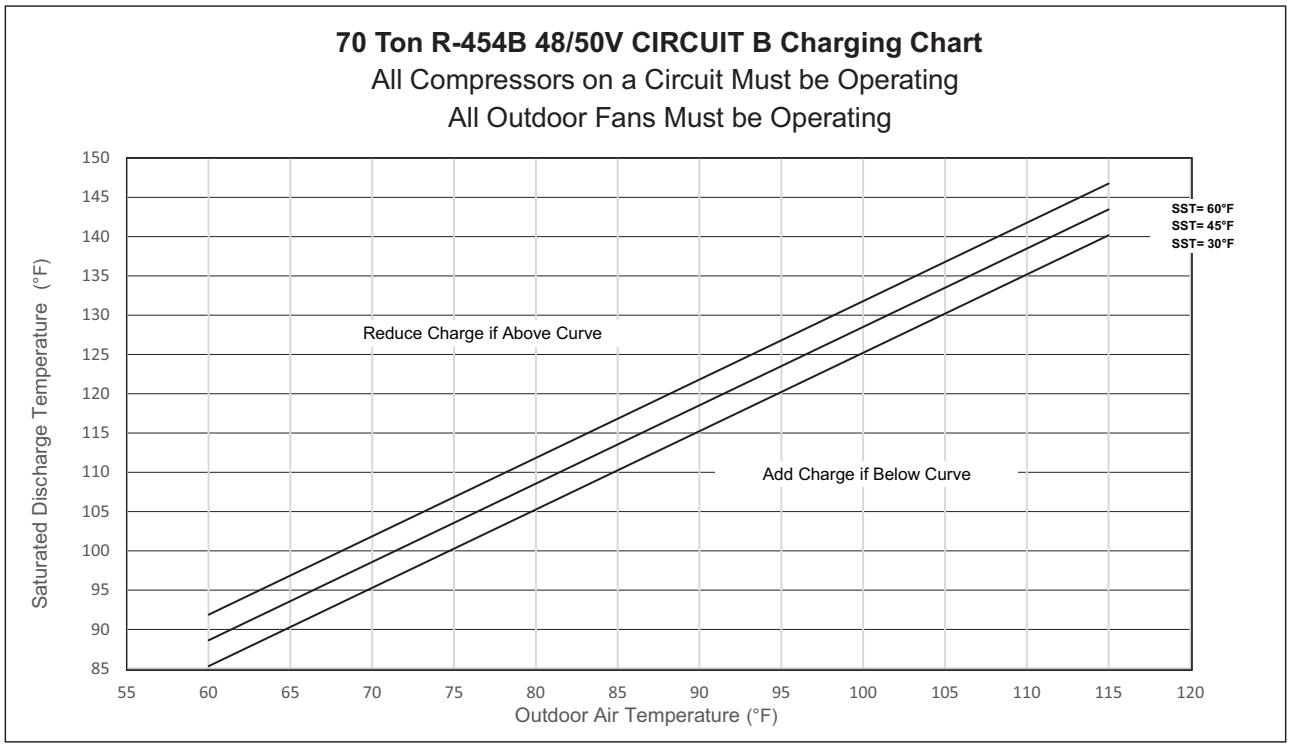


Fig. U — 50V Refrigerant Charging Charts (R-454B) 70 Ton, Circuit B

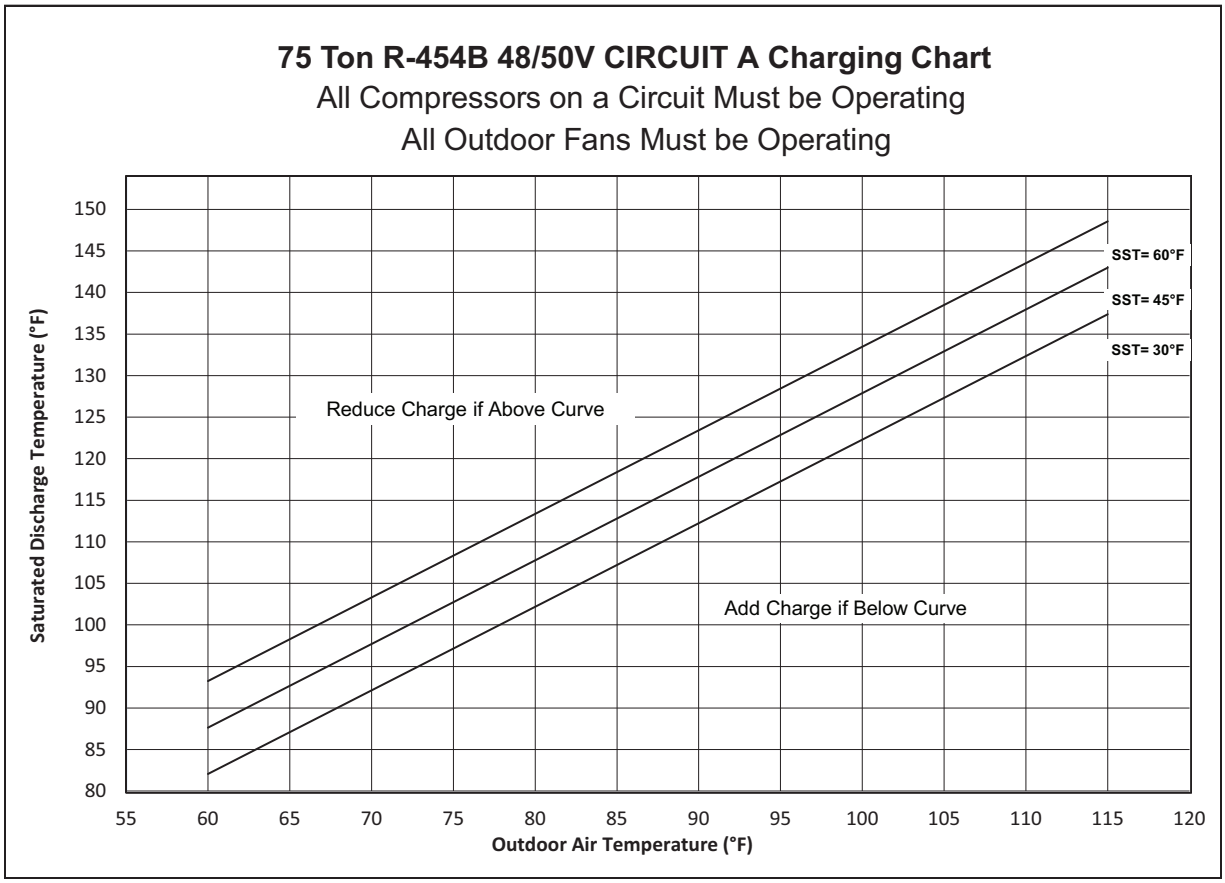


Fig. V — 50V Refrigerant Charging Charts (R-454B) 75 Ton, Circuit A

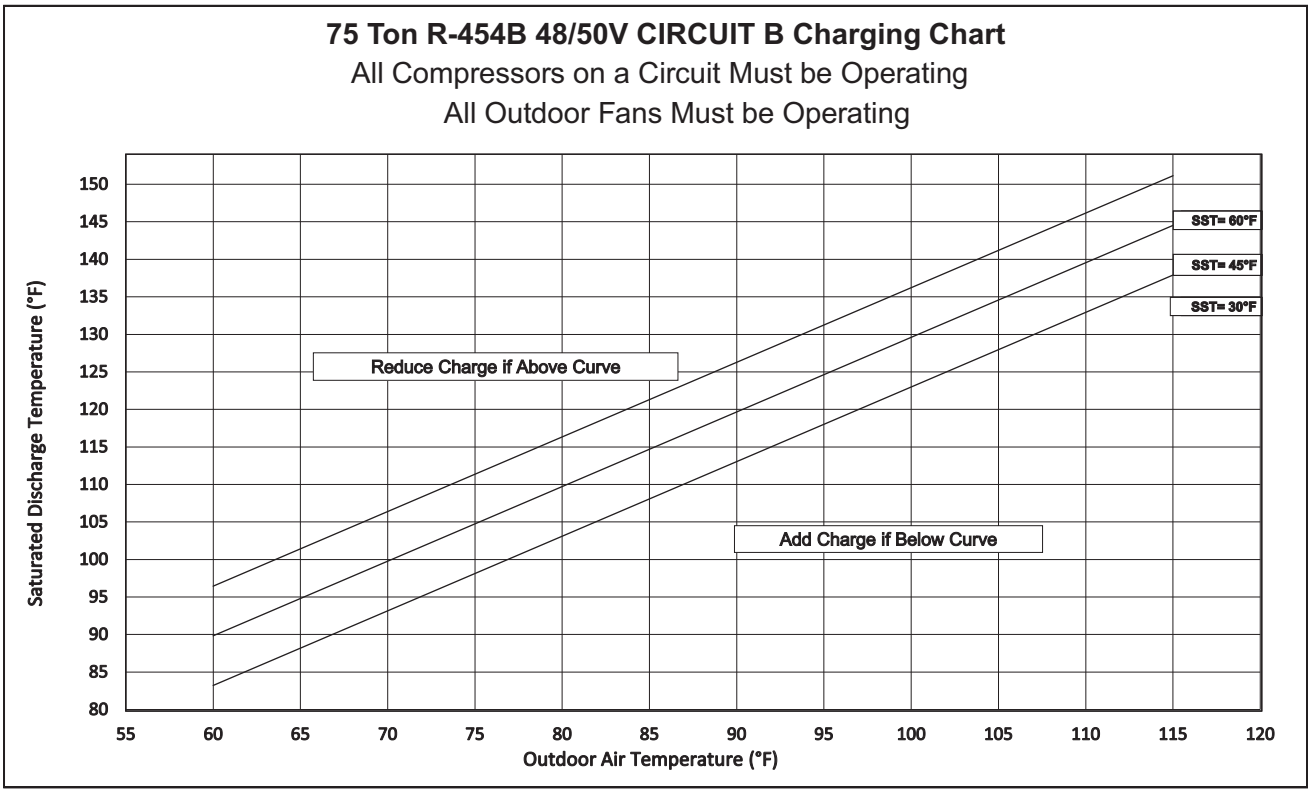


Fig. W — 50V Refrigerant Charging Charts (R-454B) 75 Ton, Circuit B

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

Catalog No. 04-53500489-01 Printed in U.S.A. Form No. 50V-2SI Pg 124 12-24 Replaces: 50V-1SI

50V PRE-START-UP INFORMATION FOR CHECKLIST

(The pre-start-up checklist must be completed by installing contractor. For Carrier factory start-up, the pre-start-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/ZIP CODE _____
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: SINGLE-ZONE_____MULTI-ZONE_____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 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 to specified torque levels (where provided); 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 are 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 primary and secondary (size 54-98) 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 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 hot water piping has been installed and is free from leaks (hot water units only).	(Y/NA) _____
Verify an actuated hot water control valve has been installed and is wired back to the unit control (hot water units only).	(Y/NA) _____
Verify that the electric heater elements are not sagging or touching (electric heat units only).	(Y/NA) _____
Verify all field-installed accessories (roof curb, thermostats, sensors) have 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. For units with UV-C fixtures, field provided 115V power has been connected and accessory UV-C emitters have been installed. (Y/N) _____
7. For units with modulating electric or hot water heat, the SAT sensor has been installed in the supply ductwork and wired back to the controller. (Y/N) _____
8. 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) _____
9. The units requiring thermostat (TSTAT) or humidistat (HSTAT) control, a 2-stage heat/cool thermostat and humidistat (or thermostat with dehumidification output) has been installed or network points will be available. (Y/N) _____
10. The control configuration is complete, and the controls are setup according to project requirements. (Y/N) _____

Air Balance

See Appendix B on page 111 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
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)
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
	2 = RAT
	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
Unoccupied Dehumidification	Enable/Disable
Vend/None Dehumidification	Enable/Disable
High Cool Dehumidification	Enable/Disable
Low Cool Dehumidification	Enable/Disable
Low Heat Dehumidification	Enable/Disable

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)

Heater Configurations

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

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 tables to indicate the unit control setpoints that are set as part of the pre-start-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

Dehumidify Setpoints

(Main Menu → Setpoints →Dehum Setpoints)		
SETPOINT	**VALUE**	**DEHUM. DEMAND SOURCE**
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

Indoor Fan Setpoints

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

Heating Setpoints

(Main Menu → Setpoints →Heating Setpoints)		
SETPOINT	**VALUE**	**HEAT DEMAND SOURCE**
Occupied Heating	°F	SPT or RAT
Unoccupied Heating	°F	SPT
Low Heat SAT	°F	SPT or RAT TSTAT
High Heat SAT	°F	SPT, RAT, or TSTAT
Low Heat On DB	°F	SPT or RAT
Low Heat Off DB	°F	SPT or RAT
High Heat On DB	°F	SPT or RAT

Cooling Setpoints

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

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 to torque specifications (where provided) and are free from corrosion. (Y/NA) _____
7. The supply air temperature sensor has been relocated to the supply ductwork (units with modulating electric or hot water heat only). (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 indoor 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 primary and secondary (where applicable) condensate drain trap has been installed and is free from obstructions.
13. Hot water piping with control valve has been installed.
14. The hot water control valve actuator has been wired back to the unit control (Y/NA) _____
15. The controls setup is complete and has been documented in the pre-start-up list. (Y/NA) _____
16. 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) _____
17. No construction, remodeling, or major renovation is occurring in the space or around the unit that could negatively impact unit operation. (Y/NA) _____
18. No safety conditions exist that would prevent start-up or operation of the equipment. (Y/NA) _____
19. 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%.

INDOOR FANS AND EXHAUST FAN CHECKS

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

INDOOR FANS AND EXHAUST FANS LOG

Use Component Test Mode to test component operation (see Appendix A on page 109 on (Y/N) for start-up control operation).
NOTE: Motor amp readings should be taken at full load airflow (per air balance).

Indoor Fan 1_____rpm_____amps Indoor Fan 4_____rpm_____amps Exhaust Fan 1_____rpm _____amps
Indoor Fan 2 _____rpm _____amps Indoor Fan 5_____rpm_____amps Exhaust Fan 2_____rpm_____amps
Indoor Fan 3_____rpm_____amps Indoor Fan 6_____rpm_____amps Exhaust Fan 3_____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 Humidi-MiZer coil (if equipped) 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 110).
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) and disable Humidi-MiZer (if equipped) when measuring cooling performance.

COMPRESSOR OIL LEVEL

Fill in the circle to indicate sight glass oil level (if equipped with sight glasses) with the compressor off.

Circuit A Compressor 1

Circuit A Compressor 2

Circuit B Compressor 1

Circuit B Compressor 2

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_____PSIG	Superheat_____°F
Liquid Line	Temp_____°F	Press_____PSIG	Subcooling_____°F
Discharge Line	Temp_____°F	Press_____PSIG	

Circuit B

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_____PSIG	Superheat_____°F
Liquid Line	Temp_____°F	Press_____PSIG	Subcooling_____°F
Discharge Line	Temp_____°F	Press_____PSIG	

Verify factory refrigerant charge using the charging charts in the service and maintenance instructions. _____

Disable Humidi-MiZer (if equipped) and verify variable speed compressor and condenser fans are at 100% speed when verifying refrigerant charge. _____

Charge Adjustment Circuit A: ±_____lb. Circuit B: ±_____lb.

HEATING CHECKS

The hot water piping has been installed per manufacturer recommendations, is free from leaks. Y/N_____

The hot water valve and actuator have been installed. Y/N_____

The hot water valve actuator is wired back to the unit control for modulation. Y/N_____

The electric heat elements are not obstructed or sagging. Y/N_____

HEATING LOG

Heating start-up should only occur at full load airflow (per air balance). Force economizer closed (for recirculating 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
Entering Water Temperature (EWT)	_____°F DB
Leaving Water Temperature (LWT)	_____°F DB
Heater Amp Draw	_____amps at 100% modulation/full capacity

START-UP NOTES:_____

_____

_____

_____

_____

_____

_____

TEMPORARY HEATER OPERATION POST-CONSTRUCTION

The unit heat source may be operated during the finishing stage of construction after interior construction is complete to provide temporary heating. Do not operate heating or cooling systems while construction is actively being performed. Do not operating mechanical cooling prior to performing a cooling start-up 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 and supply ducts are connected, are free from obstructions, are clean, and are properly sealed. (Y/N)_____
6. The SAT sensor has been installed (modulating electric or hot water heat). (Y/N)_____
7. Ensure hot water piping and control valve has been connected per installation instructions (hot water heat units only). (Y/N)_____
8. Verify that the electric heat elements are not sagging or touching (electric heat units only). (Y/N)_____
9. Heater 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. Ensure supply airflow rate is sufficient for heater operation. (Y/N)_____
12. Return air temperature to be maintained between 55°F (13°C) and 80°F (27°C). (Y/N)_____
13. Heater shall be set up to operate in accordance with installation instructions and shall be verified for operating conditions including airflow, temperature rise, and amp draw (for electric heat). (Y/N)_____
14. Ensure the unit operation is periodically checked to verify it's in accordance with manufacturer's requirements. (Y/N)_____
15. Ensure that equipment maintenance is performed during temporary operation. (Y/N)_____
16. Install new filters per project specifications prior to final occupancy. (Y/N)_____

NOTE: Carrier reserves the right to not assume responsibility for equipment damage resulting from abuse of the product when used for temporary heating or cooling, improper equipment operation (including application, airflows, or temperatures), operation when the proper pre-start-up and start-up have not been completed, or damage caused by improper operation or lack of maintenance. See the Carrier Applied Rooftop Warranty Card for additional details.

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE