WeatherMaker® 50K 20-60 Electric Cooling and Optional Electric Heating Applied Rooftop Units with Puron Advance™ Refrigerant (R-454B) and Carrier SmartVu™ Controls with PIC 6.1 Hardware and Software 3.X

Installation and Start-up Instructions

CONTENTS

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GENERAL

This installation instruction contains unit installation information, controls navigation, configuration, operation details, and equipment pre-start-up/start-up checklists.

Refer to the Advanced Controls, Operation, and Troubleshooting manual for guidance on service controls access, equipment and controls troubleshooting, and service. Refer to the User's Information and Maintenance manual for equipment maintenance instructions. Refer to the Integration Guide for information on setting up CCN communication, BACnet[1] communication, or Rnet communicating sensors.

This equipment is designed for elevations up to 10,000 ft for cooling.

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 current editions of the National Electrical Code (NEC)/National Fire Protection Association (NFPA) 70. Along with NFPA 90A for ductwork and ventilation standards.

In Canada refer to the current editions of the National Standards of Canada CAN/CSA-B149.1 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.

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

The following symbols may be seen on the equipment:

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

⚠ WARNING

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

AVERTISSEMENT

Avant d'effectuer des opérations d'entretien ou de maintenance sur l'appareil, coupez l'alimentation principale de l'appareil. Un choc électrique peut entraîner des blessures corporelles.

⚠ DANGER

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

⚠ WARNING

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

⚠ ADVERTISSEMENT

Cet équipement peut contenir une LAMPE UV-C. Recherchez ces avertissements UV-C sur les panneaux ou les portes avant de les ouvrir. Débranchez l'alimentation UV-C avant d'ouvrir les portes d'accès, de retirer les panneaux ou d'installer, d'entretenir ou de réparer des lampes ou des luminaires UV-C. N'utilisez pas de lampes UV-C en dehors du boîtier de l'appareil. L'exposition aux UV-C 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 UV- C.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

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

⚠ ADVERTISSEMENT

RISQUE DE 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 rooftop units 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

Building codes restrict the floor area of the occupied space that can be served by a ducted HVAC unit based on the unit's A2L refrigerant charge. The minimum allowable floor area is called the minimum conditioned space area (TA_{min}).

Determine the minimum 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 system).

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

UNIT SIZE 50K	HUMIDI-MIZER[a]	(TA_{min})[b]	
		Sq Ft	Sq Meter
20	No	616	57
	Yes	851	79
26	No	740	69
	Yes	989	92
30	No	725	67
	Yes	960	89
34	No	754	70
	Yes	974	91
40	No	616	57
	Yes	842	78
54	No	740	69
	Yes	930	86
60	No	836	78
	Yes	1115	104

NOTE(S):

a. Humidi-Mizer system is indicated by position 6 of the model number being J,K,L,M,N,P,V, or W.
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 includes two leak detection sensors and one leak dissipation board for all unit sizes. Select 40-60 ton units produced in the first half of 2025 included three sensors and two boards. The third sensor and second board have been designed out and are no longer required. See Table 2 for sensor and board part numbers. The A2L detection sensor communicates via a wiring harness to the dissipation board.

The dissipation board is connected to the unit control board via wire harness. See Appendix E "TYPICAL WIRING DIAGRAMS" on page 91 for A2L dissipation system wiring.

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. See certified drawings on page 28 for A2L dissipation board locations.

SENSOR CALIBRATION

The A2L leak sensors are automatically self-calibrating and do not require field calibration. A fault is triggered when a sensor is out of calibration range and requires replacement. See the Advanced Controls, Operation, and Troubleshooting guide for additional A2L dissipation board functions and troubleshooting.

DISSIPATION MODE TEST

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.

Table 2 — Refrigerant Leak Dissipation System (RLDS) Parts

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

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.

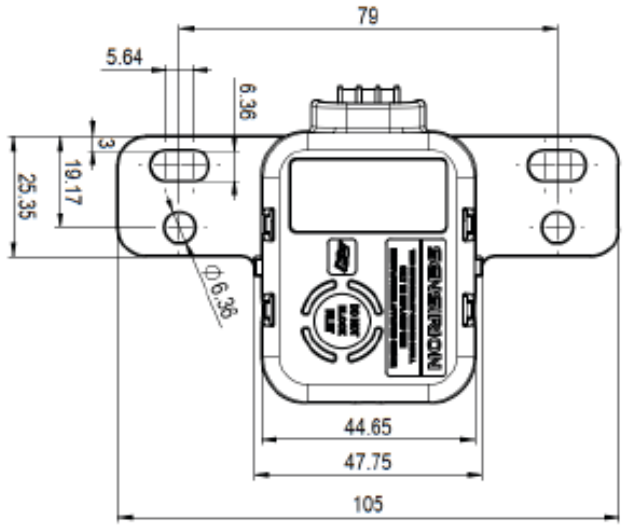
A2L DISSIPATION MODE

When a refrigerant leak sensor detects a refrigerant leak, A2L dissipation mode is activated and the following occurs:

1. The zone damper override relay (ZDOR) is activated (local output and network point).
2. Cooling and heating are disabled.
3. The indoor fan turns on to the IDF dissipation speed (25% default, must be field adjusted based on required dissipation airflow).
4. Optional: The outdoor fans may turn on to 100%.
5. The outdoor air damper closes and exhaust fans turn off.

The system will remain in A2L dissipation mode while the leak is detected. When the leak is no longer detected, a five-minute timer starts. If, after the five-minute timer has expired, the leak is no longer detected, the unit will exit A2L dissipation mode and resume normal operation.

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



NOTE: Dimensions are in milimeters.

Fig. 1 — A2L Refrigerant Leak Sensor

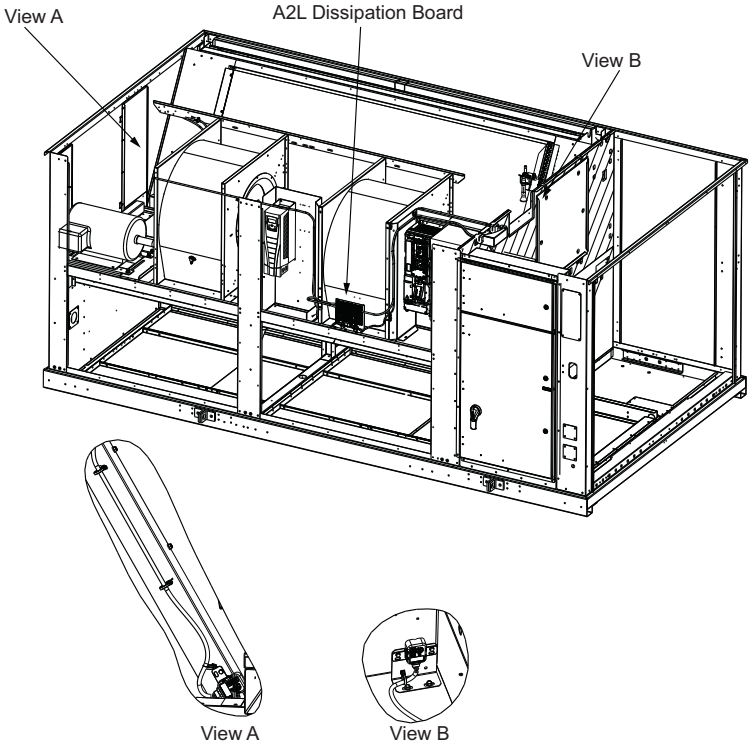


Fig. 2 — A2L Refrigerant Leak Sensor Locations

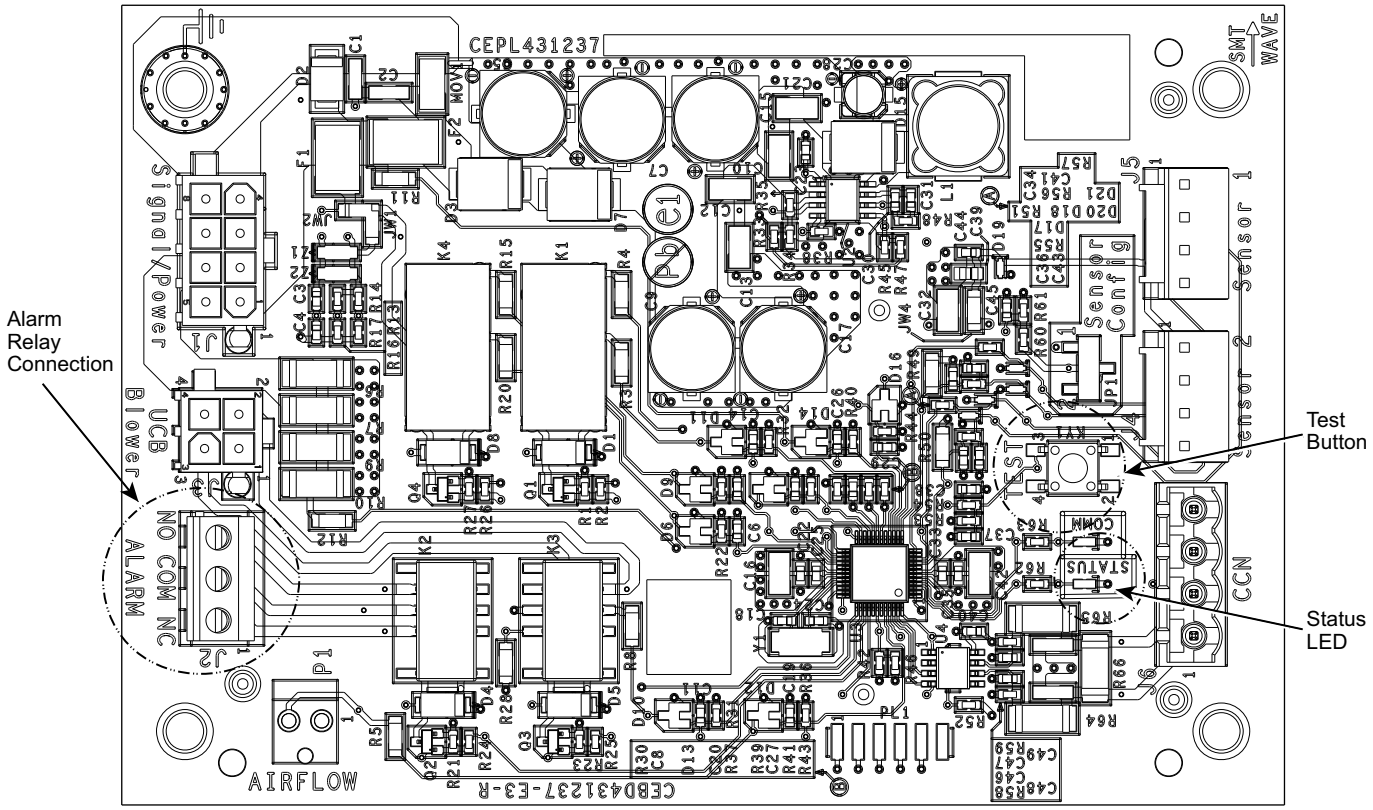


Fig. 3 — A2L Dissipation Board Details

A2L Dissipation Fan Speed

The indoor fan operates at the A2L dissipation fan speed (default 25%) when A2L dissipation mode is active. The A2L dissipation fan speed configuration must be field adjusted to ensure the system achieves the minimum dissipation circulation rate.

See Table 3 for minimum dissipation circulation rate (Q_{min}) by unit size and configuration. See Appendix B "AIR BALANCE INSTRUCTIONS" on page 89 for air balance information and control adjustment for A2L dissipation fans speed adjustment.

Refer to local code, UL-60335-2-40, or ASHRAE standard 15 for required ventilation rates and A2L dissipation requirements.

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

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

50K UNIT SIZE	HUMIDI-MIZER® SYSTEM	(Q_{min})	
		cfm	M^3H
20	No	616	57
	Yes	851	79
26	No	740	69
	Yes	989	92
30	No	725	67
	Yes	960	89
34	No	754	70
	Yes	974	91
40	No	616	57
	Yes	842	78
54	No	740	69
	Yes	930	86
60	No	836	78
	Yes	1115	104

Zone Damper Override Relay

All units include a hardwired, normally open (NO) Zone Damper Override Relay (ZDOR) output that closes when A2L dissipation mode is active. The ZDOR status is available as a network point and can be used to signal duct dampers to open and field-installed airside devices to shut off when A2L dissipation mode is active.

Duct System

IMPORTANT: Refer to local code, UL-60335-2-40, or ASHRAE standard 15 for dissipation requirements.

Equipment with A2L refrigerant should only be utilized with a fully ducted (supply air return) air distribution system. Refer to national or local building code if an open system (plenum return or supply) is used.

FIRE DAMPERS

Fire dampers must remain open during A2L dissipation mode.

FIELD-INSTALLED AIRSIDE DEVICES

All field-installed devices that are installed in the duct system or the airside section of the unit (gas heaters, duct heaters, air cleaning devices) must be disabled during A2L dissipation mode.

⚠ 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.

Air Terminal Units

IMPORTANT: The installing contractor is responsible for ensuring proper system operation and dissipation airflow during A2L dissipation mode.

For applications using air terminal units, including VAV dampers, VVT dampers, or parallel fan powered boxes, the zone damper must open to allow the system to meet the minimum dissipation circulation rate during A2L dissipation mode. See Table 3 for minimum dissipation circulation rate (Q_{min}) by unit size and configuration. For fan powered air terminal units, the terminal fan may be used during A2L dissipation mode. Electric duct heaters must be disabled during dissipation mode.

CARRIER OPEN AIRSIDE LINKAGE

For applications using only air terminal units with Carrier Open controls configured for Airside Linkage, the Linkage mode is set to Off when A2L dissipation is active. Off mode sets the terminal damper to 70% and disables the terminal fan and heater.

CARRIER CCN AIRSIDE LINKAGE

For applications using only air terminal units with Carrier CCN controls configured for Airside Linkage, the Linkage mode is set to Off when A2L dissipation is active. Off mode sets the terminal damper to 70% and disables the terminal fan and heater.

ALL OTHER CONTROLS

For applications using all other controls, including Carrier controls not configured for Linkage, the air terminal controls must be configured to open the zone dampers to achieve the minimum dissipation airflow and disable electric duct heaters when A2L dissipation mode is active. Refer to “Duct System” on page 6 for information on using ZDOR with other controls.

IMPORTANT: Air terminal unit dampers should be open to a minimum of 70% when the system isn't active.

Installation

The following checks (Items 1-6) 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, or failure.

ELECTRICAL SAFETY

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

- Verify capacitors are fully discharged using a safe method to prevent sparking. The unit may contain Variable Frequency Drives (VFDs) which contain internal capacitors that either need to be manually discharged or allowed sufficient time to discharge automatically before servicing.
- 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.

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 lower flammability limit (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 are:

- 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 shutoff valves) in a part of the system away from the leak and leak repair. Follow Steps 1-7 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 (Steps 1-7) shall be adhered to:

1. Follow all local and national regulations.
2. Review system layout for any isolation valves or additional coils which could trap refrigerant.
3. Evacuate.
4. Purge the circuit.
5. Evacuate (optional for A2L refrigerants).
6. Continuously flush or purge with inert gas when using flame to open circuit.
7. 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 shutoff 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 note 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 crankcase 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 followup 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. See Appendix C “50K MODEL NUMBER NOMENCLATURE” on page 83.

NOTE: For engineered to order (ETO) units, positions 13 and 15-18 of nameplate model number will not match submittal data. An “S” in the 13th model 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.

IMPORTANT: 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

Unload units with a crane using the included base rail rigging lugs. All lifting lugs must be engaged. 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” on page 16 for unit rigging label example. The weights listed on the rigging label are highest possible weight by unit size. Refer to the submittal or bill of lading for as-built unit weights.

IMPORTANT: All lifting lugs must be engaged when rigging.

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 provides protection against damage.
   d. Meets the minimum total conditioned area (MCSA) requirement. Refer to Table 1 for minimum are requirements.
   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-2j) when storing equipment outdoors (including the installation position), in humid 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. For units with hot water coil, cover the hot water coil inlet and outlet openings.
   i. Make any other provisions necessary to isolate the unit airside section, control box, and power box from the environment.
   j. 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-2j 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-start-up 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. Closing all refrigerant service valves and following lockout/tagout procedures.
   c. Closing water valves (for units with hot water heat).
   d. Disconnecting the unit power and following lockout/tagout.
5. Inspect the unit periodically for signs of damage. Inspect every two weeks (at a minimum) if stored outdoors or in a humid environment. Inspect daily after periods of high humidity, heavy rain, or high heat. Inspect 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. See pages starting on CL-1 and CL-16 for all 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-start-up 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. Keep the unit powered, but disabled for a minimum of 24 hours for capacitor reforming in variable frequency drive (VFD) and crankcase heater operation.

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 or lack of maintenance. See the Carrier Applied Rooftop Warranty Card for additional details.

Step 4 — Inspect Existing Unit (For Replacement Applications)

Prior to installing the new equipment, review the existing equipment. This information can be used to ensure proper configuration and setup of the new equipment.

1. Verify unit capacities, dimensions, configuration, utility sizes and connection locations, etc.
2. Check for field installed accessories or field modifications.
3. For units with a digital control system:
   a. Record all unit control setpoints and configurations, including temperature setpoints, pressure setpoints, fan control and speed configurations, outdoor air damper control and ventilation positions, etc.
   b. For units connected to a building automation system, capture any network information.
4. Review existing unit information (air balance, submittal, and schedule) for supply fan airflow and static, relief fan airflow and static, and ventilation airflows. ***Note that Carrier uses total external static pressure for packaged unit fan performance, instead of total static pressure.***
5. If existing unit information isn't available:
   a. Best practice is to have an air balance performed on the existing unit to record operational information.
   b. If an air balance is not performed, review unit operation (fan RPM, static pressure readings, etc.) to estimate fan airflow and static pressure.
   c. For units with a heat source, calculate the airflow based on temperature rise and heater capacity.
6. When using a curb adapter, ensure the curb adapter pressure drop data is calculated for the new unit fan performance.

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 starting on page 28 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 external 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.
8. Develop a plan for A2L refrigerant compliance. Ensure the space serviced by the unit is above the minimum conditioned space area. Ensure the system can achieve the minimum required dissipation airflow during dissipation mode.

Step 2 — Install Unit Support

Plan for unit support. See Tables 4-7 starting on page 19 for physical data. See roof curb dimensions (Fig. 4-7) starting on page 12. See "Rigging Label" on page 16 (Fig. 8) 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 the roof curb dimensions (Fig. 4-7) starting on page 12. Install insulation, cant strips, roofing, and counter flashing as required. For unit condensate drain to function properly, curb must be level or within level tolerances shown in the roof curb dimensions (Fig. 4-7) starting on page 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 level tolerances shown in the roof curb dimensions (Fig. 4-7) starting on page 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 Step 6 "Connect Condensate Drain" on page 27. Ensure slab is level or within level tolerances shown in the roof curb dimensions (Fig. 4-7) starting on page 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) and supply and return ducts. 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. Factor the adapter curb airside pressure drop into the new unit fan selection. For unit condensate drain to function properly, unit must be level or within level tolerances shown in the roof curb dimensions (Fig. 4-7) starting on page 12.

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

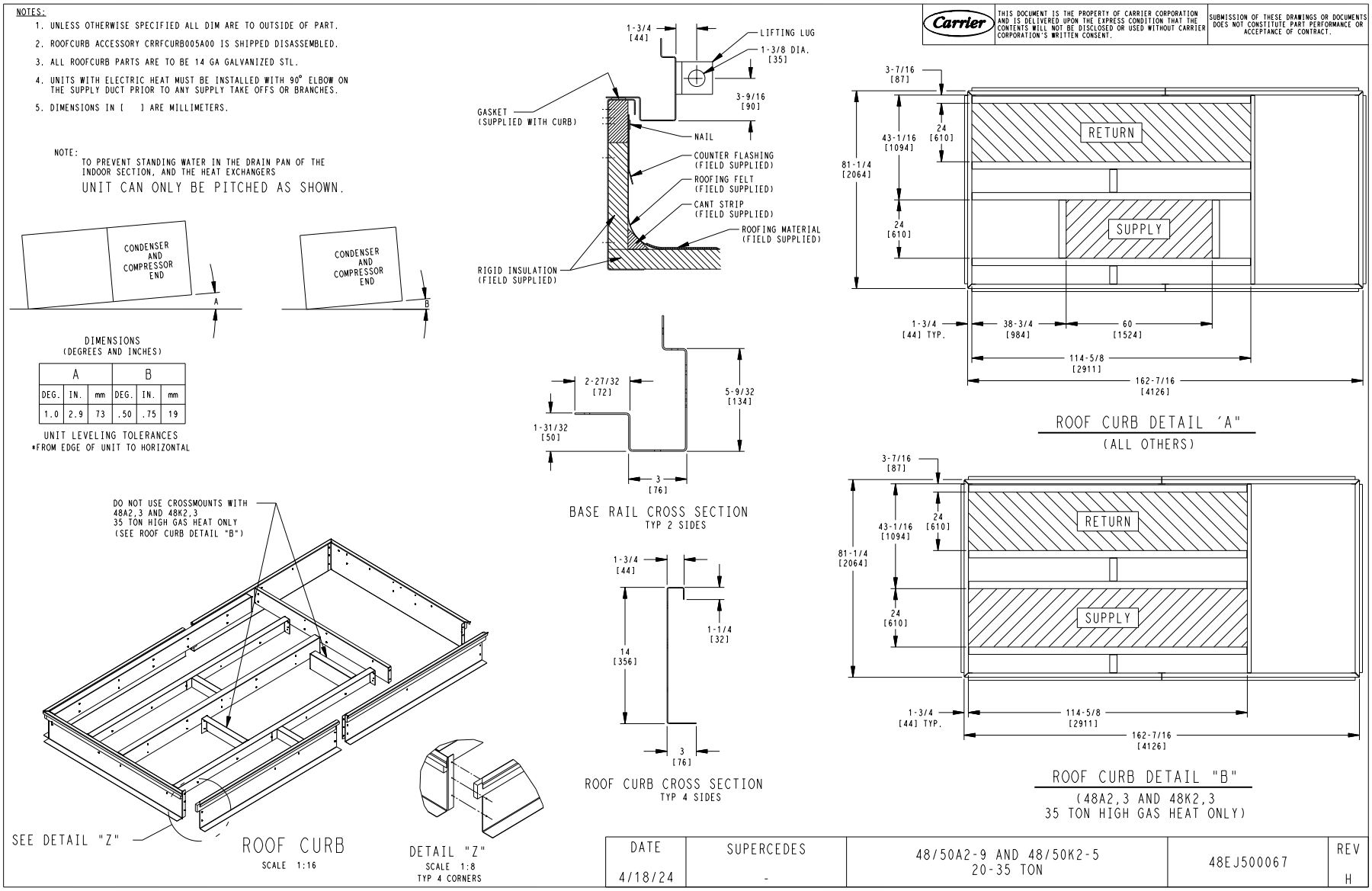
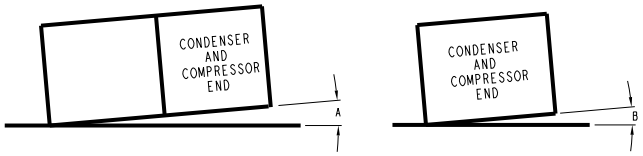


Fig. 4 — Roof Curb — 50K, Sizes 20-34

NOTE:

1. UNLESS OTHERWISE SPECIFED ALL DIM ARE TO OUTSIDE OF PART.
2. ROOFCURB ACCESSORY CRRFCURB006A00 IS SHIPPED DISASSEMBLED.
3. ALL ROOFCURB PARTS: 14 GA GALVANIZED STL.
4. UNITS WITH ELECTRIC HEAT MUST BE INSTALLED WITH 90° ELBOW ON THE SUPPLY DUCT PRIOR TO ANY SUPPLY TAKE OFFS OR BRANCHES.
5. DIMENSIONS IN [ ] ARE MILLIMETERS.

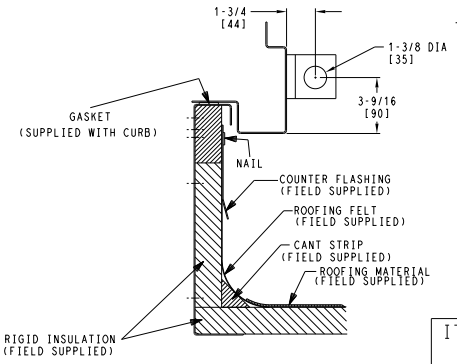
NOTE:
TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.

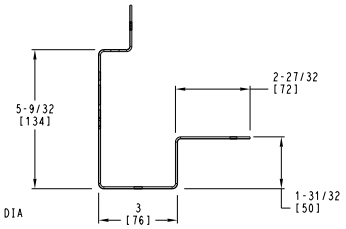


DIMENSIONS
(DEGREES AND INCHES)

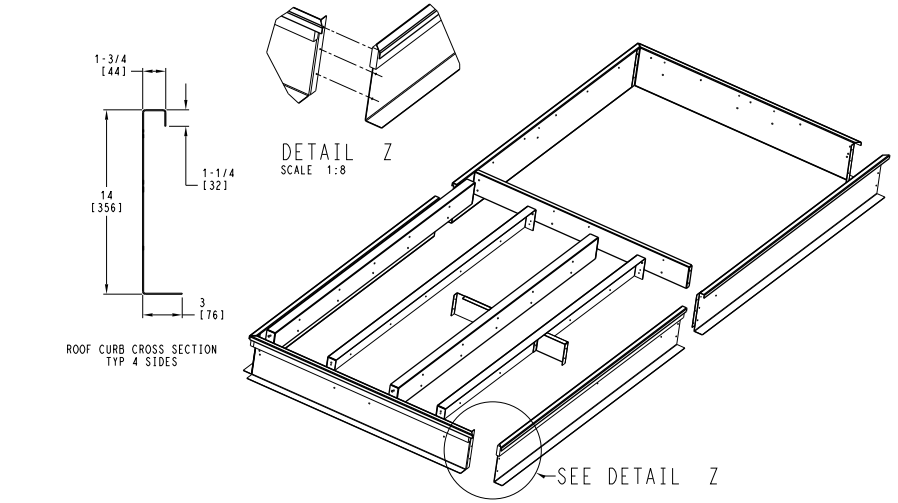
A			B		
DEG.	IN.	mm	DEG.	IN.	mm
1.0	2.9	73	.50	.75	19

UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL





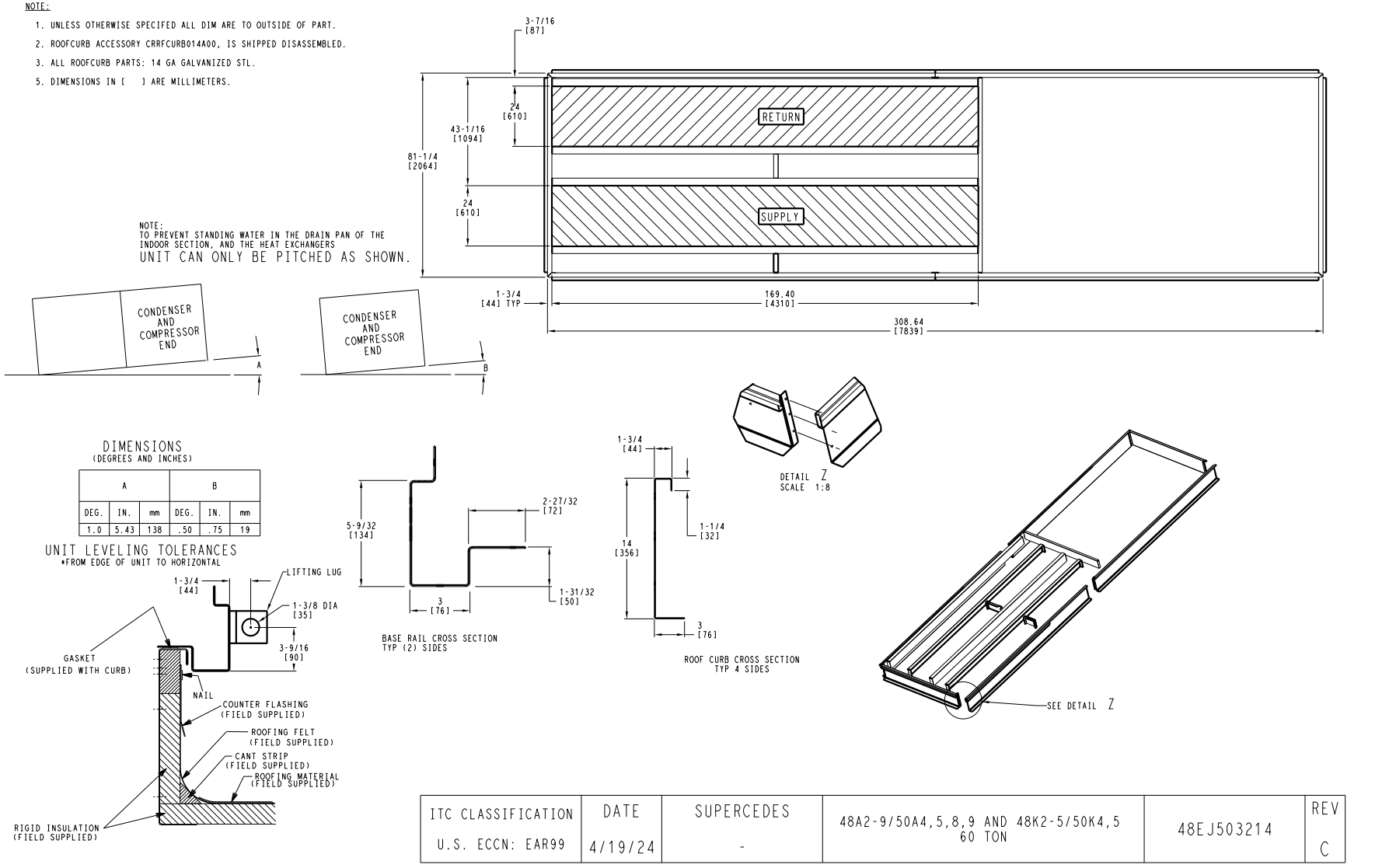
BASE RAIL CROSS SECTION
TYP (2) SIDES



ROOF CURB CROSS SECTION
TYP 4 SIDES

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48/50A2-9 AND 48/50K2-5 40-50 TON	48EJ503213	REV
U.S. ECCN: EAR99	1 OF 1	4/19/24	-			C

Fig. 5 — Roof Curb — 50K, Sizes 40-50



ITC CLASSIFICATION	DATE	SUPERCEDES			REV
U.S. ECCN: EAR99	4/19/24	-	48A2-9/50A4,5,8,9 AND 48K2-5/50K4,5 60 TON	48EJ503214	C

Fig. 6 — Roof Curb — 50K2,3 (Without Heat) and 50K4,5 Unit Size 60

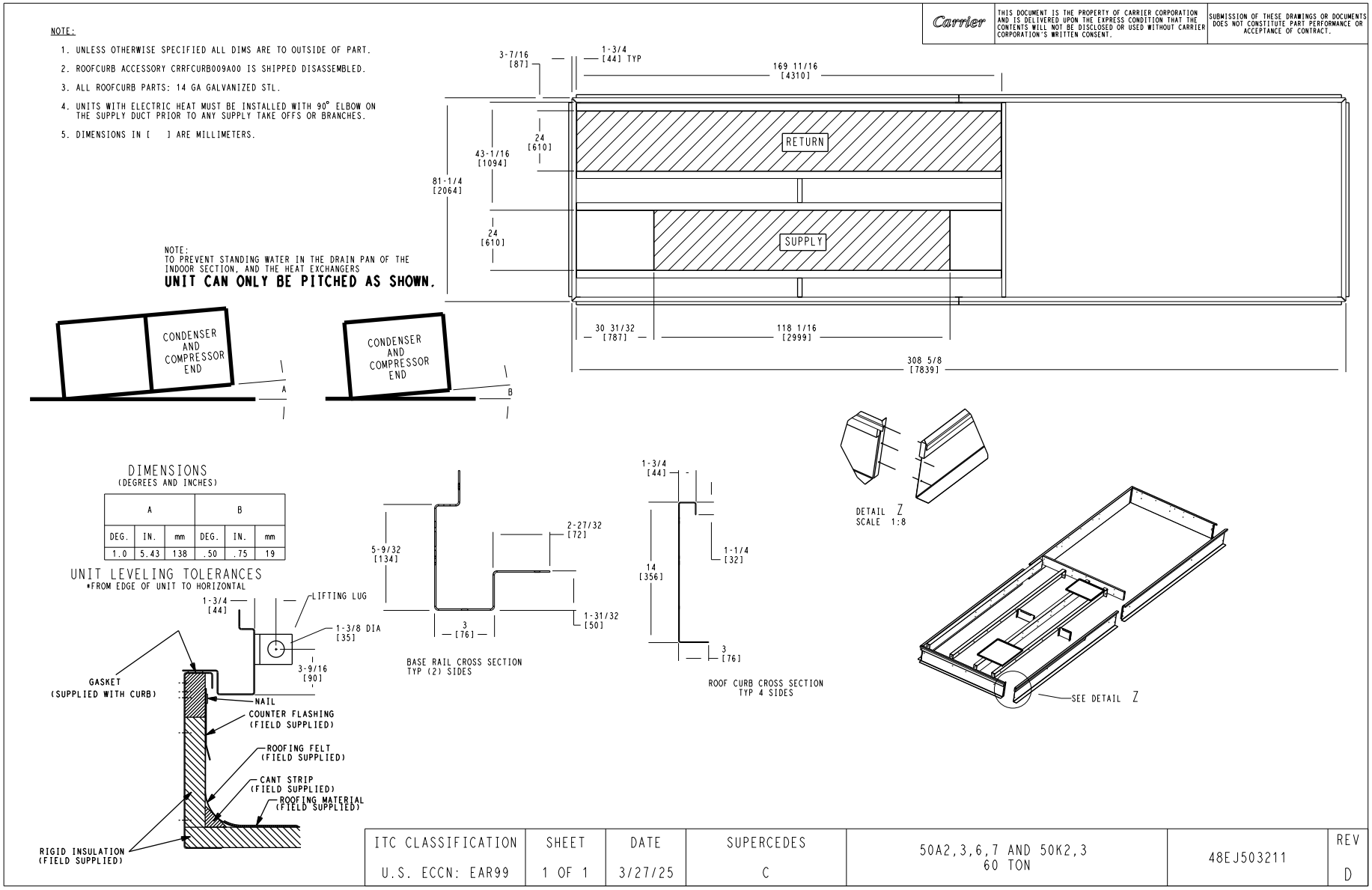


Fig. 7 — Roof Curb — 50K2, 3 Unit Size 60 (with Electric Heat)

⚠ CAUTION - NOTICE TO RIGGERS:
⚠ AVERTISSEMENT - REMARQUE À L'ATTENTION DES MONTEURS

ALL PANELS MUST BE IN PLACE WHEN RIGGING.
TOUS LES CAPOTS DOIVENT ÊTRE EN PLACE AVANT LE LEVAGE

NOTE: Rig with four cables and spread with two 92 inch (2337 mm) spreader bars. Maintain a distance of 74 inches (1880 mm) from top to unit to eyehook.

REMARQUE : Lever avec quatre câbles et séparer avec deux barres d'écartement de 92 po (2 337 mm). Maintenir une distance de 74 po (1 880 mm) du haut de l'unité jusqu'au crochet.

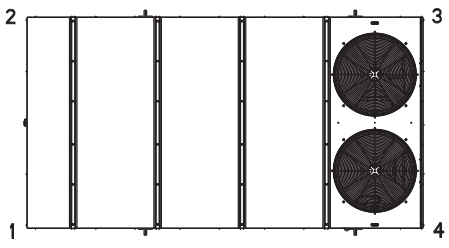
POSITION(S)			SIZE	CORNER WEIGHT								TOTAL WEIGHT		CENTER OF GRAVITY DIMENSIONS				LIFTING LUGS	
				1		2		3		4				A		B		C	
1-3	4	5		LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KGS	IN	MM	IN	MM	IN	MM
48K	2, 3	A, C, G	20 - 30	1273	577	1519	689	1330	603	1187	538	5308	2408	86.8	2206	47.4	1203	87.7	2227
			34	1322	600	1526	692	1332	604	1193	541	5371	2436	87.5	2223	47.0	1193		
			40 - 50	1688	766	1918	870	1716	778	1507	684	6827	3096	113.8	2890	47.0	1193		
			60	2367	1074	2643	1199	2236	1014	1952	885	9196	4171	169.6	4308	46.8	1189	161.7	4106
		B, D, H	20 - 30	1318	598	1529	694	1335	606	1210	549	5391	2445	87.2	2214	46.9	1191	87.7	2227
			34	1367	620	1536	697	1337	606	1216	552	5454	2474	87.9	2232	46.5	1181		
			40 - 50	1738	788	1928	875	1720	780	1526	692	6910	3134	114.3	2903	46.6	1183		
			60	2456	1114	2655	1204	2239	1016	1973	895	9320	4228	170.7	4336	46.3	1177	161.7	4106
	4, 5	A, C, G	20 - 30	1086	493	1735	787	1537	697	905	411	5261	2386	88.5	2248	54.9	1394	87.7	2227
			34	1135	515	1742	790	1539	698	911	413	5324	2415	89.2	2266	54.4	1381		
			40 - 50	1683	763	1911	867	1720	780	1511	685	6824	3095	113.5	2882	47.0	1193		
			60	2473	1122	2515	1141	2070	939	2103	954	9158	4154	169.6	4307	44.2	1122	161.7	4106
		B, D, H	20 - 30	1131	513	1745	792	1542	699	928	421	5344	2424	88.8	2257	54.3	1379	87.7	2227
			34	1180	535	1752	795	1544	700	934	424	5407	2453	89.5	2274	53.8	1366		
			40 - 50	1733	786	1921	871	1724	782	1530	694	6907	3133	114.0	2895	46.6	1183		
			60	2562	1162	2527	1146	2073	940	2124	963	9282	4210	170.7	4335	43.7	1111	161.7	4106
50K	2, 3	A	20 - 30	1143	518	1492	677	1315	596	1114	505	5063	2297	85.9	2182	48.9	1243	87.7	2227
			34	1192	541	1499	680	1317	597	1120	508	5126	2325	86.7	2201	48.5	1231		
			40 - 50	1541	699	1887	856	1704	773	1451	658	6582	2985	112.2	2850	48.2	1223		
			60	2086	946	2611	1184	2231	1012	1901	862	8826	4004	165.7	4208	48.4	1230	161.7	4106
		B, E	20 - 30	1188	539	1502	681	1321	599	1140	517	5150	2336	86.2	2190	48.4	1229	87.7	2227
			34	1237	561	1509	684	1323	600	1146	520	5213	2365	87.0	2209	47.9	1218		
			40 - 50	1592	722	1899	861	1709	775	1472	668	6669	3025	112.8	2864	47.7	1213		
			60	2186	992	2633	1194	2233	1013	1907	865	8958	4063	167.5	4253	47.9	1218	161.7	4106
		D, G	20 - 30	1184	537	1506	683	1326	601	1150	522	5166	2343	86.0	2184	48.4	1229	87.7	2227
			34	1233	559	1513	686	1328	602	1156	524	5229	2372	86.7	2202	48.0	1218		
			40 - 50	1591	722	1905	864	1712	777	1478	670	6684	3032	112.7	2862	47.8	1213		
			60	2207	1001	2621	1189	2231	1012	1917	870	8974	4070	167.5	4254	47.7	1212	161.7	4106
	4, 5	A	20 - 30	956	434	1708	775	1522	690	832	377	5016	2275	87.7	2227	56.8	1443	87.7	2227
			34	1005	456	1715	778	1524	691	838	380	5079	2304	88.4	2246	56.3	1429		
			40 - 50	1536	697	1880	853	1708	775	1455	660	6579	2984	111.9	2841	48.1	1223		
			60	2192	994	2483	1126	2065	937	2052	931	8788	3986	165.6	4206	45.7	1160	161.7	4106
		B, E	20 - 30	1001	454	1718	779	1528	693	858	389	5103	2315	88.0	2234	56.1	1426	87.7	2227
			34	1050	476	1725	782	1530	694	864	392	5166	2343	88.7	2252	55.6	1412		
			40 - 50	1587	720	1892	858	1713	777	1476	670	6666	3023	112.4	2856	47.7	1212		
			60	2292	1040	2505	1136	2067	938	2058	933	8920	4046	167.4	4252	45.2	1149	161.7	4106
		D, G	20 - 30	997	452	1722	781	1533	695	868	394	5119	2322	87.7	2228	56.1	1425	87.7	2227
			34	1046	474	1729	784	1535	696	874	396	5182	2350	88.4	2246	55.6	1412		
			40 - 50	1586	719	1898	861	1716	778	1482	672	6681	3030	112.3	2853	47.7	1213		
			60	2313	1049	2493	1131	2065	937	2068	938	8936	4053	167.4	4253	45.0	1143	161.7	4106

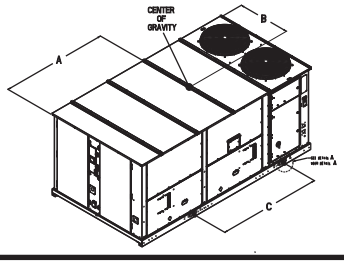
NOTE:
Weights and center of gravity are for the heaviest unit configuration by unit type and size. Refer to the unit submittal for as-built unit and corner weights.

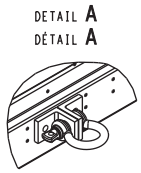
Add 75 Lbs (34 kg) for outdoor air hood crating.

REMARQUE :
Les poids et le centre de gravité correspondent à la configuration d'unité la plus lourde par type et taille d'unité. Reportez-vous à la documentation pour les détails telle que construit et les poids de coin de l'unité.

Ajouter 75 lbs (34 kg) pour les capots d'air extérieur.







48VA003836 REV. -

Fig. 8 — Rigging Label

Step 3 — Install Field-Fabricated Ductwork

⚠ WARNING

For vertical supply/return units, tools or parts could drop into ductwork and cause injury. Install a 90-degree elbow in the supply/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.

VERTICAL SUPPLY/VERTICAL RETURN

The 50K2, K3 Series units are designed for vertical supply/return. Field-fabricated ductwork must be attached to the roof curb, or support structure, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in the certified drawings starting on page 28. 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.

HORIZONTAL SUPPLY/HORIZONTAL RETURN

The 50K4, K5 Series units are designed for horizontal supply/return only. Field-fabricated ductwork connects to the factory-provided flanges on the supply/return openings of the unit. See certified drawings starting on page 28 for the flange sizes and locations. Use a single supply duct over all supply openings and a single return duct over all return openings. Do not split ductwork at unit. Connect ductwork after unit is in the installation location. Remove shipping covers before connecting ductwork.

Consider return duct sizing for return duct mounted barometric relief or power exhaust. Consider access to install and maintain outdoor air hoods and screens with ducts installed.

VERTICAL SUPPLY/HORIZONTAL RETURN

The 50K2,K3 units are designed for vertical supply/return, but can be field converted to horizontal return following Steps 1-4. Perform vertical to horizontal return conversion prior to rigging the unit in place. Vertical duct work must be attached to the roof curb or support structure prior to rigging the unit. Horizontal return duct must connect to the side of the unit using a single duct for the entire return opening. Connect the return duct after the unit is rigged in place.

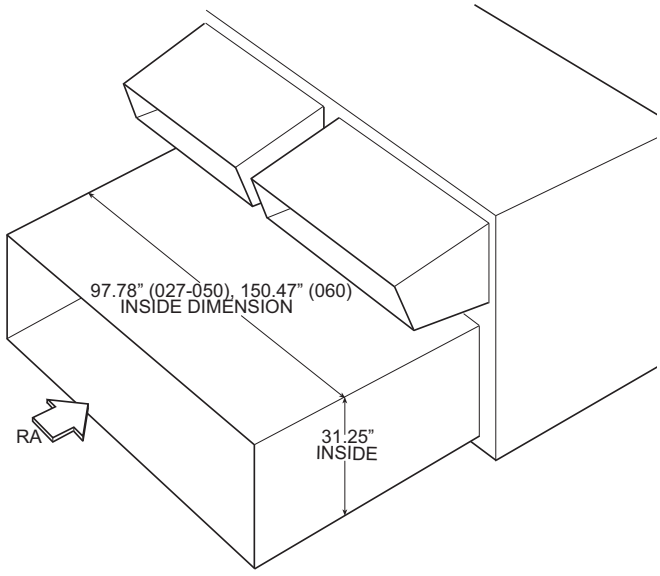
1. **For units with no relief:**
   Remove the large rectangular panels below the outdoor air intake. Unit sizes 20-50 will have two panels; unit size 60 will have three panels. These openings will be used for the return duct.
   For units with barometric relief:
   Remove the barometric relief assemblies (including hoods and dampers). Unit sizes 20-50 will have two assemblies; unit size 60 will have three assemblies. These openings will be used for the return duct. The relief assemblies will need to be relocated to the return duct. See "Barometric Relief or Power Exhaust Relocation to Return Duct" on page 18. Refer to the accessory multi-stage power exhaust and barometric relief installation instructions for guidance on mounting barometric relief in the return duct.
   For units with multi-stage power exhaust:
   Remove the power exhaust assemblies (including hoods dampers, and fans). Unit sizes 20-50 units will have two assemblies; unit size 60 will have three assemblies. These openings will be used for the return duct. The exhaust assemblies will need to be relocated to the return duct. See "Barometric Relief or Power Exhaust Relocation to Return Duct" on page 18.
   Refer to the accessory multi-stage power exhaust and barometric relief installation instructions for guidance on installing the multi-stage power exhaust in the return duct.

IMPORTANT: Install access panels in the return duct for servicing the exhaust fans.

If longer power exhaust control harnesses are needed, refer to the accessory multi-stage power exhaust and barometric relief installation instructions for the harness extension replacement part numbers or field splice the existing wire harness, using a junction box at each splice. The control harness can be routed to the control plug through the return ductwork or externally in conduit.

IMPORTANT: Take note of power harness plug locations and ensure the harnesses are unplugged before removing the exhaust assembly from the unit.

2. Seal the bottom return opening of the unit with airtight panels capable of supporting the weight of a person.
3. Identify the location of any return air sensors or smoke detector. Relocate as needed to ensure the sensor/smoke detector pickup is properly in the return air stream.
4. Using a return duct with a minimum 3/4 in. flange, connect the return duct to the side of the unit around the openings in the side of the unit. Use a single duct to cover both openings. Ensure the ductwork is properly sealed against the side of the unit. Use a flex connection to minimize vibration. See Fig. 9 for horizontal return duct dimension for field converted units.



NOTE: Relocate the RAT, RARH, or RA smoke detector before connecting the horizontal return duct.

Fig. 9 — Side Return Air Conversion

Follow AMCA (Air Movement and Control Association) guidelines relating to ductwork connections to the unit. These guidelines recommend a minimum 2-1/2 in. 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 affects 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. See Fig. 10 for barometric relief or power exhaust relocation details.

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.

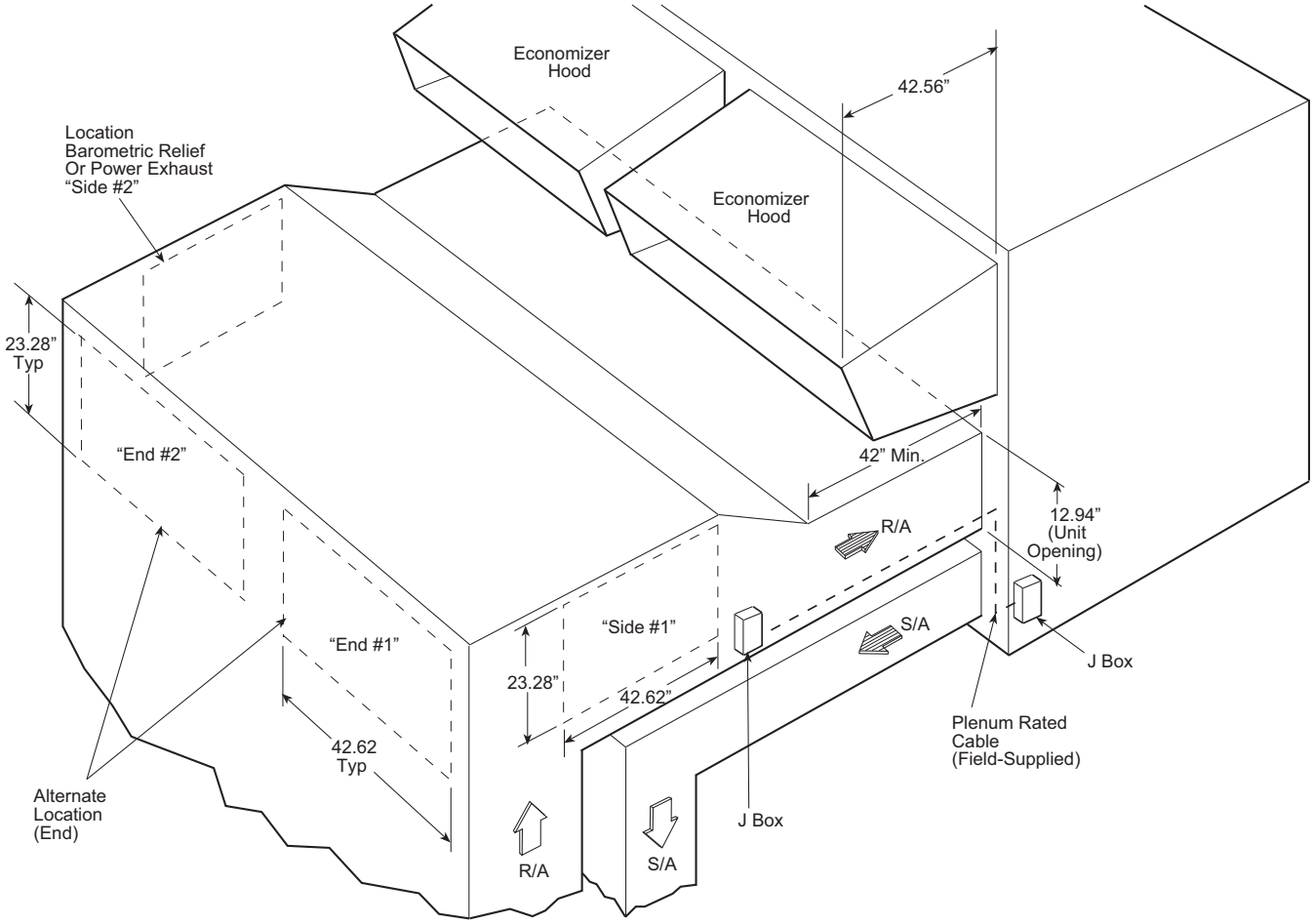


Fig. 10 — Barometric Relief or Power Exhaust Relocation to Return Duct

Table 4 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 20, 26, 30

BASE UNIT SIZE 50K2, K3, K4, K5	20		26		30	
NOMINAL CAPACITY (TONS)	**20**		**25**		**30**	
OPERATING WEIGHT (lb)	See Unit Weights Table					
COMPRESSOR	Standard	Lead Digital (Option)	Standard	Lead Digital (Option)	Standard	Lead Digital (Option)
Refrigerant Circuits	1		1		1	
Circuit A, Type (A1/A2)	Fixed / Fixed Speed	Digital / Fixed Speed	Fixed / Fixed Speed	Digital / Fixed Speed	Fixed / Fixed Speed	Digital / Fixed Speed
Circuit A, Qty...Model (A1/A2)	1…YA91 / 1…YA137	1…YAD86 / 1…YA137	1…YA91 / 1…YA182	1…YAD86 / 1…YA182	1…YA122 / 1…YA182	1…YAD115 / 1…YA182
Circuit A Oil Charge (oz) (A1/A2)	58 / 121	60 / 121	58 / 121	60 / 121	71 / 121	85 / 121
Circuit B, Type (B1/B2)	—	—	—	—	—	—
Circuit B, Qty...Model (B1/B2)	—	—	—	—	—	—
Circuit B Oil Charge (oz) (B1/B2)	—	—	—	—	—	—
Capacity Steps (%)	0, 40, 60, 100	0, 20-39, 61, 69-100	0, 33, 67, 100	0, 20-32, 68, 74-100	0, 40, 60, 100	0, 20-39, 61, 69-100
REFRIGERANT	R-454B					
Circuit A Operating Charge - Standard (lb)	19.0		23.5		23.0	
Circuit A Operating Charge with Humidi-MiZer Option (lb)	27.3		32.0		31.0	
Circuit B Operating Charge - Standard (lb)	N/A		N/A		N/A	
High Pressure Switch Auto-Reset (psig)	500					
High Pressure Switch Cutout (psig)	650					
CONDENSER COIL	Novation (Aluminum MCHX)					
Quantity	1					
Total Face Area (sq ft)	32.8					
CONDENSER FAN (STANDARD)	Metal Propeller		Metal Propeller		Metal Propeller	
Nominal cfm	19,500					
Quantity...Diameter (in.)	2...30					
Motor Hp...rpm	2.0-2.5...1140					
LOW SOUND CONDENSER FAN (OPTION)	Composite AeroAcoustic™		Composite AeroAcoustic™		Composite AeroAcoustic™	
Nominal cfm	19,500					
Quantity...Diameter (in.)	2...30.5					
Motor Hp...rpm	1.5-1.75...850					
EVAPORATOR COIL	Al/Cu RTPF					
Circuiting	Fully Active		Fully Active		Fully Active	
Tube Size (in.)	3/8					
Total Face Area (sq ft)	31.7					
Rows...Fins (in.)	3…15		4…15		4…15	
Fin Enhancement	Double Wavy		Double Wavy		Double Wavy	
Tube Enhancement	Cross Hatched		Cross Hatched		Cross Hatched	
Condensate Drain Connection Quantity...Size (in.)	1…1					
HUMIDI-MIZER COIL	Novation (Aluminum MCHX)					
Coil Circuit	A					
Coil Quantity	1					
Coil Total Face Area (sq ft)	16					
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	

Table 4 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 20, 26, 30 (cont)

BASE UNIT SIZE 50K2, K3, K4, K5	20		26		30	
NOMINAL CAPACITY (TONS)	**20**		**25**		**30**	
INDOOR FANS	DWDI Forward Curve		DWDI Forward Curve		DWDI Forward Curve	
Qty...Size (in.)	2... 20x15		2...20x15		2...20x15	
Drive Type	Belt		Belt		Belt	
Nominal cfm	8000		10,000		12,000	
Peak Motor Efficiency	89.5 / 91.7	93	89.5 / 91.7	93 / 93.6	89.5 / 91.7	93 / 93.6
Motor Hp	5 / 10	15	5 / 10	15 / 20	5 / 10	15 / 20
Motor Frame Size (T)	184 / 215	254	184 / 215	254 / 256	184 / 215	254 / 256
Motor Bearing Type	Ball					
Maximum Allowable rpm	1200					
Motor Pulley Pitch Diameter (in.)	4.9 / 4.4	5.7	4.9 / 6.1	5.5 / 5.9	4.9 / 4.4	5.7 / 5.9
Nominal Motor Shaft Diameter (in.)	1.125 / 1.375	1.625	1.125 / 1.375	1.625	1.125 / 1.375	1.625
Fan Pulley Pitch Diameter (in.)	12.4 / 8.6	9.1	12.4 / 11.1	8.6	12.4 / 9.4	9.1 / 8.6
Nominal Fan Shaft Diameter (in.)	1-15/16					
Belt Quantity	1 / 1	2 / 2	1 / 1	2 / 2	1 / 2	2 / 2
Belt Type	BX56 / BX50	5VX530	BX56 / 5VX570	5VX530	BX56 / BX50	5VX530
Belt Length (in.)	59 / 53	53	59/57	53	59/53	53
Pulley Center Line Distance (in.)	15.5 / 16.2	14.8	15.5 / 14.8	15.4 / 15.1	15.5 / 15.5	14.8 / 15.1
Factory Speed Setting at 60 or Max. Hz (rpm)	6997 / 903	1107	697 / 970	1131/ 1200	697 / 826	1107 / 1200
Grease Fitting Qty...Fitting Type (in.)	2...1/8 NPT					
PRE-EVAPORATOR FILTERS						
2 in. Throwaway (Standard) Qty...Size (in.)	10…20x24x2					
2 in. MERV 8 (Option) Qty...Size (in.)	10…20x24x2					
4 in. MERV 8 (Option) Qty...Size (in.)	5…20x24x4 / 5…20x20x4					
4 in. MERV 13 (Option) Qty...Size (in.)	5…20x24x4 / 5…20x20x4					
OUTDOOR-AIR SCREENS						
Quantity...Size (in.)	4…16x25x2 4…20x25x2		4…16x25x2 4…20x25x2		4…16x25x2 4…20x25x2	
MUTLI-STAGE POWER EXHAUST (OPTION)						
Motor Type	PSC					
Motor Quantity...Hp	4...1					
Fan Quantity	4					
Fan Diameter...width (in.)	11.9 x 10.7					
ELECTRIC HEAT (50K ONLY OPTION)						
Heater Quantity	2					
Capacity Range	27-72KW					
Heater Auto Reset Temp Limit (°F)	Opens at 170°F, and Resets at 130°F					
Heater Manual Reset Temp Limit	Opens at 160°F					
Heater Air Proving Switch Limit	—		—		—	

Table 5 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 34 and 40

BASE UNIT SIZE 50K2, K3, K4, K5	34		40[a]	
NOMINAL CAPACITY (TONS)	35		40	
OPERATING WEIGHT (lb)	See Unit Weights Table			
Refrigerant Circuits	1		2	
Circuit A, Type (A1/A2)	Fixed / Fixed Speed	Digital / Fixed Speed	Fixed / Fixed Speed	Digital / Fixed Speed
Circuit A, Qty...Model (A1/A2)	1...YA154 / 1…YA182	1...YAD147 / 1…YA182	1…YA91 / 1…YA122	1…YAD86 / 1…YA122
Circuit A Oil Charge (oz) (A1/A2)	121 / 121	114 / 121	58 / 75	60 / 75
Circuit B, Type (B1/B2)	—	—	Fixed / Fixed Speed	Digital / Fixed Speed
Circuit B, Qty...Model B1/B2)	—	—	1…YA91 / 1…YA122	1…YA91 / 1…YA122
Circuit B Oil Charge (oz) (B1/B2)	—	—	58/75	58/75
Capacity Steps (%)	0, 46, 54, 100	0, 20-45, 55, 64-100	0, 21, 29, 43, 50, 57, 71, 79, 100	0, 10-20, 30-42, 39-49, 53-71, 62-78, 82-100
REFRIGERANT	R-454B			
Circuit A Operating Charge - Standard (lb)	24.0		19.0	
Circuit A Operating Charge with Humidi-MiZer- Option (lb)	31.5		27.0	
Circuit B Operating Charge - Standard	N/A		19.3	
High Pressure Switch Auto-Reset (psig)	500			
High Pressure Switch Cutout (psig)	650			
CONDENSER COIL	Novation (Aluminum MCHX)			
Quantity	1		2	
Total Face Area (sq ft)	32.8		65.6	
CONDENSER FAN (STANDARD)	Composite AeroAcoustic™		Metal Propeller	
Nominal cfm	19,500		32,000	
Qauntity...Diameter (in.)	2...30.5		4...30	
Motor Hp...rpm	1.5-1.75… 850		2.0-2.5...1140	
LOW SOUND CONDENSER FAN (OPTION)	Composite AeroAcoustic™		Composite AeroAcoustic™	
Nominal cfm	19,500		32,000	
Quantity...Diameter (in.)	2...30.5		4...30.5	
Motor Hp...rpm	1.5-1.75...850			
EVAPORATOR COIL	Al/Cu RTPF			
Circuiting	Fully Active		Intertwined	
Tube Size (in.)	3/8		1/2	
Total Face Area (sq ft)	31.7		31.3	
Rows...Fins (in.)	4…15		4…17	
Fin Enhancement	Double Wavy		Double Wavy	
Tube Enhancement	Cross Hatched		Cross Hatched	
Condensate Drain Connection Quantity...Size (in.)	1…1			
HUMIDI-MIZER COIL	Novation (Aluminum MCHX)			
Coil Circuit	A			
Coil Quantity	1		1	
Coil Total Face Area (sq ft)	16			
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	

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Table 5 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 34 and 40 (cont)

BASE UNIT SIZE 50K2, K3, K4, K5	34		40[a]	
NOMINAL CAPACITY (TONS)	**35**		**40**	
INDOOR FANS	DWDI Forward Curve		DWDI Forward Curve	
Qty...Size (in.)	2... 20x15		2...20x15	
Drive Type	Belt		Belt	
Nominal cfm	14,000		16,000	
Peak Motor Efficiency	91.7 / 93	93.6	91.7 / 93	93.6
Motor Hp	10 / 15	20 / 25	10 / 15	20 / 25
Motor Frame Size (T)	215 / 254	256 / 284	215 / 254	256 / 284
Motor Bearing Type	Ball			
Maximum Allowable rpm	1300			
Motor Pulley Pitch Diameter (in.)	4.4 / 5.1	5.7 / 6.2	4.4 / 5.3	5.7 / 7.5
Nominal Motor Shaft Diameter (in.)	1.375 / 1.625	1.625 / 1.875	1.375 / 1.625	1.625 / 1.874
Fan Pulley Pitch Diameter (in.)	9.4 / 8.6	8.6 / 8.6	9.4 / 9.4	9.4 / 11.1
Nominal Fan Shaft Diameter (in.)	1-15/16			
Belt Quantity	2		2	
Belt Type	BX50 / 5VX530	5VX530	BX50 / 5VX530	5VX550 / BVX590
Belt Length (in.)	53		53 / 53	55 / 59
Pulley Center Line Distance (in.)	15.5 / 15.6	15.2 / 14.8	15.5 / 14.8	15.5 / 14.8
Factory Speed Setting at 60 or Max. Hz (rpm)	826 / 1048	1170 / 1272	826 / 997	1070 / 1193
Grease Fitting Qty...Fitting Type (in.)	2...1/8 NPT			
PRE-EVAPORATOR FILTERS				
2 in. Throwaway (Standard) Qty...Size (in.)	10…20x24x2			
2 in. MERV 8 (Option) Qty...Size (in.)	10…20x24x2			
4 in. MERV 8 (Option) Qty...Size (in.)	5…20x24x4 / 5…20x20x4			
4 in. MERV 13 (Option) Qty...Size (in.)	5…20x24x4 / 5…20x20x4			
OUTDOOR-AIR SCREENS				
Quantity...Size (in.)	4…16x25x2 4…20x25x2		8…16x25x2 4…20x25x2	
MUTLI-STAGE POWER EXHAUST (OPTION)				
Motor Type	PSC			
Motor Quantity...hp	4...1			
Fan Quantity	4			
Fan Diameter...width (in.)	11.9 / 10.7			
ELECTRIC HEAT (50K ONLY OPTION)				
Heater Quantity	2		2	
Capacity Range	27-72 kW		27-72 kW	
Heater Auto Reset Temp Limit (°F)	Opens at 170°F, and Resets at 130°F		Opens at 170°F, and Resets at 130°F	
Heater Manual Reset Temp Limit (°F)	Opens at 160°F		Opens at 160°F	
Heater Air Proving Switch Limit	—		—	

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Table 6 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 50 and 60 Vertical

BASE UNIT SIZE 50K2, K3, K4, K5	50[a]		60 (VERTICAL)[a]	
NOMINAL CAPACITY (TONS)	50		60	
OPERATING WEIGHT (lb)	See Unit Weights Table			
Refrigerant Circuits	2		2	
Circuit A, Type (A1/A2)	Fixed / Fixed Speed	Digital / Fixed Speed	Fixed / Fixed Speed	Digital / Fixed Speed
Circuit A, Qty...Model (A1/A2)	1…YA104 / 1…YA137	1…YAD98 / 1…YA137	1…YA122 / 1…YA182	1…YAD115 / 1…YA182
Circuit A Oil Charge (oz) (A1/A2)	75/121	85/121	75/121	85/121
Circuit B, Type (B1/B2)	Fixed/Fixed Speed	Fixed/Fixed Speed	Fixed/Fixed Speed	Fixed/Fixed Speed
Circuit B, Qty...Model (B1/B2)	1…YA104 / 1…YA137	1…YA104 / 1…YA137	1…YA122 / 1…YA182	1…YA122 / 1…YA182
Circuit B Oil Charge (oz) (B1/B2)	75 / 121	75 / 121	75 / 121	75 / 121
Capacity Steps (%)	0, 22, 28, 43, 50, 57, 72, 78, 100	0, 10-21, 31-42, 39-49, 53-71, 62-78, 82-100	0, 20, 30, 40, 50, 60, 70, 80, 100	0, 10-19, 29-39, 40-49, 53-70, 64-80, 84-100
REFRIGERANT	R-454B			
Circuit A Operating Charge - Standard (lb)	23.5		26.8	
Circuit A Operating Charge with Humidi-MiZer- Option (lb)	30.0		36.6	
Circuit B Operating Charge - Standard (lb)	22.5		25.2	
High Pressure Switch Auto-Reset (psig)	500			
High Pressure Switch Cutout (psig)	650			
CONDENSER COIL	Novation (Al MCHX)			
Quantity	2			
Total Face Area (sq ft)	65.6		99.6	
CONDENSER FAN (STANDARD)	Metal Propeller		Metal Propeller	
Nominal cfm	35,500		48,000	
Qauntity...Diameter (in.)	4...30		6...30	
Motor Hp...rpm	2.0-2.5...1140			
LOW SOUND CONDENSER FAN (OPTION)	Composite AeroAcoustic™		Composite AeroAcoustic™	
Nominal cfm	35,500		48,000	
Quantity...Diameter (in.)	4...30.5		6...30.5	
Motor Hp...rpm	1.5-1.75...850			
EVAPORATOR COIL	Al/Cu RTPF			
Circuiting	Intertwined		Intertwined	
Tube Size (in.)	1/2			
Total Face Area (sq ft)	31.3		48.1	
Rows...Fins (in.)	6…16		4…17	
Fin Enhancement	Double Wavy		Double Wavy	
Tube Enhancement	Cross Hatched		Cross Hatched	
Condensate Drain Connection Quantity...Size (in.)	1…1			
HUMIDI-MIZER COIL	Novation (Al MCHX)			
Coil Circuit	A			
Coil Quantity	1		1	
Coil Total Face Area (sq ft)	16		24.3	
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	

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Table 6 — 50K2, K3, K4, K5 Unit Physical Data — Sizes 50 and 60 Vertical (cont)

BASE UNIT SIZE 50K2, K3, K4, K5	50[a]		60 (VERTICAL)[a]	
NOMINAL CAPACITY (TONS)	**50**		**60**	
INDOOR FANS	DWDI Forward Curve		DWDI Forward Curve	
Qty...Size (in.)	2... 20x15		3...20x15	
Drive Type	Belt		Belt	
Nominal cfm	18,000		24,000	
Peak Motor Efficiency	93 / 93.6	93.6 / 94.1	93.6 / 93.6	94.1 / 94.1
Motor Hp	15 / 20	25 / 30	20 / 25	30 / 40
Motor Frame Size (T)	254 / 256	284 / 286	256 / 284	286 / 324
Motor Bearing Type	Ball			
Maximum Allowable rpm	1300		1200	
Motor Pulley Pitch Diameter (in.)	5.3 / 5.7	6.2 / 6.7	5.7 / 5.3	5.9 / 6.5
Nominal Motor Shaft Diameter (in.)	1.625 / 1.625	1.874 / 1.875	1.625 / 1.874	1.875 / 2.125
Fan Pulley Pitch Diameter (in.)	9.5 / 9.5	9.5 / 9.5	9.5 / 9.1	9.5 / 9.5
Nominal Fan Shaft Diameter (in.)	1-15/16			
Belt Quantity	2 / 2	2 / 2	2 / 3	3 / 3
Belt Type	5VX550 / 5VX550	5VX570 / 5VX570	5VX550 / 5VX530	5VX550 / 5VX570
Belt Length (in.)	53 / 55	57 / 57	55 / 53	55 / 57
Pulley Center Line Distance (in.)	14.7 / 15.5	16.1 / 1 5.7	15.5 / 15.1	15.3 / 15.9
Factory Speed Setting at 60 or Max. Hz (rpm)	986 / 1059	1152 / 1255	1059 / 1028	1105 / 1200
Grease Fitting Qty...Fitting Type (in.)	2...1/8 NPT		4...1/8 NPT	
PRE-EVAPORATOR FILTERS				
2 in. Throwaway (Standard) Qty...Size (In.)	10…20x24x2		16…20x24x2	
2 in. MERV 8 (Option) Qty...Size (in.)	10…20x24x2		16…20x24x2	
4 in. MERV 8 (Option) Qty...Size (In.)	5…20x24x4 / 5…20x20x4		8…20x20x4 / 8…20x24x4	
4 in. MERV 13 (Option) Qty...Size (In.)	5…20x24x4 / 5…20x20x6		8…20x20x4 / 8…20x24x4	
OUTDOOR-AIR SCREENS				
Quantity...Size (in.)	8…16x25x2 4…20x25x2		12…16x25x2 6…20x25 x2	
MUTLI-STAGE POWER EXHAUST (OPTION)				
Motor Type	PSC			
Motor Quantity...hp	4...1		6...1	
Fan Quantity	4		6	
Fan Diameter...width (in.)	11.9 / 10.7		11.9 / 10.7	
ELECTRIC HEAT (50K ONLY OPTION)				
Heater Quantity	2		3	
Capacity Range	27-72kW		41-108kW	
Heater Auto Reset Temp Limit (°F)	Opens at 170°F and Resets at 130°F		Opens at 170°F and Resets at 130°F	
Heater Manual Reset Temp Limit (°F)	Opens at 160°F		Opens at 160°F	
Heater Air Proving Switch Limit	—		—	

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Table 7 — 50K2, K3, K4, K5 Unit Physical Data — Size 60 Horizontal

BASE UNIT SIZE 50K2, K3, K4, K5	60 HORIZONTAL[a]	
NOMINAL CAPACITY (TONS)	**60**	
OPERATING WEIGHT (lb)	See Unit Weights Table	
Refrigerant Circuits	2	
Circuit A, Type (A1/A2)	Fixed / Fixed Speed	Digital / Fixed Speed
Circuit A, Qty...Model (A1/A2)	1…YA122 / 1…YA182	1...YAD115 / 1…YA182
Circuit A Oil Charge (oz) (A1/A2)	75 / 121	85 / 121
Circuit B, Type (B1/B2)	Fixed/Fixed Speed	Digital / Fixed Speed
Circuit B, Qty...Model (B1/B2)	1… YA122 / 1… YA182	1…YA122 / 1…YA182
Circuit B Oil Charge (oz) (B1/B2)	75 / 121	75 / 121
Capacity Steps (%)	0, 20, 30, 40, 50, 60, 70, 80, 100	0, 10-19, 29-39, 40-49, 53-70, 64-80, 84-100
REFRIGERANT	R-454B	
Circuit A Operating Charge - Standard (lb)	26.8	
Circuit A Operating Charge with Humidi-MiZer Option (lb)	36.3	
Circuit B Operating Charge - Standard (lb)	25.2	
High Pressure Switch Auto-Reset (psig)	500	
High Pressure Switch Cutout (psig)	650	
CONDENSER COIL	Novation (Al MCHX)	
Quantity	2	
Total Face Area (sq ft)	99.6	
CONDENSER FAN (STANDARD)	Metal Propeller	
Nominal cfm	48,000	
Quantity...Diameter (in.)	6...30	
Motor Hp...rpm	2.0-2.5...1140	
LOW SOUND CONDENSER FAN (OPTION)	Composite AeroAcoustic™	
Nominal cfm	48,000	
Quantity...Diameter (in.)	6...30.5	
Motor Hp...rpm	1.5-1.75...850	
EVAPORATOR COIL	Al/Cu RTPF	
Circuiting	Intertwined	
Tube Size (in.)	1/2	
Total Face Area (sq ft)	48.1	
Rows...Fins (in.)	4...17	
Fin Enhancement	Double Wavy	
Tube Enhancement	Cross Hatched	
Condensate Drain Connection Quantity...Size (in.)	1…1	
HUMIDI-MIZER COIL	Novation (Al MCHX)	
Coil Circuit	A	
Coil Quantity	1	
Coil Total Face Area (sq ft)	24.3	
Reheat Valve Qty...Type	1…On/Off Three-Way	
Bypass Valve Qty...Type	1…Modulating Three-Way	

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Table 7 — 50K2, K3, K4, K5 Unit Physical Data — Size 60 Horizontal (cont)

BASE UNIT SIZE 50K2, K3, K4, K5	60 HORIZONTAL[a]	
NOMINAL CAPACITY (TONS)	**60**	
INDOOR FANS	DWDI Forward Curve	
Qty...Size (in.)	3... 20x15	
Drive Type	Belt	
Nominal cfm	24,000	
Peak Motor Efficiency	93.6 / 93.6	94.1 / 94.1
Motor Hp	20 / 25	30 / 40
Motor Frame Size (T)	256 / 284	286 / 324
Motor Bearing Type	Ball	
Maximum Allowable rpm	1200	
Motor Pulley Pitch Diameter (in.)	5.7 / 5.3	5.9 / 6.5
Nominal Motor Shaft Diameter (in.)	1.625 / 1.874	1.875 / 2.125
Fan Pulley Pitch Diameter (in.)	9.4/9.1	9.5 / 9.4
Nominal Fan Shaft Diameter (in.)	1-15/16	
Belt Quantity	2 / 3	3 / 3
Belt Type	5VX550 / 5VX530	5VX550 / 5VX570
Belt Length (in.)	55 / 53	55 / 57
Pulley Center Line Distance (in.)	15.5 / 15.1	15.3 / 15.9
Factory Speed Setting at 60 or Max. Hz (rpm)	1070 / 1028	1105 / 1200
Grease Fitting Qty...Fitting Type (in.)	4…1/8 in. NPT	
PRE-EVAPORATOR FILTERS		
2 in. Throwaway (Standard) Qty...Size (in.)	16…20x24x2	
2 in. MERV 8 (Option) Qty...Size (in.)	16…20x24x2	
4 in. MERV 8 (Option) Qty...Size (in.)	8…20x20x4 / 8…20x24x4	
4 in. MERV 13 (Option) Qty...Size (in.)	8…20x20x4 / 8…20x24x4	
OUTDOOR-AIR SCREENS		
Quantity...Size (in.)	12…16x25x2 / 6…20x25x2	
MUTLI-STAGE POWER EXHAUST (OPTION)		
Motor Type	PSC	
Motor Quanitity...hp	6...1	
Fan Quantity	6	
Fan Diameter...width (in.)	11.9x10.7	
ELECTRIC HEAT (50K ONLY OPTION)		
Heater Quantity	3	
Capacity Range	41-108 kW	
Heater Auto Reset Temp Limit (°F)	Opens at 170°F and Resets at 130°F	
Heater Manual Reset Temp Limit (°F)	Opens at 160°F	
Heater Air Proving Switch Limit	—	—

NOTE(S):

a. For unit sizes 40, 50, and 60 Circuit A uses the right condenser coil, Circuit B uses the left condenser coil.

Step 4 — Install Basepan Gasket Material

Gasket material is required to prevent air and water leaks between the bottom of the unit, supply/return ducts, and the curb or curb adapter. Install the gasket material before rigging the unit into place. Be sure all joints and corners of gasket are square and flush to prevent possible air or water leaks.

For units with vertical supply or return, apply adhesive backed gasket material around the supply/return duct openings.

For curb or curb adapter mounted units, attach adhesive-backed gasket material on all end rails, cross rails, and duct rails.

Gasket material is included with Carrier accessory knock-down curbs. Otherwise, gasket material is field-supplied.

Step 5 — Rig Unit

Units are designed to be lifted overhead by crane, using the lifting lugs on the unit base rail. All lifting lugs must be engaged when lifting. 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. Refer to Fig. 8 for unit rigging weights. The weights listed on the rigging label are the heaviest possible weights by unit size. Refer to submittal or bill of lading for as-built unit weights.

IMPORTANT: All lifting lugs must be engaged when rigging.

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.

Unit outdoor air hoods ship on top of unit. Unit can be lifted with outdoor air hood package on top of the unit. Do not place other objects on top of or inside unit for lifting.

Refer to Fig. 8 for unit rigging label example. The weights listed on the rigging label are heaviest possible weights by unit size. Refer to the submittal or bill of lading for as-built unit weights.

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 6 — Connect Condensate Drain

The primary drain is a 1 in. female NPT pipe connection located on the right-hand side of the unit. See unit drawings starting on page 28 to locate the drain connection.

The unit must be level or within level tolerance to promote drainage. Refer to roof curb drawings (Fig. 4-7) starting on page 12 for unit level tolerance.

With field-supplied fittings and pipe sections, plumb the primary condensate drain to the 1 in. female NPT connector on the base rail. Use a trap height of at least 7 in., when looking at the front of the unit (looking into the outdoor air hoods). See Fig. 11 for drain location and Fig. 12 for typical drain sizing and layout. Apply a bead of room temperature vulcanizing silicone (RTV) or similar sealant around the pipe joint at the connector in the base rail. See unit drawings (Fig. 13-18) for drain connection details.

Consider operating conditions when selecting trap type and material. In applications where mechanical cooling or heating can occur when the outdoor air temperature is below freezing, use a freeze-proof trap or heated trap to prevent condensate from freezing. Refer to local code or customer requirements for condensate handling and disposal.

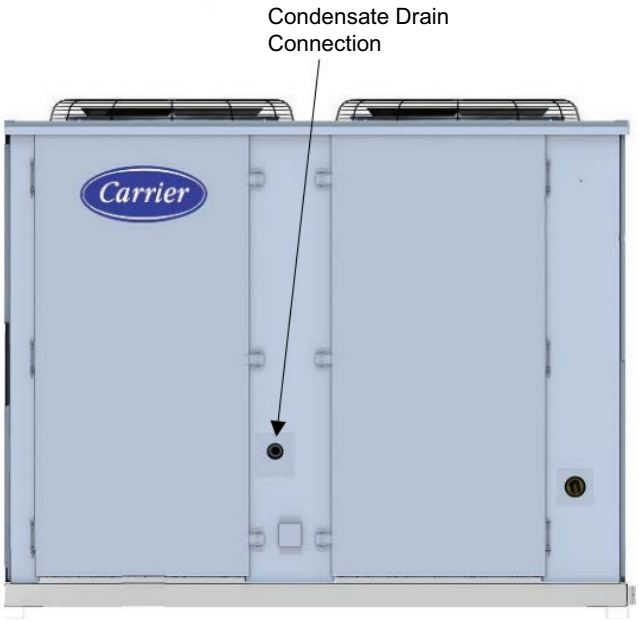


Fig. 11 — Primary Drain Connection Location

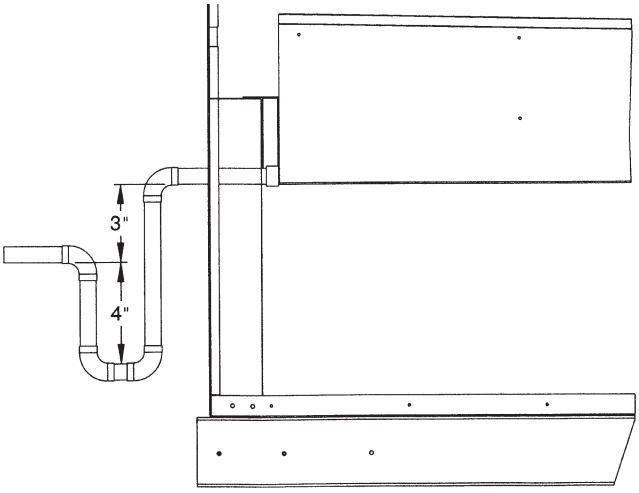


Fig. 12 — Primary Condensate Drain Piping Details

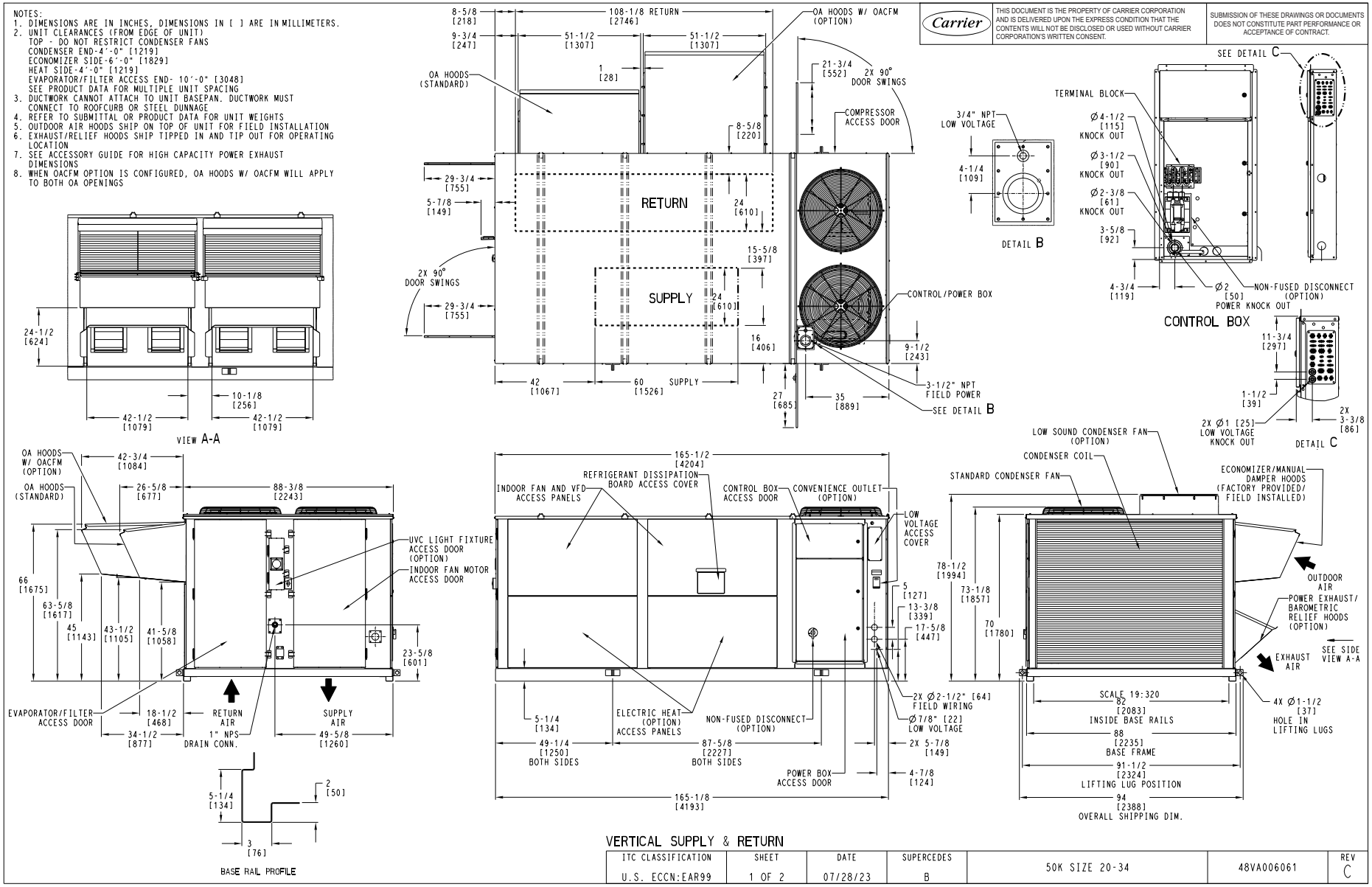


Fig. 13 — 50K, Sizes 20-34 Vertical Supply and Return

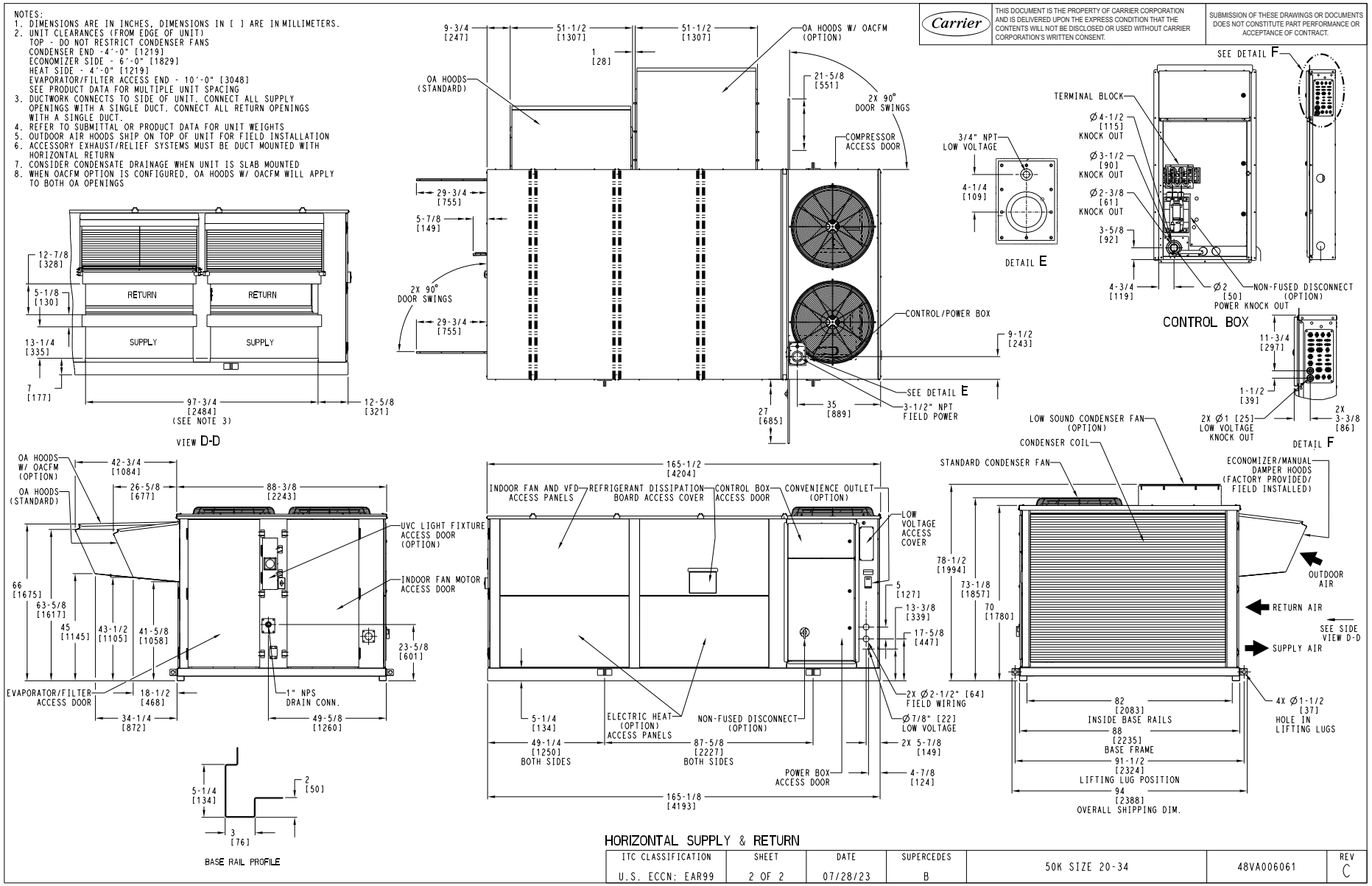


Fig. 14 — 50K, Sizes 20-34 Horizontal Supply and Return

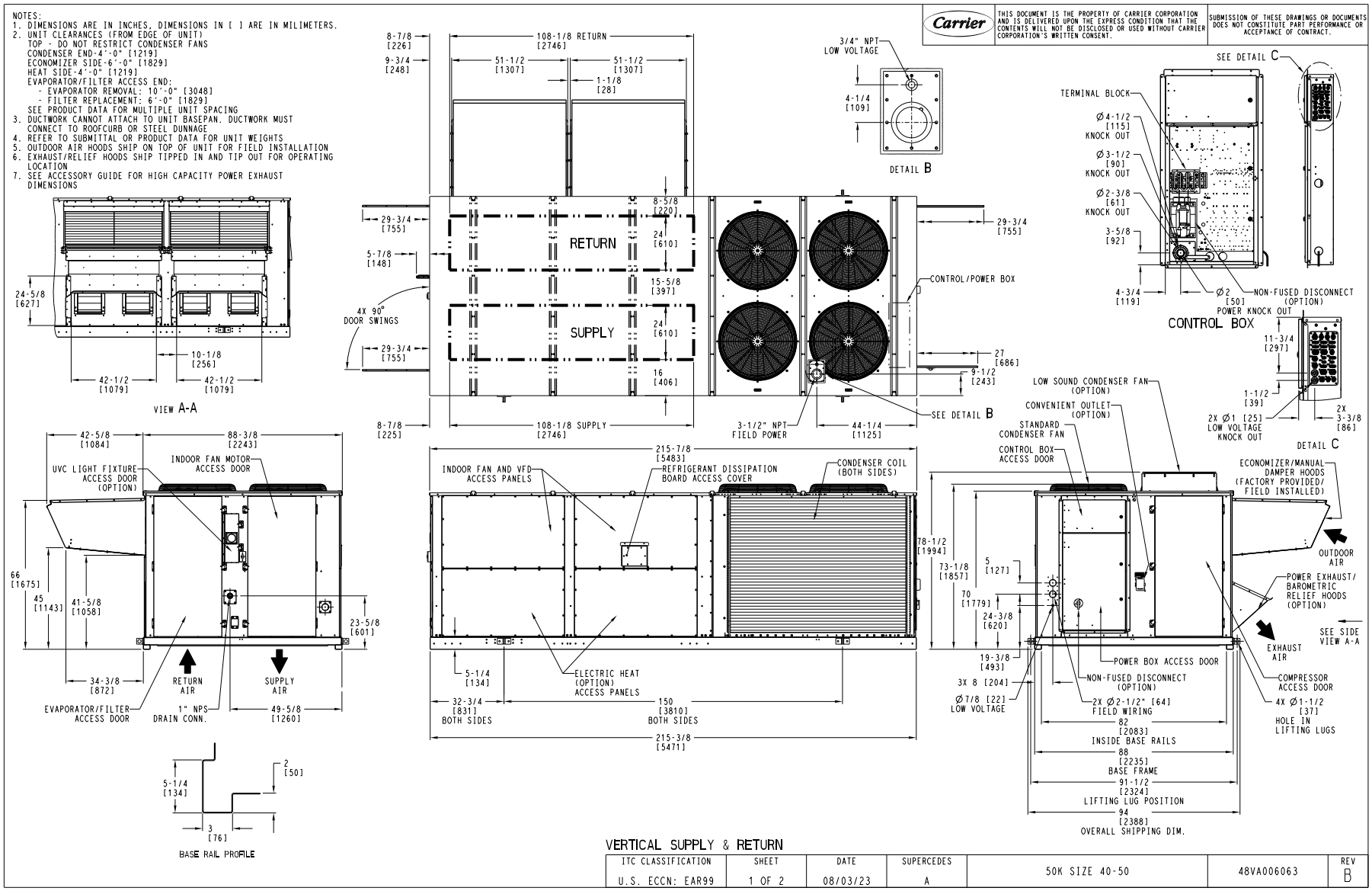


Fig. 15 — 50K, Sizes 40-50 Vertical Supply and Return

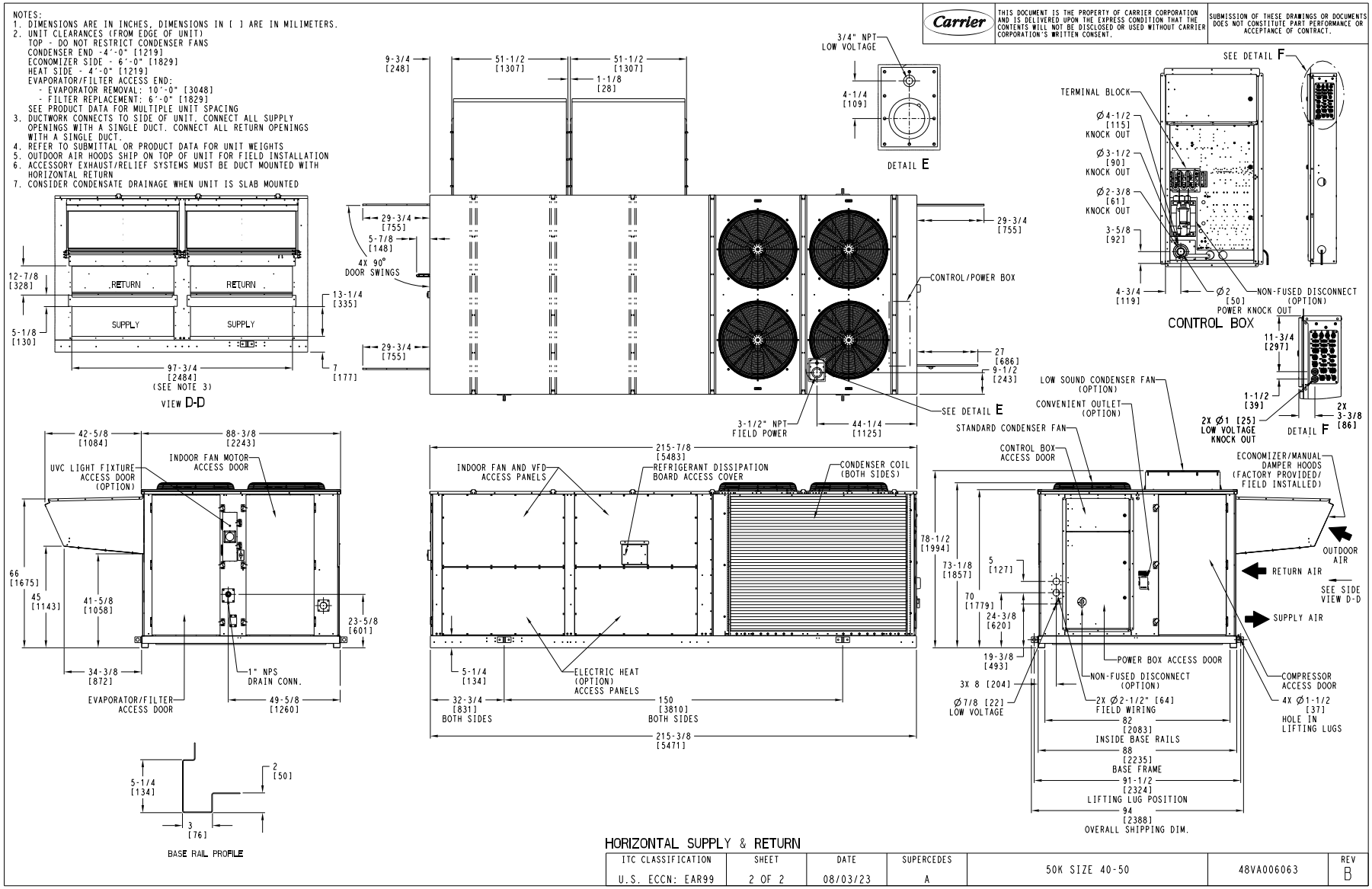


Fig. 16 — 50K, Sizes 40-50 Horizontal Supply and Return

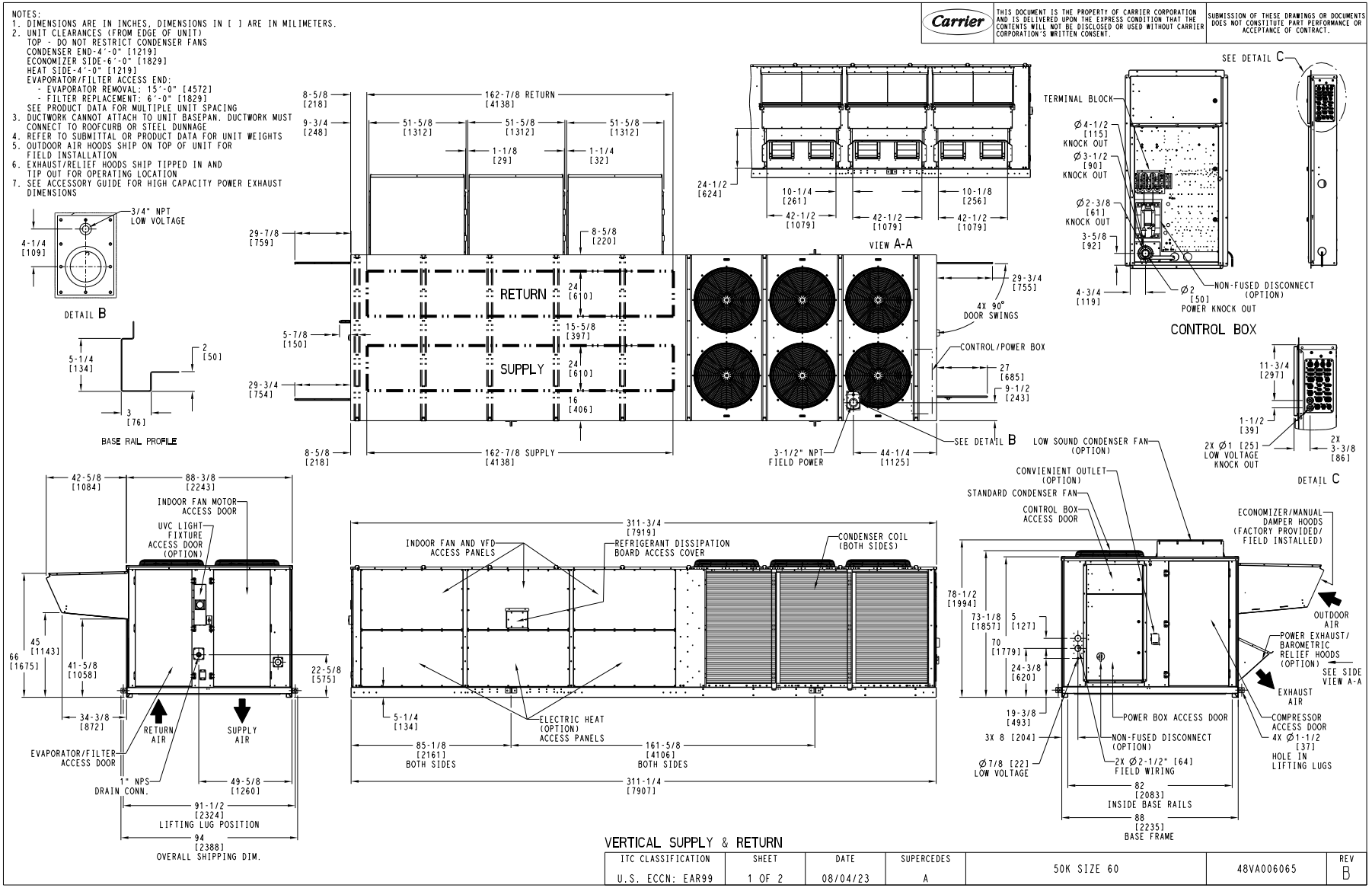


Fig. 17 — 50K, Size 60 Vertical Supply and Return

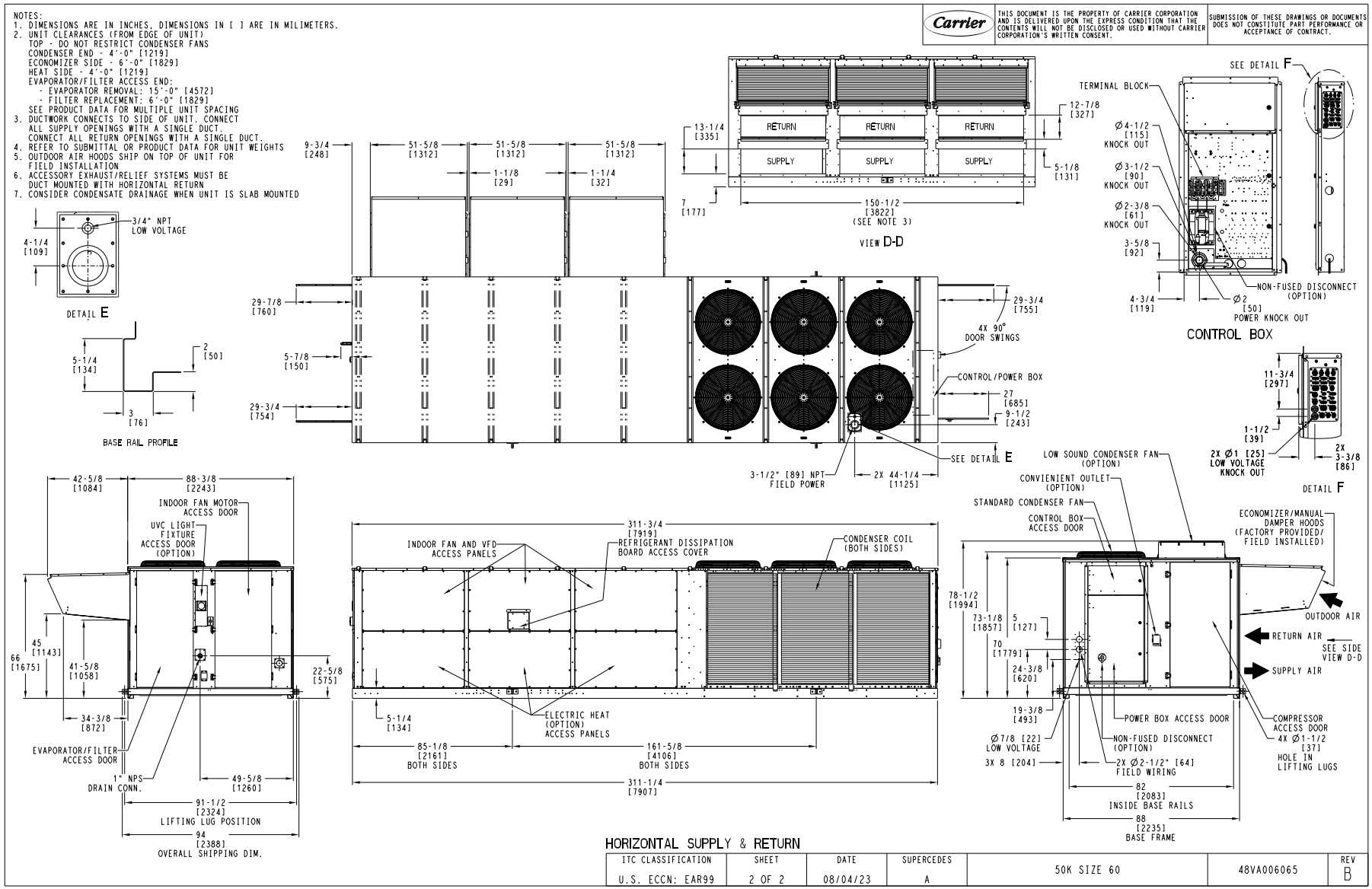


Fig. 18 — 50K, Size 60 Horizontal Supply and Return

Step 7 — Install Outdoor Air Hoods and Sensors

Outdoor air hoods ship on top of unit for field installation. Outdoor air screens ship in a box behind the indoor fan motor access door. Unit sizes 20-50 use two hoods; unit size 60 uses three hoods. Before assembly of the outdoor air hood, trim the excess seal strip so that it is flush with the outdoor air hood flanges. The OAT and OARH sensors need to be relocated to the OA hood as part of hood installation. Follow Steps 1-15 for assembling and installing the outdoor air hoods and screens.

IMPORTANT: For unit size 60, assemble the middle hood first.

NOTE: If an accessory (barometric relief or power exhaust) is used, install the accessory after installing the outdoor air hood. Refer to the accessory installation instructions for guidance.

1. Apply black seal strip (provided) to outside top-edge of hood sides. Wrap seal strip over edge to cover top flange (2 hood sides per hood assembly). Make sure seal strip covers the screw holes. See Fig. 19 for example of the seal strip application.
2. Add gray foam strip (provided) to cross members on bottom tray. See Fig. 20 for gray foam strip location.
3. Assemble hood sides, top, and cross member with gasketed screws provided. See Fig. 21 for hood assembly.
4. Attach speed clips (provided) to hood top. Engagement section of the clip faces inside hood. See Fig. 22 for speed clip assembly locations.
5. Apply black seal strip (provided) to mounting flanges of hood sides being sure to cover mounting holes. See Fig. 23 for black seal strip application.
6. Apply black seal strip (provided) to back of hood top mounting flange. Seal strip of hood top mounting flange must press tightly against seal strip of hood side mounting flanges. See Fig. 23 for example of hood top and hood side locations.
7. Remove and save the screws securing the OAT/OARH sensor assembly in the shipping location. The sensor assembly will be relocated to the OA hood. Make sure the sensor assembly and wire harness are accessible during hood installation. See Fig. 24 for OAT/OARH sensor shipping location. NOTE: Not all units will include an OARH sensor.
8. Attach gray foam strip (provided) to block-off baffle on outer face of flange. See Fig. 25 for application of gray foam strip to block-off.

IMPORTANT: For units with the outdoor air measuring option (OACFM), complete Step 8 — "Outdoor Airflow Measuring Sensor Installation (If Equipped)" on page 37, prior to completing the rest of step 7.

9. Remove the screws on each end and along top of the outdoor air opening of unit. Set hood assembly in place and attach to unit using gasketed screws. See Fig. 26 for removing the screws from the unit.
10. Locate and mount block-off baffle using 3 screws. See Fig. 27 for example of mounting the block-off. Once the block-off baffle is installed, reinstall the OAT/OARH sensor assembly sensor on the baffle in the operating location using the screws. See Fig. 24 for the OAT/OARH sensor operating location.
11. Assemble bottom filter tracks side by side with the mounting angle together. The filter track assemblies must be installed with the flange and mounting angle pointing down. See Fig. 28-30 for assembly of filter tracks by unit size and flange mounting angle.
12. Attach speed clips (provided) to hood side panels. Engagement section of clip faces up and towards the outside of the hood side panels. Attach mounting angles to hood with gasketed screws provided. See Fig. 31 for speed clip details.

    NOTE: Be sure the filters are installed with the airflow in the correct direction.
13. Attach filter track under the hood assembly. See Fig. 32 for flange and mounting angle (bottom).
14. Attach black seal strip (provided) to filter cover. Seal strip should be applied centered over the holes of the one flange, making sure to fully cover holes and center over the other large flange. See Fig. 33 for location of black seal strip and cover.
15. Slide two 20 x 25 in. filters into cross members of hood assembly. Attach filter cover over filters with screws and speed clips provided. See Fig. 34 for filter and filter cover location.

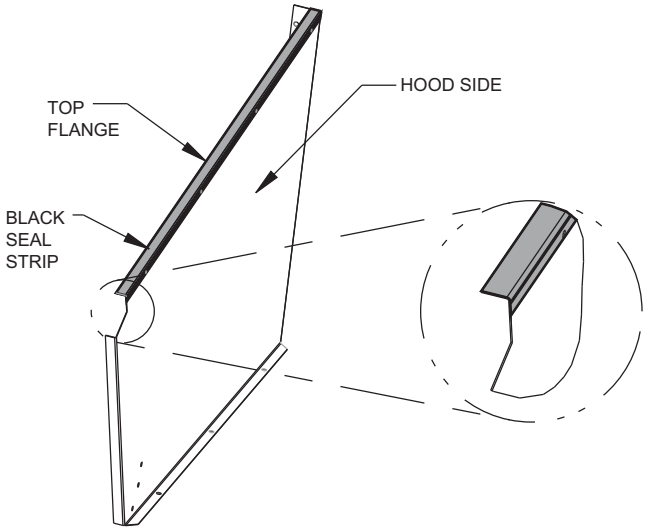


Fig. 19 — Adding Seal Strip to Top of Hood Sides

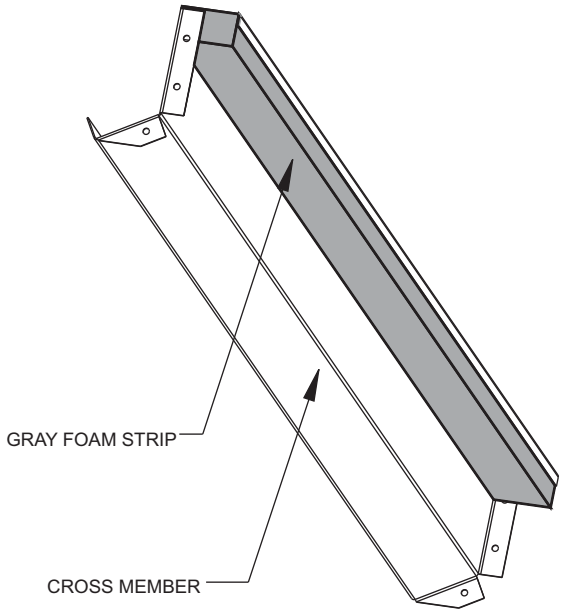


Fig. 20 — Adding Foam Strip to Cross Member

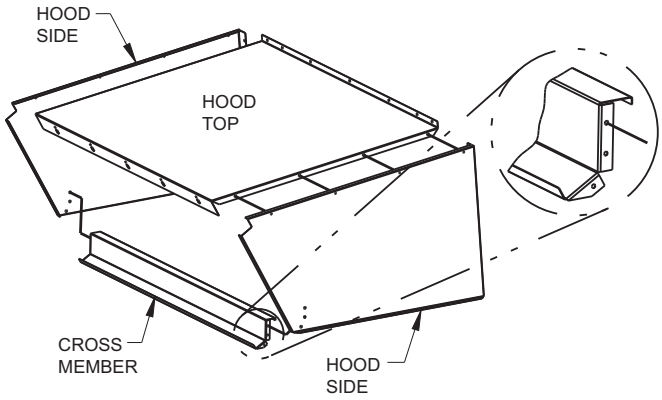


Fig. 21 — Economizer Hood Assembly

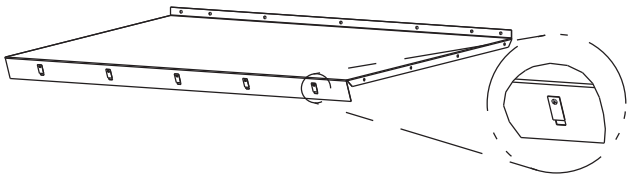


Fig. 22 — Top Hood with Speed Clips

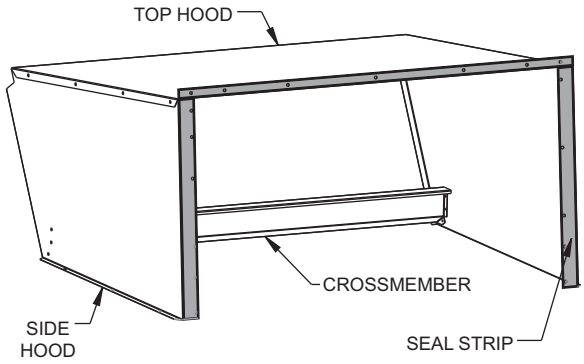


Fig. 23 — Adding Seal Strip to Hood Top and Side Hoods

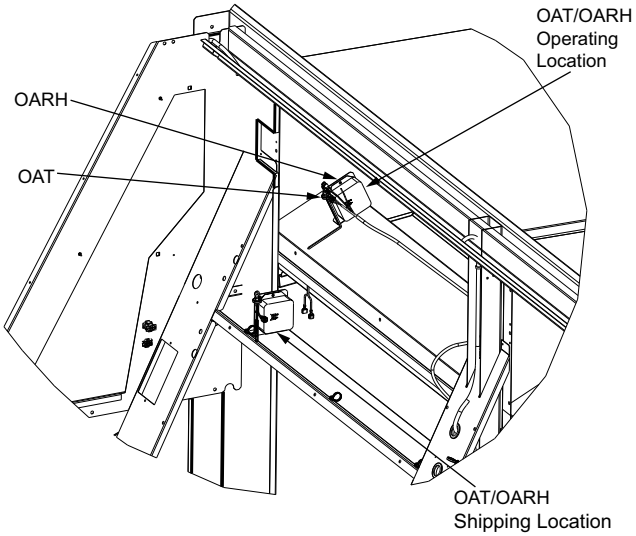


Fig. 24 — OAT/OARH Sensor/Shipping Locations

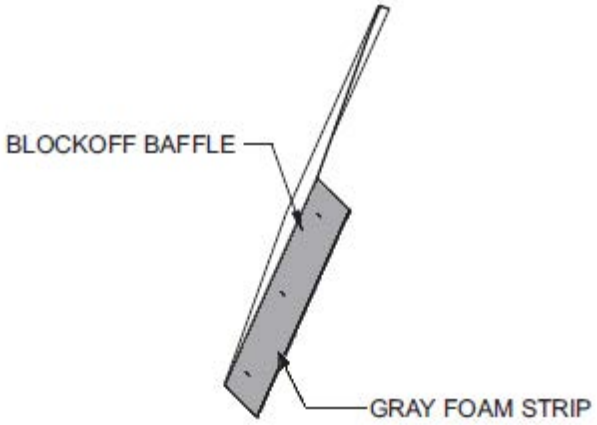


Fig. 25 — Adding Foam Strip to Block-Off Baffle

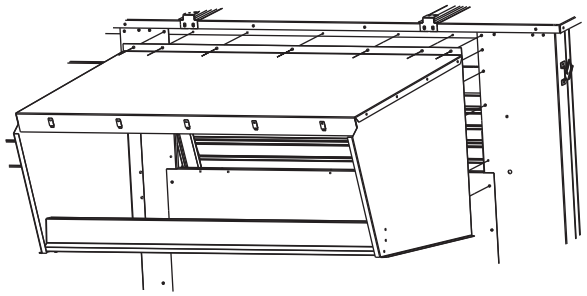


Fig. 26 — Removing Screws from the Outdoor Air Opening of Unit

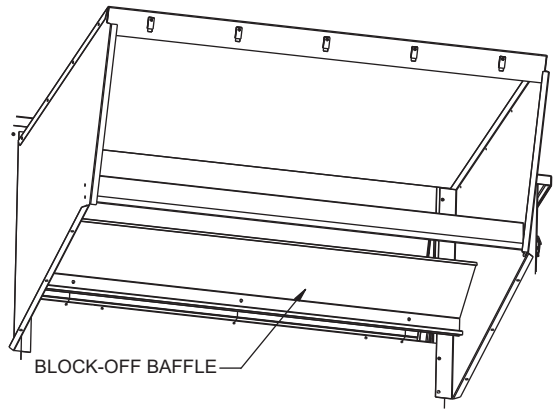


Fig. 27 — Mounting Block-Off Baffle to the Unit

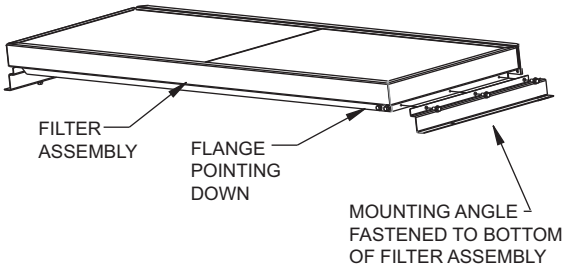


Fig. 28 — Correctly Assembled Bottom Filter Assembly (Sizes 20-35 Only)

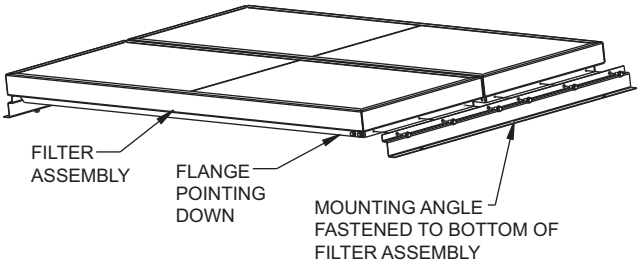


Fig. 29 — Correctly Assembled Bottom Filter Assembly (Sizes 40-60 Only)

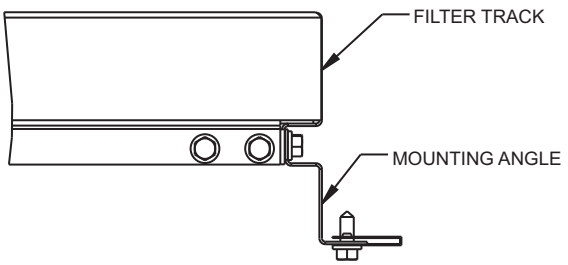


Fig. 30 — Flange and Mounting Angle Pointing Down

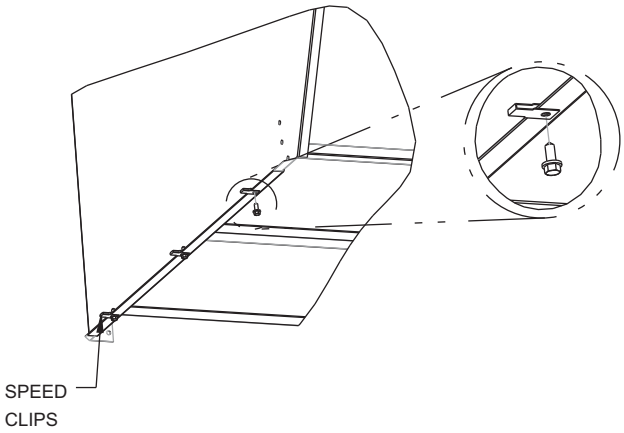


Fig. 31 — Bottom Filters Installed with Flange Pointing Down (Speed Clip Location)

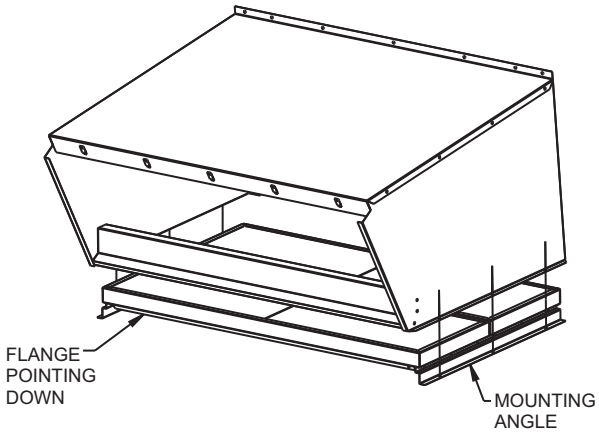


Fig. 32 — Bottom Filters Installed with Flange Pointing Down (Mounting Angle Location)

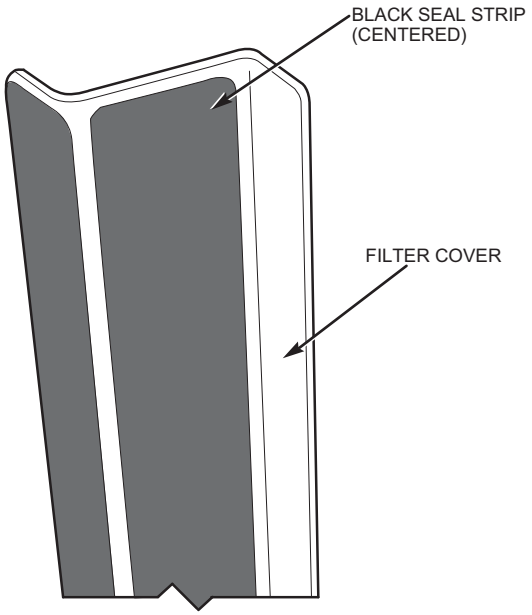


Fig. 33 — Attaching Seal Strip to Filter Cover

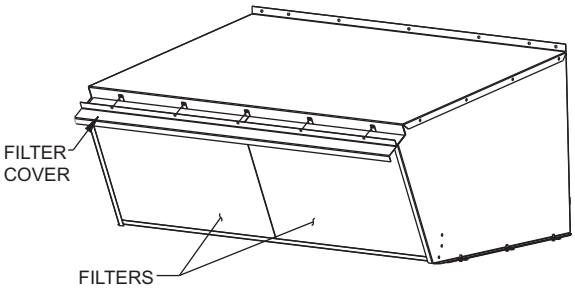


Fig. 34 — Filters and Filter Cover

Step 8 — Outdoor Airflow Measuring Sensor Installation (If Equipped)

For units with the outdoor airflow (OACFM) measuring option (position 14 of the model number = 3, 5, 6, or 7), the airflow sensor must be installed in the outdoor air hood prior to completing outdoor air hood assembly. The OACFM sensors come harnessed in the unit, and are mounted on the inside of the unit near the economizer. One end should be zip tied while the other will be screwed into place. When installing the unit, sensors should be removed from the interior of the unit and installed in the hood assemblies.

IMPORTANT: For 60 ton units, the middle hood must be installed prior to installing right or left hoods, as there will be no access to screws in the middle sensor.

To view the OACFM reading, navigate the SmartVu interface to (***Main Menu → Inputs → Analog Inputs)***. Press the OACFM reading at the top of the screen.

NOTE: The OACFM reading is dependent on a curve fit with a correction factor. When IDFs are off, there will be a reading of 500+ cfm to account for reading error/corrections.

See Fig. 35-37 for sensor placement in shipping and hood installation. See Fig. 38 for transmitter location.

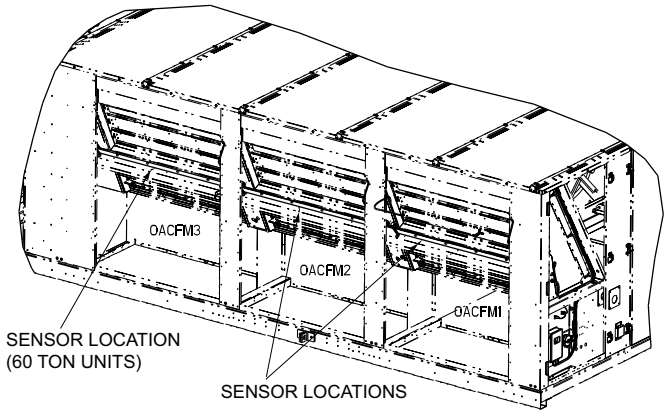


Fig. 35 — Sensor Placement In Shipping

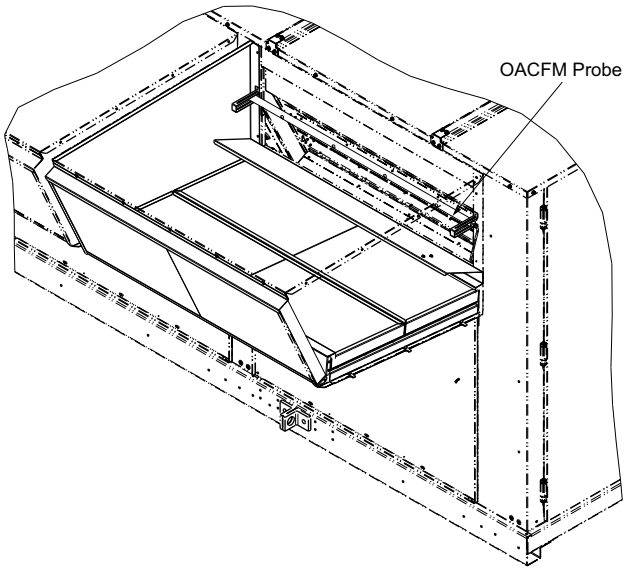


Fig. 36 — OACFM Hood Installation

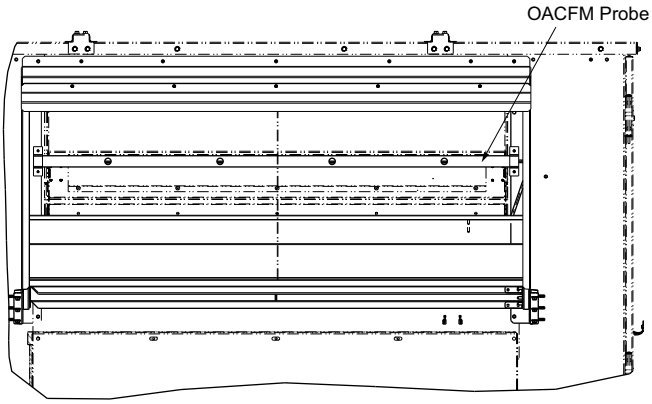


Fig. 37 — Hood Installation (Front View)

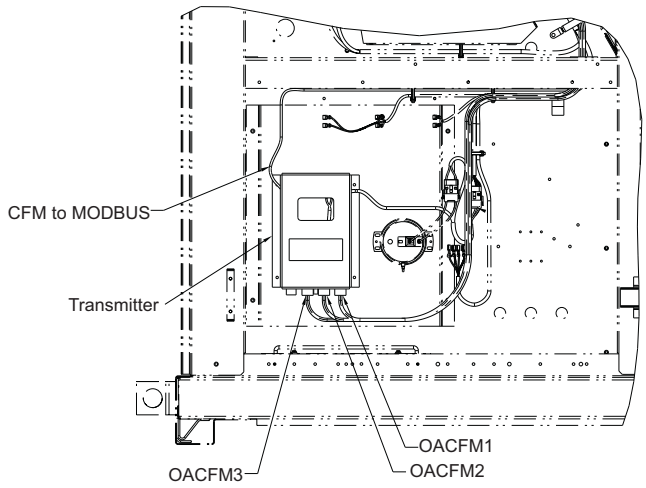


Fig. 38 — Transmitter Wiring Locations

Step 9 — Set up Barometric Relief or Multi-Stage Power Exhaust (If Equipped)

Units with factory-installed barometric relief or multi-stage power exhaust ship with the relief/exhaust assembly tipped in for shipping. The relief/exhaust assembly must be tipped out for operation. Brackets and extra screws are shipped in shrink wrap around the dampers.

Unit sizes 20-50 have two relief/exhaust assemblies and unit size 60 has three relief/exhaust assemblies. For units with power exhaust, electrical connections have been made and adjusted at the factory. See Fig. 39 for relief/exhaust shipping and operating orientation and Fig. 40 for operating orientation.

Follow Steps 1-6 to place the relief/exhaust assembly in the operating position.

1. Remove 9 screws holding each relief/exhaust assembly in place. Each assembly is secured with 3 screws on each side and 3 screws along the bottom. Save screws.
2. Pivot each assembly outward until edges of the assembly rests against inside wall of unit.
3. Secure each assembly to unit with 6 screws across top (3 screws provided) and bottom (3 screws from Step 1).
4. With screws saved from Step 1, install brackets on each side of damper assembly.
5. Remove tape from damper blades.
6. Repeat on next relief/exhaust assembly.

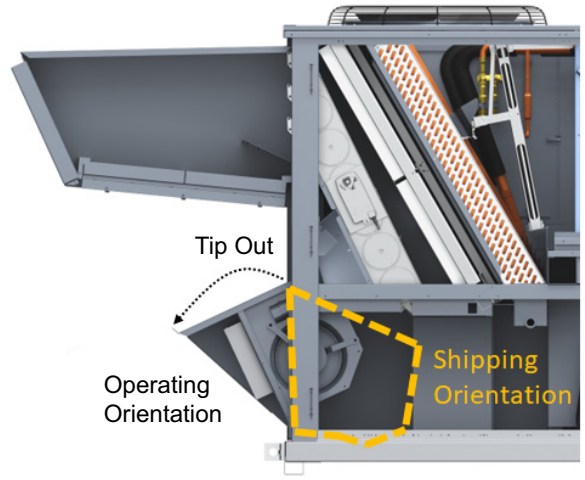
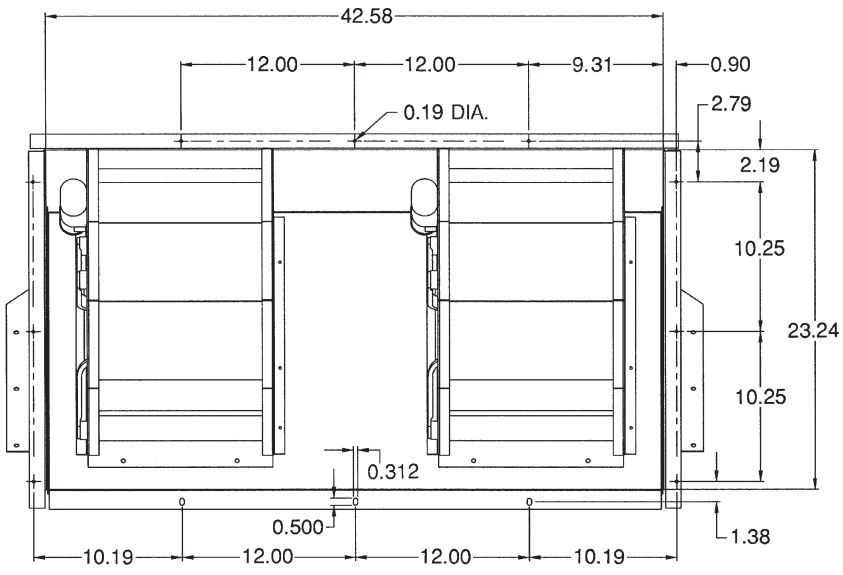
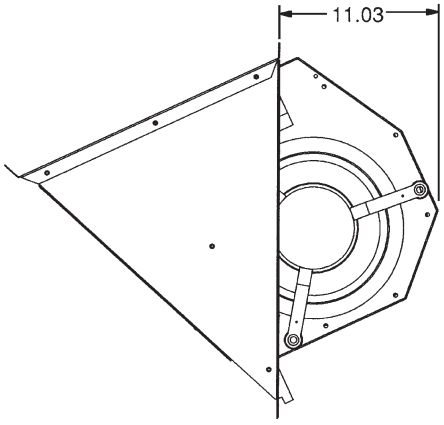


Fig. 39 — Exhaust/Relief Shipping and Operating Locations





NOTE: Dimensions in inches.

Fig. 40 — Exhaust/Relief Details

Step 10 — 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 standard with a single point power connection, located in the unit power box. Refer to Fig. 13-18 for power box locations.

Refer to the unit nameplate for unit minimum circuit ampacity (MCA) and maximum overcurrent protection (MOCP) details. See Appendix E "TYPICAL WIRING DIAGRAMS" on page 91 or refer to the unit wiring diagram for single point power wiring details.

Units can be engineered to order (ETO) with a dual point power connection, located in the unit power box. Refer to the supplemental unit nameplate for unit minimum circuit ampacity (MCA) and maximum overcurrent protection (MOCP) details for each circuit. Refer to the unit wiring diagram for dual point power wiring details.

UNPOWERED CONVENIENCE OULET

Units with unpowered convenience outlet require a separate 115-v, 15A power feed to energize the outlet. The convenience outlet is typically located near the unit power box. Field power connection must be made directly at the outlet. Refer to Fig. 13-18 unit certified drawings for convenience outlet locations. See Appendix E "TYPICAL WIRING DIAGRAMS" on page 91 wiring for connection details. Ensure that a clearly visible warning label is present, indicating that the outlet is powered independently from the unit's main 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. Refer to the unit certified drawing for UV-C disconnect switch location. Refer to the unit wiring diagrams for connection 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 field power wiring must comply with NEC (National Electrical Code) and all applicable local codes and regulations. Size conductors based on the MCA (Minimum Circuit Amps) listed on the unit nameplate and a minimum conductor temperature rating of 167°F (75F°C). Units are compatible with copper or aluminum power wire.

See Table 8 for wire size ranges applicable to non-fused disconnects only. For units without a non-fused disconnect, refer to Fig. 41 and the specifications provided in this section.

If the conductor size used in the application is smaller than the minimum size permitted by the unit's power termination device, implement one of the following solutions:

- Increase conductor size to meet termination requirements.
- Install field-supplied lug adapters that are properly rated for both conductor and termination device.
- Use another code-compliant method to adapt conductor size as required.

Units without Factory-Installed Non-Fused Disconnect

Power wire terminations are made at a terminal block in the power box. See Fig. 41 for wiring connections. Terminal block wire size range is 4 AWG (American Wire Gauge) to 500 MCM (maximum circular mils).

See Appendix E "TYPICAL WIRING DIAGRAMS" on page 91 for wiring details.

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. 42 for wiring connections. 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. See Appendix E "TYPICAL WIRING DIAGRAMS" on page 91 for wiring details.

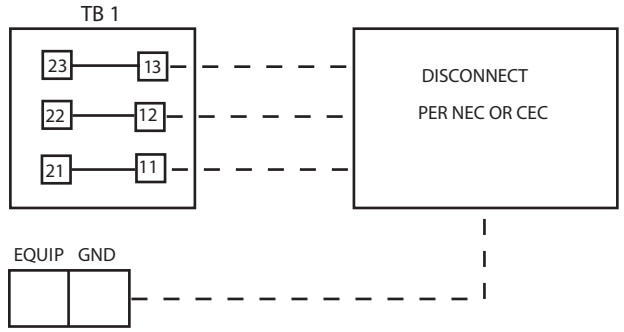
NOTE: Refer to the label on the disconnect for the torque specifications.

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

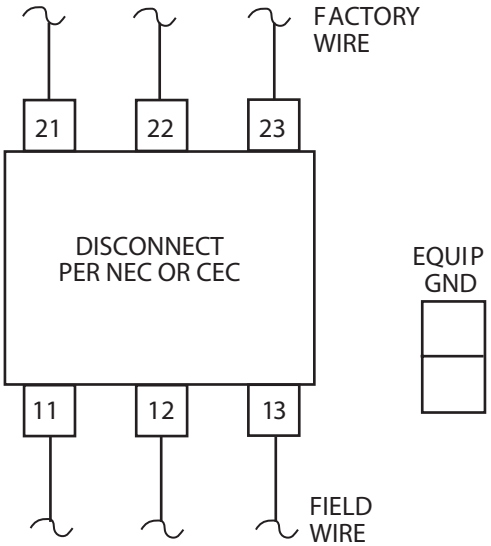
AWG — American Wire Gauge
MCM — Maximum Circular Mils



LEGEND

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

Fig. 41 — Terminal Block Field Wiring Connections



LEGEND

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

Fig. 42 — Non-Fused Disconnect Field Wiring Connections

OPERATING VOLTAGE

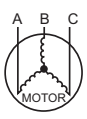
Units are factory wired for the voltage shown on the unit nameplate. Operating voltage to the unit must be within the voltage range indicated on the unit nameplate. Voltages between phases must be balanced within 2%, and the current must be balanced within 10%. See Table 9 for component amp draws by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

$$\text{Average Voltage} = \frac{(452 + 464 + 455)}{3} = \frac{1371}{3} = 457$$

Determine maximum deviation from average voltage. If the average voltage is higher than the phase voltage, subtract the phase voltage from the average. If the phase voltage is higher than the average voltage, subtract the average voltage from the phase voltage.

(Avg) 457 – (AB) 452 = 5-v

(BC) 464 – (Avg) 457 = 7-v

(Avg) 457 – (AC) 455 = 2-v

Maximum deviation is 7-v.

Determine percent of voltage imbalance.

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

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. When parallel power conductors are used, both ground lugs must be utilized to ensure proper grounding. The ground lug wire size range is 6 AWG (American Wire Gauge) to 250 MCM (thousands of circular mils). Refer to Fig. 41 and 42 for typical ground lug wiring. See APPENDIX E — "TYPICAL WIRING DIAGRAMS" on page 91 for the component arrangement diagram showing the grounding lug connection in the bottom of the power box.

NOTE: Tighten the ground lugs to 275 in.-lb (22.9 ft-lb or 31 Nm).

OVERCURRENT PROTECTION

All units must be equipped with overcurrent protection devices, such as fuses or circuit breakers. Overcurrent protection devices must comply with NEC, CEC, and all local codes. Size the overcurrent protection device according to the MOCP (maximum overcurrent protection) value on the unit nameplate. The Overcurrent protection device rating must not exceed the unit's specified MOCP.

NOTE: While overcurrent protection rating can be lower than the listed MOCP, this can lead to nuisance tripping. Under no circumstances should the overcurrent protection rating 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 external 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 as well as additional Mar-Bal[1] distribution terminals to accommodate units with a high number of power conductors while maintaining the High SCCR rating.

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.

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

Table 9 — 48/50K Electrical Data — Component Amp Draw[a]

48/50K UNIT SIZE	VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE		COMPRESSOR A1		COMPRESSOR A2		COMPRESSOR B1		COMPRESSOR B2		STANDARD OFM		LOW SOUND OFM		CONTROLS
		Min.	Max.	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	Qty	FLA (ea)	Qty	FLA (ea)	FLA
20	208-3-60	187	229	28.7	207.5	40.8	270.0	—	—	—	—	2	6.8	2	5.8	5.3
	230-3-60	207	253	28.7	207.5	40.8	270.0	—	—	—	—	2	6.8	2	5.8	4.8
	460-3-60	414	506	12.8	100.2	19.4	147.0	—	—	—	—	2	3.4	2	2.8	2.4
	575-3-60	518	633	10.9	78.0	13.7	109.0	—	—	—	—	2	3.3	2	2.4	2.0
26	208-3-60	187	229	28.7	207.5	49.0	386.3	—	—	—	—	2	6.8	2	5.8	5.3
	230-3-60	207	253	28.7	207.5	49.0	386.3	—	—	—	—	2	6.8	2	5.8	4.8
	460-3-60	414	506	12.8	100.2	24.0	182.0	—	—	—	—	2	3.4	2	2.8	2.4
	575-3-60	518	633	10.9	78.0	19.2	131.0	—	—	—	—	2	3.3	2	2.4	2.0
30	208-3-60	187	229	33.3	255.0	49.0	386.3	—	—	—	—	2	6.8	2	5.8	5.3
	230-3-60	207	253	33.3	255.0	49.0	386.3	—	—	—	—	2	6.8	2	5.8	4.8
	460-3-60	414	506	16.0	140.0	24.0	182.0	—	—	—	—	2	3.4	2	2.8	2.4
	575-3-60	518	633	12.9	107.6	19.2	131.0	—	—	—	—	2	3.3	2	2.4	2.0
34	208-3-60	187	229	45.9	335.5	49.0	396.3	—	—	—	—	2	6.8	2	5.8	5.3
	230-3-60	207	253	45.9	335.5	49.0	396.3	—	—	—	—	2	6.8	2	5.8	4.8
	460-3-60	414	506	22.2	150.0	24.0	182.0	—	—	—	—	2	3.4	2	2.8	2.4
	575-3-60	518	633	17.3	109.0	19.2	131.0	—	—	—	—	2	3.3	2	2.4	2.0
40	208-3-60	187	229	28.7	207.5	33.3	255.0	28.7	207.5	33.3	255.0	4	6.8	4	5.8	5.3
	230-3-60	207	253	28.7	207.5	33.3	255.0	28.7	207.5	33.3	255.0	4	6.8	4	5.8	4.8
	460-3-60	414	506	12.8	100.2	16.0	140.0	12.8	100.2	16.0	140.0	4	3.4	4	2.8	2.4
	575-3-60	518	633	10.9	78.0	12.9	107.6	10.9	78.0	12.9	107.6	4	3.3	4	2.4	2.0
50	208-3-60	187	229	29.8	255.0	40.8	270.0	29.8	255.0	40.8	270.0	4	6.8	4	5.8	5.3
	230-3-60	207	253	29.8	255.0	40.8	270.0	29.8	255.0	40.8	270.0	4	6.8	4	5.8	4.8
	460-3-60	414	506	13.5	130.0	19.4	147.0	13.5	130.0	19.4	147.0	4	3.4	4	2.8	2.4
	575-3-60	518	633	11.2	93.7	13.7	109.0	11.2	93.7	13.7	109.0	4	3.3	4	2.4	2.0
60	208-3-60	187	229	33.3	255.0	49.0	386.3	33.3	255.0	49.0	386.3	6	6.8	6	5.8	5.3
	230-3-60	207	253	33.3	255.0	49.0	386.3	33.3	255.0	49.0	386.3	6	6.8	6	5.8	4.8
	460-3-60	414	506	16.0	140.0	24.0	182.0	16.0	140.0	24.0	182.0	6	3.4	6	2.8	2.4
	575-3-60	518	633	12.9	107.6	19.2	131.0	12.9	107.6	19.2	131.0	6	3.3	6	2.4	2.0

NOTE(S):

a. Refer to Carrier's website at http://ecat.Carrier.com for selection performance data.

LEGEND

C/O — Convenience Outlet
FLA — Full-Load Amp
IFM — Indoor Fan Motor
LRA — Locked Rotor Amp
OFM — Outdoor Fan Motor
RLA — Rated Load Amp

Table 9 — 48/50K Electrical Data — Component Amp Draw[a] (cont)

48/50K UNIT SIZE	VOLTAGE (V-Ph-Hz)	IFM								POWER EXHAUST				POWERED C/O
										MULTI-STAGE		HIGH CAPACITY		
		HP	FLA (ea)	HP	FLA (ea)	HP	FLA (ea)	HP	FLA (ea)	Qty	FLA (ea)	Qty	FLA (ea)	FLA
20	208-3-60	5	15.4	10	30.5	15	44.6	—	—	4	5.9	4	6.4	4.8
	230-3-60		14.5		27.9		41.3		—	4	5.9	4	6.4	4.8
	460-3-60		7.3		14.0		20.7		—	4	3.1	4	3.2	2.2
	575-3-60		5.8		11.6		16.6		—	4	2.4	4	2.4	1.7
26	208-3-60	5	15.4	10	30.5	15	44.6	20	58.3	4	5.9	4	6.4	4.8
	230-3-60		14.5		27.9		41.3		53.4	4	5.9	4	6.4	4.8
	460-3-60		7.3		14.0		20.7		26.7	4	3.1	4	3.2	2.2
	575-3-60		5.8		11.6		16.6		21.6	4	2.4	4	2.4	1.7
30	208-3-60	5	15.4	10	30.5	15	44.6	20	58.3	4	5.9	4	6.4	4.8
	230-3-60		14.5		27.9		41.3		53.4	4	5.9	4	6.4	4.8
	460-3-60		7.3		14.0		20.7		26.7	4	3.1	4	3.2	2.2
	575-3-60		5.8		11.6		16.6		21.6	4	2.4	4	2.4	1.7
34	208-3-60	10	30.5	15	44.6	20	58.3	25	72.6	4	5.9	4	6.4	4.8
	230-3-60		27.9		41.3		53.4		68.8	4	5.9	4	6.4	4.8
	460-3-60		14.0		20.7		26.7		34.1	4	3.1	4	3.2	2.2
	575-3-60		11.6		16.6		21.6		27.0	4	2.4	4	2.4	1.7
40	208-3-60	10	30.5	15	44.6	20	58.3	25	72.6	4	5.9	4	6.4	4.8
	230-3-60		27.9		41.3		53.4		68.8	4	5.9	4	6.4	4.8
	460-3-60		14.0		20.7		26.7		34.1	4	3.1	4	3.2	2.2
	575-3-60		11.6		16.6		21.6		27.0	4	2.4	4	2.4	1.7
50	208-3-60	15	44.6	20	58.3	25	72.6	30	85.8	4	5.9	4	6.4	4.8
	230-3-60		41.3		53.4		68.8		80.3	4	5.9	4	6.4	4.8
	460-3-60		20.7		26.7		34.1		40.2	4	3.1	4	3.2	2.2
	575-3-60		16.6		21.6		27.0		31.2	4	2.4	4	2.4	1.7
60	208-3-60	20	58.3	25	72.6	30	85.8	40	113.3	6	5.9	6	6.4	4.8
	230-3-60		53.4		68.8		80.3		105.1	6	5.9	6	6.4	4.8
	460-3-60		26.7		34.1		40.2		52.3	6	3.1	6	3.2	2.2
	575-3-60		21.6		27.0		31.2		42.2	6	2.4	6	2.4	1.7

NOTE(S):

a. Refer to Carrier's website at http://ecat.Carrier.com for selection performance data.

LEGEND

C/O — Convenience Outlet
FLA — Full-Load Amp
HP — Horsepower
IFM — Indoor Fan Motor
kW — Kilowatt
OFM — Outdoor Fan Motor

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 thru-the-basepan wiring, where the high voltage coupling is partially obstructed. See Fig. 43 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. 44 for cover plate location.
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.

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. 45 for typical basepan high voltage coupling and side knockout locations.

For units with a factory-installed disconnect

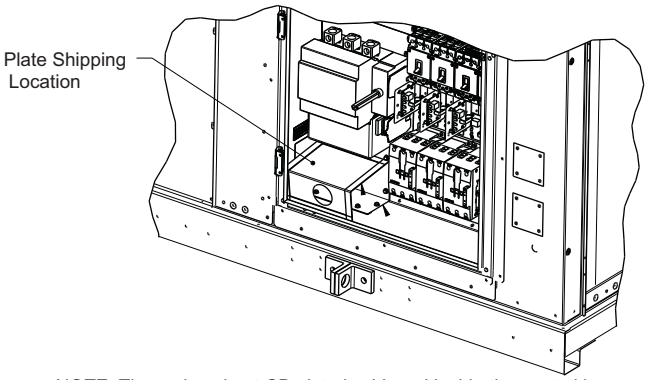
Pass the wiring through the high voltage basepan coupling and into the power box, through the power box cover plate. Make wire terminations at the non-fused disconnect and ground lug(s). See Fig. 46 for power box layout.

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.

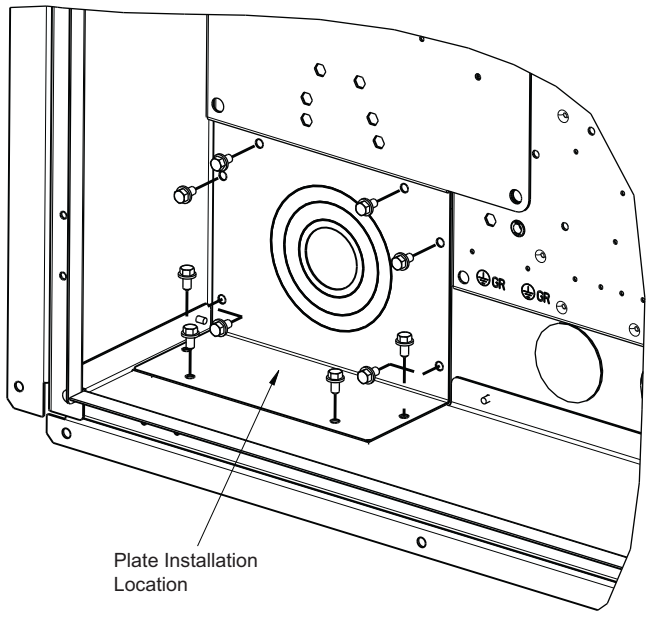
Make load side power and ground connections at the load side of the disconnect. Pass the wiring back into the unit, through the second high voltage knockout in the corner post, and into the power box, through the power box cover plate. Make wire terminations at the terminal block and ground lug(s). See Fig. 45 for corner post side knockout locations and Fig. 46 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.



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

Fig. 43 — 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. 44 — Cover Plate Installation Location

Thru-The-Side Wiring

All units include knockouts for thru-the-side high voltage wiring penetrations. See Fig. 45 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. 46 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. 45 for corner post high voltage knockout locations and Fig. 46 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.

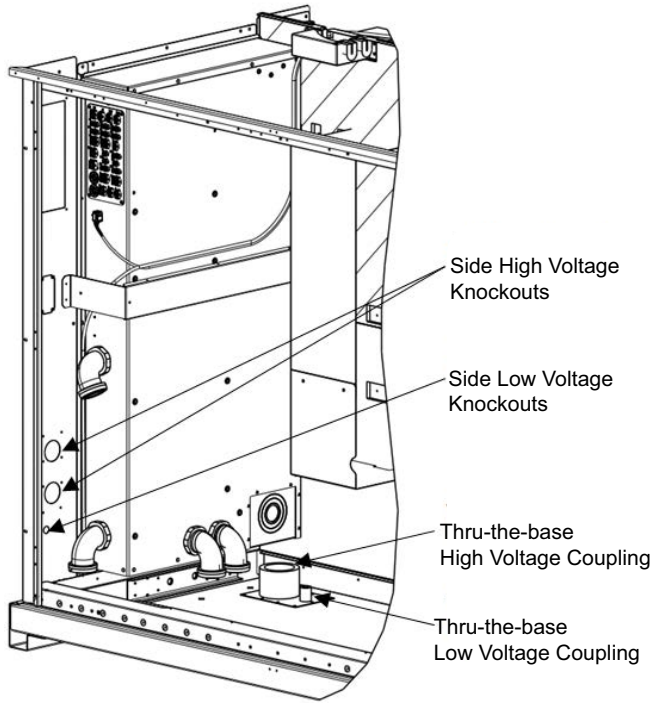


Fig. 45 — Basepan Coupling Locations and Side Knockouts for Power and Control Wiring

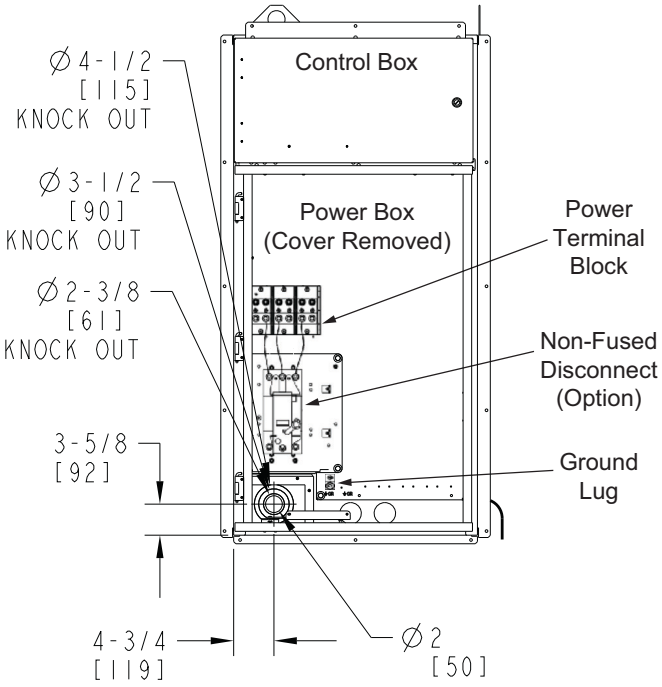
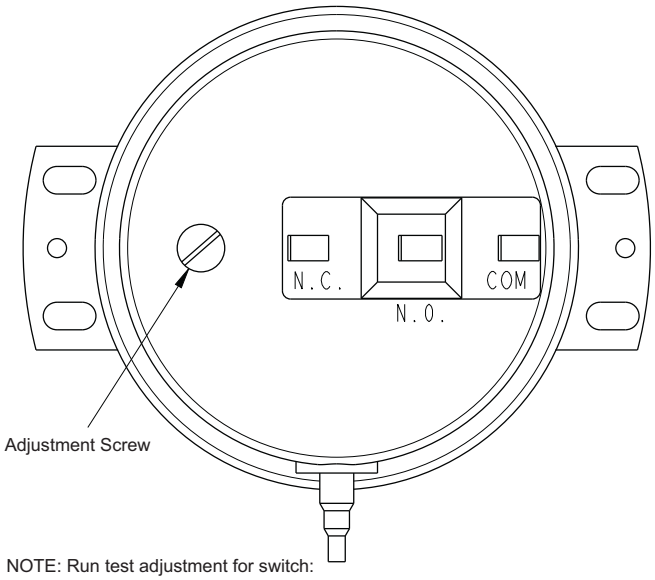


Fig. 46 — Power Box Layout and Knockouts

Step 11 — 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. 47 for adjustment screw location on the switch. The pre-filter status switch is located in the auxiliary control box behind the filter/evaporator access door. See Fig. 48 for auxiliary control box location. 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. 47 — Pre-Filter Status Switch Adjustment Screw

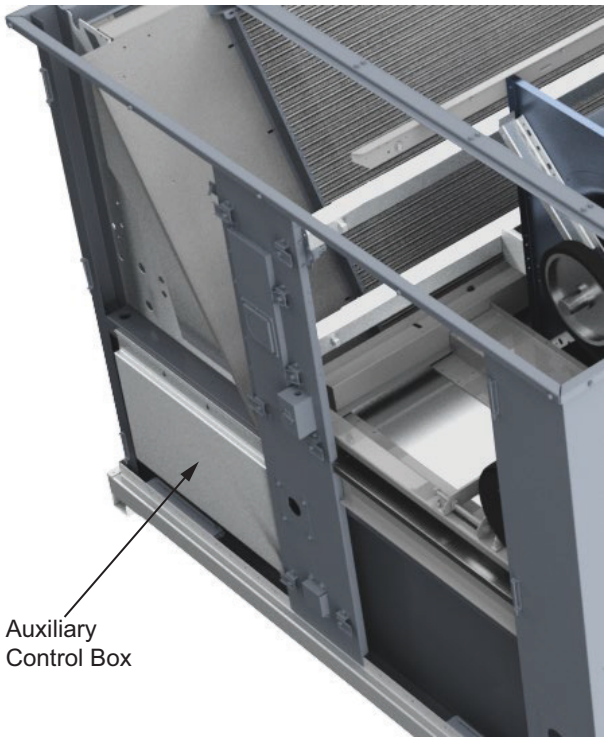


Fig. 48 — Auxiliary Control Box Location

To set the switch trip pressure:

1. Review filter manufacturer's guidance for recommended final resistance pressure (typically 1 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 12 — Connect Air Pressure Tubing (If Equipped)

Variable air volume (VAV) unit and units with power exhaust with building pressure (BP) control include pressure transducers for measuring the duct supply pressure (SP) or building pressure that require field-supplied pneumatic tubing and pressure pickup ports.

The pressure transducers are in an auxiliary control box, accessible through the filter access door. Refer to Fig. 48 for auxiliary control box location. See Fig. 49 for typical pressure transducer locations in the auxiliary control box.

Use fire-retardant plenum pneumatic 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. Remove barb covers before installing tubing. 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 connected to pneumatic tubing at the factory that leads to a pressure pickup port outside of the unit cabinet for gauge pressure sensing.

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 down the main trunk duct, away from duct transitions or obstructions that could affect the pressure reading. A duct pressure pickup port or probe (field-supplied) is recommended for proper pressure sensing. Connect the other end of the tubing to the high side pressure port on the SP transducer.

POWER EXHAUST BUILDING PRESSURE CONTROL

The tubing for the building pressure 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 port on the BP transducer.

Tubing for high side is field-installed and should sample air pressure entering the unit at the end of the return duct. Tubing for low side is factory-installed. Verify that connections at the sensor have not come loose in shipping.

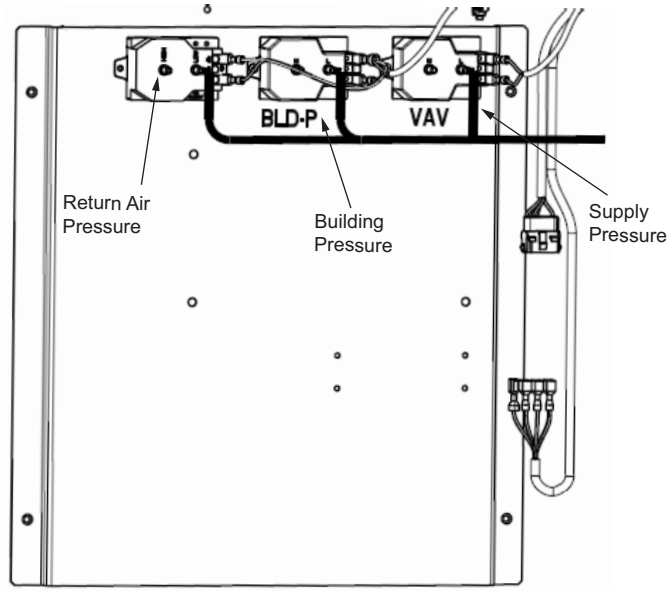


Fig. 49 — Pressure Transducer Locations

Step 13 — Install Supply-Air Temperature Sensor (Modulating Electric Heat Units Only)

Units ordered with modulating electric heat include a factory-provided, field-installed supply air temperature (SAT) sensor. The SAT sensor is required for SAT control of modulating heat and for SAT monitoring for low and high SAT alarms.

NOTE: Units with staged heat do not operate based on SAT and do not include an SAT sensor. An SAT sensor may be field installed on units with staged heat or no heat to monitor for low and high SAT alarms. Units special ordered with hot water coil require a field- supplied SAT sensor.

The SAT sensor is a duct probe sensor with 10K-2 thermistor that ships in the unit power box. The SAT sensor must be field installed in the supply duct and wired back to the SAT harness in the low voltage wire bundle using field-supplied wire. Refer to Fig. 13-18 for power box location by unit size. See Fig. 50 for SAT wire harness location. See Fig. AA in Appendix E on page 107 for unit low voltage wiring diagrams for wiring details.

NOTE: The SAT wire harness may include an eyelet style thermistor used for factory run testing. This sensor must be removed to wire in the duct probe thermistor.

The SAT sensor should be installed in the supply duct following Steps 1-5.

1. Use the SAT duct style probe sensor (not eyelet sensor).
2. The SAT sensor should be installed at least 20 ft (6 m) away from the supply opening and out of the direct line of site of the heat exchangers.
3. The SAT should be installed near the middle of the duct width or height to get a good mix of supply air.
4. The SAT sensor should not be obstructed by insulation, duct dampers, turning vanes, etc.
5. Do not run the SAT sensor wiring through the supply duct. For curb mounted units, a thru-the-base coupling is included in the outdoor section of the unit to allow low voltage wiring to pass through the base pan and into the building.

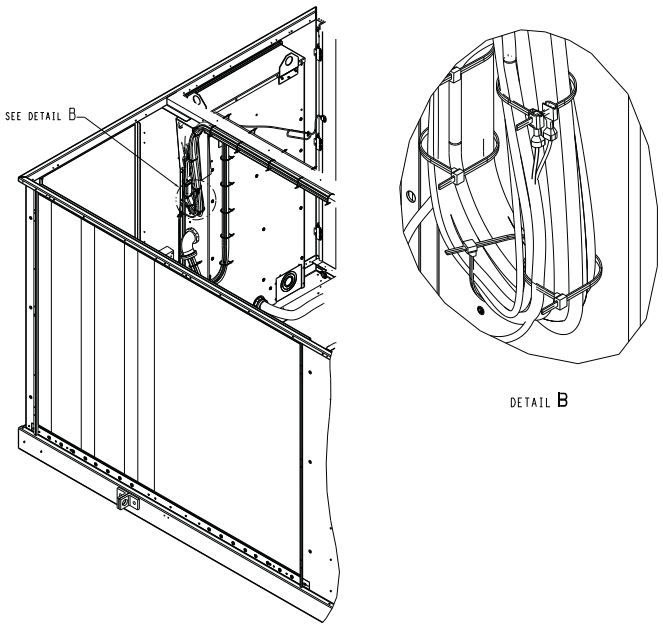


Fig. 50 — SAT Sensor Harness

Step 14 — Connect Chicago Relief Valve Piping (CRV Units Only)

Units ordered with the Chicago Relief Valve (CRV) option include a refrigerant pressure relief valve, set to 650 psi, installed on the liquid line of each refrigerant circuit. See Fig. 51 for CRV locations. The relief valve outlet is a 3/4 in. NPTFI connection. Consult local code for relief piping requirements.

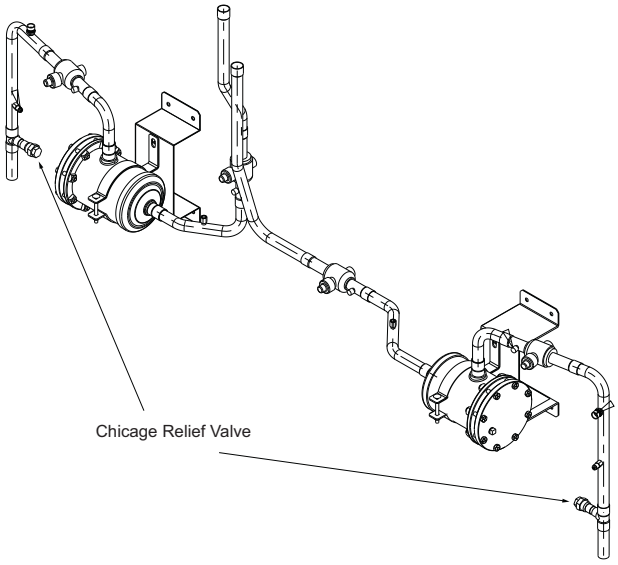


Fig. 51 — Chicago Relief Valve Locations (Dual Circuit Shown)

Step 15 — Install Unit Accessories

For applications requiring accessories, the following packages are available for all units:

- UV emitters
- roof curbs
- filter status switch
- smoke detector
- 2-stage thermostats
- non-communicating sensors
- Rnet communicating sensor

Refer to the individual accessory installation instructions in each accessory package for information on installing accessories. Refer to the SmartVu integration guide for directions on wiring and configuring Rnet communicating sensors. See Appendix H “48/50K SMARTVU CONTROL NAVIGATION” on page 126 for navigation information.

Step 16 — Install Control Wiring

Refer to the accessory or sensor installation instructions for wiring. Refer to the Advanced Controls, Operation, and Troubleshooting guide for advanced control guidance.

CONFIGURE CONTROL TRANSFORMER (208V UNITS ONLY)

On 208/230-v units, transformers 1, 2, and 3 (optional) are wired for 230-v. If the 208/230-v unit is to be run with 208-v power supply, the transformers must be rewired. For transformers 1 and 2, move the wire connected to terminal H3 and connect it to terminal H2. For transformer 32, move the wire from H2 and connect it to terminal H3.

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. 45 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. 52 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 are provided for connecting field-installed control devices and sensors to the unit's control system. See "Typical Control Box Layout" on page 51 for control terminal strip location.

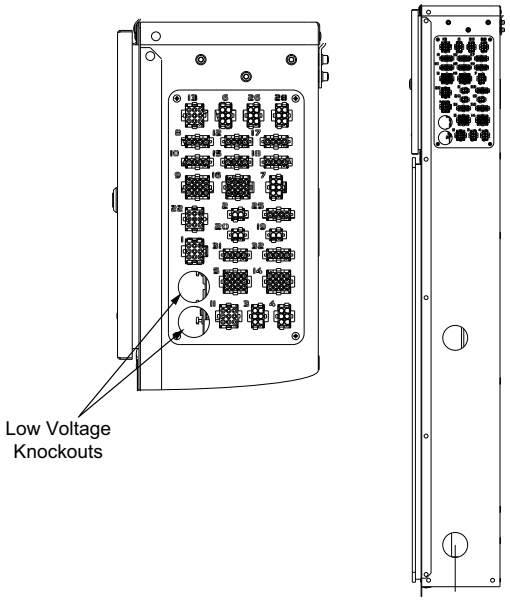


Fig. 52 — Control Knockouts Locations

Terminal Block 4 (TB)

See Fig. 53 and Table 10 for TB4 layout and descriptions. Terminal strip inputs and outputs are shown in Table 10.

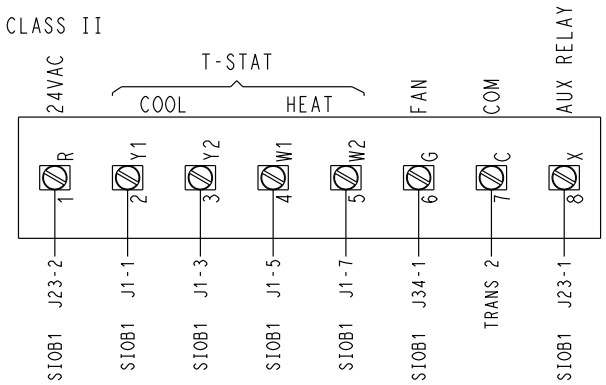


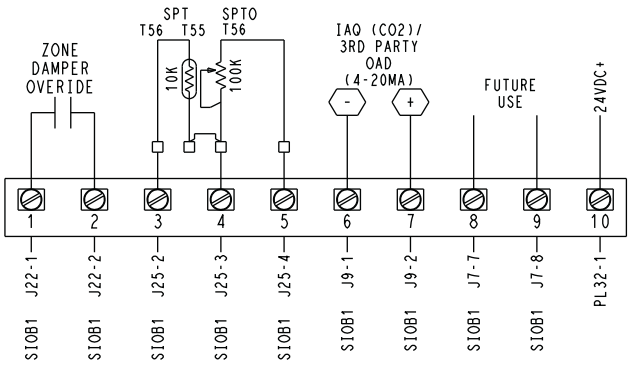
Fig. 53 — TB4 Layout

Table 10 — TB4 Details

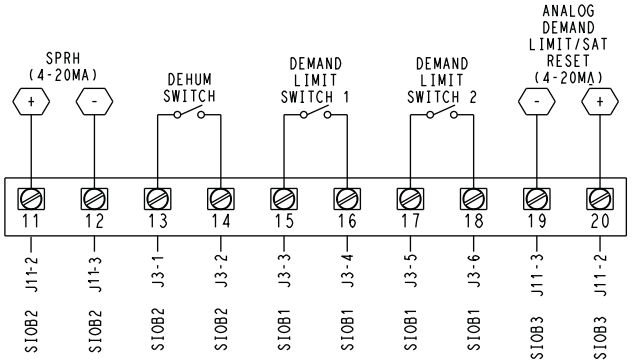
INPUTS AND OUTPUTS	LABEL	DESCRIPTION
1	R	24 vac to power field-use devices, such as thermostats (1A max. between C and R).
2	Y1	Low Cool Input: Used with TSTAT cool/heat demand source. A low cool demand is initiated when the low cool input is supplied with 24 vac.
3	Y2	High Cool Input: Used with TSTAT cool/heat demand source. A high cool demand is initiated when the high cool input is supplied with 24 vac.
4	W1	Low Heat Input: Used with TSTAT cool/heat demand source. A heat/cool demand is initiated when the low heat input is supplied with 24 vac.
5	W2	High Heat Input: Used with TSTAT cool/heat demand source. A high heat demand is initiated when the high heat input is supplied with 24 vac.
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 supplied with 24 vac. When used for TSTAT cool/heat demand, a Vent demand is triggered when the indoor fan input is supplied with 24 vac.
7	C	24 vac common to 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)

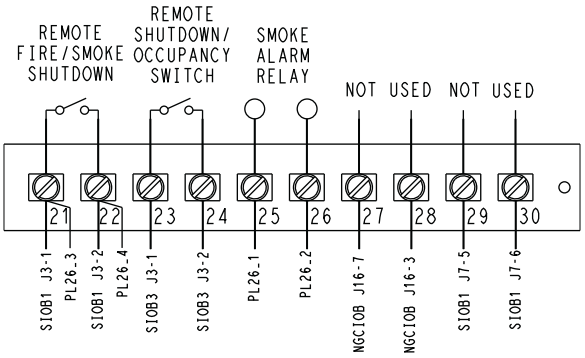
See Fig. 54 and Table 11 for TB5 layout and sensor accessory options.



TB5 (Terminals 1-10)



TB5 (Terminals 11-20)



TB5 (Terminals 21-30)

48VA001725 | REV C

Fig. 54 — 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 A2L leak dissipation mode is active, heating mode is active and heating capacity is above 50% (adjustable), a dehumidification is being performed, smoke pressurization/evacuation/purge is active, the indoor fan is on during the unoccupied period (temperature compensated start, unoccupied cool/heat/dehumidify/vent, 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. Sensor 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)	Input configurable as an 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 sensors (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	Input 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	Input 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	Input 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 detector/fire shutdown is triggered when switch input is shorted (normally open).
23 and 24	Remote Switch	Input configurable for shutdown or occupancy control, shutdown or occupied when switch input is shorted (normally open).
25 and 26	Smoke Alarm Relay	Output 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. 55 and Table 12 for TB6 layout and input options.

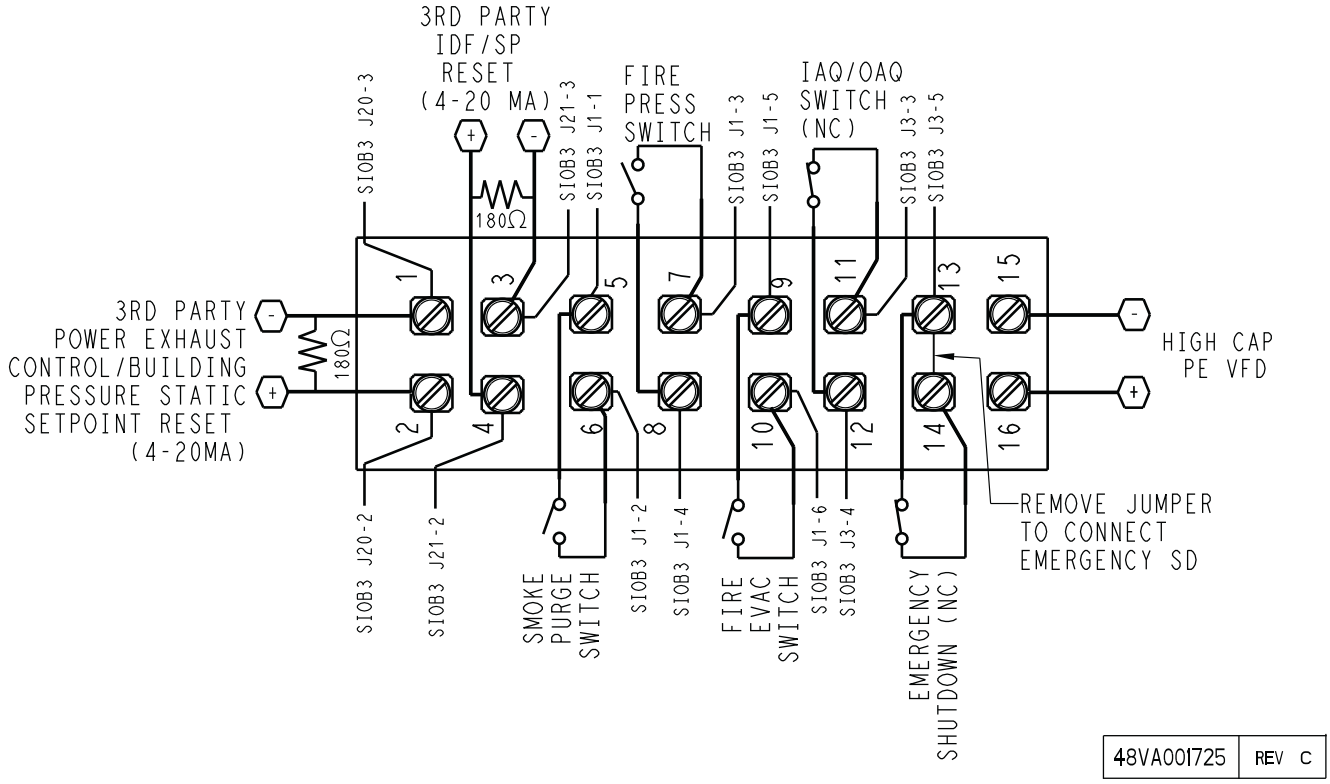


Fig. 55 — TB6 Layout

Table 12 — TB6 Input Options

TERMINALS	DEVICE	DESCRIPTION
1 and 2	Third-Party Exhaust Fan Modulation	Input 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	Input 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	Input configurable 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	High Capacity Power Exhaust (HCPE)	Output provides modulation signal for accessory high-capacity power exhaust (HCPE). Provides 2-10 vdc signal.

Step 17 — Inspect Indoor Fan Bearings for Grease

Prior to unit operation, inspect the indoor fan shaft bearings to ensure that a sealing bead of grease is present at the bearing seal. The fan bearings should contain a grease charge from the factory. Unit sizes 20-50 units have two fan bearings; unit size 60 has three fan bearings and a fan coupling that should be inspected. Fan bearings can be accessed from the indoor fan access panels.

If a sealing bead of grease is not visible, it is recommended to grease the bearings. Lock-out and tag-out unit power prior to greasing. For units without extended lubrication lines, greasing is done at the bearing. For units with extended lubrication lines (included with service back and with low ambient), a grease port is located in the fan access door for the far bearings. Use Regal AFB-2 or equivalent grease. Rotate the fan while greasing. Do not over grease. Refer to the User's Information and Maintenance Manual for lubrication instructions.

NOTE: Operating the indoor fan without proper bearing lubrication can cause equipment damage. Do not operate the indoor fan without the indoor fan access panels installed.

SMARTVU™ CONTROLS

Introduction

The WeatherMaker® 50K unit features the Carrier SmartVu™ control system with PIC 6.1 hardware, which controls and monitors the unit operation. This section of the manual provides an overview of the on control system and operation. See Appendix G — "CONTROL QUICK SETUP" on page 111 for quick setup guidance. For information on controls service access, refer to the 48/50K Advanced Controls, Operation, and Troubleshooting Guide on HVACPartners (http://www.HVACPartners.com) or http://www.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. 56 and 13-17 (certified drawings) for control box location and Fig. 57 for typical control box layout. See Fig. 58 for SmartVu display connections. The SmartVu controls include multiple standard and optional factory-installed sensors. See Table 13 for air sensor listing. See Fig. 59 for air sensor locations.

Fig. 56 — Control Box Location

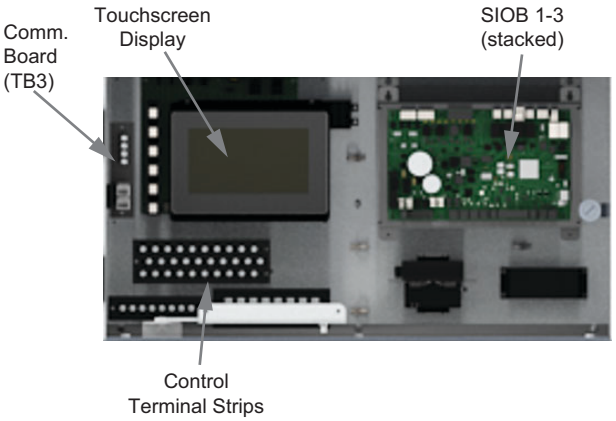


Fig. 57 — Typical Control Box Layout

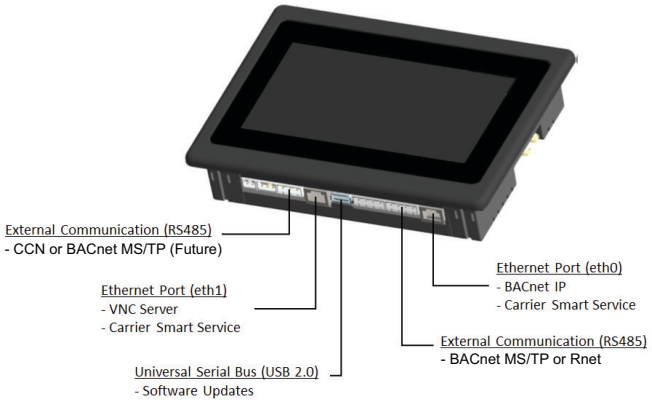


Fig. 58 — Carrier SmartVu™ Display Connections

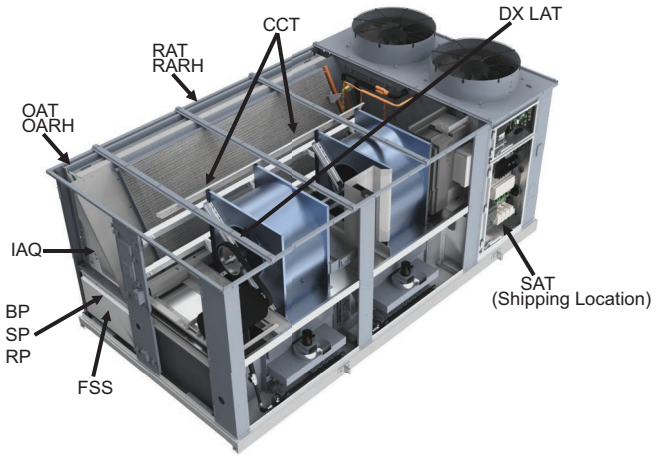


Fig. 59 — Air Sensor Locations

Table 13 — Factory-Installed Air Sensors

NAME[a]	DESCRIPTION	LOCATION	PART NUMBER	INCLUDED
BP	Building Pressure	Auxiliary Control Box (behind evaporator/filter access door)	HK05ZG022	Exhaust with BP Option
CCT	Cooling Coil Temperature	In front of HZMR coil on rail.	HH79NZ039 x4	Humidi-Mizer Option
IAQ	Return Air Carbon Dioxide (CO_2)	Return Section	HH99ZZ019	RA CO_2 Sensor Option
DX LAT	DX Leaving Air Temperature	Fan Inlet	HH79NZ039 x4	Standard
OAT	Outdoor Air Temperature	Outdoor Air Intake	HH79NZ039	Standard
OARH	Outdoor Air Relative Humidity	Outdoor Air Intake	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	Ships in power box, field-installed in supply duct.	HH79NZ043	Modulating Heat Option
SP	Supply Duct Pressure	Auxiliary Control Box (behind evaporator/filter access door)	HK05ZG019	VAV Option
RP	Return Pressure	Auxiliary Control Box (behind evaporator/filter access door)	HK05ZG024	Multi-Stage PE
FSS	Filter Status Switch	Auxiliary Control Box (behind evaporator/filter access door)	HK06WC039	Filter Status Switch Option

NOTE(S):

a. When a network sensor value is present, the system will display the network sensor value instead of the local sensor value.
b. SAT sensors are only factory provided with modulating heat.

Control Interface

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. 58 for display layout and port locations.

VNC VIEWER

The SmartVu controls can be accessed using a hardwired ethernet connection at ethernet port 0 (J15) (on the bottom right side of the touchscreen display) and a VNC Viewer, such as RealVNC. Refer to Fig. 58 (SmartVu touchscreen display) for ethernet port 0 port locations. See Table 14 for default IP addresses for 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 14 — Ethernet Addresses

PORT NAME	LOCATION	DEFAULT ADDRESSES
ETH0 (J15)	Bottom right side of display	169.254.1.1

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. Pressing on specific icons or buttons will perform an action. See Table 15 for a list of the interface buttons related to navigation. See Appendix H “48/50K SMARTVU CONTROL NAVIGATION” on page 126 for navigation layout.

Screens can contain multiple pages of information. When additional pages are present, the page up/down ▲ 1/2 ▼ 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. 60 for an example of a screen with multiple pages.

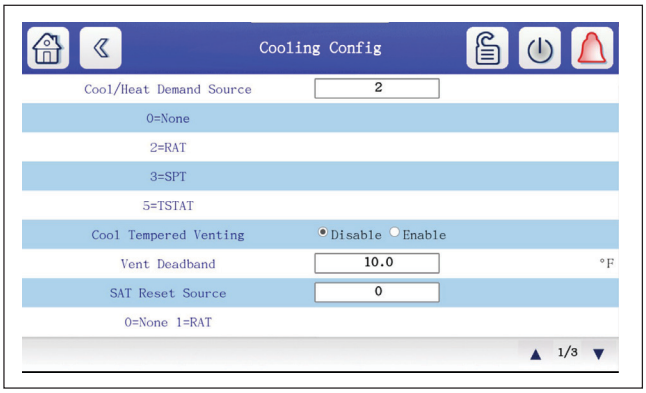
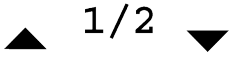


Fig. 60 — Page Up/Down Buttons

Table 15 — 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.
	Units Button	Select between imperial or metric units.

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 navigate to the System Configuration screen (by pressing the system configuration icon on the main menu screen), then press on the Cooling Configuration screen (by pressing the cooling configuration icon on the system configuration screen). See Fig. 61 for the screen views and press points for this example.

NOTE: Sufficient access level (user or higher) is required to access certain screens.

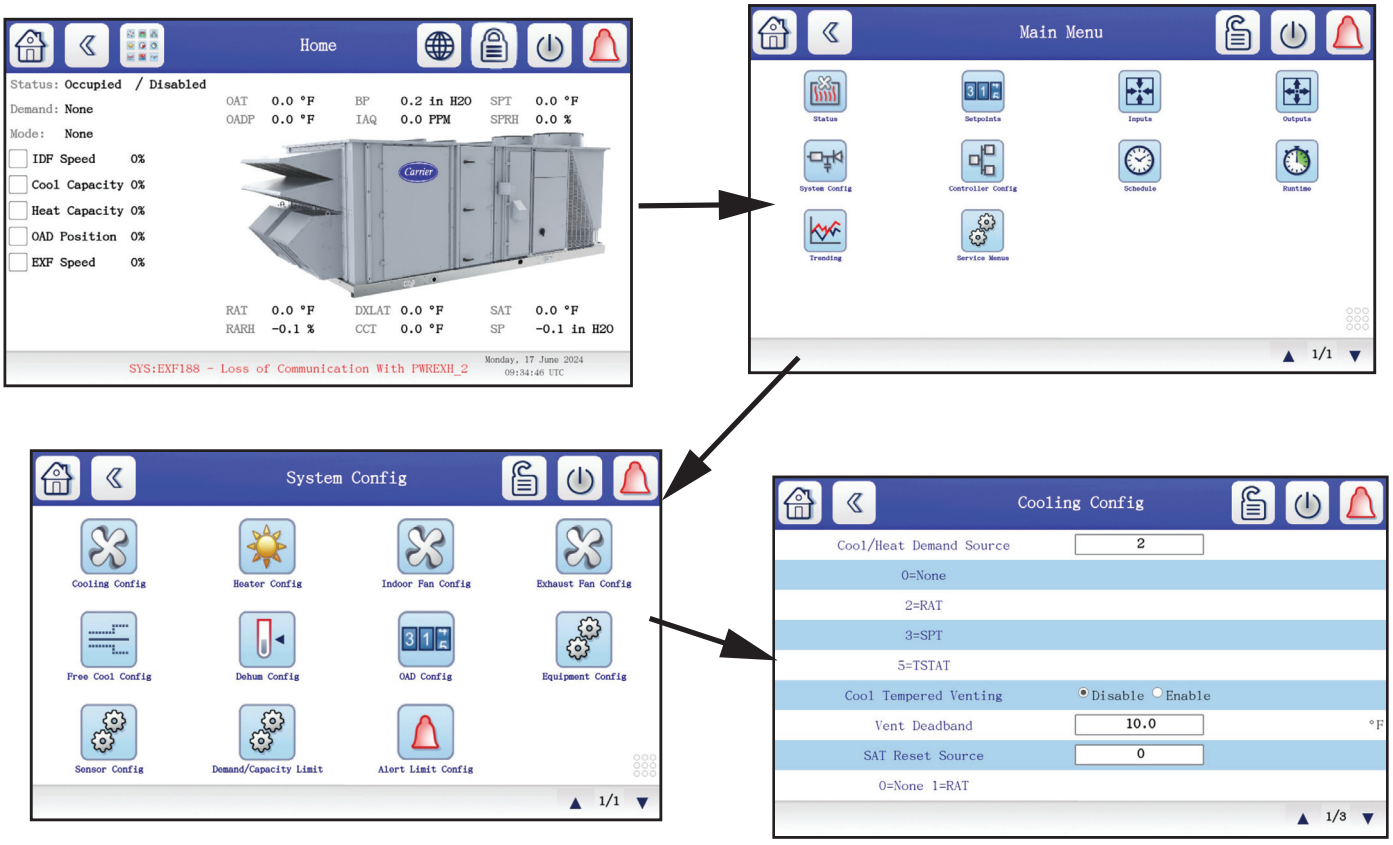


Fig. 61 — Equipment Configuration Screen Navigation Example

DATA ENTRY

Most screens contain data that is editable or selectable between multiple options, such as setpoints and configurations. See Table 16 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 Touch To Enter Password . When editable data is numerical, such as a temperature setpoint, pressing on editable data on the touchscreen UI will bring up the keypad to allow the user to change the data. See Fig. 62 for keypad layout.

When editable data is alpha-numerical, such as a password entry, pressing on the editable data will bring up the keyboard to allow the user to change the data. See Fig. 63 for keyboard touchscreen layout.

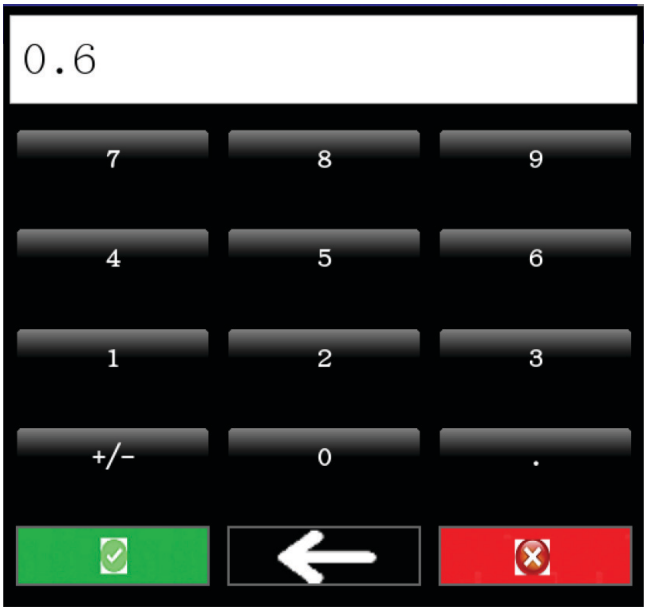


Fig. 62 — Keypad Layout

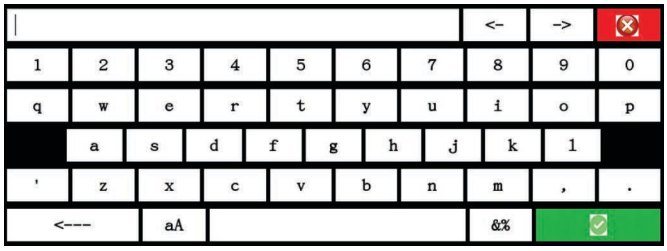


Fig. 63 — Keyboard Layout Touchscreen

For settings that have 2 configurations options, option buttons are used to indicate the configuration. See Fig. 64 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. 65 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. 64 — Enable/Disable Configuration Example

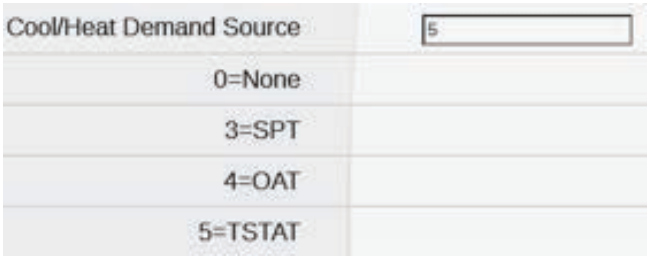


Fig. 65 — Configured Device Example

Table 16 — 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 Option Button	The indicated option is not active.
	Active Option Button	The indicated option is active.
	Save Button	Saves changes made on a screen.
	Discard Button	Discards changes made on a screen.
	Locked Button	Indicates 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 the Carrier Controller is powered on and will be shown for 2-3 minutes. See Fig. 66 welcome screen example. 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. 67 for login screen layout.

PASSWORDS

There are multiple user access levels. See Table 17 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, Press on the user login from the login screen to go to the user login screen. See Fig. 68 for user login screen layout. Press on `Touch To Enter Password` to bring up the keyboard and enter the password, then press done. Press 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. 69 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. 70 on page 58 for typical home screen layout.

Fig. 66 — Welcome Screen Example

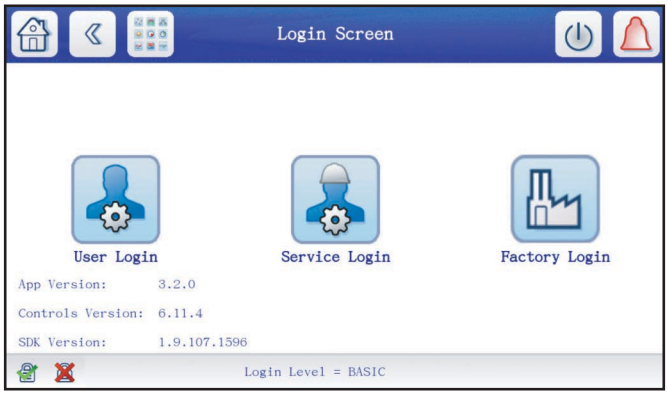


Fig. 67 — Login Screen

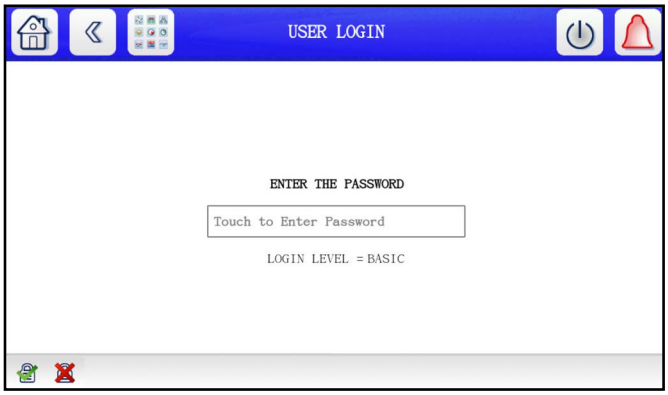


Fig. 68 — User Login Screen

Fig. 69 — Main Menu Screen

Table 17 — 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.

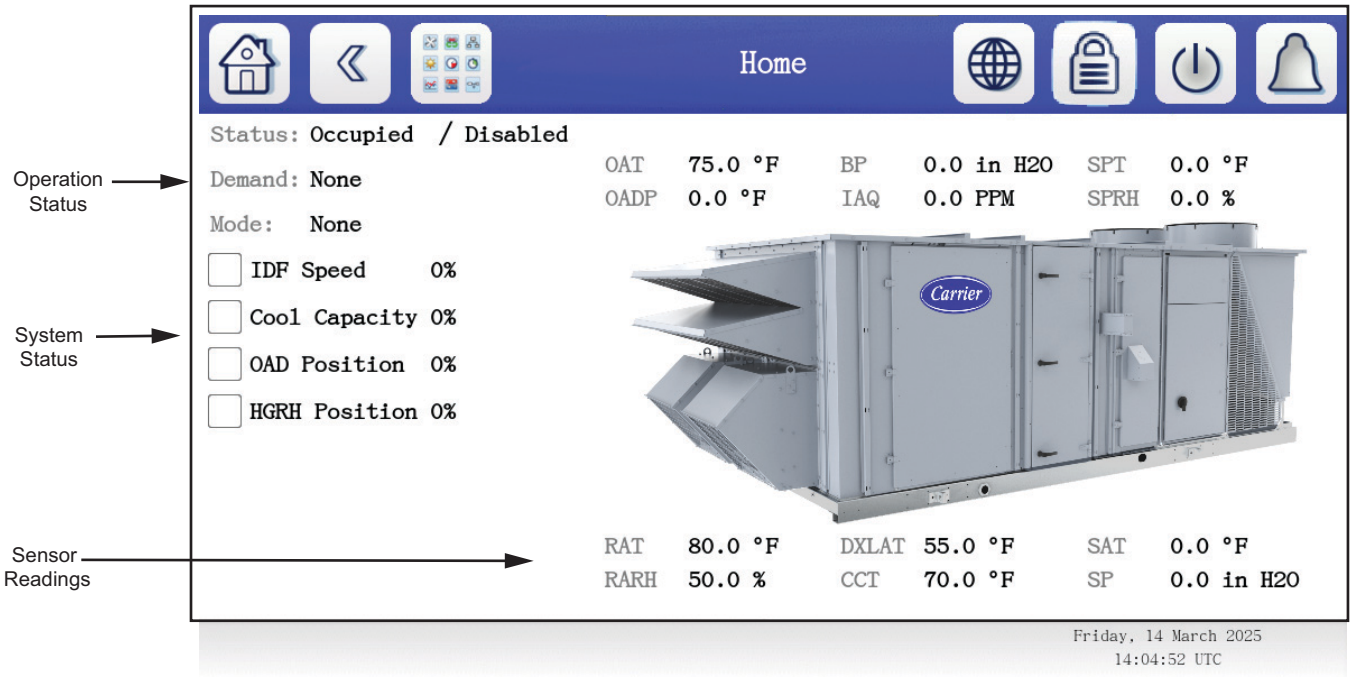


Fig. 70 — Home Screen Example

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. 71 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. 72 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. 73 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. 74 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. 75 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. 76 for the start/stop screen layout (shown with user access level in Service Run mode). See Table 18 for the start/stop screen functions.

Fig. 71 — Status Screen

Fig. 72 — Setpoint Screen

Fig. 73 — System Configuration Screen

Fig. 74 — Controller Configuration Screen

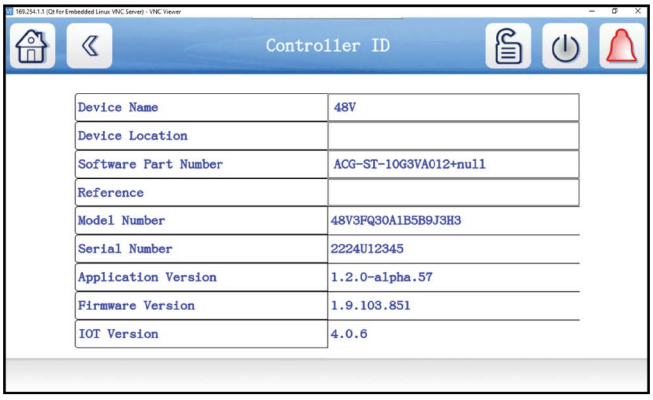


Fig. 75 — Controller ID Screen

Fig. 76 — Start/Stop Screen

Table 18 — 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.

Occupancy Control

Occupancy control is used to determine if the unit is in the occupied or unoccupied period. Occupancy affects control behavior and which setpoints the unit will operate on. Multiple occupancy sources may be used at the same time. The list of available occupancy sources are listed in order of priority (i.e., Airside Linkage is the highest priority).

AIRSIDE LINKAGE

The system can use a Carrier Airside Linkage primary controller as an occupancy source. Refer to SmartVu Controls Network Integration guide for setup guidance.

SPACE TEMPERATURE SENSOR OVERRIDE

The system can override an unoccupied period using a space temperature sensor (SPT) override. The system can monitor the local or network SPT override input to determine occupied override status. See Appendix G, “STEP F — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED SENSORS” on page 105 for instructions on setting up SPT override.

REMOTE SWITCH

The system can use a hardwired input to determine occupancy. When the remote switch is configured for occupancy, the system will monitor inputs 23 and 24 on TB5 to determine occupancy status. Refer to Fig. 54 on page 49 for TB5 layout. See Appendix G, "STEP G — CONFIGURE EQUIPMENT FOR FIELD INSTALLED SWITCHES" on page 105 for instructions on setting up the remote switch for occupied override.

BUILDING AUTOMATION SYSTEM OCCUPANCY

The system can use a building automation (BAS) system to determine occupancy, including a Carrier Comfort Network (CCN) schedule, a BACnet schedule, or a BACnet network occupancy point. Only one BAS occupancy source can be used at a time. Refer to the SmartVu Controls Network Integration guide for setup guidance.

NOTE: The system does not fall back to a local schedule if BAC occupancy is lost. The primary BAS configuration must be set to None for a local schedule to be used.

HOLIDAY SCHEDULE

The system can refer to an internal holiday schedule to override a local schedule and force the unoccupied period for a specific duration. A holiday schedule can be configured up to 30 different ways. To set a holiday schedule, navigate to the Holiday Schedule screen (***Main Menu→ Schedule→Holiday Schedule***) and perform the following:

1. Click on an available schedule.
2. Enter the holiday schedule start month (1-12).
3. Enter the holiday schedule start day (1-31).
4. Enter the duration of the holiday schedule (1-99).
5. Click save at the bottom of the screen to save the holiday schedule.

See Fig. 77 for holiday schedule screen layout. NOTE: In this screen example, the holiday schedule is set to start on 12/24 and will run for a duration of 5 days.

LOCAL SCHEDULE

The system can refer to an internal local schedule to define the occupied and unoccupied periods. Local schedules can be configured Up to 8 different ways. The default local schedule 1 is set to be occupied 24 hours per day, every day. To set a local schedule, navigate to the Local Schedule screen (***Main Menu→ Schedule→Local Schedule***) and perform the following:

1. Use the drop down box at the top of the screen to select the schedule you want to edit (period 1-8).
2. Check the box under the days that the schedule will be active (Mon-Sun).
3. Edit the Occupied From time for when the occupied period starts and click save. This time is in military (24-hour).
4. Edit the To time for when the occupied period stops and click save. This time is in military (24-hour).
5. Click save at the bottom of the screen to save the local schedule.
6. Edit any remaining schedules as needed.

See Fig. 78 for local schedule screen layout.

NOTE: In this screen example, the local schedule for period 1 is set to be occupied from 04:00 (4:00 AM) until 18:00 (6:00 PM) on Monday through Friday.

NOTE: The primary BAS configuration must be set to None for a local schedule to be used.

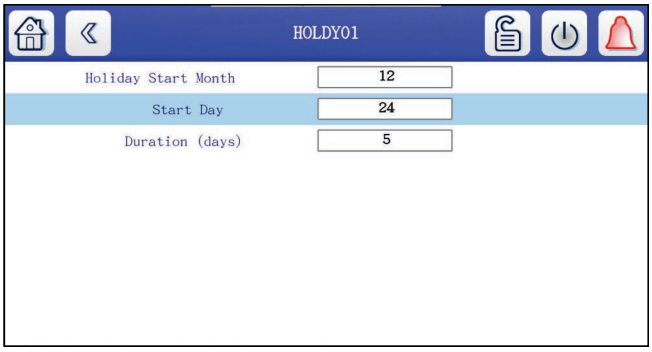


Fig. 77 — Holiday Schedule Screen

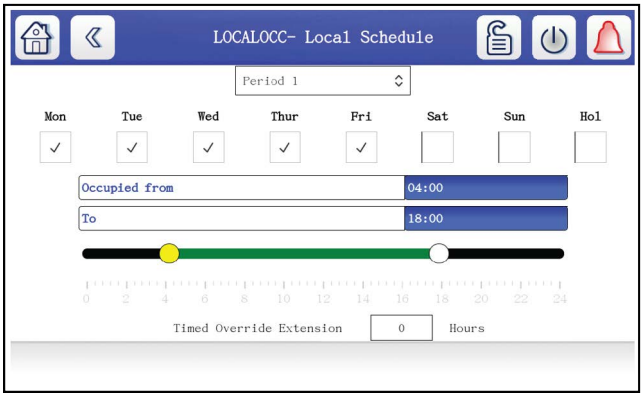


Fig. 78 — Local Schedule Screen

UNIT OPERATION

Prior to enabling full unit operation, Carrier recommends performing an air balance and completing the controls quick setup, pre-start-up checklist, start-up checklist, and the start-up log. See CL-1 to CL-10 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 DURING CONSTRUCTION" on page CL-10 for checklist.

Temporary Operation with a Generator

Due to the sensitive nature of the electronic devices used 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 requires the controls be configured and pre-start-up and start-up checks be performed prior to unit operation. See Appendix G — "CONTROL QUICK SETUP" on page 111 for control setup instructions and pages CL-1 to CL-10 for pre-start-up and start-up checklists. 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 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 maximum 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.
   b. Set up the cool/heat demand source for TSTAT or RAT. See "STEP I — CONFIGURE OUTDOOR AIR DAMPER (OPTIONAL)" on page 110 of Appendix G on page 102.
   c. 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 H — CONFIGURE INDOOR FAN" on page 105 of Appendix G on page 102.
   d. For constant supply fan and ventilation (outdoor air), configure a unit schedule and configure the occupied IDF for continuous. See "STEP H — CONFIGURE INDOOR FAN" on page 105 of Appendix G on page 102.
   e. If cooling or heating are not required during temporary operation, lock out 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 Maximum Cool Capacity to 0 to lock out cooling or set the Maximum 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 are 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

Overview

The 50K Series units are configurable for a wide range of operations for single-zone and multi-zone applications. The sequence of operation will depend on the unit configuration, setpoints, and the operating period (occupied or unoccupied).

The control uses demands to determine unit operation. A "demand" is what the space is calling for, such as cooling, heating, venting, or dehumidification. The demand level is based on the demand source inputs and the unit setpoints. See "COOL/HEAT DEMAND DETERMINATION" on page 70 and the dehumidify demand determination in "Dehumidification Operation" on page 75 for details on demand determination.

The unit operates based on supply air temperature (SAT) control for cooling, modulating heat, and dehumidification modes. Staged heat mode is based on demand level only.

Units ordered with a modulating heater include a factory-supplied, field-installed SAT sensor. For units without a SAT sensor, the control uses the factory-installed direct expansion system leaving air temperature (DXLAT) sensor for cooling or dehumidification operation. The DXLAT sensor is standard on all units.

The following sections for a simplified summary of the available sequence of operation based on unit configuration.

Indoor Fan

All units include a variable speed indoor fan, which is configurable for a variety of control types to meet application requirements. See below for the available indoor fan control types, configurations, and sequence of operations. See "Emergency Mode Sequence of Operation" table on page 77 for emergency mode sequence of operation.

IMPORTANT: For applications with VAV/VVT dampers, the dampers should be configured to be open at least 70% when the system is inactive.

CONSTANT VOLUME (CV)

The indoor fan will operate at the high cool IDF speed with a vent, cool, or dehumidify demand or the high heat IDF speed with a heat demand. Constant volume indoor fan is recommended for process applications or applications that are sensitive to sound changes. Consult local energy codes for CV control allowance. See Table 19 for sequence of operation.

STAGED AIR VOLUME (SAV) CAPACITY

The indoor fan speed stages based on the current demand level (with a heat, vent, or dehumidify demand) or the current cooling capacity (with a cool demand). SAV Capacity is recommended for single-zone applications with high sensible loads and is the default configuration for units with the SAV application option. See Table 20 on page 63 for sequence of operation.

STAGED AIR VOLUME (SAV) DEMAND

The indoor fan speed stages based on the current demand level. SAV demand is recommended for single-zone applications with high latent loads. See Table 21 on page 64 for SAV demand sequence of operation.

SUPPLY PRESSURE CONTROL (SP)

The indoor fan speed modulates to maintain the supply pressure at the effective supply pressure control point. SP control is recommended for multi-zone applications with air terminal units and is the default configuration for units with the VAV application option. See Table 22 on page 64 for sequence of operation.

NOTE: Units with staged heat do not follow SP in heating mode.

Supply Pressure Reset

When SP reset is active, the supply air control point is the SP setpoint. When SP reset is active, the control creates a new effective SP control point that is lower than the SP setpoint. See Table 23 on page 65 for SP reset configurations and sequence of operation.

SINGLE-ZONE VAV (SZ-VAV)

Single-zone VAV control will modulate the indoor fan speed based on space temperature and the effective cooling or heating temperatures. SZ-VAV is recommended for single-zone applications with high sensible loads or sound sensitive applications. See Table 24 on page 65 for sequence of operation.

NOTE: Units with staged heat do not follow SZ-VAV in heating mode.

THIRD-PARTY INPUT CONTROL (THIRD-PARTY)

The indoor fan speed will modulate based on a third-party hardwired or network input. When the occupied or unoccupied IDF control is set to demand, the G input is required to enable the indoor fan. Third-party input control is recommended for applications that require special fan sequencing. See Table 25 on page 66 for sequence of operation.

NOTE: For units with 2-stage heat, the system does not follow the third-party input in heating mode.

Table 19 — CV Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	OPERATION
Occupied	Occupied: Continuous	Vent, Cool, or Dehum.	The IDF operates at the High Cool IDF speed.
		Heat	The IDF operates at the High Heat IDF speed.
	Occupied: Demand	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	Unoccupied: Disabled	All	The IDF is off.
	Occupied: Demand[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 RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Table 20 — SAV Capacity Indoor Fan Sequence of Operation

OCCUPANCY	IDF OCC. CONFIG.	DEMAND	CONDITION	OPERATION
Occupied	Occupied: Continuous	Vent	All	The IDF operates at the Min. IDF Speed.
		Low Cool, High Cool, VAV Cool	Cool Capacity < Low Cool Cap Thresh	The IDF operates at the Min. IDF Speed.
			Low Cool Cap Thresh ≤ Cool Capacity < Med Cool Cap Thresh	The IDF operates at the Low Cool IDF Speed.
			Med Cool Cap Thresh ≤ Cool Capacity < High Cool Cap Thresh	The IDF operates at the Med. Cool IDF Speed.
			High Cool Cap Thresh ≤ Cool Capacity	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.
	Occupied: Demand	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min. IDF Speed.
		Low Cool, High Cool, VAV Cool	Cool Capacity < Low Cool Cap Thresh	The IDF operates at the Min. IDF Speed.
			Low Cool Cap Thresh ≤ Cool Capacity < Med Cool Cap Thresh	The IDF operates at the Low Cool IDF Speed.
			Med Cool Cap Thresh ≤ Cool Capacity < High Cool Cap Thresh	The IDF operates at the Med. Cool IDF Speed.
			High Cool Cap Thresh ≤ Cool Capacity	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	Unoccupied: Disabled	All	All	The IDF is off.
	Unoccupied: Demand[a]	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min. IDF Speed.
		Low Cool, High Cool, VAV Cool	Cool Capacity < Low Cool Cap Thresh	The IDF operates at the Min. IDF Speed.
			Low Cool Cap Thresh ≤ Cool Capacity < Med Cool Cap Thresh	The IDF operates at the Low Cool IDF Speed.
			Med Cool Cap Thresh ≤ Cool Capacity < High Cool Cap Thresh	The IDF operates at the Med. Cool IDF Speed.
			High Cool Cap Thresh ≤ Cool Capacity	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 RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Table 21 — SAV Demand Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONDITION	OPERATION
Occupied	Occupied: Continuous	Vent	All	The IDF operates at the Min. IDF Speed
		Low Cool	All	The IDF operates at the Low Cool IDF Speed.
		High Cool, 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.
	Occupied: Demand	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min. IDF Speed.
		Low Cool	All	The IDF operates at the Low Cool IDF Speed.
		High Cool, 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	Unoccupied: Disabled	All	All	The IDF is off.
	Unoccupied: Demand[a]	None	All	The IDF is off.
		Vent	All	The IDF operates at the Min. IDF Speed.
		Low Cool	All	The IDF operates at the Low Cool IDF Speed.
		High Cool, 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 RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Table 22 — Supply Pressure Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONFIGURATION	OPERATION
Occupied	Occupied: Continuous	Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based on maintaining the SP at the effective SP control point.
		Low Heat, High Heat	Modulating	The IDF modulates based on maintaining the SP at the effective SP control point.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
	Occupied: Demand	None	All	The IDF is off.
		Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based to maintain the SP at the effective SP control point.
		Low Heat, High Heat	Modulating	The IDF modulates based to maintain the SP at the effective SP control point.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
Unoccupied	Unoccupied: Disabled	All	All	The IDF is off.
	Unoccupied: Demand[a]	None	All	The IDF is off.
		Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based to maintain the SP at the effective SP control point.
		Low Heat, High Heat	Modulating	The IDF modulates based to maintain the SP at the effective SP control point.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Table 23 — Supply Pressure Reset Sequence of Operation

SP RESET SOURCE	OCCUPANCY	MODE	CONDITION	SP RESET CALCULATION
SPT, RAT	Occupied	Cooling	SP Reset Source Temperature ≥ Occupied Cooling Setpoint	None
			SP Reset Source Temperature < Occupied Cooling Setpoint	SP Reset Ratio * (Occupied Cooling Setpoint - SP Reset Source Temperature), up to the SP Reset Limit.
		All Other	All	None
	Unoccupied	All	All	None
Average Zone Damper Position (ZDP)	Occupied	Cooling	Avg. ZDP ≥ ZDP Reset Threshold	None
			Avg. ZDP < ZDP Reset Threshold	SP Reset Ratio * 10* (ZDP Reset Threshold - Avg ZDP), up to the SP Reset Limit.
		All Other	All	None.
	Unoccupied	All	All	None.
Third-Party	Occupied	Cooling	All	SAT reset is set based on a network input or hardwired input. For the hardwired input, the SAT reset is scaled linearly between 4mA (0”reset) and 20mA (3” reset).
		All Other	All	None
	Unoccupied	All	All	None

Table 24 — Single-Zone VAV Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONDITION	OPERATION
Occupied	Occupied: Continuous	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 versus the effective cooling setpoint.
		High Cool, Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	Modulating	The IDF modulates between the Low Heat IDF speed and the High Heat IDF speed based on the space temperature versus the effective heating setpoint.
		High Heat	Modulating	The IDF operates at the High Heat IDF Speed.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
	Occupied: Demand	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 versus the effective cooling setpoint
		High Cool, Dehumidify	All	The IDF operates at the High Cool IDF Speed.
		Low Heat	Modulating	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	The IDF operates at the High Heat IDF Speed.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
Unoccupied	Unoccupied: Disabled	All	All	The IDF is off.
	Unoccupied: Demand[a]	None	All	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	The IDF modulates between the Low Heat IDF speed and the High Heat IDF speed based on the space temperature versus the effective heating setpoint.
		High Heat	Modulating	The IDF operates at the High Heat IDF Speed.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Table 25 — Third-Party Input Indoor Fan Sequence of Operation

OCCUPANCY	IDF CONFIG.	DEMAND	CONFIGURATION	OPERATION
Occupied	Occupied: Continuous	Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based on a third-party hardwired or network inputs. For the hardwired input, the IDF speed scales linearly between 4mA (IDF min. speed) and 20mA (IDF max. speed).
		Low Heat, High Heat	Modulating	The IDF modulates based on a third-party input.
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
	Occupied: Demand	None	All	The IDF is off.
		Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based on a third-party hardwired or network inputs. For the hardwired input, the IDF speed scales linearly between 4mA (IDF min. speed) and 20mA (IDF max. speed).
		Low Heat, High Heat	Modulating	The IDF modulates based on a third-party hardwired or network inputs. For the hardwired input, the IDF speed scales linearly between 4mA (IDF min. speed) and 20mA (IDF max. speed).
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.
Unoccupied	Unoccupied: Disabled	All	All	The IDF is off.
	Unoccupied: Demand[a]	None	All	The IDF is off.
		Vent, Low Cool, High Cool, VAV Cool, Dehumidify	All	The IDF modulates based on a third-party hardwired or network inputs. For the hardwired input, the IDF speed scales linearly between 4mA (IDF min. speed) and 20mA (IDF max. speed).
		Low Heat, High Heat	Modulating	The IDF modulates based on a third-party hardwired or network inputs. For the hardwired input, the IDF speed scales linearly between 4mA (IDF min. speed) and 20mA (IDF max. speed).
		Low Heat	Staged Heat	The IDF operates at the Low Heat IDF Speed.
		High Heat	Staged Heat	The IDF operates at the High Heat IDF Speed.

NOTE(S):

a. For RAT cool/heat demand source, the indoor fan will turn on for 10 minutes when there is a cool or heat demand to mix building air. If the demand persists after 10 minutes, a cool or heat mode is selected. If the demand does not persist, the indoor fan shuts off.

Economizer

Units ordered with the optional factory-installed economizer include an actuated outdoor air damper (OAD) and return air damper (RAD) assembly that can provide ventilation control, free cooling operation, and other special operating modes, including emergency modes. See Table 47 on page 77 for emergency mode sequence of operation.

NOTE: The economizer cannot be field installed on 48/50K units.

VENTILATION

When the indoor fan is on during the occupied period, the control will utilize the economizer outdoor air damper (OAD) to provide fresh outdoor air for ventilation. Ventilation is configurable to operate based on OAD position or an associated sensor value (IAQ or OA CFM). See Table 26 for a list of outdoor air damper ventilation control configurations and the associated sequence of operation.

INDOOR AIR QUALITY (IAQ) RESET

The control can reset the ventilation position or air quantity based on an IAQ reading or a third-party signal. IAQ reset can help save energy by reducing the ventilation rate when the space does not require full ventilation. See Table 27 for IAQ reset configurations and sequence of operation

FREE COOLING

The economizer is configurable to provide free cooling during the occupied or unoccupied periods. A series of user adjustable checks are available to allow free cooling. See Table 28 on page 68 for a list of available free cooling checks. See Table 29 on page 68 for free cooling sequence of operation.

PRE-OCCUPANCY PURGE

The unit can be configured to ventilate the space prior to the occupied period to flush out stale air and support high indoor air quality. The duration of the purge depends on the outdoor air temperature. See Table 30 on page 69 for pre-occupancy purge sequence of operation.

Exhaust Fan

For units ordered with a factory-installed or accessory exhaust fan (EXF), the EXF relieves excess building pressure. The exhaust fan will only operate when the outdoor air damper is open. See Table 31 on page 69 for exhaust fan configurations and sequence of operation.

Table 26 — Ventilation Sequence of Operation

VENTILATION CONTROL	DEMAND	CONDITION	OPERATION
None	All	All	The OAD is closed.
IDF Mapping	None	All	The OAD is closed.
	All Other	Free Cooling Inactive	When the IDF is on, the system modulates the OAD at the effective ventilation position, which is based on the IDF speed and the following configurations. **IDF SPEED** / **OAD POSITION** **VENT SPEED 1** — Vent position 1 **VENT SPEED 2** — Vent position 2 **VENT SPEED 3** — Vent position 3 **VENT SPEED 4** — Vent position 4
Third-Party Full	None	All	The OAD is closed.
	All Other	All	When the IDF is on, the system modulates the OAD position directly based on a third party hardwired or network input. For the hardwired input, the OAD position is scaled linearly between 4mA (OAD min. position) and 20mA (OAD max. position). NOTE: OAD position resets and free cooling are not performed with third-party full control.
Third-Party Vent	None	All	The OAD is closed.
	All Other	Free Cooling Inactive	When the IDF is on, the system modulates the OAD at the ventilation positions, which is calculated based on a third party hardwired or network input. For the hardwired input, the OAD position is scaled linearly between 4mA (OAD min. position) and 20mA (OAD max. position).
IAQ Mapping	None	All	The OAD is closed.
	All Other	Free Cooling Inactive	When the IDF is on, the system modulates the OAD between the IAQ min and IAQ max. positions to achieve the IAQ level between the IAQ low and IAQ high levels. NOTE: IAQ reset is not performed with IAQ mapping.
OACFM	None	All	The OAD is closed.
	All Other	Free Cooling Inactive	When the IDF is on, the system modulates the OAD to maintain the measured outdoor airflow at the effective OACFM control point.

Table 27 — IAQ Reset Sequence of Operation

VENT CONTROL	IAQ RESET SOURCE	CONDITION	OPERATION
None	All	All	IAQ reset not performed.
All	None	All	IAQ reset not performed.
OAD Mapping, Third-Party Vent	IAQ Switch	IAQ switch open.	The ventilation control point is reset by the IAQ Position Reset.
		IAQ switch closed.	IAQ reset not performed.
	IAQ Sensor	IAQ ≤ IAQ Override Threshold - IAQ Override Deadband	The ventilation control point is decreased by the IAQ Position Reset.
		IAQ ≥ IAQ Override Threshold + IAQ Override Deadband	IAQ reset not performed.
	Third-party	All	IAQ reset is performed based on a third-party hardwired or network input. For the hardwired input, the IAQ reset is scaled linearly between 4mA (0% reset) or 20mA (IAQ Position Reset).
OACFM	IAQ Switch	IAQ switch open	The OACFM control point is decreased by the IAQ OACFM Reset.
		IAQ switch closed	IAQ reset not performed.
	IAQ Sensor	IAQ ≥ IAQ Override Threshold + IAQ Override Deadband	IAQ reset not performed.
		IAQ ≤ IAQ Override Threshold - IAQ Override Deadband	The ventilation control point is decreased by the IAQ OACFM Reset.
	Third-party	All	IAQ reset is performed based on a third-party hardwired or network input. For the hardwired input, the IAQ reset is scaled linearly between 4mA (0 cfm reset) or 20mA (IAQ OACFM Reset).
Third-Party Full, IAQ Mapping	All	All	IAQ reset not performed.

Table 28 — Free Cooling Checks

NAME	CHECK	ALLOW FREE COOL	PREVENT FREE COOL
Dry Bulb Limit	OAT versus 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 versus RAE)	OAE is at or below the RAE minus the Diff. Enthalpy deadband for 1 minute.	OAE is above the RAE minus the Diff. Enthalpy deadband.
	Differential Dry Bulb (OAT versus 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 versus 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 29 — Free Cooling Sequence of Operation

DEMAND	FREE COOLING	CONDITION	OPERATION
None	All	All	The OAD is closed.
Low Cool, High Cool, VAV Cool	Not Available	All	Free cooling is disabled. The OAD operates based on ventilation control.
	Available	OAT > SAT control point	Integrated free cooling mode is enabled. The OAD and compressors modulate/stage to maintain the SAT at the SAT control point.
		OAT ≤ SAT control point	Free cooling mode is enabled. The OAD modulates to maintain the SAT at the SAT control point.
Vent, Low Heat, High Heat, Dehumidify	All		Free cooling is disabled. The OAD operates based on ventilation control.

Table 30 — Pre-Occupancy Purge Sequence of Operation

PRE-OCCUPANCY PURGE	PERIOD	CONDITION	OPERATION
Disabled	All	All	Pre-occupancy purge is not performed.
Enabled	Unoccupied	OAT > IAQ Purge OAT High Lockout or OAT < IAQ Purge OAT Low Lockout	Pre-occupancy purge is not performed.
		Occ Cooling + Low Cool On DB < OAT < IAQ Purge OAT High Lockout and Occ Heating – Low Heat DB > OAT > IAQ Purge	Pre-occupancy purge is performed. The IDF will turn on and the OAD will open to the IAQ Purge Long Position at the Purge Long Duration before the occupied period.
		Occ Cooling + Low Cool On DB > OAT < IAQ Purge OAT High Lockout and Occ Heating – Low Heat DB < OAT > IAQ Purge OAT Low Lockout	Pre-occupancy purge is performed. The IDF will turn on and the OAD will open to the IAQ Purge Long Position at the Purge Long Duration before the occupied period.

Table 31 — Exhaust Fan Sequence of Operation

<table>
<tr><th>EXF CONTROL</th><th>CONDITION</th><th>OPERATION</th></tr>
<tr><td>None</td><td>All</td><td>The EXF is off.</td></tr>
<tr><td rowspan="2">OAD Mapping</td><td>Multi-stage Exhaust</td><td>The exhaust fan operates between four (20-50 ton) or six (60 ton) stages based on outdoor air position and the EXF OAD position configurations. See below for exhaust fan stages based on OAD position configurations and EXF OAD position configurations.
<table>
<tr><th>OAD POSITION</th><th>EXHAUST FAN STAGE</th></tr>
<tr><td>< EXF OAD Pos 1</td><td>Off</td></tr>
<tr><td>≥ EXF OAD Pos 1,
< EXF OAD Pos 2</td><td>1</td></tr>
<tr><td>≥ EXF OAD Pos 2,
< EXF OAD Pos 3</td><td>2</td></tr>
<tr><td>≥ EXF OAD Position 3,
< EXF OAD Position 4</td><td>3</td></tr>
<tr><td>≥ EXF OAD Position 4,
< EXF OAD Position 5</td><td>4</td></tr>
<tr><td>≥ EXF OAD Position 5,
< EXF OAD Position 6</td><td>5 (60T only)</td></tr>
<tr><td>≥ EXF OAD Position 6</td><td>6 (60T only)</td></tr>
</table></td></tr>
<tr><td>High Capacity Exhaust</td><td>When the OAD is below EXF OAD position1, the EXF is 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.</td></tr>
<tr><td rowspan="2">Building Pressure</td><td>Multi-stage Exhaust</td><td>When the OAD is open and the building pressure is above the BP setpoint + BP threshold for the BP time, the exhaust fan stages up to the next available stage. When the OAD is open and the building pressure is below the BP setpoint - BP threshold for the BP time, the exhaust fan stages down to the next available BP stage or off. When the OAD is closed, the EXF is off.</td></tr>
<tr><td>High Capacity Exhaust</td><td>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.</td></tr>
<tr><td rowspan="2">Third-Party Input</td><td>Multi-stage Exhaust</td><td>Not used.</td></tr>
<tr><td>High Capacity Exhaust</td><td>When the OAD is open, the EXF is allowed to operate and will modulate based on a third party hardwired or network input. For the hardwired input, the EXF speed is scaled linearly between 4mA (EXF min.speed) and 20mA (EXF max. speed). The EXF is off if the input is below 4mA.</td></tr>
</table>

Cooling And Heating Operation

OVERVIEW

Cooling and heating operation is a three-step process. Follow Steps 1-3 for cooling and heating operation.

1. Demand Determination: The control monitors the cool/heat demand source input to determine if the unit needs to provide cooling, heating, or other.
2. Supply Air Temperature Control Point: For all cooling operation and with modulating heat operation, the control sets the supply air temperature control point to the SAT setpoint associated with the active demand level. For units with staged heat, a supply air temperature control point is not used.
3. Mode Determination: The control selects an available cooling, heating, or other mode based on the current conditions and unit configuration, and operates cooling or modulating heat to achieve the supply air temperature at the supply air temperature control point.

Units ordered with a modulating heater include a factory-supplied, field-installed SAT sensor, the control will use the factory-installed direct expansion system leaving air temperature (DX-LAT) sensor for cooling or dehumidification operation.

COOL/HEAT DEMAND DETERMINATION

The cool/heat demand source determines which input the control monitors to determine if there is a demand (call) for cooling or heating from the space. The demand level determines the supply air temperature (SAT) control point that cooling or heating mode will operate to achieve.

Effective Cooling and Heating Temperatures

For temperature based cool/heat demand sources (SPT and RAT), the control calculates an effective cooling and heating temperature for demand determination. See Table 32 for the effective cooling temperature calculations based on demand source and occupancy period.

Return Air Temperature (RAT)

When the cool/heat demand source is RAT, the control monitors the factory-installed RAT sensor and compares it to the effective cooling and heating temperatures to determine if there is a cool or heat demand. RAT cool/heat demand source is recommended for multi-zone applications.

See Table 33 for the available RAT demand levels, associated SAT setpoints, and the start and stop conditions. See Fig. 79 for the occupied RAT demand processing diagram and Fig. 80 for the unoccupied RAT demand processing diagram.

IMPORTANT: The RAT cool/heat demand source uses the occupied heating setpoint to calculate the effective cooling temperature during the occupied period. When changing the occupied heating setpoint, also change the VAV cool on deadband to prevent a cool demand when the RAT is cool. Activating cooling with a cool RAT can cause operational issues.

Space Temperature (SPT)

When the cool/heat demand source is configured for SPT, the control monitors the local field-installed SPT input and compares it to the effective cooling and heating temperatures to determine if the is a cool or heat demand. SPT cool/heat demand source is recommended for single-zone applications and multi-zone VVT systems.

IMPORTANT: When Linkage is active, the unit will use the Linkage average zone temperature instead of the local SPT sensor.

See Table Table 34 on page 72 for the available SPT demand levels, associated SAT setpoints, and the start and stop conditions. See Fig. 80 for the unoccupied RAT demand processing diagram and Fig. 81 for the occupied SPT demand processing diagram

Thermostat (TSTAT)

When the cool/heat demand source is configured for TSTAT, the control monitors the local or network thermostat inputs (Y1, Y2, W1, W2, G) to determine if there is a cool or heat demand. TSTAT cool/heat demand source is recommended for single-zone applications with a thermostat or applications that require third-party cooling and heating control. See Table Table 35 on page 72 for the available TSTAT demand levels, associated SAT setpoints, and the start and stop conditions.

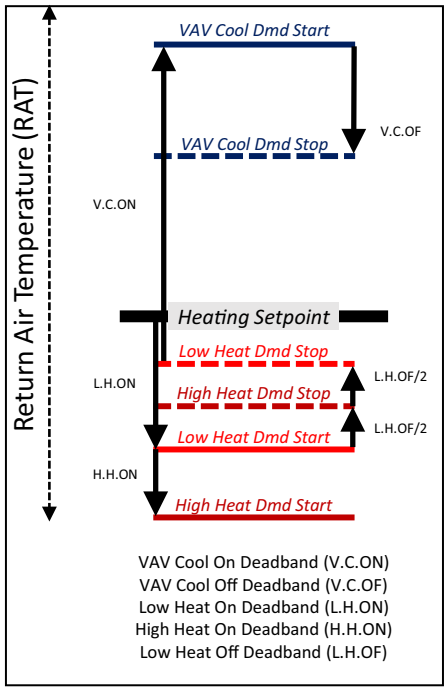


Fig. 79 — Occupied RAT Demand Processing

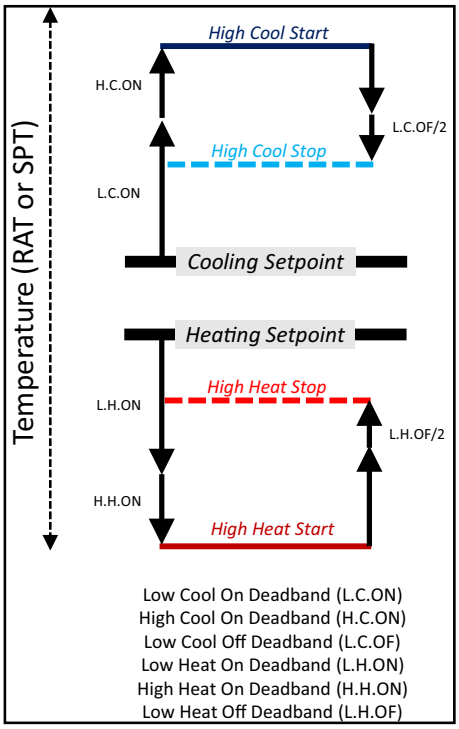


Fig. 80 — Unoccupied RAT or SPT Demand Processing

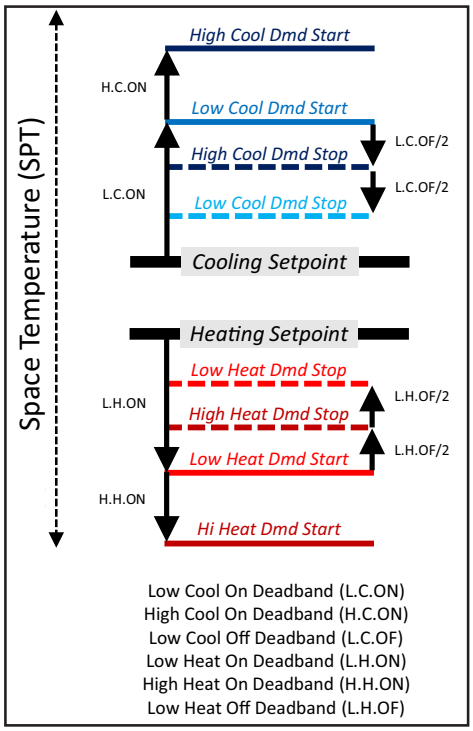


Fig. 81 — Occupied SPT Demand Processing

Table 32 — Effective Cooling and Heating Temperatures[a]

DEMAND SOURCE	EFFECTIVE TEMP.	OCCUPANCY	EFFECTIVE TEMP. CALCULATION
SPT	Cooling	Occupied	Occupied Cooling Setpoint ± SPT Offset + Demand Limit
		Unoccupied	Unoccupied Cooling Setpoint
	Heating	Occupied	Occupied Heating Setpoint ± SPT Offset - Demand Limit
		Unoccupied	Unoccupied Heating Setpoint
RAT	Cooling	Occupied	Occupied Heating Setpoint - Low Heat On Deadband + High Heat On Deadband + VAV Cool On Deadband ± SPT Offset + Demand Limit
		Unoccupied	Unoccupied Cooling Setpoint
	Heating	Occupied	Occupied Heating Setpoint + SPT Offset - Demand Limit
		Unoccupied	Unoccupied Heating Setpoint

NOTE(S):

a. When Linkage is active, the unit uses the Linkage cooling and heating setpoints instead of the unit cooling and heating setpoints.

Table 33 — RAT Demand Levels

DEMAND	START CONDITION	SAT CONTROL POINT	STOP CONDITION
None	Unoccupied only. There is no cool or heat demand.	None	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.	Vent SAT setpoint	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.	VAV Cool SAT setpoint	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.
High Cool	Unoccupied only. RAT rises above the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband.	High Cool SAT setpoint	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	Occupied only. RAT drops below the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	Low Heat SAT setpoint (modulating heat only)	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.	High Heat SAT setpoint (modulating heat only)	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 34 — SPT Demand Levels

DEMAND	START CONDITION	SAT CONTROL POINT	STOP CONDITION
		OCCUPIED PERIOD	
None	There is no cool or heat demand.	None	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.	Vent SAT	Low Cool or Low Heat demand starts.
Low Cool	Occupied only. SPT rises above the Occupied or Unoccupied Cooling setpoint plus the Low Cool On deadband.	Low cool SAT	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.	High Cool SAT	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	Occupied only. SPT drops below the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	Low Heat SAT (modulating heat only)	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.	High Heat SAT (modulating heat only)	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 35 — TSTAT Demand Levels

DEMAND	START CONDITION	SAT CONTROL POINT	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.	None	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.	Vent SAT	Y1, Y2, W1, or W2 input become active.
Low Cool	Y1 input is active.	Low Cool SAT	Y1 input deactivates.
High Cool	Y1 and Y2 inputs are active.	High Cool SAT	Y2 input deactivates.
Low Heat	W1 input is active.	Low Heat SAT (modulating heat only)	W1 input deactivates.
High Heat	W1 and W2 inputs are active.	High Heat SAT (modulating heat only)	W2 input deactivates.

SUPPLY AIR TEMPERATURE CONTROL POINT

When a cool or heat demand starts, the control will start a cooling or heating mode and will operate the cooling or modulating/multi-stage heat systems to maintain the SAT at the SAT control point. The demand level SAT setpoint names match the associated demand level (low cool, high cool, VAV cool, low heat, high heat, or vent).

Supply air temperature reset (SATR)

The control can reset SAT control point when the space is at part load conditions during the occupied period. The SAT reset adds to the SAT control point, creating an effective SAT control point that is higher than the active demand level SAT setpoint. The higher SAT control point used in cooling mode can save energy by expanding free cooling and reducing compressor operation See Table 36 for SAT reset configurations and sequence of operation.

COOLING AND HEATING MODES

All cooling, modulating heating, and venting modes operate to maintain the unit supply air temperature (SAT) at the effective SAT control point. Staged heat mode operates based on the demand level. See below for typical system cooling and heating modes. Refer to Table 29 on page 68 for free cooling and integrated free cooling sequences of operation.

NOTE: The unoccupied indoor fan configuration must be set to demand for cooling, venting, or heating to occur during the unoccupied period.

Mechanical Cooling

Mechanical cooling mode uses the unit cooling circuit (compressors, evaporator, condenser fans, condenser, EXVs) to provide cooling. See Table 37 for mechanical cooling mode operation.

NOTE: For units with a lead digital compressor, the digital compressor will start at full capacity for a period of two minutes. After two minutes, the digital compressor can modulate. This may cause the SAT to be below the SAT control point in low load conditions.

Heat Tempered Cooling Mode

For applications in cold climates that have constant cooling loads, the modulating heater tempers very cold mixed air to prevent over-cooling the space with a cool demand. See Table 38 on page 74 for heat tempered cooling mode operation.

Venting Modes

Venting mode occurs when there is no cool or heat demand, but the indoor fan is on to provide system ventilation air. The unit can control to a neutral SAT in venting mode. See Table 39 on page 74 for venting mode operation.

Modulating Heating Mode

The modulating heat source provides heating based on the effective SAT control point. See Table 40 on page 74 for modulating heating mode operation.

Staged Heating Mode

The staged heat source provides demand-based heating operation when there is a heat demand. See Table 41 on page 74 for staged heating mode operation.

Other

See Table 42 on page 74 for other cooling and heating sequence of operation.

Table 36 — SAT Reset Operation

SAT RESET SOURCE	OCCUPANCY	MODE	CONDITION	SAT RESET CALCULATION
SPT, OAT, RAT	Occupied	Cooling	SAT Reset Source Temperature ≥ Occupied Cooling Setpoint	None
			SAT Reset Source Temperature < Occupied Cooling Setpoint	SAT Reset Ratio * (Occupied Cooling Setpoint - SAT Reset Source Temperature), up to the SAT Reset Limit.
		All Other	All	None
	Unoccupied	All	All	None
Third-Party	Occupied	Cooling	All	SAT reset is set based on a network input or hardwired input. For the hardwired input, the SAT reset is scaled linearly between 4mA (0°F reset) and 20mA (SP Reset Limit).
		All Other	All	None
	Unoccupied	All	All	None

Table 37 — Mechanical Cooling Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Cool, High Cool, VAV Cool	Free cooling is unavailable, mechanical cooling 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 38 — Heat Tempered Cooling Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Cool, High Cool, VAV Cool	The unit has modulating heat, heating 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 39 — 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 staged heat and the MAT is below the MAT control point minus the Vent deadband.	Fan Only Venting	Cooling and heating are disabled.
	Mechanical 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 heating system is enabled and will modulate to maintain the unit SAT at the Vent SAT setpoint.

Table 40 — Modulating Heating Mode Sequence of Operation

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

Table 41 — Staged Heating Mode Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
Low Heat	The unit has staged heat and heating is available.	Staged Heating	Heat stage 1 is enabled.
High Heat	The unit has staged heat and heating is available.	Staged Heating	Heat stage 2 is enabled (high heat only).

Table 42 — Other Cooling/Heating Sequence of Operation

DEMAND	CONDITION	MODE	OPERATION
All	All	Idle/None	All components are off.
Low Cool, High Cool, VAV Cool	There is a cool demand, but the system is not able to select a cooling mode due to a lockout or alarm.	Cooling Prevented	Mechanical cooling and free cooling are not available due to lockouts or component status. All other components are allowed to operate as normal.
Low Heat, High Heat	There is a heat demand, but the system is not able to select a heating mode due to a lockout or alarm.	Heating Prevented	The heating system is not available due to lockouts or component status. All other components are allowed to operate as normal.
Low Cool, High Cool, VAV Cool	Mechanical cooling is active and the SAT drops below the recycle limit (45°F, default).	Recycle	Mechanical cooling is disabled until the SAT rises above the recycle limit by the recycle DB (5°F, default).
All	Mechanical cooling is operating and an oil recovery cycle is needed.	Oil Recovery	The compressors will stage up to push oil through the system.

Dehumidification Operation

OVERVIEW

For units with the factory-installed Humidi-MiZer® modulating dehumidification system, dehumidification operation is also three-step process. Follow Steps 1-3 for dehumidification operation.

1. Demand Determination: The control monitors the dehumidify demand source input to determine if there is a dehumidify demand.
2. Cooling Coil Temperature Control Point: When a dehumidify demand starts, the control sets the cooling coil temperature control point at the dehumidify cooling coil temperature setpoint.
3. Mode Determination: The control selects an available dehumidification mode based on the current conditions and unit configuration. The control stages/modulates the cooling system to maintain the cooling coil temperature at the effective cooling coil temperature control point. The control stages/modulates the cooling system to maintain the CCT at the CCT control point and the Humidi-MiZer system to maintain the unit SAT at the effective SAT control point.

DEHUMIDIFY DEMAND SOURCES

The dehumidify demand source determines which control input the unit monitors to determine if there is a demand (call) for dehumidification from the space.

Return Air Relative Humidity (RARH)

When the dehumidify demand source is set to RARH, the control monitors the local or network RARH input and compares it to the dehumidify relative humidity (RH) setpoint to determine if there is a dehumidify demand. Deadbands adjust when the demand starts and stops compared to the dehumidify setpoint. RARH is recommended for single or multi-zone applications. See Table 43 for RARH demand levels and Fig. 82 for RARH demand determination.

Space Relative Humidity (SPRH)

When the dehumidify demand source is set to SPRH, the control monitors the local or network SPRH input and compares it to the dehumidify relative humidity (RH) setpoint to determine if there is a dehumidify demand. Deadbands adjust when the demand starts and stops compared to the dehumidify setpoint. SPRH is recommended for single-zone applications or multi-zone applications with a critical space. See Table 43 on page 76 for SPRH demand levels and Fig. 83 for SPRH demand determination.

Humidistat (HSTAT)

When the dehumidify demand source is set to HSTAT, the control monitors the dehumidify input to determine if there is a dehumidify demand. HSTAT is recommended for single-zone applications or multi-zone applications with third-party control of dehumidification. See Table 44 on page 76 for available demands for HSTAT demand source.

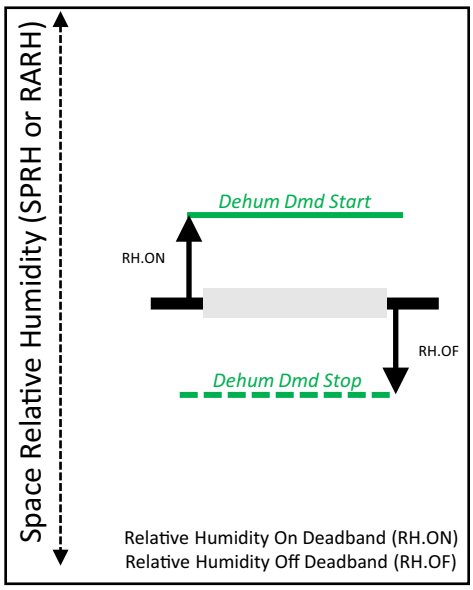


Fig. 82 — RARH Demand Processing

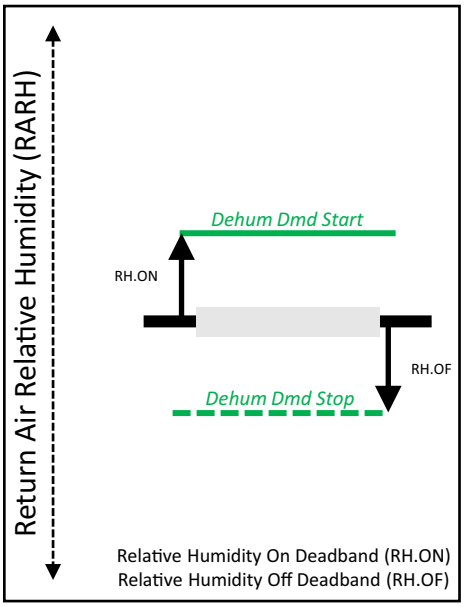


Fig. 83 — SPRH Demand Processing

Table 43 — 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 44 — 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.

DEHUMIDIFY CHECKS

Control configurations can prevent dehumidify demands under certain conditions, such as the occupancy period or when specific cool/heat demands are present. Preventing dehumidify demands with specific cool/heat demands can allow the system to prioritize temperature control over relative humidity control for sensitive applications. See Table 45 for dehumidification checks and Table 46 for sequence of operation.

COOLING COIL TEMPERATURE CONTROL POINT

When a dehumidify demand starts, the control sets the CCT control point to the dehumidify CCT set point. The CCT control point approximates the supply air dewpoint temperature. CCT control stops when dehumidification mode stops.

NOTE: All units with Humidi-MiZer system include a factory-installed CCT sensor.

DEHUMIDIFICATION MODE

When dehumidification mode starts for units with Humidi-MiZer, the cooling system operates to maintain the CCT at the CCT control point. The Humidi-MiZer system is enabled, the Humidi-MiZer reheat valve opens, and the Humidi-MiZer bypass valve modulates to maintain the SAT at the SAT control point, based on the current cool/heat demand level. See Table 46 for sequence of operations.

NOTE: Dehumidification will only occur during the unoccupied period if the unoccupied indoor fan configuration is set to demand.

HUMIDI-MIZER RECHARGE

Any time a refrigerant circuit with Humidi-MiZer starts, the control opens Humidi-MiZer reheat valve for a period of two minutes to recharge the Humidi-MiZer coil. The SAT can be above or below the SAT control point during and shortly after the recharge time.

HUMIDI-MIZER PURGE

When the system has been operating in dehumidification mode for an extended period with the Humidi-MiZer bypass valve open greater than 50%, the control will periodically enable a Humidi-MiZer purge cycle. The Humidi-MiZer bypass valve closes for a period of two minutes to purge the condenser coil of trapped oil. The SAT can be above or below the SAT control point during and shortly after the purge time.

Advanced Control Functions

EMERGENCY MODES

Emergency modes are a special set of unit operations that are triggered by safety inputs and user configurations. See Table 47 for emergency mode sequences of operation.

OTHER ADVANCED FUNCTION

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

Table 45 — 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 46 — Humidi-MiZer System 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 SAT control point (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 SAT control point (High Cool setpoint).
VAV Cool/ Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the SAT control point (VAV Cool SAT setpoint).
Low Heat/ Dehumidify				The HZMR reheat valve is enabled, the HZMR bypass valve modulates to maintain the SAT at the SAT control point (Low Heat SAT setpoint).

Table 47 — Emergency Mode Sequence of Operation

MODE	CONDITION	OPERATION
Leak Mitigation	The A2L mitigation board indicates a refrigerant leak.	Cooling and heating are stopped. ZDOR is activated. The OAD closes and the RAD opens. The EXF turns off. The IDF turns on and operates at the leak mediation speed. The ODFs may turn on and operate at max. speed. IMPORTANT: All duct mounted heaters or electronic devices must be disable and duct dampers must be opened to a minimum of 70% when dissipation mode is active. Refer to local code, UL-60335-2-40, or ASHRAE standard 15 for required ventilation rates and A2L dissipation requirements.
Smoke Shutdown	The smoke detector switch is enabled and the switch closes.	Cooling, heating, the IDF, and EXFs all turn off, the OAD closes and the RAD opens.
Smoke Purge	The smoke purge switch is enabled and the switch closes.	Heating and cooling are stopped. ZDOR is activated. The OAD opens to 100%, the EXF turns on to the EXF Smoke Purge Speed, and the IDF turns on to the IDF Smoke Purge Speed.
Smoke Evacuations	The smoke evacuation switch is enabled and the switch closes.	Heating and cooling are stopped. ZDOR is activated. The OAD opens to the OAD Smoke Evac Pos, the EXF turns on to the EXF Smoke Evac Speed, and the IDF turns on to the IDF Smoke Evac Speed.
Smoke Pressurization	The smoke pressurization switch is enabled and the switch closes.	Heating and cooling are stopped. ZDOR is activated. The EXF turns off, the OAD opens to the OAD Smoke Press Pos, and the IDF turns on to the IDF Smoke Press Speed.
Indoor Fan VFD Bypass	The unit is equipped with the VFD bypass option, and the indoor fan VFD bypass mode is user enabled.	VFD bypass mode can be user enabled to allow the IDF to operate if the VFD has failed. In bypass mode, the system uses a contactor to enable/disable the IDF motor, bypassing the VFD. The IDF will turn on and off as commanded by the control but will only operate at full speed (no speed control).

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***), Press on `Touch To Enter Password` 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*). Press 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

Press on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu. Press 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

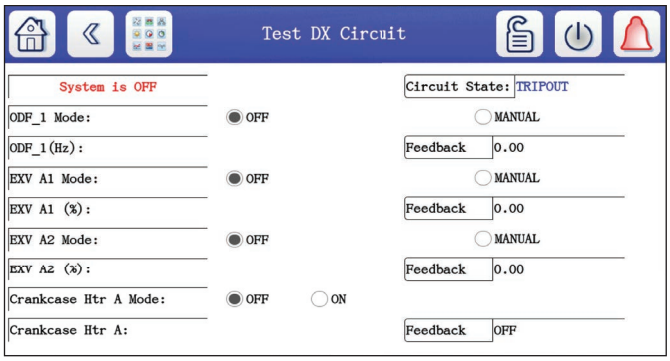
Press on the option button (next to ON) to turn on the component. Press on the option button (next to OFF) to turn the component off. See Fig. C for an example of the crankcase heater turned on in test mode.

TEST MODULATING DEVICE

Press on the option button (next to MANUAL) to enable the test. When the test is enabled, the request field will be displayed on the screen. Press on the request field to bring up the keypad. Enter the requested operating capacity and press OK. The device will begin to operate. Press on the option button (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 time out 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.



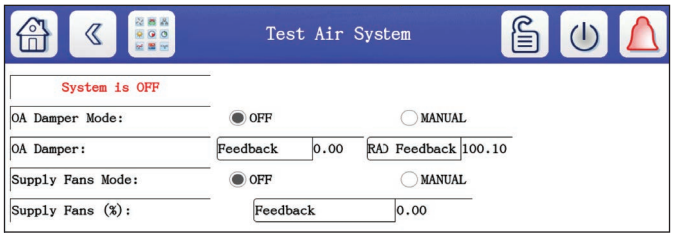


Fig. B — Test DX Circuit and Test Air System Screens (Component Test)

Fig. C — Crankcase Heater Test Example

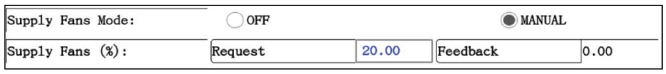


Fig. D — Indoor Fan Test Example

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*). Press 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

Press on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu and press 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), press on the option button (next to ON) to turn on the system. To test modulating systems (modulating heat), press on the option button (next to MANUAL) to enable the test. When the test is enabled, the request field will be displayed on the screen. Press on the request field to bring up the keypad. Enter the requested operating capacity and press OK. To turn a component or system off, press the option button 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 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 it would under normal operating conditions and its associated control configurations.

NOTE: Compressors can not be set to “Auto” in Service Test Mode.

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 time out 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)

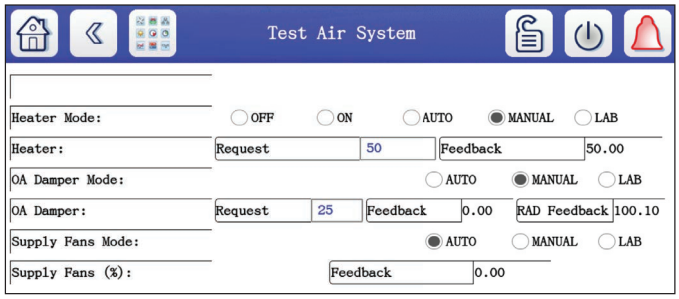


Fig. F — Test Air System Example (Service Run)

APPENDIX B — AIR BALANCE INSTRUCTIONS

Overview

The 50K 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.

IMPORTANT: Verify that the indoor fan bearings have a visible seal bead of grease prior to operating the indoor fan. Add grease as necessary.

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-F 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***), press on Touch To Enter Password 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*). Press 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 78 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.

Step 3 — Go to the Service Test Menu

Press on the Service Test Menu button on the Start/Stop screen to navigate to the Service Test Menu. Press 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

Press on the option button (next to MANUAL) to enable the test. When the test is enabled, the request field will be displayed on the screen. Press on the request field to bring up the keypad. Enter the requested operating capacity and press 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. Press on the option button (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.

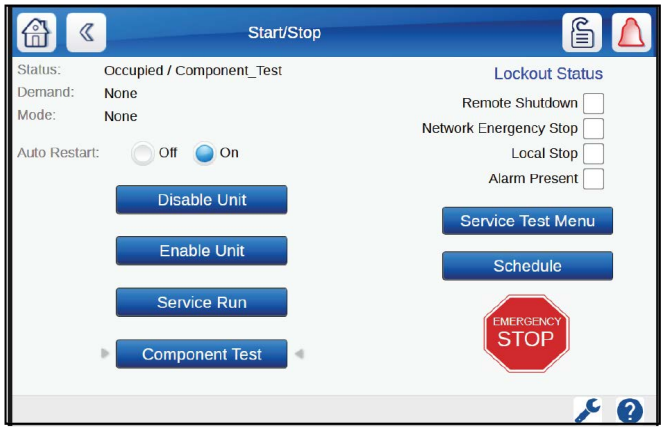


Fig. G — Start/Stop Screen in Test Mode

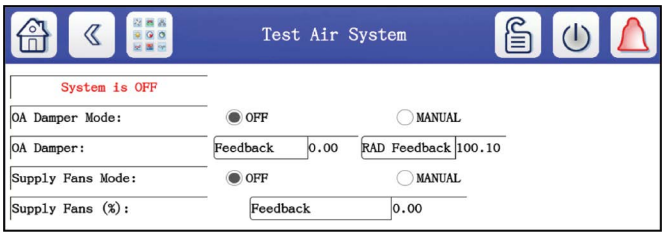


Fig. H — Test Air System Screens (Component Test)

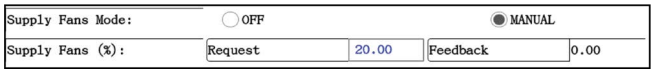


Fig. I — Indoor Fan Test Example

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, SZ-VAV, 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 SAV demand or SAV capacity IDF control configurations.
IDF Med Cool Speed	%	IDF speed with medium cool capacity. If unknown, target 66% of design cooling airflow. Used with SAV capacity IDF control configuration.
IDF High Cool Speed	%	IDF speed with a high cool demand or high cool capacity, typically the design cooling airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.
IDF Low Heat Speed	%	IDF speed with a low heat demand or low heat capacity. If unknown, target 66%-75% of design heating airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.
IDF High Heat Speed	%	IDF speed with a high heat demand or high heat capacity, typically the design heating airflow. Used with SAV demand, SAV capacity, or CV IDF control configurations.
IDF Purge Speed	%	The IDF speed during smoke purge mode.
IDF Evacuation Speed	%	The IDF speed during smoke pressurization mode.
IDF Pressurization Speed	%	The IDF speed during smoke evacuation mode.
ABB IDF Set Frequency	Hz	Sets the maximum VFD frequency. Do not adjust this configuration unless instructed to by Carrier support.

Table B — Fan Service Configuration[a]

CONFIGURATION	VALUE	DESCRIPTION
		(Main Menu→Service Menu→Fan Service Config)
IDF RFG Leak Speed	%	Sets the indoor fan speed when A2L leak dissipation mode is active. Refer to Table Table 3 on page 6 for the minimum dissipation circulation rate required when dissipation mode is active.

NOTE(S):

a. The service password is required for accessing the service menu. Contact your Carrier applied sales office or Carrier tech support for the service password.

Table C — 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 D — 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.
IAQ Min. Position	%	The minimum position that the OAD is allowed to operate at when providing ventilation with the IAQ vent control type.
IAQ Max. Position	%	The maximum position that the OAD is allowed to operate at when providing ventilation with the IAQ vent control type.
OAD Evac. Position	%	The OAD position during smoke evacuation mode.
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.
OA CFM Setpoint	cfm	The ventilation airflow target when the vent control type is set for OACFM.

Table E — 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 with high-capacity power exhaust only.
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 with high-capacity power exhaust.
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 with high-capacity power exhaust.
EXF OAD Position 1	%	The OAD position where the exhaust fan operates at stage 1 when using OAD mapping. Only used with multi-stage power exhaust.
EXF OAD Position 2	%	The OAD position where the exhaust fan operates at stage 4 when using OAD mapping. Only used with multi-stage power exhaust.
EXF OAD Position 3	%	The OAD position where the exhaust fan operates at stage 3 when using OAD mapping. Only used with multi-stage power exhaust.
EXF OAD Position 4	%	The OAD position where the exhaust fan operates at stage 4 when using OAD mapping. Only used with multi-stage power exhaust.
EXF OAD Position 5	%	The OAD position where the exhaust fan operates at stage 5 when using OAD mapping. Only used with multi-stage power exhaust on 60 ton units.
EXF OAD Position 6	%	The OAD position where the exhaust fan operates at stage 6 when using OAD mapping. Only used with multi-stage power exhaust on 60 ton units.

Table F — 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 — 50K MODEL NUMBER NOMENCLATURE

Position:	1	2	3	4	5	6	7	8	9	10	11-18
Example:	5	0	K	2	A	-	2	0	-	0	-1A0A0A0

Heat Type (1,2)[a]
50 – Packaged Cooling Only/Electric Heat

Model Series (3)
K – WeatherMaker® Applied Rooftop Unit

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

50K Heat (5)
A – No Heat
B – Low Electric Heat, Staged
D – High Electric Heat, Staged
E – Low Electric Heat, Modulating
G – High Electric Heat, Modulating

Direct Expansion System (6)
- – Standard Efficiency
A – Standard Efficiency, Low Sound
B – Standard Efficiency, Low Ambient
F – Standard Efficiency, Digital Compressor
G – Standard Efficiency, Low Sound, Digital Compressor
H – Standard Efficiency, Low Ambient, Digital Compressor
J – Standard Efficiency, Humidi-MiZer
K – Standard Efficiency, Low Sound, Humidi-MiZer
L – Standard Efficiency, Low Ambient, Humidi-MiZer
M – Standard Efficiency, Digital Compressor, Humidi-MiZer
N – Standard Efficiency, Low Sound, Digital Compressor, Humidi-MiZer
P – Standard Efficiency, Low Ambient, Digital Compressor, Humidi-MiZer
S – High Efficiency, Low Sound, Low Ambient
U – High Efficiency, Low Sound, Low Ambient, Digital Compressor
V – High Efficiency, Low Sound, Low Ambient, Humidi-MiZer
W – High Efficiency, Low Sound, Low Ambient, Digital Compressor, Humidi-MiZer

SEE NEXT PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

Indoor Fan Options (10)
0 – 5 HP ODP Motor, Variable Frequencey Drive (VFD)
1 – 10 HP ODP Motor, VFD
2 – 15 HP ODP Motor, VFD
3 – 20 HP ODP Motor, VFD
4 – 25 HP ODP Motor, VFD
5 – 30 HP ODP Motor, VFD
6 – 40 HP ODP Motor, VFD
7 – 5 HP ODP Motor, VFD, Shaft Grounding Rings (SGR)
8 – 10 HP ODP Motor, VFD, SGR
9 – 15 HP ODP Motor, VFD, SGR
A – 20 HP ODP Motor, VFD, SGR
B – 25 HP ODP Motor, VFD, SGR
C – 30 HP ODP Motor, VFD, SGR
D – 40 HP ODP Motor, VFD, SGR
E – 5 HP ODP Motor, VFD with Bypass, SGR
F – 10 HP ODP Motor, VFD with Bypass, SGR
G – 15 HP ODP Motor, VFD with Bypass, SGR
H – 20 HP ODP Motor, VFD with Bypass, SGR
J – 25 HP ODP Motor, VFD with Bypass, SGR
K – 30 HP ODP Motor, VFD with Bypass, SGR
L – 40 HP ODP Motor, VFD with Bypass, SGR
M – 5 HP TEFC Motor, VFD with Bypass, SGR
N – 10 HP TEFC Motor, VFD with Bypass, SGR
P – 15 HP TEFC Motor, VFD with Bypass, SGR
Q – 20 HP TEFC Motor, VFD with Bypass, SGR
R – 25 HP TEFC Motor, VFD with Bypass, SGR
S – 30 HP TEFC Motor, VFD with Bypass, SGR
T – 40 HP TEFC Motor, VFD with Bypass, SGR

Construction (9)
- – Single Wall
A – Double Wall
B – Agion® [b] Double Wall
C – Single Wall, Double Wall Bottom
D – Double Wall, Double Wall Bottom
E – Agion® [b] Double Wall, Double Wall Bottom

Size and Refrigerant (7,8)
20 – 20 Tons, R-454B
26 – 25 Tons, R-454B
30 – 30 Tons, R-454B
34 – 35 Tons, R-454B
40 – 40 Tons, R-454B
50 – 50 Tons, R-454B
60 – 60 Tons, R-454B

NOTE(S):
a. When the model number has an S for the design revision and the last 5 digits are all numbers, that indicates the unit is special order (ETO). Contact your Carrier applied sales office for base unit and ETO details.
b. Third-party trademarks and logos are the property of their respective owners.

LEGEND

DP — Drain Pan
Al/Cu — Aluminum Fin/Copper Tube
MCHX — Microchannel
ETO — Engineered To Order
HX — Heat Exchanger
SCCR — Short Circuit Current Rating
ODP — Open Drip Proof
TEFC — Totally Enclosed Fan Cooled

APPENDIX C — 50K MODEL NUMBER NOMENCLATURE (cont)

Position:	1-10	11	12	13	14	15	16	17	18
Example:	50K2A-20-0	-	1	A	0	A	0	A	0

SEE PREVIOUS PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

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 Drain Pan, Al/Cu Evap, MCHX Cond, Hail Guard
F – Galvanized Drain Pan, Al/Cu Evap, E-Coat MCHX Cond., Hail Guard
G – Stainless Steel Drain Pan, Al/Cu Evap, MCHX Cond., Hail Guard
H – Stainless Steel Drain Pan, Al/Cu Evap, E-Coat MCHX Cond., Hail Guard
J – Stainless Steel Drain Pan, E-Coat Al/Cu Evap, E-Coat MCHX Cond., Hail Guard

Voltage (12)

1 – 575V
5 – 208V/230V
6 – 460V

Design Series (13)

A – Initial Release
S – ETO

Controls (14)

0 – Standard Controls
1 – Humidity and Enthalpy Sensing (Humidity Sensors)
2 – RA CO_2
3 – Outdoor Air Measuring (OA CFM)
4 – Humidify Sensors, RA CO_2
5 – Humidify Sensors, OA CFM
6 – RA CO_2, OA CFM
7 – Humidify Sensors, RA CO_2, OA CFM

Outdoor Air and Relief (15)

A – Manual OA Damper
B – Ultra Low Leak Economizer
C – Ultra Low Leak Economizer, Barometric Relief
D – Ultra Low Leak Economizer, Multi-Stage Power Exhaust (MSPE)
F – Ultra Low Leak Economizer, Multi-Stage PE with Building Pressure (BP) Control
P – Ultra Low Leak Economizer, Power and Control for Accessory MSPE with BP Control
Q – Ultra Low Leak Economizer, Power and Control for Accessory High-Capacity PE, 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 + PM
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, Extended Lube Lines)
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 (RRV), COFS, FSS + ADR, RASD, Service Pack

Indoor Air Quality (18)

0 – 2" Pre-Filter Rack with 2" Throwaway Filter
1 – 2" Pre-Filter Rack with 2" M8 Filter
2 – 2" Pre-Filter Rack with 2" M8 Filter, Ultraviolet Light (UV-C) Fixture
3 – 4" Pre-Filter Rack with 4" M8 Filter
4 – 4" Pre-Filter Rack with 4" M8 Filter, UV-C
5 – 4" Pre-Filter Rack with 4" M13 Filter
6 – 4" Pre-Filter Rack with 4" M13 Filter, UV-C

NOTE(S):

a. When the model number has an S for the design revision and the last 5 digits are all numbers, that indicates the unit is special order (ETO). Contact your Carrier applied sales office for base unit and ETO details.

LEGEND

DP — Drain Pan
Al/Cu — Aluminum Fin/Copper Tube
MCHX — Microchannel
ETO — Engineered To Order
HX — Heat Exchanger
SCCR — Short Circuit Current Rating
ODP — Open Drip Proof
TEFC — Totally Enclosed Fan Cooled

APPENDIX D — CHARGING CHARTS

Table G — Refrigerant Charges (R-454B)

K Series Refrigerant Charge (lb) - Without Service Pack, Without Humidi-Mizer®							
SIZE	**20**	**26**	**30**	**34**	**40**	**50**	**60**
CIRCUIT A	19.3	23.5	23.0	24.0	19.0	23.5	26.8
CIRCUIT B	NA	NA	NA	NA	19.3	22.5	25.2

K Series Refrigerant Charge (lb) - Without Service Pack, With Humidi-Mizer®							
SIZE	**20**	**26**	**30**	**34**	**40**	**50**	**60**
CIRCUIT A	27.3	32.0	31.0	31.5	27.0	30.0	36.3
CIRCUIT B	NA	NA	NA	NA	19.3	22.5	25.2

K Series Refrigerant Charge (lb) - With Service Pack, Without Humidi-Mizer®							
SIZE	**20**	**26**	**30**	**34**	**40**	**50**	**60**
CIRCUIT A	21.0	25.2	24.7	25.7	20.7	25.2	28.5
CIRCUIT B	NA	NA	NA	NA	21.0	24.2	26.9

K Series Refrigerant Charge (lb) - With Service Pack, With Humidi-Mizer®							
SIZE	**20**	**26**	**30**	**34**	**40**	**50**	**60**
CIRCUIT A	29.0	33.7	32.7	33.2	28.7	31.7	38.0
CIRCUIT B	NA	NA	NA	NA	21.0	24.2	26.9

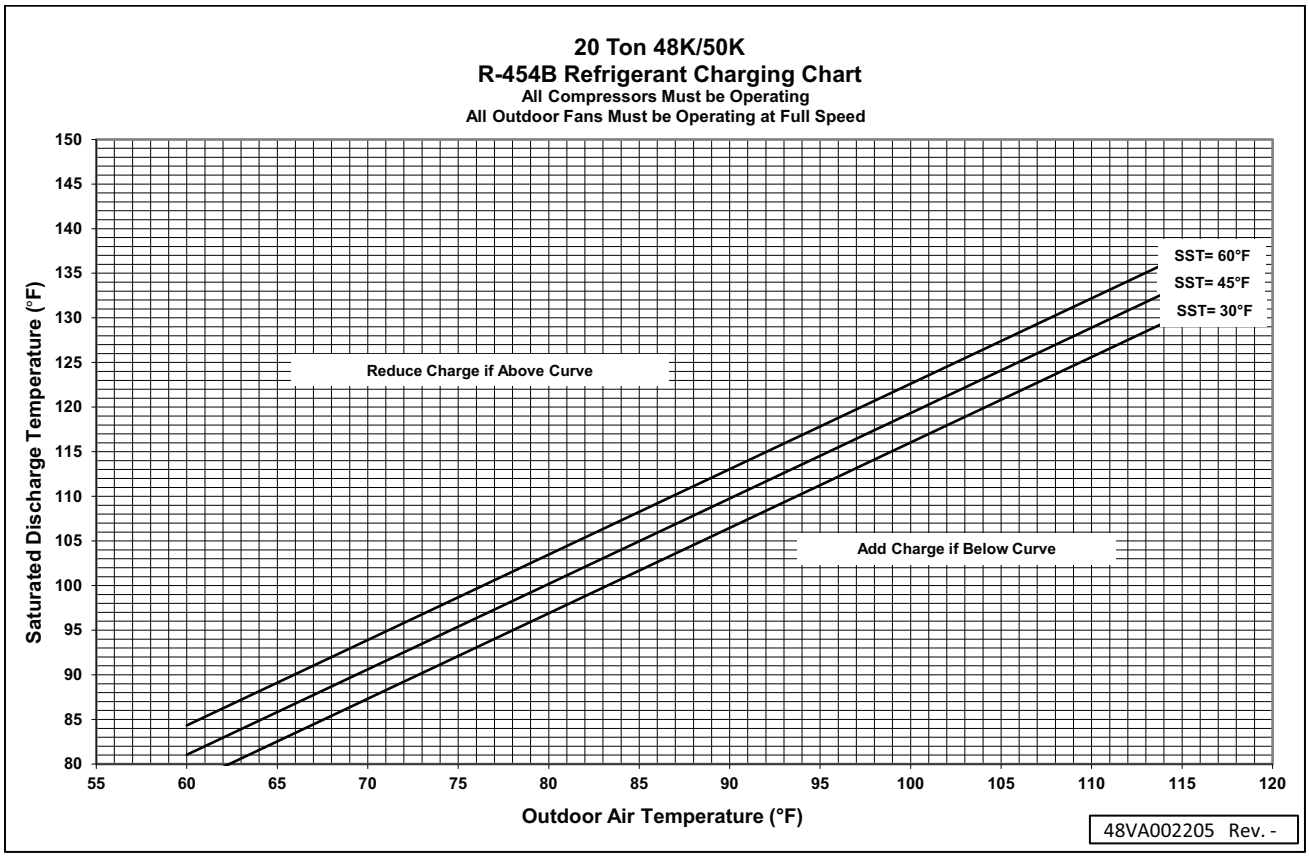


Fig. J — 50K Refrigerant Charging Charts (R-454B) 20 Ton

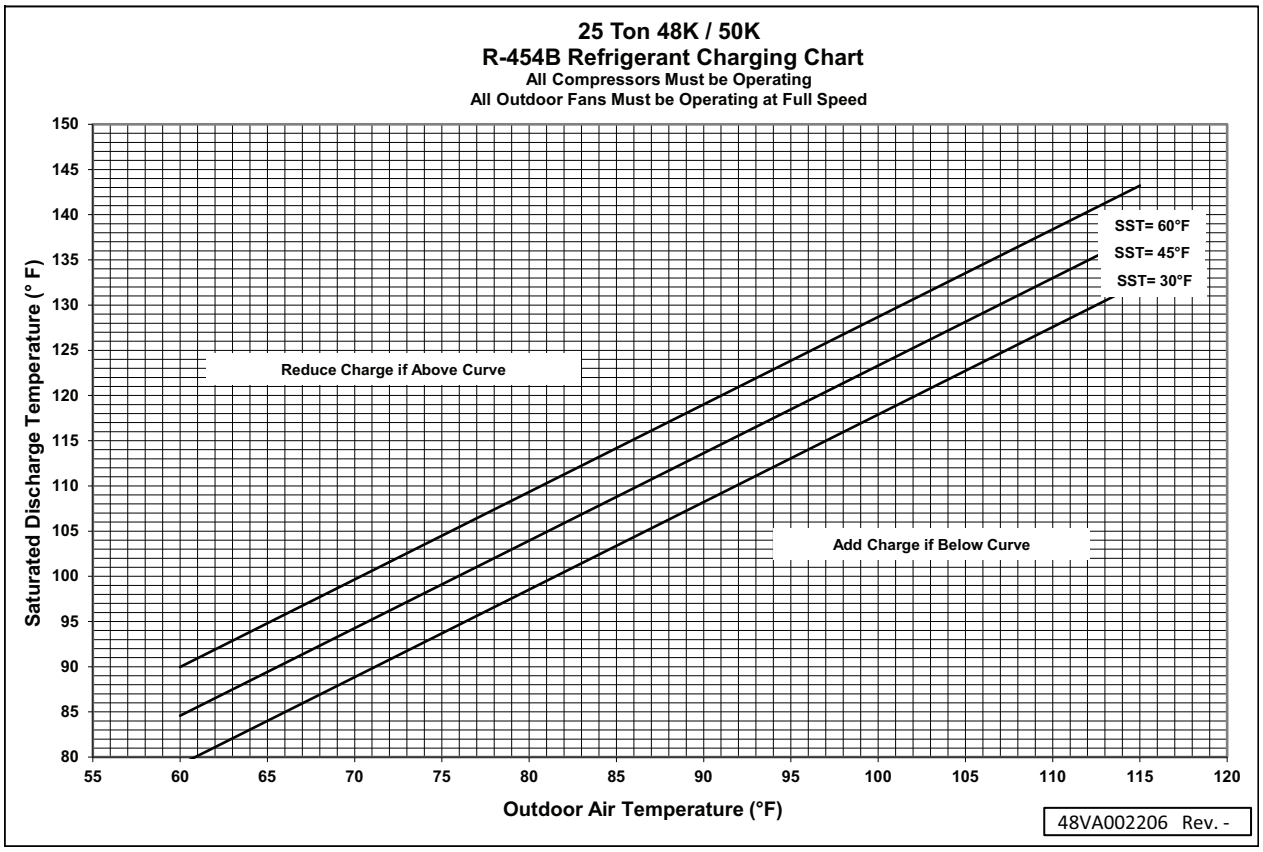


Fig. K — 50K Refrigerant Charging Charts (R-454B) 25 Ton

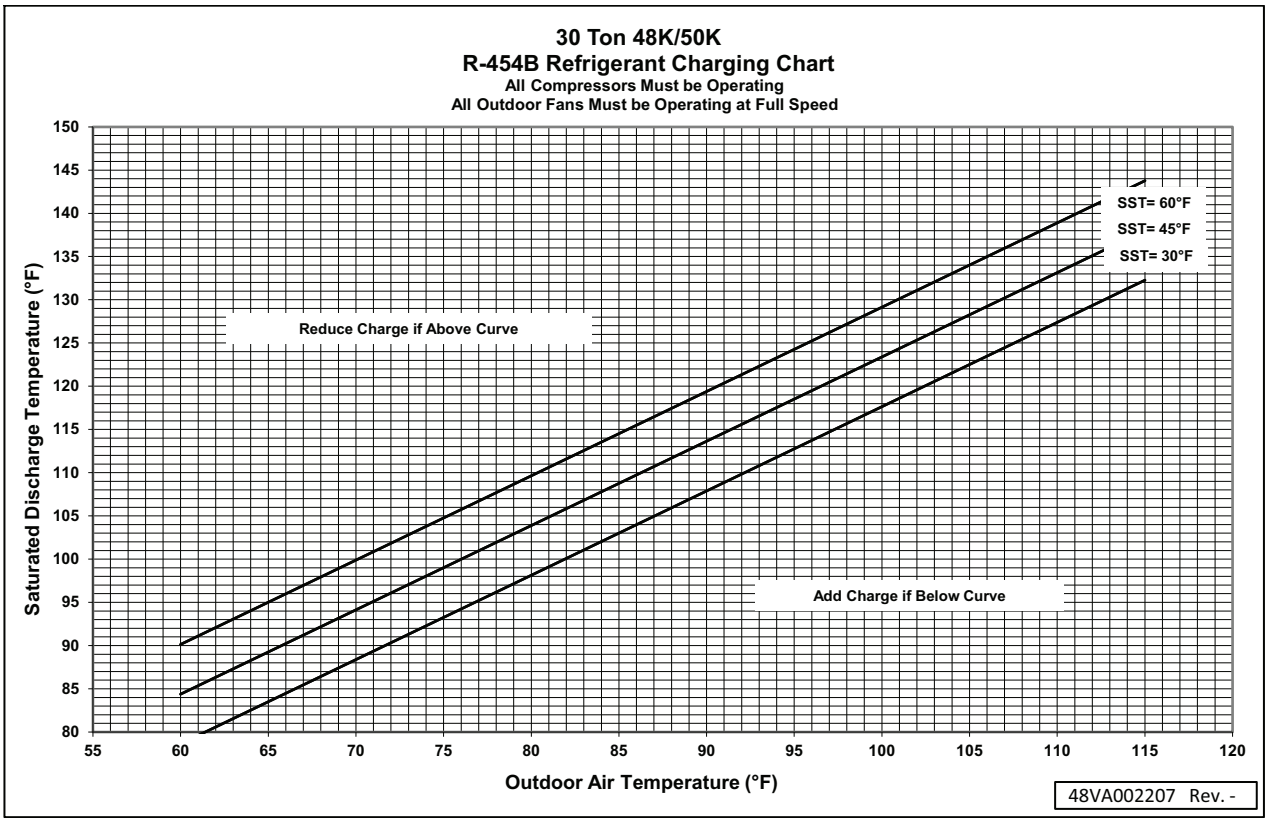


Fig. L — 50K Refrigerant Charging Charts (R-454B) 30 Ton

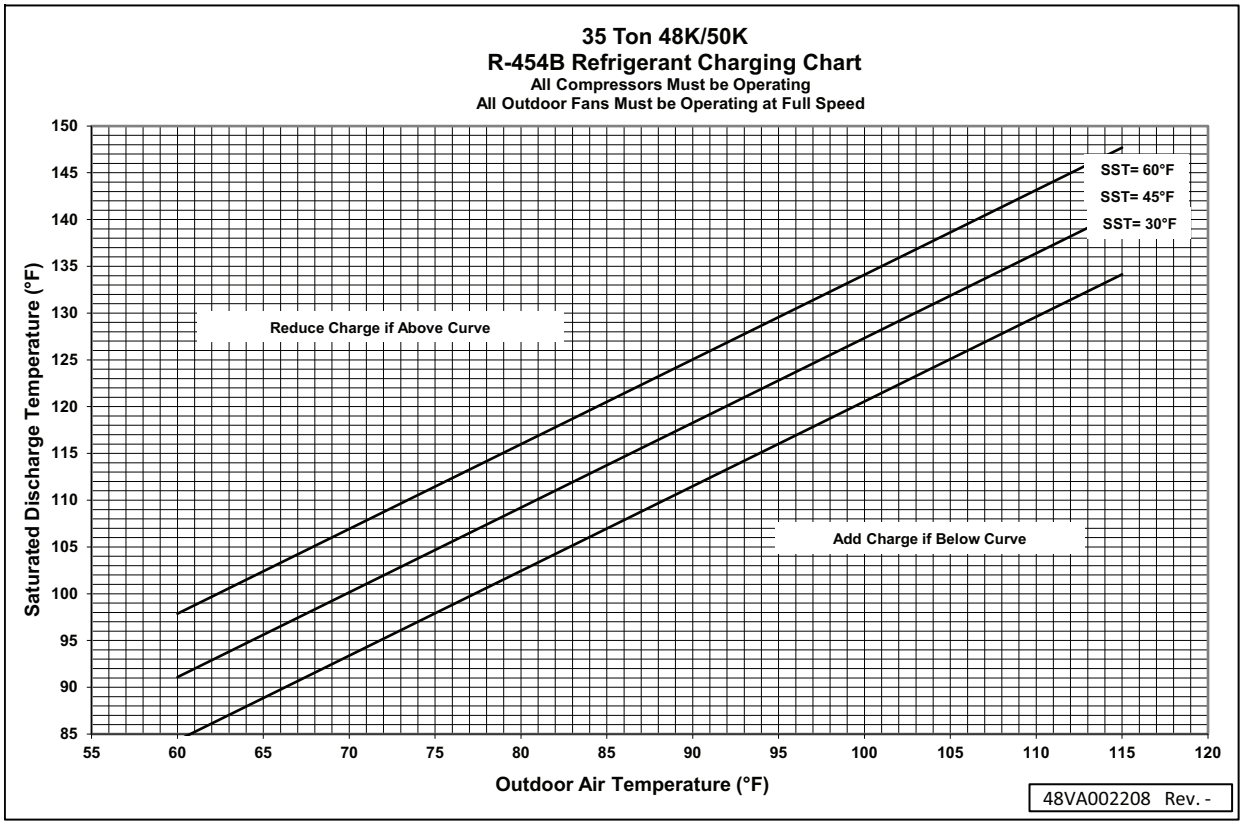


Fig. M — 50K Refrigerant Charging Charts (R-454B) 35 Ton

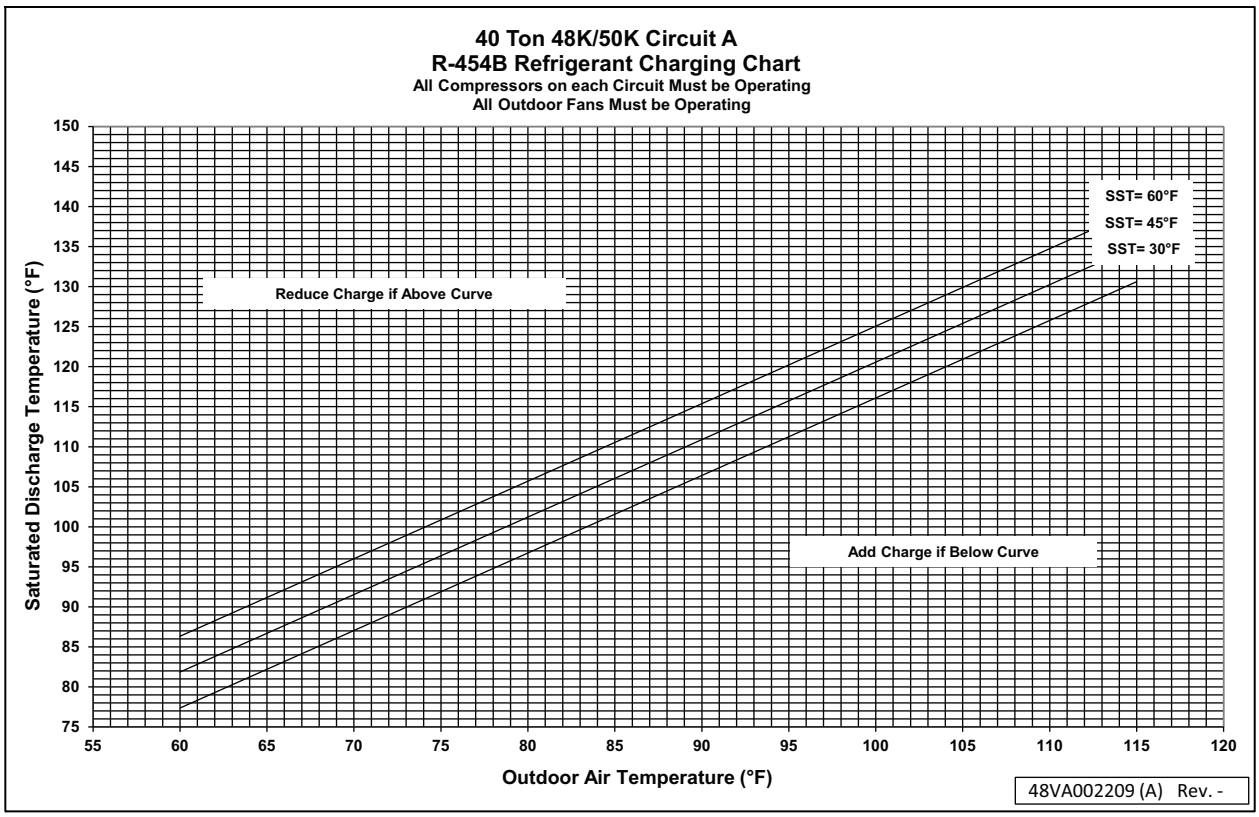


Fig. N — 50K Refrigerant Charging Charts (R-454B) 40 Ton, Circuit A

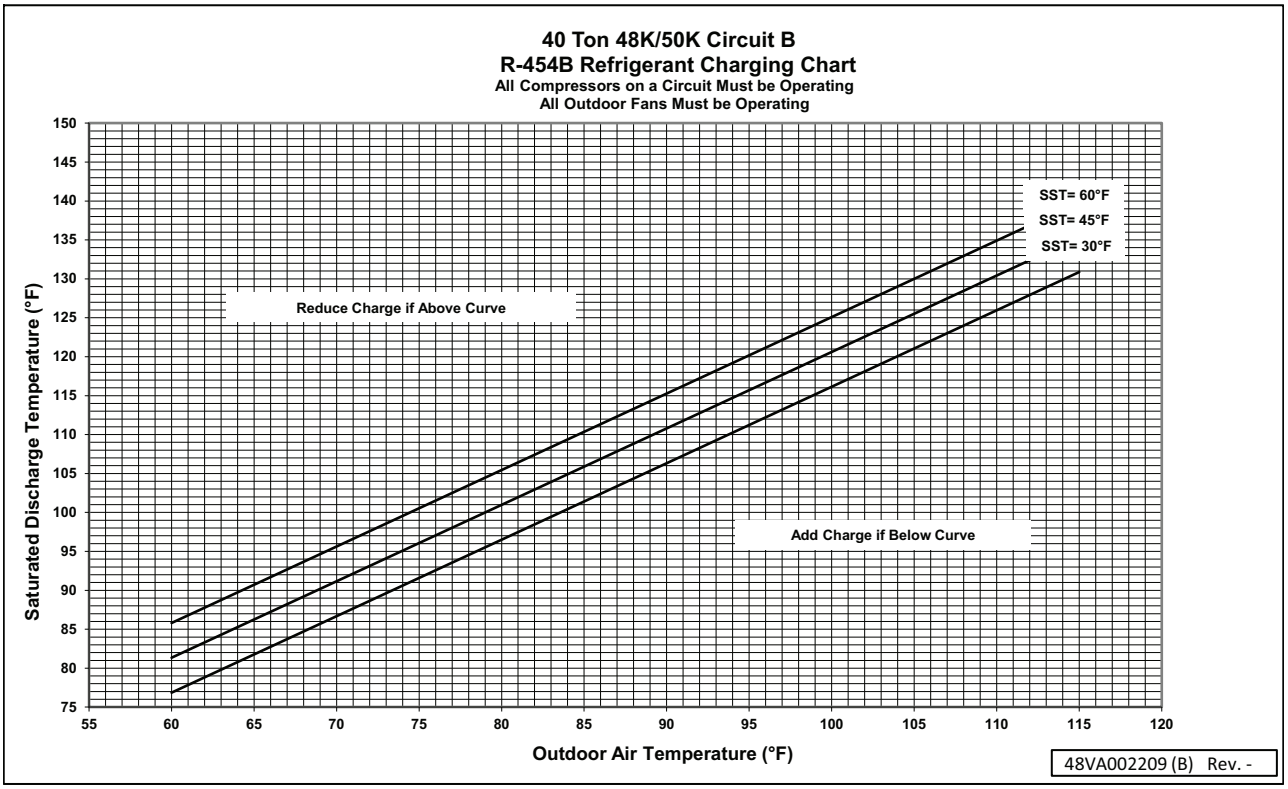


Fig. O — 50K Refrigerant Charging Charts (R-454B) 40 Ton, Circuit B

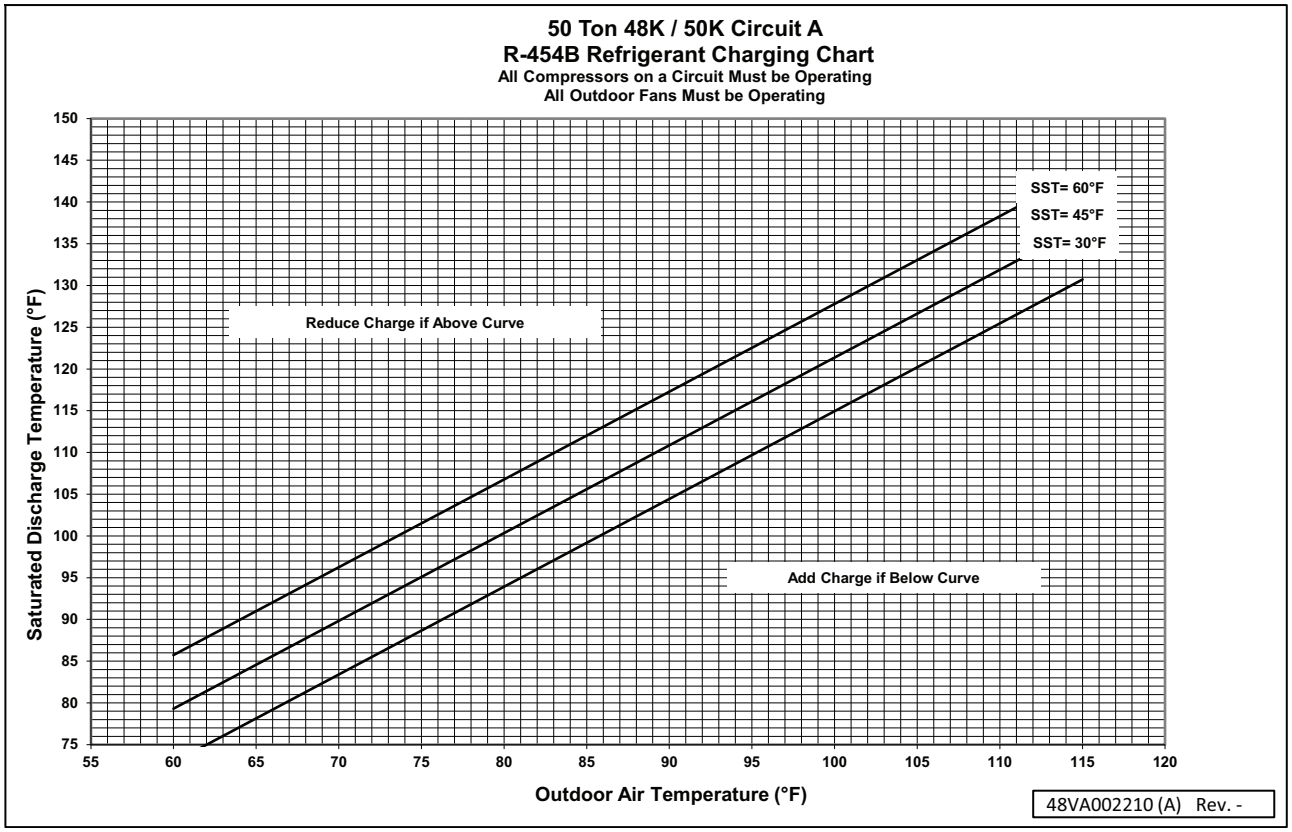


Fig. P — 50K Refrigerant Charging Charts (R-454B) 50 Ton, Circuit A

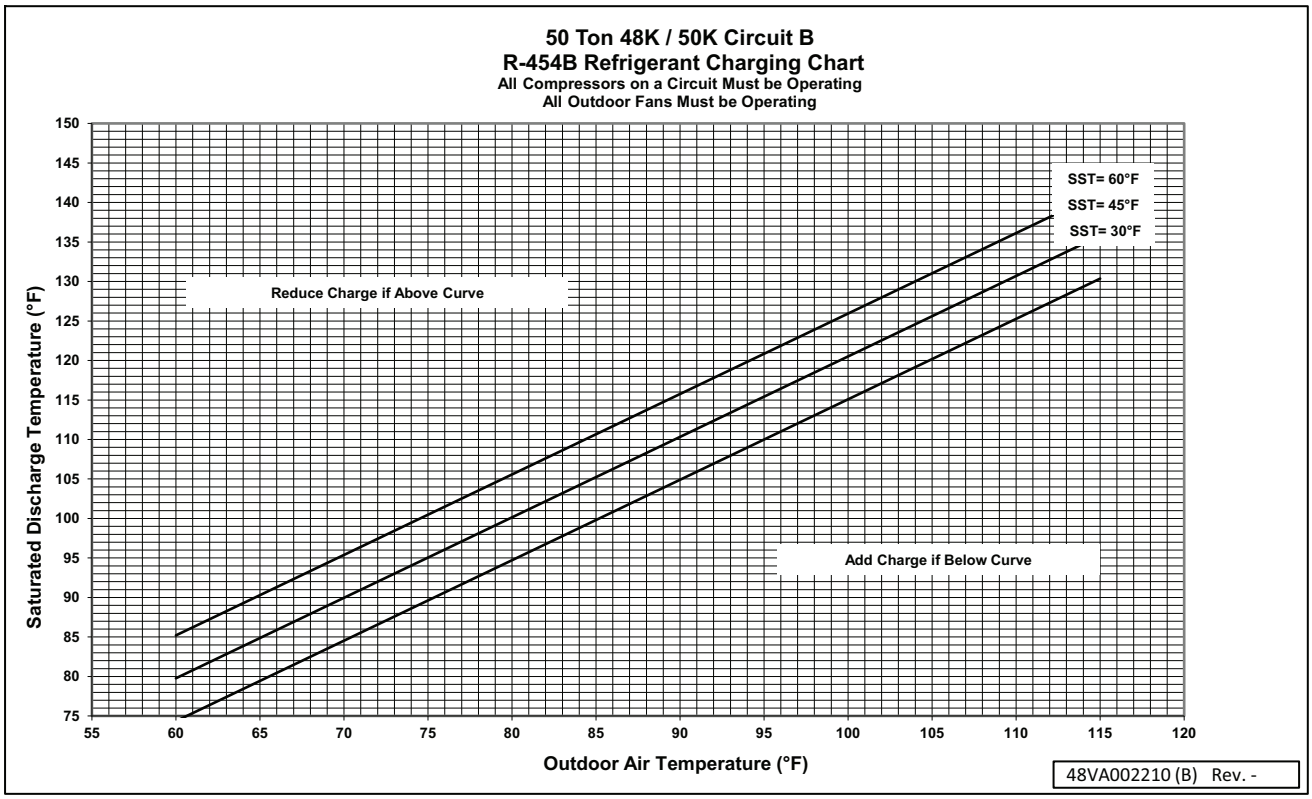


Fig. Q — 50K Refrigerant Charging Charts (R-454B) 50 Ton, Circuit B

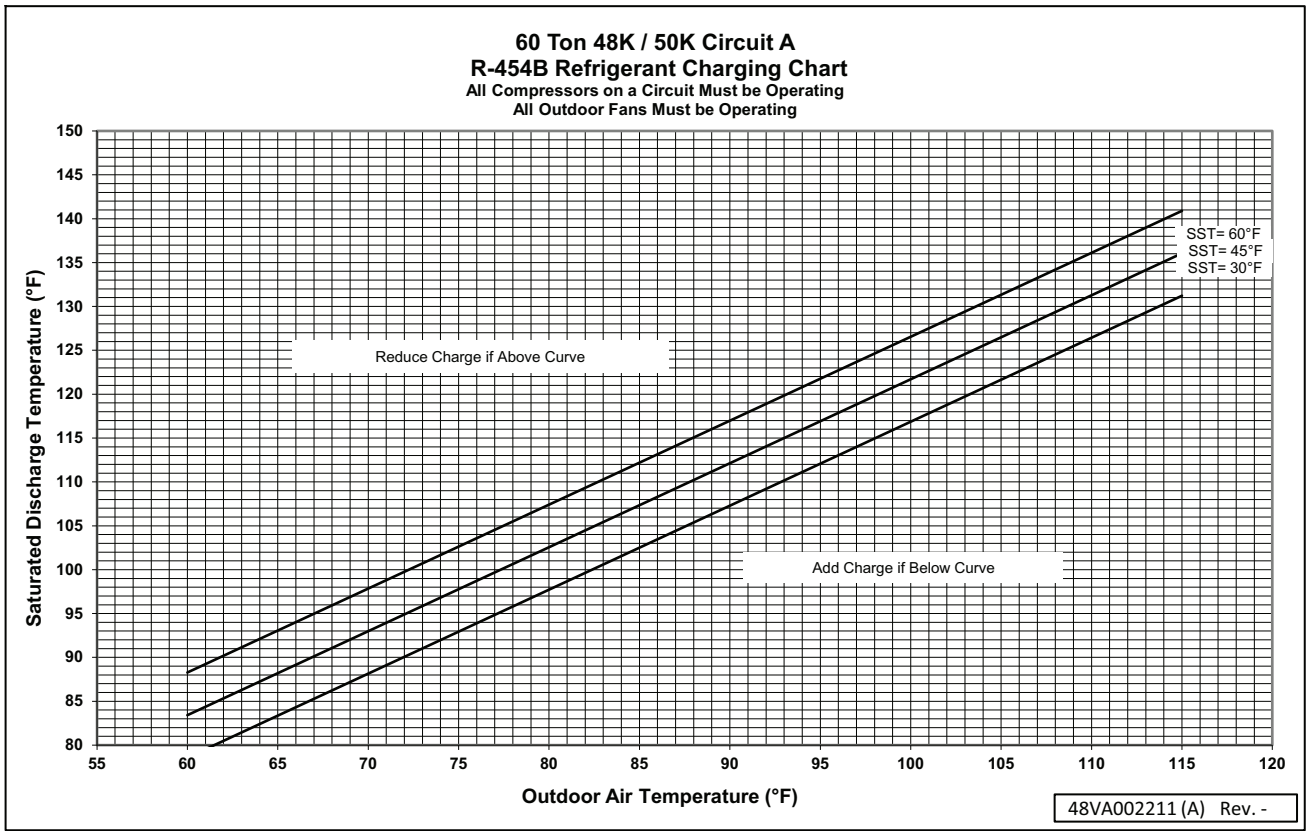


Fig. R — 50K Refrigerant Charging Charts (R-454B) 60 Ton, Circuit A

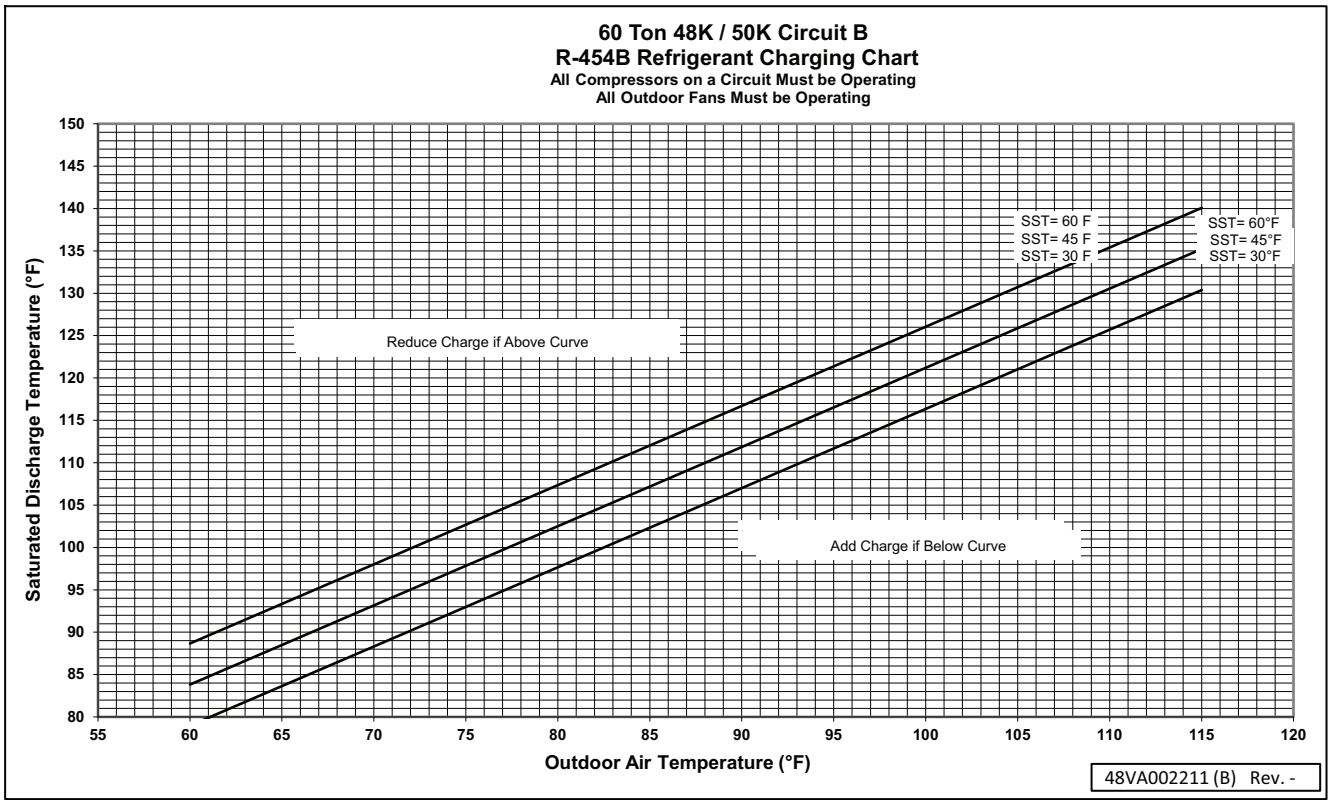
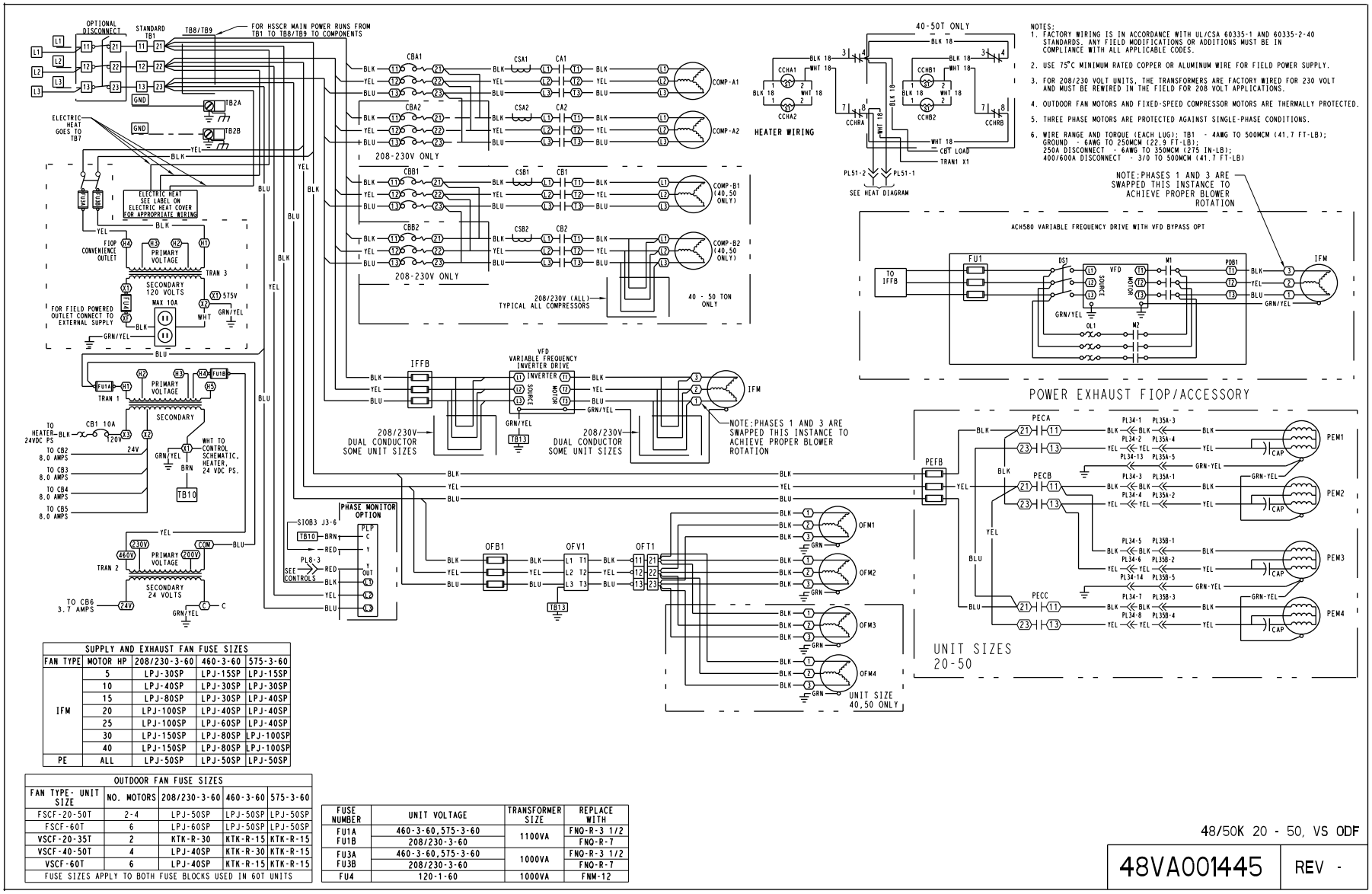


Fig. S — 50K Refrigerant Charging Charts (R-454B) 60 Ton, Circuit B

APPENDIX E — TYPICAL WIRING DIAGRAMS



SUPPLY AND EXHAUST FAN FUSE SIZES				
FAN TYPE	MOTOR HP	208/230-3-60	460-3-60	575-3-60
IFM	5	LPJ-30SP	LPJ-15SP	LPJ-15SP
	10	LPJ-40SP	LPJ-30SP	LPJ-30SP
	15	LPJ-80SP	LPJ-30SP	LPJ-40SP
	20	LPJ-100SP	LPJ-40SP	LPJ-40SP
	25	LPJ-100SP	LPJ-60SP	LPJ-40SP
	30	LPJ-150SP	LPJ-80SP	LPJ-100SP
	40	LPJ-150SP	LPJ-80SP	LPJ-100SP
PE	ALL	LPJ-50SP	LPJ-50SP	LPJ-50SP

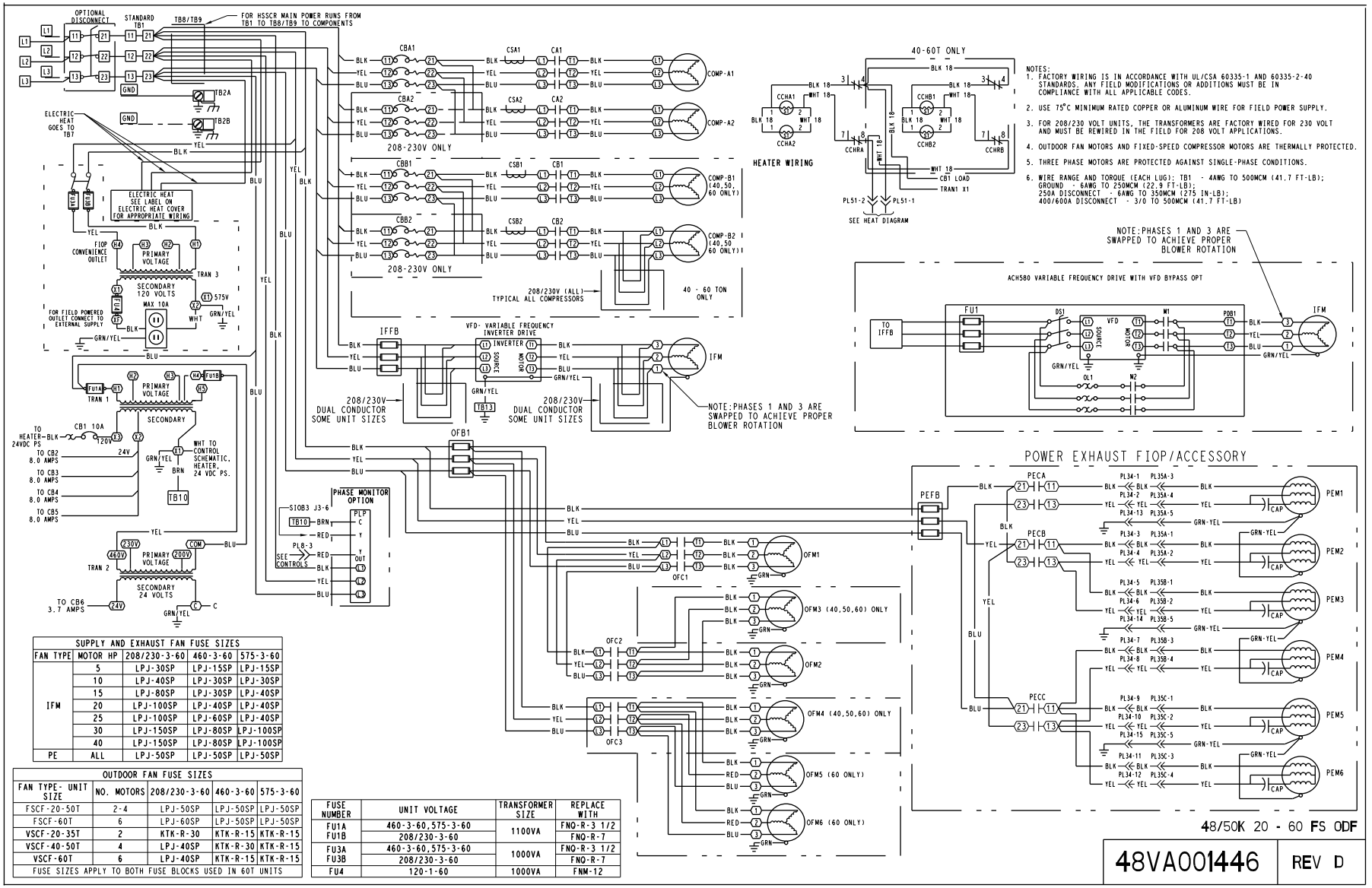
OUTDOOR FAN FUSE SIZES				
FAN TYPE- UNIT SIZE	NO. MOTORS	208/230-3-60	460-3-60	575-3-60
FSCF-20-50T	2-4	LPJ-50SP	LPJ-50SP	LPJ-50SP
FSCF-60T	6	LPJ-60SP	LPJ-50SP	LPJ-50SP
VSCF-20-35T	2	KTK-R-30	KTK-R-15	KTK-R-15
VSCF-40-50T	4	LPJ-40SP	KTK-R-30	KTK-R-15
VSCF-60T	6	LPJ-40SP	KTK-R-15	KTK-R-15
FUSE SIZES APPLY TO BOTH FUSE BLOCKS USED IN 60T UNITS				

FUSE NUMBER	UNIT VOLTAGE	TRANSFORMER SIZE	REPLACE WITH
FU1A	460-3-60,575-3-60	1100VA	FNQ-R-3 1/2
FU1B	208/230-3-60		FNQ-R-7
FU3A	460-3-60,575-3-60	1000VA	FNQ-R-3 1/2
FU3B	208/230-3-60		FNQ-R-7
FU4	120-1-60	1000VA	FNM-12

48/50K 20 - 50, VS ODF

48VA001445 | REV -

Fig. T — 48/50K Variable Speed Outdoor Fans (Low Ambient) Power Schematic (Sizes 20-50)



NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH UL/CSA 60335-1 AND 60335-2-40 STANDARDS. ANY FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. USE 75°C MINIMUM RATED COPPER OR ALUMINUM WIRE FOR FIELD POWER SUPPLY.
3. FOR 208/230 VOLT UNITS, THE TRANSFORMERS ARE FACTORY WIRED FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.
4. OUTDOOR FAN MOTORS AND FIXED-SPEED COMPRESSOR MOTORS ARE THERMALLY PROTECTED.
5. THREE PHASE MOTORS ARE PROTECTED AGAINST SINGLE-PHASE CONDITIONS.
6. WIRE RANGE AND TORQUE (EACH LUG): TB1 - 4AWG TO 500MCM (41.7 FT-LB); GROUND - 6AWG TO 250MCM (22.9 FT-LB); 250A DISCONNECT - 6AWG TO 350MCM (275 IN-LB); 400/600A DISCONNECT - 3/0 TO 500MCM (41.7 FT-LB)

SUPPLY AND EXHAUST FAN FUSE SIZES				
FAN TYPE	MOTOR HP	208/230-3-60	460-3-60	575-3-60
IFM	5	LPJ-30SP	LPJ-15SP	LPJ-15SP
	10	LPJ-40SP	LPJ-30SP	LPJ-30SP
	15	LPJ-80SP	LPJ-30SP	LPJ-40SP
	20	LPJ-100SP	LPJ-40SP	LPJ-40SP
	25	LPJ-100SP	LPJ-60SP	LPJ-40SP
	30	LPJ-150SP	LPJ-80SP	LPJ-100SP
	40	LPJ-150SP	LPJ-80SP	LPJ-100SP
PE	ALL	LPJ-50SP	LPJ-50SP	LPJ-50SP

OUTDOOR FAN FUSE SIZES				
FAN TYPE- UNIT SIZE	NO. MOTORS	208/230-3-60	460-3-60	575-3-60
FSCF-20-50T	2-4	LPJ-50SP	LPJ-50SP	LPJ-50SP
FSCF-60T	6	LPJ-60SP	LPJ-50SP	LPJ-50SP
VSCF-20-35T	2	KTK-R-30	KTK-R-15	KTK-R-15
VSCF-40-50T	4	LPJ-40SP	KTK-R-30	KTK-R-15
VSCF-60T	6	LPJ-40SP	KTK-R-15	KTK-R-15
FUSE SIZES APPLY TO BOTH FUSE BLOCKS USED IN 60T UNITS				

FUSE NUMBER	UNIT VOLTAGE	TRANSFORMER SIZE	REPLACE WITH
FU1A	460-3-60,575-3-60	1100VA	FNQ-R-3 1/2
FU1B	208/230-3-60		FNQ-R-7
FU3A	460-3-60,575-3-60	1000VA	FNQ-R-3 1/2
FU3B	208/230-3-60		FNQ-R-7
FU4	120-1-60	1000VA	FNM-12

Fig. U — 48/50K Fixed Speed Outdoor Fans Power Schematic (Sizes 20-60)

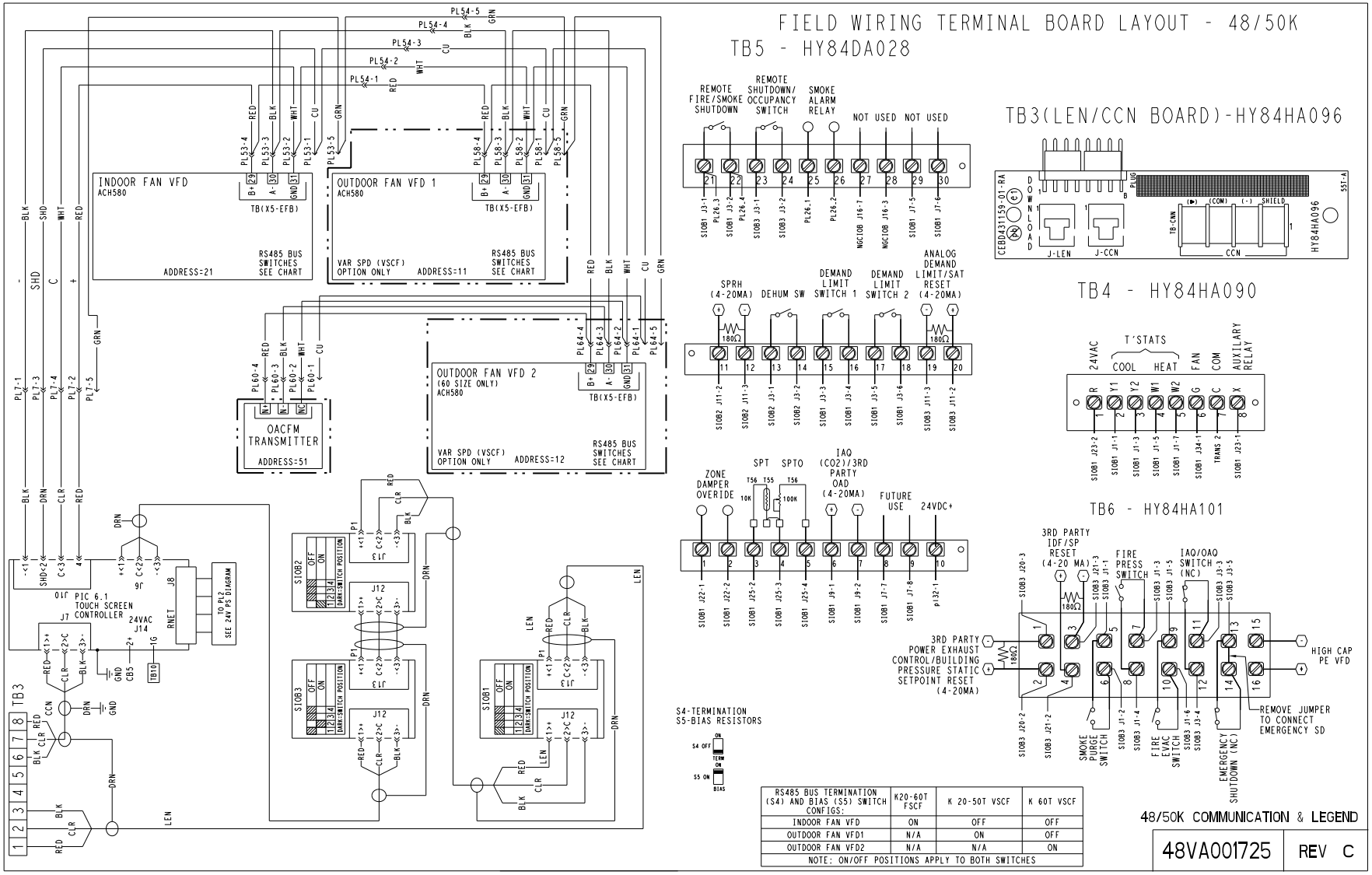


Fig. V — 48/50K PIC6 Communication Schematic

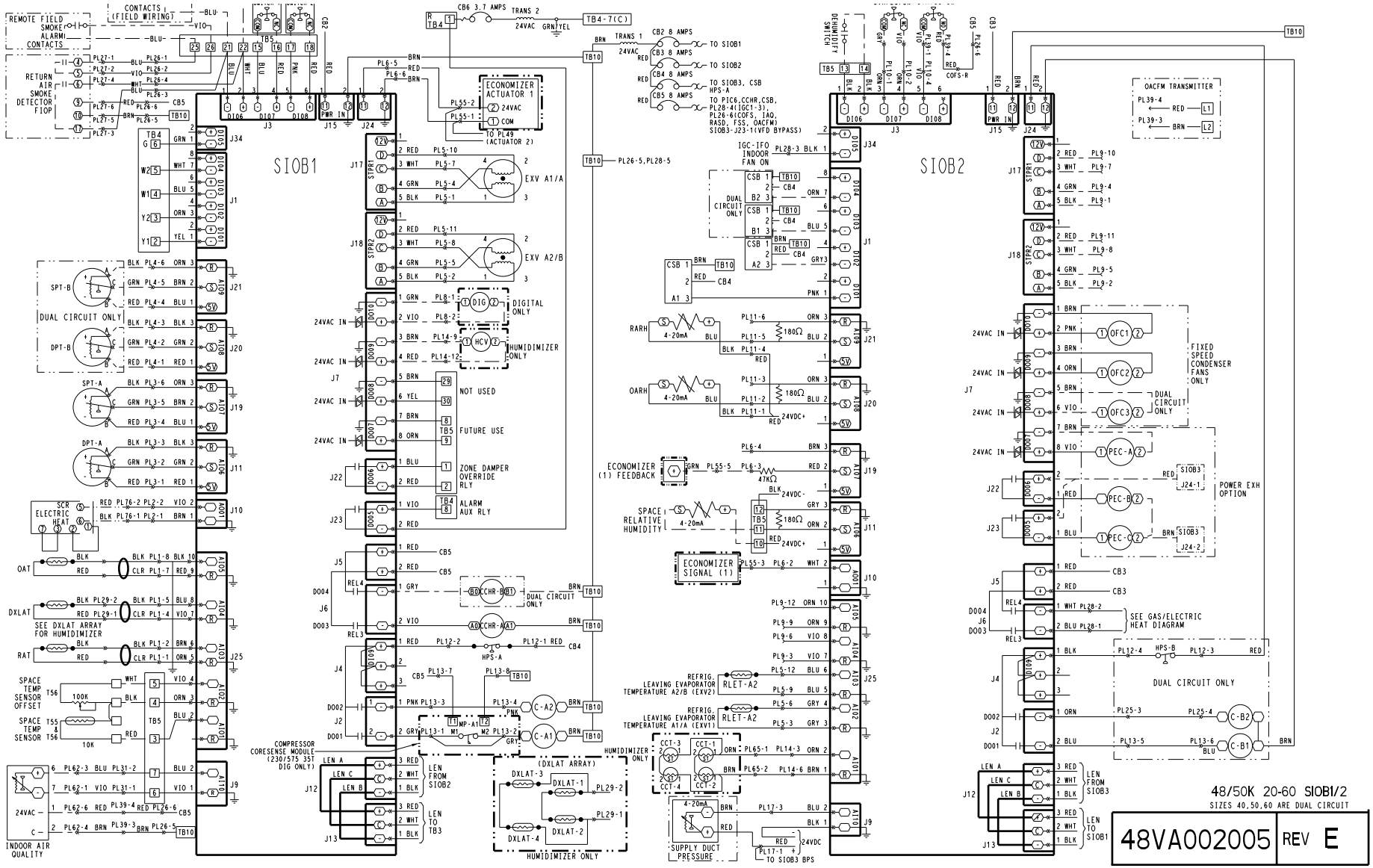


Fig. W — 48/50K SIOB 1/2 (Sizes 20-60)

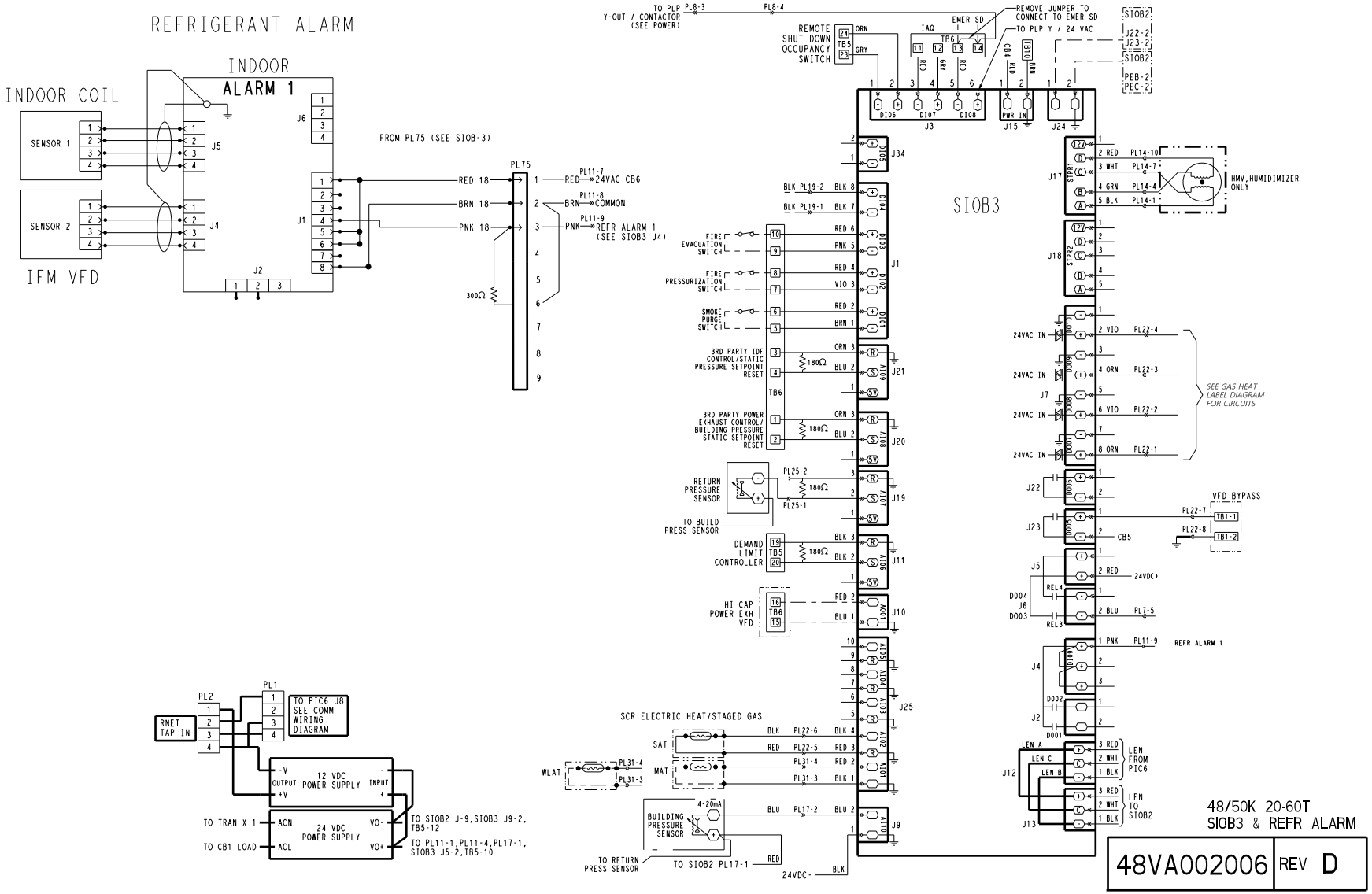


Fig. X — 48/50K SIOB3 and Refrigerant Alarm (Sizes 20-60)

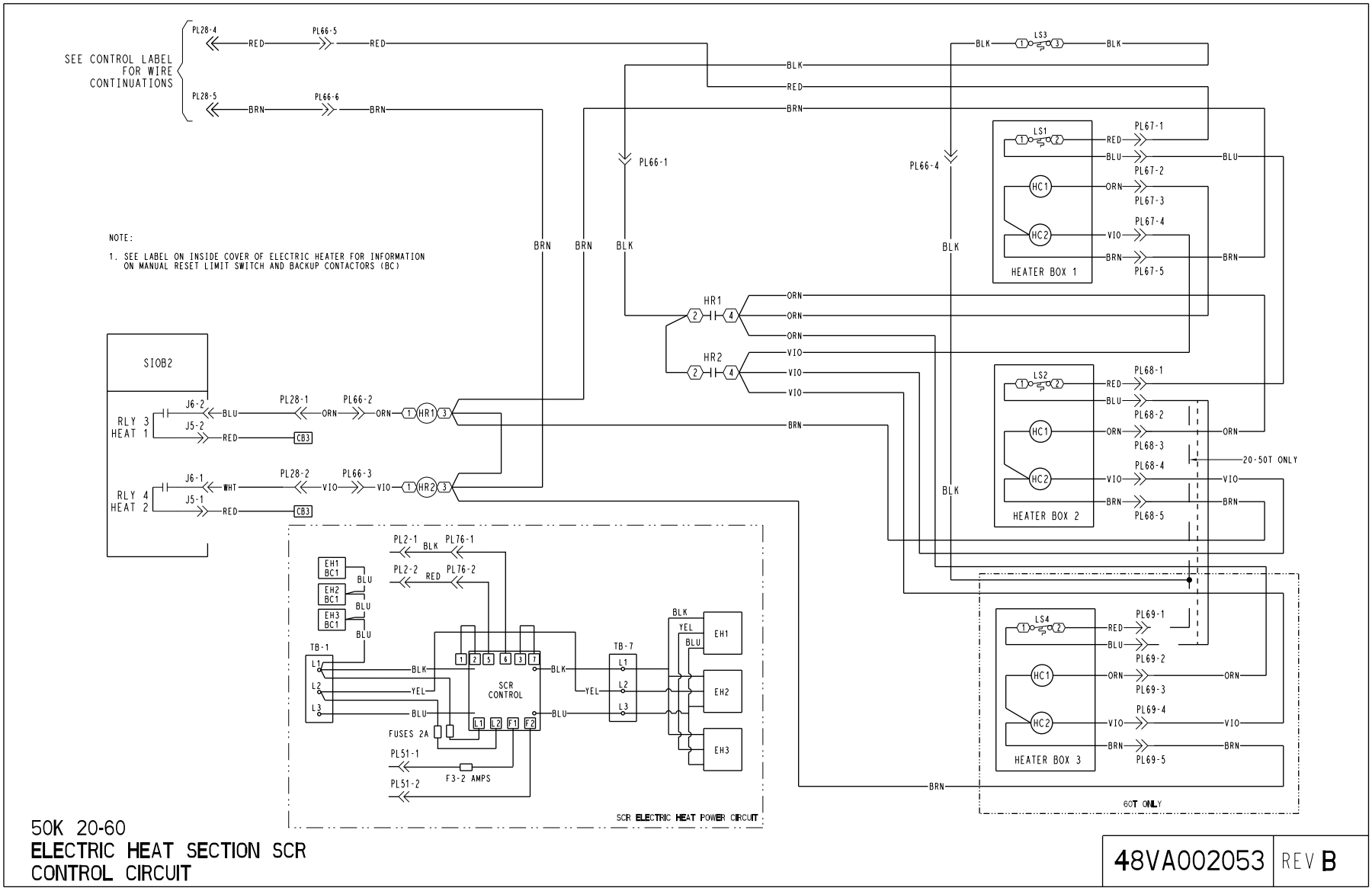


Fig. Y — 50K Electric Heat Section SCR Control Circuit (Sizes 20-60)

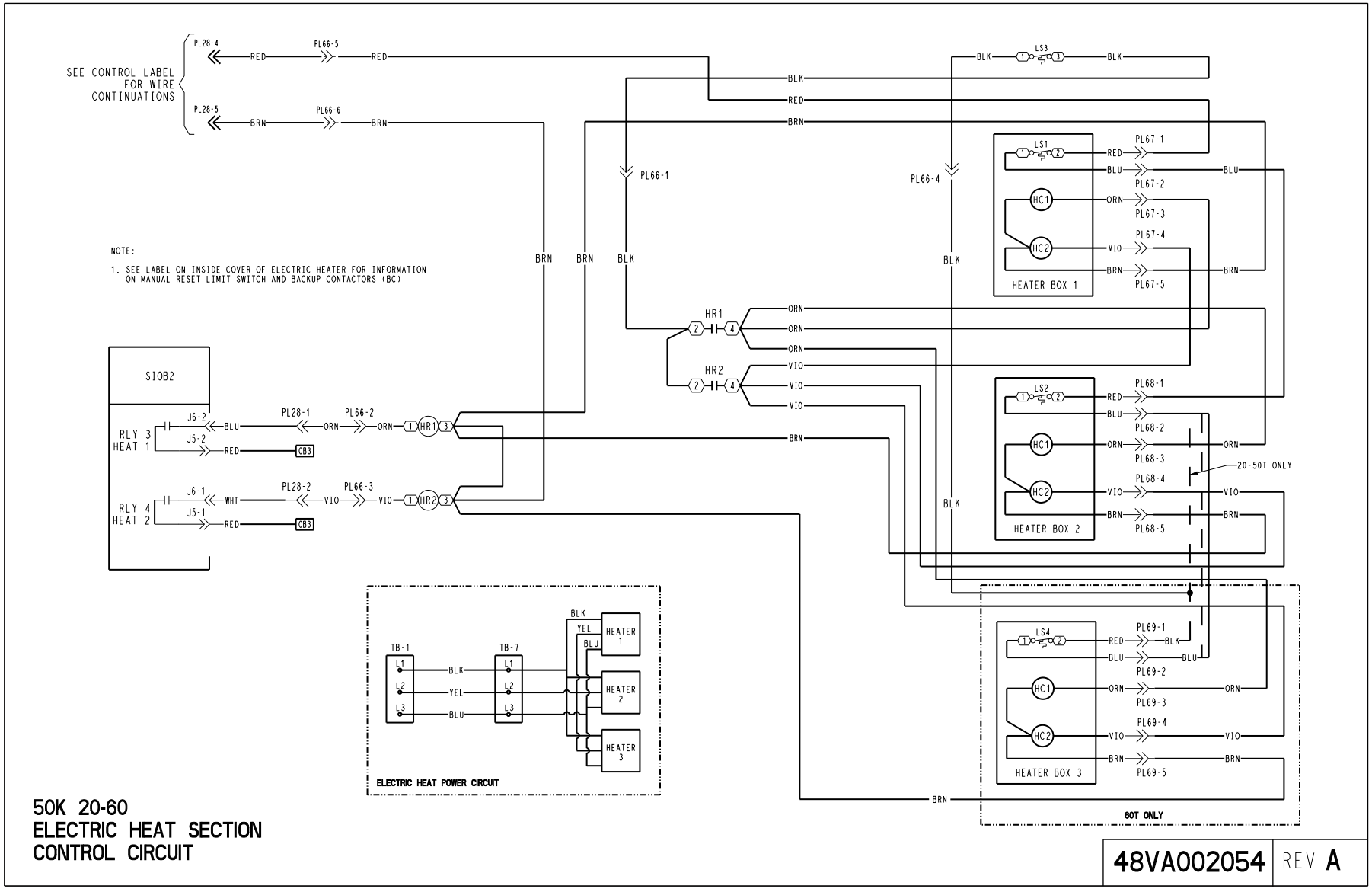


Fig. Z — 50K Electric Heat Section Control Circuit (Sizes 20-60)

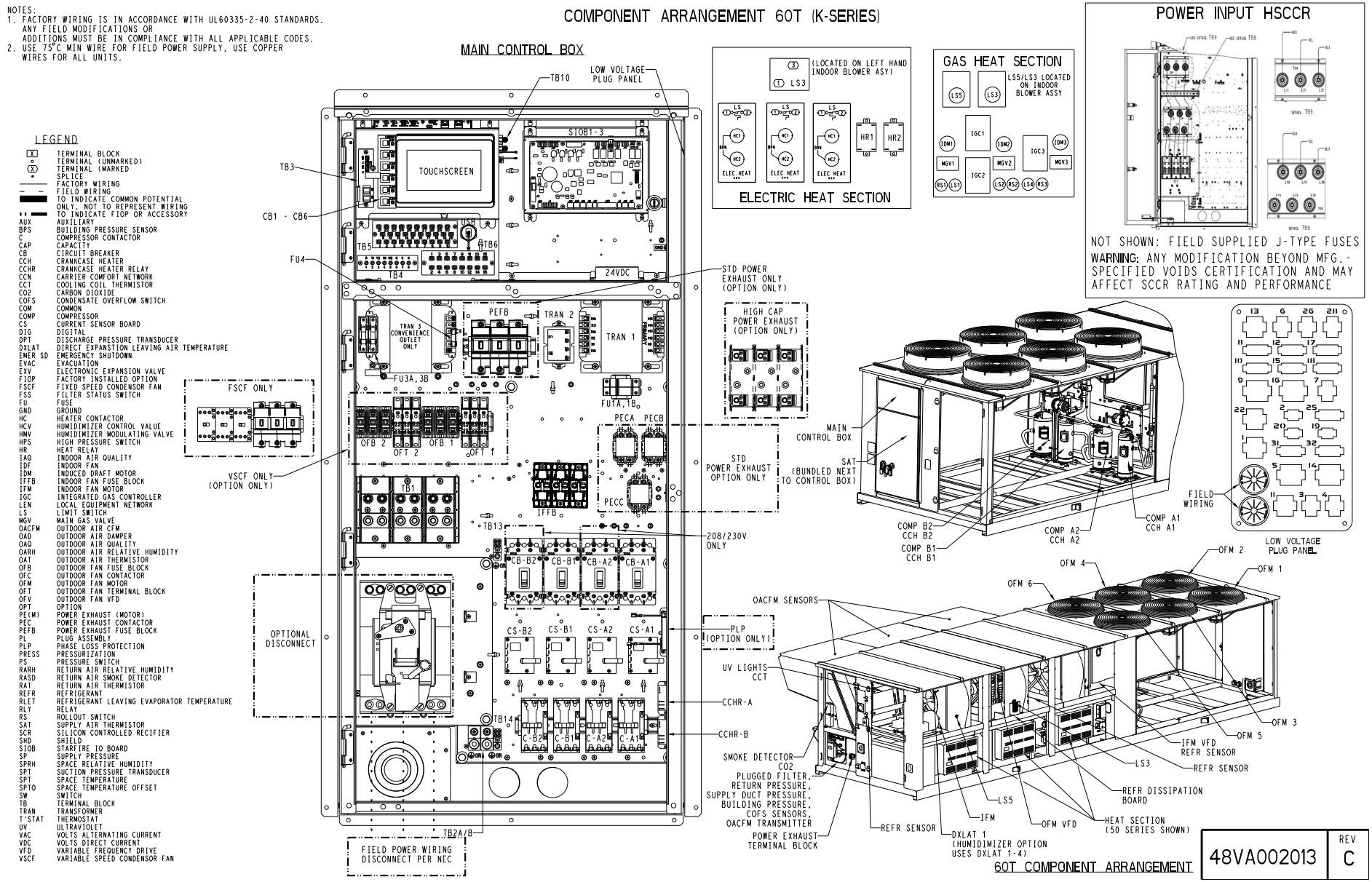


Fig. AA — 48/50K Component Arrangement (Size 60 Horizontal and Vertical)

APPENDIX F — CONTROL BOARD I/O POINTS

Table H — SIOB 1 Inputs and Outputs

TYPE	INPUT	BOARD CONNECTOR	CONTROL BOX CONNECTOR	CCN POINT	DESCRIPTION	DEVICE TYPE
Analog Input	AI1	J25-2/3	TB5-3/4	SPT	Space Temperature Sensor	10k Ohm Thermistor
Analog Input	AI2	J25-3/4	TB5-3/4/5	SPTO	Space Temperature Sensor Offset	10k Ohm Thermistor
Analog Input	AI3	J25-5/6	PL1-1/2/3	RAT	Return Air Temperature Sensor	10k Ohm Thermistor
Analog Input	AI4	J25-7/8	P1-4/5/6	DXLAT	Direct Expansion Leaving Air Temperature	10k Ohm Thermistor
Analog Input	AI5	J25-9/10	PL1-7/8/9	OAT	Outdoor Air Temperature Sensor	10k Ohm Thermistor
Analog Input	AI6	J11-1/2/3	PL3-1/2/3	DPA	Condensing Pressure Sensor A	0-5 VDC
Analog Input	AI7	J19-1/2/3	PL3-4/5/6	SPA	Suction Pressure (Sensor A)	0-5 VDC
Analog Input	AI8	J20-1/2/3	PL4-1/2/3	DPB	Condensing Pressure (Sensor B)	0-5 VDC
Analog Input	AI9	J21-1/2/3	PL4-4/5/6	SPB	Suction Pressure (Sensor B)	0-5 VDC
Analog Input	AI10	J9-1/2	TB5-6/7	IAQ	Indoor Air Quality Sensor (CO_2) / Third-Party OAD Control	4-20 mA
Discrete Input	DI1	J1-1	TB4-Y1	TSTAT_Y1	Thermostat Low Cool Demand (Y1)	24VAC, NO
Discrete Input	DI2	J1-3	TB4-Y2	TSTAT_Y2	Thermostat High Cool Demand (Y2)	24VAC, NO
Discrete Input	DI3	J1-5	TB4-W1	TSTAT_W1	Thermostat Low Heat Demand (W1)	24VAC, NO
Discrete Input	DI4	J1-7	TB4-W2	TSTAT_W2	Thermostat High Heat Demand (W2)	24VAC, NO
Discrete Input	DI5	J34-1	TB4-G	TSTAT_G	Thermostat Fan (G)	24VAC, NO
Discrete Input	DI6	J3-1/2	TB5-21/22	FIRESW	Return Air Smoke Detector FIOP / Remote Fire Shutdown	24VAC, NO
Discrete Input	DI7	J3-3/4	TB5-15/16	DLS1	Demand Limit Switch 1	24VAC, NO
Discrete Input	DI8	J3-5/6	TB5-17/18	DLS2	Demand Limit Switch 2	24VAC, NO
Discrete Input	DI9	J4-1 | CB4	PL12-1/2	HPSA	Circuit A HPS Feedback	24VAC, NC
Analog Output	AO1	J10-1/2	PL2-1/2	HEATCMD	Hydronic Modulating Valve / Modulating Electric Heat Control	0-10V
Discrete Output	DO1	J2-2	PL13-1	CPA1	Compressor A1	24VAC
Discrete Output	DO2	J2-1	PL13-3	CPA2	Compressor A2	24VAC
Discrete Output	DO3	J6-2	CCHRA-A0	CCHRA	Crankcase Heater Relay A	24VAC
Discrete Output	DO4	J6-1	CCHRB-B0	CCHRB	Crankcase Heater Relay B	24VAC
Discrete Output	DO5	J23-1/2	TB4-7/8	ALMOUT	Alarm / Auxiliary Relay	24VAC
Discrete Output	DO6	J22-1/2	TB5-1/2	DOR	Zone Damper Override Relay	24VAC
Discrete Output	DO9	J7-3/4	PL14-9/12	HMS	Humidi-MiZer 3-way Single Control Valve	24VAC
Discrete Output	DO10	J7-1/2	PL8-1/2	HGBV/ CMPRELA1	Digital Compressor	24VAC
Stepper Output	STPR1	J17-2/3/4/5	PL5-1/4/7/10	EXVA1CMD	Electronic Expansion Valve A1	Stepper Motor
Stepper Output	STPR2	J18-2/3/4/5	PL5-2/5/8/11	EXVA2CMD	Electronic Expansion Valve A2	Stepper Motor

APPENDIX F — CONTROL BOARD I/O POINTS (cont)

Table I — SIOB 2 Inputs and Outputs

TYPE	INPUT	BOARD CONNECTOR	CONTROL BOX CONNECTOR	CCN POINT	DESCRIPTION	DEVICE TYPE
Analog Input	AI1	J25-1/2	PL14-3/6	CCT	Coil Leaving Air Temperature	10k Ohm Thermistor
Analog Input	AI2	J25-3/4	PL5-3/6	DGTA1	Refrigerant Leaving Evaporator Temperature A1	5k Ohm Thermistor
Analog Input	AI3	J25-5/6	PL5-9/12	DGTA2	Refrigerant Leaving Evaporator Temperature A2	5k Ohm Thermistor
Analog Input	AI4	J25-7/8	PL9-3/6	DGTB1	Refrigerant Leaving Evaporator Temperature B1	5k Ohm Thermistor
Analog Input	AI5	J25-9/10	PL9-9/12	DGTB2	Refrigerant Leaving Evaporator Temperature B2	5k Ohm Thermistor
Analog Input	AI6	J11-2/3	TB5-11/12	SPRH	Space Relative Humidity	4-20mA, 180Ω Resistor
Analog Input	AI7	J19-2	PL6-3	DAMPPOS	Economizer OAD Feedback	2-10VDC, 47kΩ Resistor
Analog Input	AI8	J20-2/3	PL11-2/3	OARH	Outdoor Air Relative Humidity	4-20mA, 180Ω Resistor
Analog Input	AI9	J21-2/3	PL11-5/6	RARH	Return Air Relative Humidity	4-20mA, 180Ω Resistor
Analog Input	AI10	J9-1/2	PL17-3 | -24VDC	SDP	Supply Duct Pressure Sensor	4-20mA
Discrete Input	DI1	J1-1	CSBA1-3	CMPFBKA1	Compressor Feedback A1	24VAC, NO
Discrete Input	DI2	J1-3	CSBA2-3	CMPFBKA2	Compressor Feedback A2	24VAC, NO
Discrete Input	DI3	J1-5	CSBB1-3	CMPFBKB1	Compressor Feedback B1	24VAC, NO
Discrete Input	DI4	J1-7	CSBB2-3	CMPFBKB2	Compressor Feedback B2	24VAC, NO
Discrete Input	DI5	J34-1	PL28-3	IGCFANSW	IGC Indoor Fan On	24VAC, NO
Discrete Input	DI6	J3-1/2	TB5-13/14	DEHUMSW	Dehumidify Switch	24VAC, NO
Discrete Input	DI7	J3-3/4	PL10-1/2	CNDOSW	Condensate Overflow Switch	24VAC, NC
Discrete Input	DI8	J3-5	PL10-4	PFPSS	Filter Status Switch	24VAC, NO
Discrete Input	DI9	J4-1 | J24-1	PL12-3/4	HPSB	Circuit B HPS Feedback	24VAC, NC
Analog Output	AO1	J10-2	PL6-2	DAMPCMD	Economizer OAD Control	2-10VDC
Discrete Output	DO1	J2-2	PL13-5	CPB1	Compressor B1	24VAC
Discrete Output	DO2	J2-1	PL25-3	CPB2	Compressor B2	24VAC
Discrete Output	DO3	J6-2	PL28-1	STGHEAT1	Gas Heat / Electric Heat (Relay 1)	24VAC
Discrete Output	DO4	J6-1	PL28-2	STGHEAT2	Gas Heat / Electric Heat (Relay 2)	24VAC
Discrete Output	DO5	J23-1/2	PECC-1 | SIOB3 J24-1	PEC	Multi-Stage Power Exhaust-Stage C	24VAC
Discrete Output	DO6	J22-1/2	PECB-1 | SIOB3 J24-1	PEB	Multi-Stage Power Exhaust-Stage B	24VAC
Discrete Output	DO7	J7-7/8	PECA-1/2	PEA	Multi-Stage Power Exhaust-Stage A	24VAC
Discrete Output	DO8	J7-5/6	OFC3-1/2	ODF3	Fixed Speed Condenser (Fan 3)	24VAC
Discrete Output	DO9	J7-3/4	OFC2-1/2	ODF2	Fixed Speed Condenser (Fan 2)	24VAC
Discrete Output	DO10	J7-1/2	OFC1-1/2	ODF1	Fixed Speed Condenser (Fan 1)	24VAC
Stepper Output	STPR1	J17-2/3/4/5	PL9-1/4/7/10	EXVB1CMD	Electronic Expansion Valve B1	Stepper Motor
Stepper Output	STPR2	J18-2/3/4/5	PL9-2/5/8/11	EXVB2CMD	Electronic Expansion Valve B2	Stepper Motor

APPENDIX F — CONTROL BOARD I/O POINTS (cont)

Table J — SIOB 3 Inputs and Outputs

TYPE	INPUT	BOARD CONNECTOR	CONTROL BOX CONNECTOR	CCN POINT	DESCRIPTION	DEVICE TYPE
Analog Input	AI9	J21-2/3	TB6-3/4	SPSR	Third-Party IDF Control / Static Pressure Setpoint Reset	4-20mA
Analog Input	AI10	J9-1/2	PL17-1 | -24VDC	BP	Building Pressure Sensor	4-20mA
Discrete Input	DI1	J1-1/2	TB6-5/6	SMOKESW	Smoke Purge Switch	24VAC, NO
Discrete Input	DI2	J1-3/4	TB6-7/8	PRESSSW	Smoke Pressurization Switch	24VAC, NO
Discrete Input	DI3	J1-5/6	TB6-9/10	EVACSW	Smoke Evacuation Switch	24VAC, NO
Discrete Input	DI6	J3-1/2	TB5-23/24	RESW	Remote Shutdown / Occupancy Switch	24VAC, NO
Discrete Input	DI7	J3-3/4	TB6-11/12	IAQSW	Indoor Air Quality / Outdoor Air Quality Switch	24VAC, NO
Discrete Input	DI8	J3-5/6	TB6-13	PMR_STAT	Emergency Shutdown / Phase Monitor	24VAC, NC
Discrete Input	DI9	J4-1	PL11-9	RFGLEAK1	A2L Refrigerant Leak Dissipation	24VAC, NC
Analog Output	AO1	J10-1/2	TB6-15/16	EFCMD	Accessory High Capacity Power Exhaust Control	2-10VDC
Discrete Output	DO5	J23-1 | CB5	PL22-7/8	VFDB	VFD Bypass Fan On/Off control	24 VAC
Discrete Output	DO7	J7-8	PL22-1	STGHEAT3	Heat Relay 3	24 VAC
Discrete Output	DO8	J7-6	PL22-2	STGHEAT4	Heat Relay 4	24 VAC
Discrete Output	DO9	J7-4	PL22-3	STGHEAT5	Heat Relay 5	24 VAC
Discrete Output	DO10	J7-2	PL22-4	STGHEAT6	Heat Relay 6	24 VAC
Stepper Output	STPR1	J17-2/3/4/5	PL14-1/4/7/10	HMV	Humidi-MiZer Control Valve 1	Stepper Motor

Control Set Up

The 50K series unit can be used in a wide variety of applications, including single-zone and multi-zone applications with air terminal units. The quick setup section provides guidance on the control setup steps for most applications, descriptions of configurations and setpoints, and application guidance.

NOTE: Screens, setpoints, and configurations may be hidden based on unit configuration or control settings.

Refer to "SEQUENCE OF OPERATION" on page 61 for operating sequences by configuration. Refer to the 48/50K Advanced Controls, Service, Operation, and Troubleshooting guide for service control setup. Refer to the SmartVu Controls for Applied Rooftop Units with PIC 6.1 Hardware Network Integration guide for guidance on setting up network communication and communicating sensors.

Table K — Control Set-up Steps

	CONTROL 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 switch operation.
H	Configure indoor fan.
I	Optional: configure the outdoor air damper (only units with economizer).
J	Configure the cooling system.
K	Optional: configure the dehumidification system (only units with Humidi-MiZer).
L	Configure the heating system.
M	Optional: configure the exhaust fan (only units with exhaust fan).
N	Optional: configure free cooling.
O	Optional: set indoor fan setpoints (only SP indoor fan control).
P	Set cooling setpoints.
Q	Optional: set dehumidify setpoints (only units with Humidi-MiZer).
R	Set heating setpoints.
S	Optional: set exhaust fan setpoint (BP exhaust fan control only).
T	Setup occupancy source.

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, See the Controls, Start-Up, Operation, Service, and Troubleshooting guide for troubleshooting steps or contact your Carrier sales office.

STEP B — LOGIN WITH USER ACCESS LEVEL

Press on the login icon on the top right panel of the Home screen to go to the Login screen. Then, press on the user login icon. On the User Login screen, press on password entry button `Touch To Enter Password` to bring up the keyboard. Enter the user password (1111) and press done. Then, press 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)***. For locations that follow daylight savings time, set the start and stop conditions for daylight savings time. When DST Enable is set to enable, The system will automatically add the "mins to add" to the local system time when current date and time is at the configured start time (after midnight on start day of the start week, of the start month) and will subtract the "mins to sub" from the system time when the current time and date is at the configured stop time (after midnight on the stop day of the stop week of the stop month). See Fig. AB for daylight savings time screen layout. See Table L for Daylight Savings Time configurations.

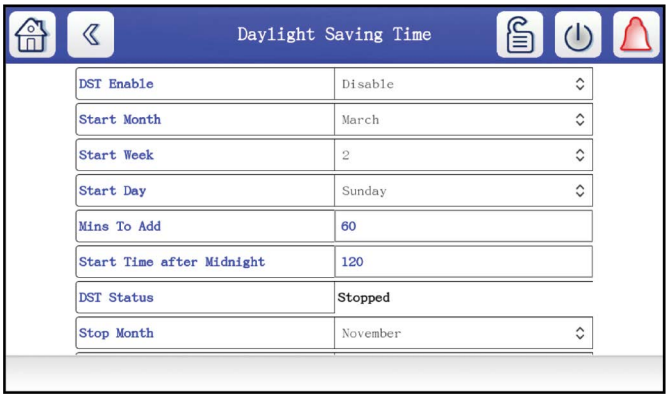


Fig. AB — Daylight Savings Time Screen

Table L — 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 start month that DST will start.
Start Day	Mon. to Sun.	The day of the start 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.
Stop Month	Jan. to Dec.	The month that DST will stop.
Stop Week	1 to 5	The week of the stop month that DST will stop.
Stop Day	Mon. to Sun.	The day of the stop week that DST will stop.
Minutes To Sub	60 min.	The amount of daylight savings time change (subtraction).
Stop Time After Midnight	0 to 720	Time after 0:00 to apply the daylight savings time change.

STEP D — SET DATE AND TIME

Navigate to the Manual Time Sync screen (***Main Menu→ Controller Config→Time Sync→Manual Time Sync***). Set the date and time. Time and date are used as part of the local schedule and for alarm and trend data. See Fig. AC for manual time sync screen layout.

Set The Date

Click on the current date in blue to bring up the calendar. Use the arrows at the top of the calendar to change the month and year. Once the month and year are correct, click on the date. Once the date is set, click on the save button on the bottom of the screen. See Fig. AD for the change date screen example. The date shown is 12/3/2025.

NOTE: The date is set in the month/day/year format but will show as day/month/year on the alarm screens.

Set the Time

Click on the current time in blue to bring up the time dial. Scroll up or down on the hours, minutes, and AM/PM to adjust the time. The current selection will show in the middle of the screen in black. See Fig. AE for the change time screen example. The time shown is 10:46 AM.

NOTE: The time is set in 12 hour time but will show as military (24 hour) time on the alarm screens.

STEP E — SET EQUIPMENT CONFIGURATION FOR INPUTS AND OUTPUTS

Navigate to the Equipment Configuration screen (***Main Menu→System Config→Equipment Config***). Set the equipment configurations for control inputs and outputs for factory-installed and field-installed devices. Click the save changes ( ) button at the bottom of the screen to save the configuration changes. See Fig. AF for equipment configuration screen layout. See Table M for the Equipment Configuration listing.

IMPORTANT: The equipment configuration ONLY enables/disables the control input/outputs and sets the input/output assignments. Additional control operation configurations are required to be set to use the assigned inputs and outputs. Setting the equipment configuration may be required to allow select control functionality to be configured. For example, to control the indoor fan based on a third-party modulation signal, the third-party IDF/SPSR reset must be assigned to "third IDF modulation" AND the IDF control configuration must be set to "third-party modulation". See Fig. AF-AU for configuration screens with control operation configurations.

NOTE: Select configuration changes may require a reboot, indicated by a reboot button showing at the bottom of the screen. Pressing the reboot button will force the controller to reboot. **NOTE: Wait until after Steps E, F, and G are complete to reboot the controller, which will reduce the number of reboots.**

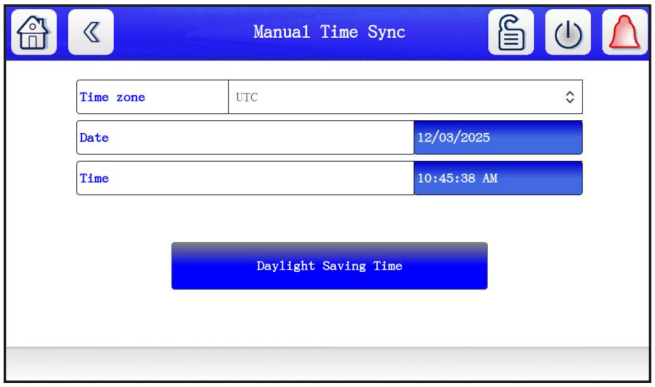


Fig. AC — Manual Time Sync Screen

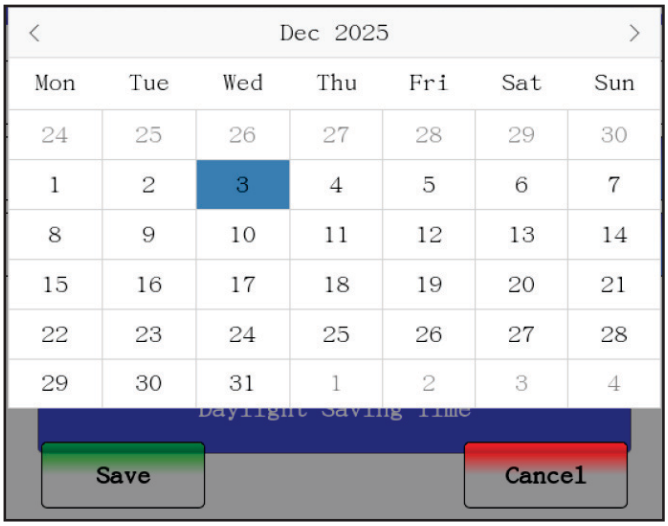


Fig. AD — Change Date Screen Example

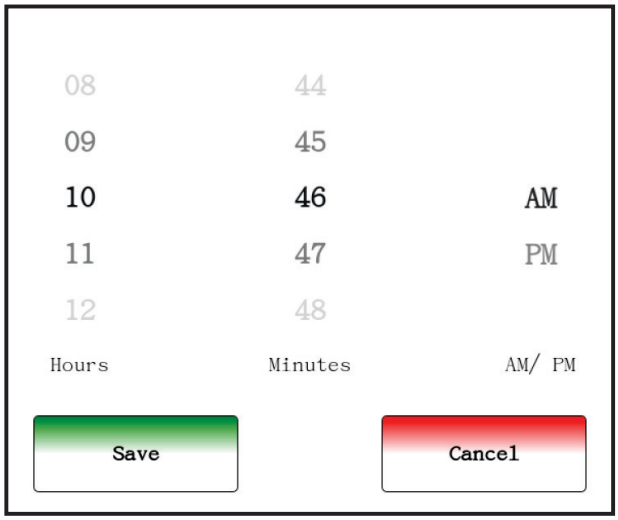


Fig. AE — Set/Change Time Screen

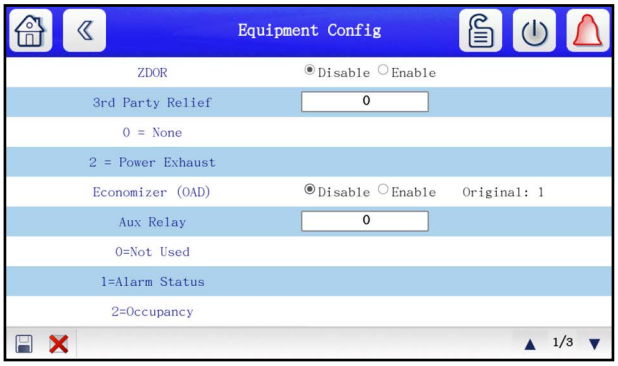


Fig. AF — Equipment Configuration Screen

Table M — Equipment Sensor/Switch Configuration by Application

ITEM	CONFIG.	DESCRIPTION	NOTES
Zone Damper Override Relay Sensor (ZDOR) (TB-5, Terminals 1 and 2)	Enable (Default)	The control provides a hardwired and network zone damper override (ZDOR) relay output to command zone dampers to their maximum position during: • A2L leak dissipation mode • Heating mode with heat capacity over 50% (user adjustable) • Dehumidification mode • Smoke control modes • Test modes • Unoccupied IDF operation	ZDOR should be enabled for all applications with zone dampers or duct heaters to open the damper and disable the heater during A2L leak dissipation mode.
	Disable	The control does not provide a ZDOR output.	
Third-Party Relief Input Config. (TB-6, Terminals 1 and 2)	0 = None (Default)	Disables the local third-party relief input.	—
	2 = Exhaust Fan	Enables the local third-party relief input and assigns it to third-party exhaust fan speed modulation for units with high-capacity power exhaust.	See EXF config. on page 119 for guidance on setting EXF control to third-party modulation.
Economizer (OAD)	Enable	Enables the economizer inputs and outputs (OAD and RAD actuator command and feedback (default for units with economizer).	See OAD config. on page 110 and Free cooling config. on page 117 for configuring ventilation and free cooling functions.
	Disable	Disables the economizer inputs and outputs (default for units with manual outdoor air damper).	—
Auxiliary Relay (TB-4, Terminal 8)	0 = Not Used (Default)	Disables the auxiliary relay.	—
	1 = Alarm Status	Enables the auxiliary relay to indicate alarm status. The relay closes when the unit is in alarm.	—
	2 = Occupancy	Enables the auxiliary relay to indicate occupancy status. The relay closes when the unit is occupied.	—
IAQ/OAD Input Configuration (TB-5, Terminals 6 and 7)	0 = Not Used	Disables the local indoor air quality (IAQ)/outdoor air damper (OAD) input (default for units without the return air CO_2 sensor option).	—
	1 = IAQ Sensor	Enables the local IAQ/OAD input and assigns it to IAQ sensor (default for units with the return air CO_2 sensor option).	See OAD config. on page 110 for guidance on setting ventilation and free cooling configurations.
	2 = Third-Party OAD Modulate	Enables the local IAQ/OAD input and assigns it to third-party economizer position modulation.	
	3 = IAQ OAD Pos Reset	Enables the local IAQ/OAD input and assigns it to third-party ventilation position reset.	
	4 = OACFM Reset	Enables the local IAQ/OAD input and assigns it to third-party ventilation airflow reset.	
Third-Party EAD /BP Input Configuration (In Harness)	0 = None	Disables the local exhaust air damper (EAD)/building pressure (BP) sensor input (default for units without a power exhaust with building pressure (BP) control).	—
	2 = BP	Enables the local EAD/BP input and assigns it to BP sensor (default for units with a power exhaust with the BP control option).	See EXF config. on page 117 for guidance on setting EXF control to BP.
Third-Party IDF / SPSR Input Configuration (TB-6, Terminals 3 and 4)	0 = None (Default)	Disables the local third-party indoor fan (IDF)/supply pressure reset (SPR) input.	—
	1 = Third-Party IDF	Enables the local third-party IDF/SPR input and assigns it to third-party IDF speed modulation.	See IDF config. on page 105 for guidance on setting the IDF control to third-party modulation.
	2 = Static Pressure Reset	Enables the local third-party IDF/SPR input and assigns it to third-party SP reset.	See IDF config. on page 105 for guidance on setting the SP reset source to third-party.
Equipment And System Touch	Enable (Default)	The control allows for connectivity with an Equipment or System Touch device.	Refer to the SmartVu for Applied RTU Network Integration Guide for setup instructions.
	Disable	The control does not allow for connectivity with an Equipment or System Touch device.	

STEP F — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED SENSORS

See Fig. AG for sensor configuration screen layout. When finished, press the save changes button Save at the bottom of the screen. Set the sensor configurations to enable inputs for factory-installed or field-installed sensors and devices. Click the save changes ( ) button at the bottom of the screen to save the configuration changes. See Fig. AG for Sensor Configuration screen layout. See Table N for the Sensor Configuration listing by application.

IMPORTANT: The sensor configurations ONLY enables/disables the control inputs for the associated sensors/devices. Additional control operation configurations are required to be set to use the enabled sensors. Setting the sensor configuration may be required to allow select control functionality to be configured.

For example, to control the indoor fan based on supply pressure, SP sensor input must be enabled AND the IDF control configuration must be set to SP. See Fig. AG-AI configuration screens for control operation configurations.

NOTE: Select configuration changes may require a reboot, indicated by a reboot button showing at the bottom of the screen. Pressing the reboot button will force the controller to reboot. Wait until after Steps E, F, and G are complete to reboot the controller, which will reduce the number of reboots.

STEP G — CONFIGURE EQUIPMENT FOR FIELD INSTALLED SWITCHES

Navigate to the Equipment Configuration screen (***Main Menu → System Config → Switch Config).*** Set the switch configurations to enable inputs for factory-installed or field-installed devices. Click the save changes Save button at the bottom of the screen to save the configuration changes. See Fig. AH for Switch Configuration screen layout. See Table O for the Sensor Configuration listing.

IMPORTANT: The switch configurations ONLY enables/disables the control inputs for the associated devices. Additional control operation configurations are required to be set to use the assigned inputs and outputs. Setting the sensor configuration may be required to allow select control functionality to be configured.

NOTE: Select configuration changes may require a reboot, indicated by a reboot button showing at the bottom of the screen. Pressing the reboot button will force the controller to reboot. **Wait until after Steps E, F, and G are complete to reboot the controller, which will reduce the number of reboots.**

STEP H — CONFIGURE INDOOR FAN

Navigate to the Indoor Fan configuration screen (***Main Menu →System Config → Indoor Fan Config***). See Fig. AI for indoor fan configuration screen layout. When finished, press the save changes button Save at the bottom of the screen. See Table P for indoor fan control configurations by application.

Configure the indoor fan control configuration and speed configurations based on application requirements. See Fig. AI for indoor fan configuration screen layout. See Table P for indoor fan control configurations. When finished, press the save changes button Save at the bottom of the screen.

IMPORTANT: Each K series unit ships with a standard drive package. The indoor fans must be air balanced to ensure the indoor fan is operating at the correct rpm to achieve the application design airflow.

NOTE: The 50K series unit uses belt drive fans with a standard drive package based on the unit size and fan motor size. Refer to the physical data tables (starting on page 19) for the fan rpm at 100% fan speed (60 Hz). Refer to the unit submittal for the required fan speed based on design conditions.

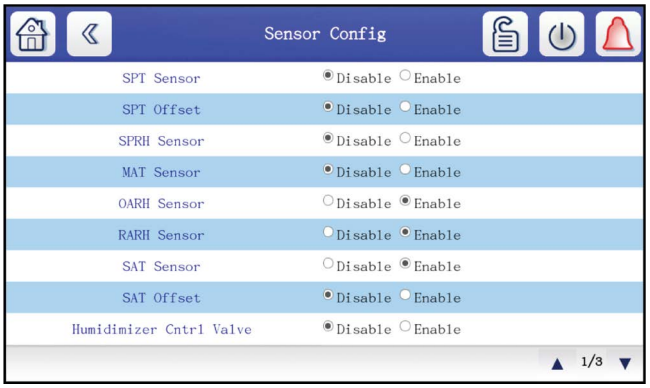


Fig. AG — Sensor Configuration Screen Layout

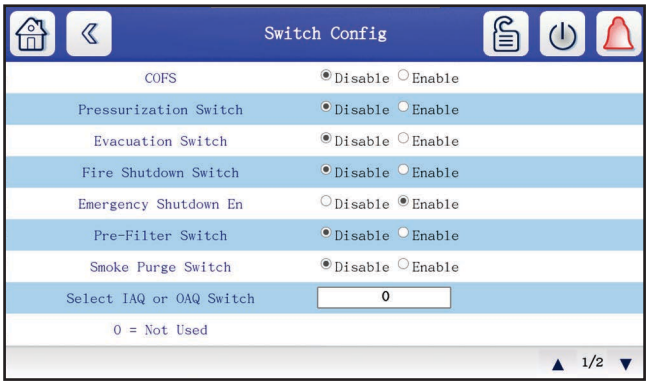


Fig. AH — Switch Configuration Screen Layout

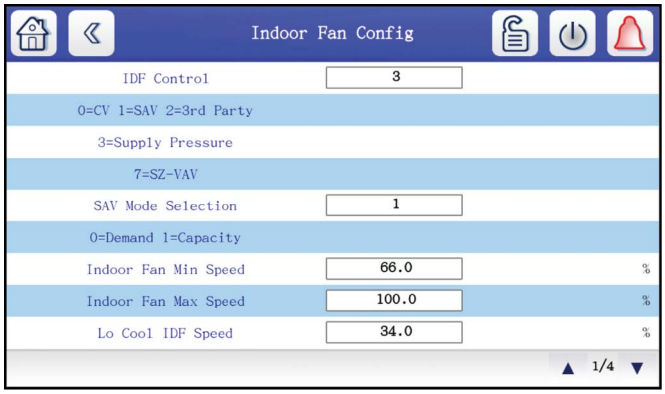


Fig. AI — Indoor Fan Configuration Screen

Table N — Sensor Configurations by Application

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Occupied Standby Time	5 - 30 min. 5 min.= Default	Sets the time that the space needs to be detected as unoccupied for occupied standby period to start.	Requires Occupied Standby to be configured for enable on Demand/ Capacity Limit screen.
Occupancy Override Time	0 to 4 Hours, 0 hrs. = Default	The amount of time the system goes occupied for when SPT occupancy override is active. Setting the Occupancy Override Time to 0 disables occupancy override.	—
Outdoor Leak Detector	Enable	Enables the outdoor leak detection input. The associated A2L leak detection sensor is located in the unit power box.	The outdoor leak detector was only used on early size 60 units. Do not adjust this configuration unless instructed by Carrier support.
	Disable (Default)	Disables the outdoor leak detection input.	
Thermostat (TB-4, terminals 2-6)	Enable	Enables the local thermostat inputs (Y1, Y2, G, W1, W2).	See Cool config. on page 114 section for guidance on setting the cool/heat demand source to TSTAT.
	Disable (Default)	Disables the local thermostat inputs.	—
Humidistat (TB-5, terminals 13 and 14)	Enable	Enables the local humidistat (dehumidify switch) input.	See Dehum. config. on page 114 for guidance on setting the dehum. demand source to HSTAT.
	Disable (Default)	Disables the local humidistat input.	—
SPT Sensor (TB-5, terminals 3 and 4)	Enable	The system enables a local space temperature (SPT) sensor input.	See Cool config. on page 114 for guidance on setting the cool/heat demand source to SPT. See the Cool config. on page 114 and IDF config. on page 105 for control configurations that use SPT.
	Disable (Default)	The system disables the local space temperature sensor input.	—
SPT Offset (TB-5, terminals 4 and 5)	Enable	The control monitors the local SPT offset input or network SPT offset input to reset the effective cooling and heating temperatures.	The default SPT offset range is ±10°F
	Disable (Default)	The system does not monitor the local space temperature offset input.	—
SPRH Sensor (TB-5, terminals 13 and 14)	Enable	Enables the local space relative humidity (SPRH) sensor input.	See Dehum. config. on page 114 for guidance on setting the dehum. demand source to SPRH.
	Disable (Default)	Disables the local SPRH sensor input.	—
MAT Sensor (In Harness)	Enable	Enables the local mixed air temperature (MAT) sensor input.	Requires a field-installed MAT sensor.
	Disable (Default)	The control disables the local MAT sensor input.	The control will calculate MAT based on the OAT, RAT, and OAD position.
OARH Sensor (In Harness)	Enable	Enables the local outdoor air relative humidity (OARH) sensor input (default for units with the humidity and enthalpy sensing option). OARH is used to calculate outdoor air dew point (OADP) and outdoor air enthalpy (OAE).	See Free Cool config. on page 117 for control configurations that use OARH/OAE/OADP.
	Disable	Disables the local OARH sensor input (default for units without the humidity and enthalpy sensing option).	
RARH Sensor (In Harness)	Enable	Enables the local return air relative humidity (RARH) sensor input (default for units with the humidity and enthalpy sensing option). RARH is used to calculate return air enthalpy (RAE).	See Free Cool Config. on page 117 and Dehum. config. on page 114 for control configurations that use RARH/RAE.
	Disable	Disables the local RARH sensor input (default for units without the humidity and enthalpy sensing option).	—
SAT Sensor (In Harness)	Enable	Enables the local supply air temperature (SAT) sensor inputs (default for units with modulating/multi-stage heat).	Required for modulating electric or hot water heat operation.
	Disable	Disables the local SAT sensor input (default for units with staged heat or no heat).	The control uses DXLAT for cooling when SAT is unavailable.
Humidi-Mizer Control Valve	Enable	Enables the Humidi-MiZer valves (default for units with Humidi-MiZer).	Do not adjust this configuration unless instructed by Carrier support/customer service.
	Disable	Disables the Humidi-MiZer valves (default for units without Humidi-MiZer).	
Supply Pressure Sensor (In Harness)	Enable	Enables the local supply pressure (SP) sensor input (default for units with the VAV application option).	Refer to IDF config. on page 105 for guidance on setting the IDF control to SP.
	Disable	Disables the local SP sensor input (default for units with the SAV application option).	—
SP High Range	0 to 5 in H_2O (5 in H_2O = Default)	The high pressure range of the supply pressure transducer.	Must be set to 5 in H_2O for the factory sensor.
SP Low Range	0 to 5 in H_2O (0 in H_2O = Default)	The low pressure range of the supply pressure transducer.	Must be set to 0 in H_2O for the factory sensor.

APPENDIX G — CONTROL QUICK SETUP (cont)

Table N — Sensor Configurations by Application (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
IAQ Low Range	0 to 10,000 PPM (0 PPM Default)	The low PPM range of the IAQ sensor. Must be 0 PPM for the factory installed RA CO_2 sensor.	Must be set to 0 PPM for the factory sensor.
IAQ High Range	0 to 10,000 PPM (2000 PPM Default)	The high PPM range of the IAQ sensor.	Must be set to 2000 PPM for the factory sensor.
SPT Occupancy Override	0= Reset	The system will restart the occupied override period when the SPT occupied override button is pressed for the second time.	Requires SPT Occupied Override to be enabled.
	1 = Clear	The system will stop the occupied override period when the SPT occupied override button is pressed for the second time.	
Vent OACFM Min. CP	0 = 40,000 CFM (0 CFM= Default)	Sets the minimum outdoor air cfm the unit will control to in Ventilation control is set to outdoor airflow measuring (OACFM).	See OAD config. on page 110 for configuring the vent control for OACFM.

Table O — Switch Input Configuration

ITEM	CONFIGURATION	DESCRIPTION	NOTES
COFS	Enable	The control monitors the condensate overflow switch (COFS) input (default for units with COFS option).	COFS can be configured to disable mechanical cooling or disable the unit
	Disable	The control does not monitor the COFS input (default for units without COFS option.	—
Smoke Pressurization Switch (TB-6, Terminals 7 and 8)	Enable	The control monitors the local smoke pressurization input to active Smoke Pressurization mode when the input is active.	Refer to: IDF config. on page 105, EXF config. on page 103, and OAD config. on page 110 for smoke control mode configurations.
	Disable (Default)	The system does not monitor the local smoke pressurization input.	—
Smoke Evacuation Switch (TB-6, Terminals 9 and 10)	Enable	The control monitors the local smoke evacuation input to active Smoke Evacuation mode when the input is active.	—
	Disable (Default)	The system does not monitor the local smoke evacuation switch.	—
Fire Shutdown Switch (TB-5, Terminals 21 and 22)	Enable	The control monitors the local fire shutdown input for emergency shutdown (default for units with factory-installed smoke detector).	It can take up to a minute before the fans stop, due to inertia.
	Disable (Default)	The control does not monitor the local fire shutdown input (default for units without the smoke detector option).	—
Emergency Shutdown Switch (TB-6, Terminals 13 and 14)	Enable	The control monitors the local emergency shutdown input for emergency shutdown (default for units with phase monitor option).	—
	Disable	The control does not monitor the local emergency shutdown input (default for units without the phase monitor option).	—
Pre-Filter Switch (In Harness)	Enable	Enables local pre-filter input (default for units with the pre-filter switch option).	Refer to the Alert config. screen for guidance on setting the pre-filter change alert to pre-filter switch.
	Disable	Disables the local pre-filter input.	—
Smoke Purge Switch (TB-6, Terminals 5 and 6)	Enable	The control monitors the local smoke purge input to active Smoke Purge mode when the input is active.	Refer to: IDF config. on page 105, EXF config. on page 117, and OAD config. page 110 for smoke control mode configurations.
	Disable (Default)	They system does not monitor the local smoke purge input.	—
IAQ / OAQ Switch (TB-6, Terminals 11 and 12)	0 = Not Used (Default)	Disables the local indoor air quality (IAQ)/outdoor air quality (OAQ) switch input.	—
	1 = IAQ Switch	Enables the local IAQ/OAQ switch input and assigns it for IAQ switch.	See OAD config. page 110 for control configurations that use IAQ switch.
	2 = OAQ	Enables the local IAQ/OAQ switch input and assigns it for OAQ switch. The control will monitor the input and will close the OAD when the switch is active.	—
Remote Input (TB-5, Terminals 23 and 24)	0 = None (Default)	Disables the local remote input.	—
	1= Remote Shutdown	Enables the remote input and assigns it for remote shutdown. The control will monitor the input and will shut down the unit (non-emergency) when the input is active.	—
	2 = Occupancy Switch	Enables the remote input and assigns it for occupancy switch. The control will monitor the input and will set the unit period to occupied when the switch is active.	—

Table P — Indoor Fan Configurations by Application

<table>
<tr><th>ITEM</th><th>CONFIGURATION</th><th>DESCRIPTION</th><th>NOTES</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. Recommended for process applications or applications sensitive to changes in sound.</td><td>Check local energy codes for allowance.</td></tr>
<tr><td>1 = Staged Air Volume (SAV™)</td><td>The indoor fan speed stages based on demand level or cooling and heating capacity level (default for units ordered with SAV application option). Recommended for single-zone applications.</td><td>—</td></tr>
<tr><td>2 = Third-Party Control[a]</td><td>The IDF speed modulates between the IDF Min Speed and IDF Max Speed based on a third-party input. Recommended for applications requiring specific IDF sequences of operation.</td><td>Requires third-party IDF/ SPR input to be configured for third-party IDF and a local or network IDF speed modulation input.</td></tr>
<tr><td>3 = Supply Pressure (SP)[a]</td><td>The IDF speed modulates between the IDF Min. Speed and IDF Max. Speed to maintain the supply pressure (SP) at the effective SP control point (default for units ordered with the VAV application option).</td><td>Require the SP sensor input to be enabled and a local SP sensor or network SP input. For units with staged heat, SP control is ignored in heating mode and the IDF operates as SAV.</td></tr>
<tr><td>7 = Single-Zone VAV (SZ_VAV)</td><td>The IDF speed modulated between IDF Low and High Cool Speeds with a Cool demand or the IDF Low and High Heat Speeds with a Heat demand based on the deviation of the SPT from the effective cooling and heating temperatures. Recommended for sound sensitive single zone applications.</td><td>Requires the SPT cool/heat demand source and a local SPT sensor network SPT input.</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>Recommended in single zone air conditioning applications for tighter space temperature control.</td><td>Only used when IDF control is set for SAV.</td></tr>
<tr><td>1 = Capacity</td><td>The IDF speed stages based on the cooling or heating capacity or demand level (default for units ordered with SAV application option). 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>Recommended for single-zone applications with high latent loads.</td><td>Only used when IDF control is set for SAV.</td></tr>
<tr><td>IDF Min. Speed</td><td>0 to 100% (Default varies)</td><td>The minimum speed that the IDF will control. Used with all IDF control types except CV.</td><td rowspan="2">An air balance is required to set the IDF speed configurations based on application requirement and the min. and max. allowable cooling and heating airflows. See product data manual for airflow ranges.</td></tr>
<tr><td>IDF Max. Speed</td><td>0 to 100% (Default varies)</td><td>The maximum speed that the IDF will control. Used with SP and third-party IDF control.</td></tr>
<tr><td>Low Cool IDF Speed</td><td>0 to 100% (Default varies)</td><td>The IDF speed with a Low Cool demand or with low cooling capacity for SAV demand or SAV capacity IDF control.</td><td rowspan="3">Only used with SAV IDF control. An air balance is required to set the IDF speed configurations based on application requirement and the min. and max. allowable cooling
See product data manual for airflow ranges.</td></tr>
<tr><td>Med Cool IDF Speed</td><td>0 to 100% (Default varies)</td><td>The IDF speed with a medium cooling capacity for SAV capacity IDF control.</td></tr>
<tr><td>High Cool IDF Speed</td><td>0 to 100% (Default varies)</td><td>The IDF speed with a High Cool demand, Dehum demand, or with high cooling capacity for SAV demand or SAV capacity IDF control.</td></tr>
</table>

Table P — Indoor Fan Configurations by Application (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
SAV Low Cool Cap. Threshold	0 to 100% (Default varies)	The low cooling capacity threshold used with SAV capacity IDF control.	Only used with SAV Capacity IDF control.
SAV Med. Cool Cap. Threshold	0 to 100% (Default varies)	The medium cooling capacity threshold used with SAV capacity IDF control.	
SAV High Cool Cap. Threshold	0 to 100% (Default varies)	The high cooling capacity threshold used with SAV capacity IDF control.	
Min. Rfg. Fan Speed	0 to 100% (34% Default)	The minimum IDF speed required for the DX circuit to operate.	Do not adjust unless instructed by Carrier support.
Low Heat IDF Speed	0 to 100% (100% Default)	The IDF speed with a Low Heat demand for SAV demand or for SZ-VAV, SP, or third-party IDF control with staged heat, or with low heating capacity for SAV capacity IDF control.	Only used with SAV IDF control or with staged heat. An air balance is required to set the IDF speed configurations based on application requirement and the min. and max. allowable heating airflows. See the product data for airflow ranges.
High Heat IDF Speed	0 to 100% (100% Default)	The IDF speed with a High Heat demand for SAV demand or for SZ-VAV, SP, or third-party IDF control with staged heat, or with low heating capacity for SAV capacity IDF control.	
IDF Purge Speed	0 to 100% (34% Default)	The IDF speed when Smoke Purge mode is active.	Only used when smoke control inputs are enabled. An air balance is required to set the smoke control speed configurations based on application requirements. Improper smoke control mode configuration can cause building damage.
IDF Pressurization Speed	0 to 100% (34% Default)	The IDF speed when Smoke Pressurization mode is active.	
IDF Evacuation Speed	0 to 100% (34% Default)	The IDF speed when Smoke Evacuation mode is active.	
Occupied Fan	0 = Demand	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify during the occupied period. Recommended for applications with a separate ventilation system.	—
	1 = Continuous (Default)	The IDF will operate continuously during the occupied period. Recommended for applications where the RTU provides ventilation.	—
Unoccupied Fan	0 = None	The IDF is off during the unoccupied period.	Cooling, heating, ventilation, or dehumidification will not be performed during the unoccupied period.
	1 = Demand Based (Default)	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify demand during the unoccupied period.	Required for temperature compensated start.
SP Reset Source	0 = None (Default)	SP reset is not performed.	—
	1 = RAT	SP reset is calculated based on (Occupied Cooling setpoint - RAT) * SP Reset Ratio. Recommended for multi-zone applications without a high priority zone.	—
	2 = SPT	SP reset is calculated based on (Occupied Cooling setpoint - SPT) * SP Reset Ratio, and the space temperature (SPT) is below the Occupied Cooling setpoint. Recommended for multi-zone applications with a high priority zone.	Requires SPT input to be enabled and a local SPT sensor or network SPT input.
	4 = Third-Party	SP reset is performed when the IDF is configured for SP control, the unit is in a vent or cooling mode, and a third-party input is active. Recommended for applications that want to maintain SP control with but have the capability of resetting the SP control point.	Requires the third-party IDF/ SPR input to be configured for SPR and a local or network SPR modulation input.
	5 = Zone Damper Pos	SP reset is calculated based on (SDP Reset ZDP Threshold - ZPD) * (10 * SP Reset Ratio), and the average zone damper position (ZDP) is below the SP Reset ZDP Threshold. Recommended for multi-zone VAV applications without a high profile zone.	Requires a network ZDP position input.
SP Reset Ratio	0 to 3 in H_2O (1.0 In H_2O°F Default)	The amount SP is reset is the difference between the effective cooling temp and the SP resource temperature (SPT or RAT).	Only used when the SP Reset Source to be SPT or RAT.
SP Reset Limit	0 to 3 in H_2O (0.8 In H_2O Default)	The maximum allowable value for SP Reset.	
SDP Reset Time	5 to 30 min. (15 min. Default)	The time interval that the control will check the average zone damper position (ZDP).	Only used when the SP reset source to be set to ZDP.
SDP Reset ZDP Threshold	40 to 100% (85% Default)	The threshold that the average ZDP must be below for SP reset to be performed.	
ABB IDF Set Frequency	0 to 100 Hz (60 Hz Default)	The max. frequency of the IDF VFD. If this configuration is changed, verify the IDF speed does not exceed the max. allowable speed and verify the motor amp draw does not exceed the unit nameplate amp draw (not the motor nameplate).	Do not adjust unless instructed by Carrier support.

NOTE(S):

a. For units with staged 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 I — CONFIGURE OUTDOOR AIR DAMPER (OPTIONAL)

For units with economizer, navigate to the Outdoor Air Damper Configuration screen (***Main Menu*** → ***System Config*** → ***OAD Config***). The outdoor air damper (OAD) configuration screen is used to set the outdoor air damper ventilation control and operating positions (0%-100% range). A separate screen is provided to configure free cooling control.

Configure the OAD ventilation control and operating positions based on application requirements. See Fig. AJ for outdoor air damper configuration screen layout. See Table Q for outdoor air damper configurations. When finished, press the save changes button Save at the bottom of the screen.

NOTE: An air balance should be performed to set the outdoor air damper positions to ensure the proper ventilation rate is maintained based on application requirements.

⚠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.

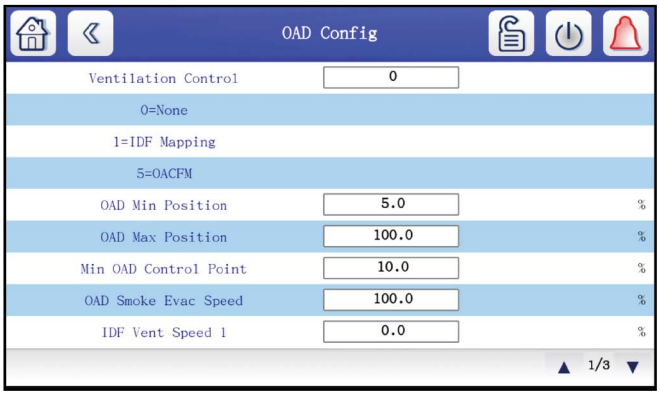


Fig. AJ — Outdoor Air Damper Configuration Screen

APPENDIX G — CONTROL QUICK SETUP (cont)

Table Q — Outdoor Air Damper Configurations

<table>
<tr><th>ITEM</th><th>CONFIGURATION</th><th>DESCRIPTION</th><th>NOTES</th></tr>
<tr><td rowspan="6">Ventilation Control</td><td>0 = None</td><td>Ventilation is not performed (default for units with manual outdoor air damper option).</td><td>Free cooling can still be performed if ventilation is set to none.</td></tr>
<tr><td>1 = IDF Mapping</td><td>The outdoor air damper (OAD) position modulates linearly based on the IDF speed and the following user adjustable configurations:
<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>Recommended for applications with constant occupancy rates.</td><td>Requires economizer to be configured for enabled.
An air balance is required to set the vent IDF speeds and vent OAD positions to ensure the ventilation rate meets application requirements.</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. Recommended for applications that require full third-party OAD control.</td><td>Requires the IAQ/OAD input to be configured for third-party OAD and a local or network third-party OAD modulation input.
Requires economizer to be configured for enabled.</td></tr>
<tr><td>3 = Third-Party Vent Only</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 override the third-party commanded OAD position. Recommended for applications that require full third-party OAD ventilation position control while allowing free cooling and IAQ reset.</td><td>Requires the IAQ/OAD input to be configured for third-party OAD and a local or network third-party OAD modulation input.
Requires economizer to be configured for enabled.</td></tr>
<tr><td>5 = OACFM</td><td>The OAD position modulates between the minimum and maximum OAD positions to maintain the measured outdoor airflow (OACFM) at the effective OACFM control point (default for units with the OACFM option). Recommended for applications that require precise ventilation</td><td>Requires the OACFM option or a network OACFM input.
Requires economizer to be configured for enabled.</td></tr>
<tr><td>6 = IAQ Mapping</td><td>The OAD position modulates linearly between the indoor air quality (IAQ) Min and Max Positions based on the IAQ PPM (CO_2 parts per million) reading and the IAQ Low and High Level configurations. Recommended for applications with a variable occupancy rates.</td><td>Requires the IAQ/OAD input to be configured for IAQ sensor and a local IAQ sensor or network IAQ PPM input.
Requires the economizer to be configured for enabled.</td></tr>
<tr><td>IAQ High Level</td><td>400 to 5000 PPM
(2000 PPM = Default</td><td>Sets the IAQ level that the OAD will be at the IAQ max. position (highest ventilation position).</td><td rowspan="2">Only used with IAQ mapping ventilation control.</td></tr>
<tr><td>IAQ Low Level</td><td>400 to 5000 PPM
(400 PPM = Default</td><td>Sets the IAQ level that the OAD will be at the IAQ min. position (lowest ventilation position).</td></tr>
<tr><td>IAQ Max. Pos</td><td>20 to 100%
(50% = Default)</td><td>Sets the Max. Damper Position for the interpolation for IAQ Ventilation Control.</td><td rowspan="2">An air balance is required to set the OAD positions to ensure the ventilation rate meets the application requirement. Only used with IAQ mapping ventilation control.</td></tr>
<tr><td>IAQ Min. Pos</td><td>0 to 80%
(10% = Default)</td><td>Sets the Min. Damper Position for the interpolation for IAQ Ventilation Control.</td></tr>
<tr><td>OAD Min. Position</td><td>0 to 100%
5% = Default</td><td>The minimum OAD position that the system is allowed to operate at while ventilation or free cooling is being performed.</td><td>Changing the OAD min. position will automatically change any OAD position configurations that are set below the new OAD min. position.</td></tr>
<tr><td>OAD Max. Position</td><td>0 to 100%
100% = Default</td><td>The maximum OAD position that the system is allowed to operate at while ventilation or free cooling is being performed.</td><td>Changing the OAD max. position will automatically change any OAD position configurations that are set above the new OAD max. position.</td></tr>
</table>

Table Q — Outdoor Air Damper Configurations (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Min. OAD Control Point	0 to 100% (10% = Default)	The minimum OAD position that the system is allowed to operate at while ventilation is being performed.	Air balance is required to set the OAD positions to ensure the ventilation rate meets application requirements.
IDF Vent Speed 1	0 to 100% (34% Default)	The IDF speed that sets the OAD to the OAD Vent Position 1 during ventilation control.	Only used with IDF mapping ventilation control. An air balance is required to set the vent IDF speeds and vent OAD positions to ensure the ventilation rate meets application requirements.
IDF Vent Speed 2	0 to 100% (50% Default)	The IDF speed that sets the OAD to the OAD Vent Position 2 during ventilation control.	
IDF Vent Speed 3	0 to 100% (70% Default)	The IDF speed that sets the OAD to the OAD Vent Position 3 during ventilation control.	
IDF Vent Speed 4	0 to 100% (90% Default)	The IDF speed that sets the OAD to the OAD Vent Position 4 during ventilation control.	
OAD Damper Vent Pos 1	0 to 100% (40% Default)	The OAD position when the IDF is at the IDF Vent Speed 1 during ventilation control.	
OAD Damper Vent Pos 2	0 to 100% (30% Default)	The OAD position when the IDF is at the IDF Vent Speed 2 during ventilation control.	
OAD Damper Vent Pos 3	0 to 100% (25% Default)	The OAD position when the IDF is at the IDF Vent Speed 3 during ventilation control.	
OAD Damper Vent Pos 4	0 to 100% (10% Default)	The OAD position when the IDF is at the IDF Vent Speed 4 during ventilation control.	
OAD Smoke Evac. Speed	0 to 100% (100% Default)	The OAD position when Smoke Evacuation mode is active.	Only used with smoke control inputs are enabled. An air balance is required to set the smoke control position configurations based on application requirements. NOTE: Improper smoke control mode configuration can cause building damage.
IAQ Vent Standby Demand	Enable	Poor IAQ (IAQ PPM above IAQ PPM Threshold or IAQ switch closed) will trigger a Vent demand.	Requires the IAQ/OAD input to be configured for IAQ sensor and a local IAQ sensor or network IAQ PPM inputs, or, the IAQ/OAQ input to be configured for IAQ and a local IAQ switch or network IAQ switch input.
	Disable (Default)	IAQ does not trigger a Vent demand.	—
IAQ Reset Source	0 = None (Default)	IAQ override is not performed.	—
	1 = IAQ Switch	IAQ override is performed based on an IAQ switch and IAQ Switch OAD Pos Reset configuration. When the IAQ switch is active, the OAD position is not reset. When the IAQ switch is inactive, the OAD position is reset by the IAQ OAD Position Reset.	Requires the IAQ/OAQ input to be configured for IAQ and a local IAQ switch or network IAQ switch input.
	2 = IAQ PPM Sensor	IAQ override is performed based on an IAQ sensor reading and the IAQ override threshold and deadband configurations.	Requires the IAQ/OAD input to be configured for IAQ sensor and a local IAQ sensor or network IAQ PPM input.
	3 = Third-Party Reset	IAQ override is performed based on an third-party inputs.	Requires the IAQ/OAD input to be configured for IAQ OAD position reset or OACFM reset and a local modulation signal or network OAD or OACFM position reset input.
IAQ Override Threshold	0 to 5000 PPM (1200 PPM = Default)	The IAQ PPM target.	Only used when IAQ Reset is configured for IAQ PPM sensor or IAQ Vent Standby demand is enabled.
IAQ Override Deadband	0 to 5000 PPM (200 PPM = Default)	The amount that the IAQ PPM reading needs to be above or below the IAQ PPM threshold to start or stop IAQ override.	Only used when IAQ Reset is configured for IAQ PPM sensor.

Table Q — Outdoor Air Damper Configurations (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
IAQ Override Position	-100 to 100% (-10% = Default)	The amount that the OAD position is reset when IAQ override is active. The OAD position is decreased when the IAQ override is active and the IAQ Override Position is negative. The OAD position is increased when the IAQ override is active and the IAE Override Position is positive.	Only used when ventilation control type is configured for IDF mapping or third-party vent and IAQ reset source is configured.
IAQ Pre-Occupancy Purge	Enable	Allows a pre-occupancy purge cycle to occur durnig the unoccupied period if the conditions for a purge are met. During the purge, the IDF will turn on and the OAD will open IAQ Purge Low or IAQ Purge High Temp Positions based on the system conditions.	Requires a local or BAS schedule and an economizer. Requires the Unoccupied IDF to be configured for demand.
	Disable (Default)	Disables pre-occupancy purge.	—
IAQ Purge OAT Low Lockout	0 to 50°F (45°F Default)	Pre-occupancy purge is disabled when the OAT is below the temperature.	—
IAQ Purge OAT High Lockout	85 to 115°F (95°F Default)	Pre-occupancy purge is disabled when the OAT is above this temperature.	—
IAQ Purge Short Position	0 to 100% (25% Default)	The OAD position used during pre-occupancy purge when the OAT is below the Occupied Heating setpoint - Low Heat On deadband and above the Occupied Cooling setpoint + Low Cool On deadband.	When the OAT is colder or hotter than the desired occupied space temp range, pre-occ. purge is performed at a lower OAD position for a longer time. Only used when IAQ Pre-Occ. Purge is enabled.
Purge Long Duration	0 to 60 min. (60 min. = Default)	The pre-occupancy purge duration used when the OAD is at the IAQ Purge Lo Temp Position.	
IAQ Purge Long Position	0 to 100% (75% Default)	The OAD position used during pre-occupancy purge when the OAT is above the Occupied Heating setpoint - Low Heat On deadband and below the Occupied Cooling setpoint + Low Cool On deadband.	When the OAT is within the desired occupied space temp range, pre-occ. purge is performed at a higher OAD position for a shorter time. Only used when IAQ Pre-Occ. Purge is enabled.
Purge Short Duration	0 to 60 min. (20 min. = Default)	The pre-occupancy purge duration used when the OAD is at the IAQ Purge Hi Temp Posisiton.	
OA CFM Setpoint	0 to 40000 CFM (2000 CFM Default)	The OACFM setpoint used for OACFM ventilation control.	Only used with Ventilation Control is configured fro OACFM.
IAQ OA CFM Reset	0 to 40000 CFM (500 CFM Default)	The amount the OACFM control point is reduced when IAQ reset is active when the ventilation configuration is set to OACFM.	Only used when Ventilation Control is configured for OACFM and IAQ reset source is configured.

STEP J — CONFIGURE THE COOLING SYSTEM

Navigate to the Cooling Configuration screen (***Main Menu*** → ***System Config*** → ***Cooling Config***). Configure the cool/heat demand source and cooling control configurations based on application requirements. See Fig. AK for cooling configuration screen layout. See Table R for cooling configurations. When finished, press the save changes button Save at the bottom of the screen.

NOTE: The cool/heat demand source also governs heating demands for units with heat.

STEP K — CONFIGURE THE DEHUMIDIFICATION SYSTEM (OPTIONAL)

For units configured with Humidi-MiZer dehumidification, navigate to the Dehumidify Configuration screen (***Main Menu*** → ***System Config*** →***Dehum Config***). Configure the dehumidify demand source and dehumidification control configurations based on application requirements. See Fig. AL for dehumidify configuration screen layout. See Table S for dehumidification configurations by application. When finished, press the save changes button Save at the bottom of the screen.

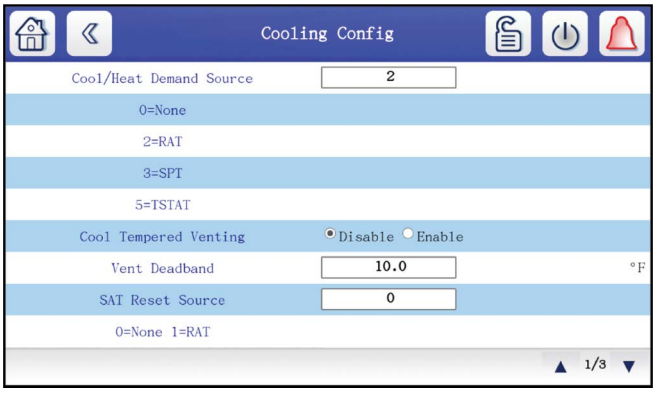


Fig. AK — Cooling Configuration Screen

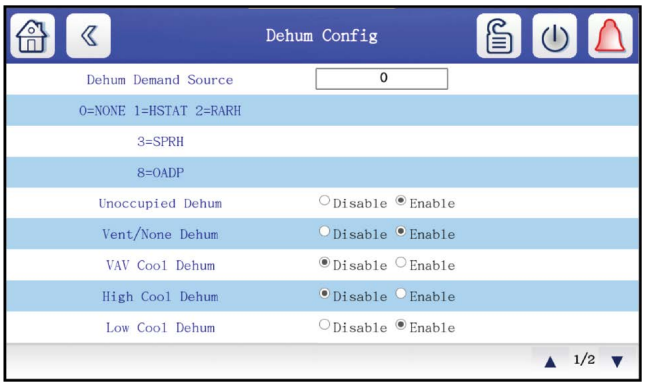


Fig. AL — Dehumidification Configuration Screen

Table R — Cooling Configurations by Application

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Cool/Heat Demand Source	0 = None	Cooling and heating is disabled.	—
	2 = RAT (Default)	The control compares the return air temperature (RAT) to the effective cooling and heating setpoints to determine if there is a cool or heat demand. Recommended for stand-alone multi-zone systems.	During the occupied period, the effective cooling temperature is based on the occupied heating setpoint. Refer to Fig. 79 for Occupied RAT demand processing. When Linkage is active, the unit uses the Linkage average cooling and heating setpoints.
	3 = SPT	The control compares the space temperature (SPT) to the effective cooling and heating setpoints to determine if there is a cool or heat demand. Recommended for single zone systems or communicating multi-zone systems.	Requires the SPT input to be enabled and a local SPT sensor, network SPT input, or Linkage average zone temperature. temperature. When Linkage is active, the unit uses the Linkage average zone temperature and average cooling and heating setpoints.
	5 = TSTAT	The control monitors the local or network thermostat (TSTAT) inputs to determine if there is a cool or heat demand. Recommended for single zone systems with a thermostat or for third-party cooling or heating operation. See below for demand mapping by input.	Requires a local 2-stage heat/cool thermostat or network TSTAT inputs. G input is used to initiate a vent demand with occupied or unoccupied IDF configurations. G input is used to enable the IDF with third-party IDF control.

ACTIVE INPUT	DEMAND LEVEL
Y1	Low Cool
Y2	High Cool
W1	Low Heat
W2	High Heat
G	Vent

Table R — Cooling Configurations by Application (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Cool Tempered Venting	Enable	When there is a Vent demand and the MAT is above the vent SAT setpoint by the vent deadband, the system will enable mechanical cooling to temper the MAT to the vent SAT setpoint. Recommended for hot climates.	—
	Disable (Default)	Cool tempered venting is disabled.	—
Vent Deadband	10 to 30°F, (15°F Default)	The amount the MAT needs to be above (for cool tempered venting) or below (for heat tempered venting) the Vent SAT setpoint to start a tempering mode.	Only used when Cool Tempered Venting or Heat Tempered Venting are enabled. See Table T on page 118 and “STEP L — CONFIGURE THE HEATING SYSTEM” on page 117 for guidance on configuring Heat Tempered Venting.
SAT Reset Source	0 = None (Default)	SAT reset is not performed.	—
	1 = RAT	SAT reset is calculated based on (Occupied Cooling setpoint - RAT) * SAT Reset Ratio. Recommended for VAV applications without a high priority zone.	—
	2 = SPT	SAT reset is calculated based on (Occupied Cooling setpoint - SPT) * SAT Reset Ratio. Recommended for VAV applications with a high priority zone.	Requires the SPT input to be enabled and a local SPT sensor or network SPT input. SPT reset cannot be used with SPT cool/heat demand source.
	3 = OAT	SAT reset is calculated based on (Occupied Cooling setpoint - OAT) * SAT Reset Ratio. Recommended for VAV applications with a high priority zone.	—
	4 = Analog Input	SAT reset is calculated based on a hardwired input. The reset amount is scaled linearly between 4mA (0°F reset) and 20mA (SAT Reset Limit).	Refer to the Demand/ Capacity Limiting section for guidance on setting the Limiting/SAT Reset input for SAT reset.
	5 = Setpoint	SAT reset is calculated from a local or network SAT reset setpoint.	Requires a network SAT reset input.
SAT Reset Ratio	1 to 10°F (0°F Default)	The ratio that the SAT is reset for every 1°F that the SAT reset source (RAT, SPT, or OAT) is below the Occupied Cooling Setpoint. Setting the SAT Reset Ratio to 0 disables temperature based (RAT, SPT, OAT) SAT reset.	Only used when SAT Reset Source is set to RAT, SPT, or OAT.
SAT Reset Limit	1 to 20°F (10°F Default)	The maximum value of SAT Reset that is allowed.	Only used when a SAT Reset Source is configured.
Cool Comfort Trending	Enable	Prevents the system from transitioning to a High Cool Demand until the Cool Trend Time has expired. Recommended to help reduce peak demand charges at equipment startup.	Requires the SPT cool/ heat demand source.
	Disable (Default)	Cool comfort trending is disabled.	—
Cool Trend Level	0.1 to 5°F (0.2°F Default)	The amount of SPT change required during the Comfort Trend Time to prevent honoring a High Cool demand.	Only used when Cool Comfort Trending is enabled.
Cool Trend Time	1 to 5 min. (2 min. Default)	The amount of time that comfort trending allows tto pass before honoring a High Cool demand.	
Cool Heat Gap Config.	2 to 10°F (5°F Default)	The minimum temperature difference between the Occupied Cooling and Occupied Heating setpoints.	The control will automatically adjust the occupied cooling and heating setpoints to maintain the temperature gap.
TC Start Cool Factor	0 to 60 min./°F (0 min./ °F Default)	The system calculates the early start time in minutes, based on the TC Start Cool Factor * (SPT – Occupied Cooling Setpoint) and will start cooling when the current time is at the early start time before occupied. Setting the TC Start Factor to 0 disables the function.	Requires the SPT input to be enabled and a local SPT sensor or network SPT input. Requires the unoccupied IDF to be configured for demand. Requires a schedule.

Table S — Dehumidify Configurations by Application[a]

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Dehumidify Demand Source	0 = None (Default)	Dehumidification is disabled.	—
	1 = HSTAT	The control monitors the local or network humidistat (HSTAT) inputs to determine if there is a dehumidify demand. Recommended for single-zone systems with a humidistat or for third-party dehumidification operation.	Requires the HSTAT input to be enabled and a local or network HSTAT input.
	2 = RARH	The unit compares the return air relative humidity (RARH) sensor reading to the dehumidify relative humidity (dehum RH) setpoint to determine if there is a dehumidify demand. Requires local RARH sensor or network RARH value.	Requires the RARH input to be enabled and a local RARH sensor or network RARH input.
	3 = SPRH	The unit compares the space relative humidity (SPRH) sensor reading to the dehumidify relative humidity (dehum RH) setpoint to determine if there is a dehumidify demand. Requires local SPRH sensor or network SPRH value.	Requires the SPRH input to be enabled and a local SPRH sensor or network SPRH input.
Unoccupied Dehum.	Enable	Dehumidification can occur during the unoccupied period.	—
	Disable (Default)	Dehumidification is prevented during the unoccupied period.	—
Vent/None Dehum.	Enable (Default)	A dehumidify demand can exist with a vent or none demand. This configuration is recommended for most applications.	—
	Disable	A dehumidify demand is prevented with a vent or none demand.	—
High Cool Dehum.	Enable	A dehumidify demand is allowed with a High Cool demand. Recommended for applications that prioritize humidity control over temperature control.	The default High Cool SAT is 55°F, so a dedicated dehumidification cycle is typically not required when cooling is active.
	Disable (Default)	A dehumidify demand is prevented with a High Cool demand. Recommended for most applications.	—
Low Cool Dehum.	Enable (Default)	A dehumidify demand is allowed with a Low Cool demand. Recommended for applications that prioritize humidity control over temperature control.	—
	Disable	A dehumidify demand is prevented with a Low Cool demand. Recommended for applications that prioritize temperature control over humidity control.	—
Low Heat Dehum.	Enable	A dehumidify demand is allowed with a Low Heat demand. Recommended for applications that prioritize humidity control over temperature control.	Only Humidi-MiZer will be used to satisfy the heat demand. Depending on the operating conditions, the Humidi-MiZer SAT will likely be below the effective heating SAT control point.
	Disable (Default)	A dehumidify demand is prevented with a Low Heat demand. Recommended for most applications.	
High Heat Dehum.	Enable	A dehumidify demand is allowed with a High Heat demand. Recommended for applications that prioritize humidity control over temperature control.	
	Disable (Default)	A dehumidify demand is prevented with a High Heat demand. Recommended for most applications.	
VAV Cool Dehum.	Enable	A dehumidify demand is allowed with a VAV Cool demand. Recommended for applications that prioritize humidity control over temperature control.	The default VAV SAT is 55°F, so a dedicated dehumidification cycle is typically not required when cooling is active.
	Disable (Default)	A dehumidify demand is prevented with a VAV Cool demand. Recommended for most applications.	—
OA Dehum. Enable	Enable	Allows the system to use the economizer to perform dehumidification when there is a cool/dehumidify demand, free cooling is available, and for the OAT is below the effective dehumidify cooling coil temperature (CCT) control point.	Requires economizer to be enabled and free cooling to be enabled. Ensure building pressure relief is available.
	Disable (Default)	Prevents the system from using the economizer to satisfy a dehum. demand.	—
Occupied Free Dehum.	Enable	Allows dehumidification with economizer during the occupied period.	Only used when OA Dehum Enable is set to enable.
	Disable (Default)	Prevent dehumidification with economizer during the occupied period.	
Unoccupied Free Dehum.	Enable	Allows dehumidification with economizer during the unoccupied period.	
	Disable (Default)	Prevent dehumidification with economizer during the unoccupied period.	

NOTE(S):

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

STEP L — CONFIGURE THE HEATING SYSTEM

For units configured with a heat source, navigate to the Heating Configuration screen (***Main Menu → System Config→Heating Config***). Set the heater configurations based on the application requirements. See Fig. AM for heater configuration screen layout. See Table T for heater configurations and applications. When finished, press the save changes button Save at the bottom of the screen.

NOTE: The cool/heat demand source configuration on the cooling configuration screen governs heat demands.

STEP M — CONFIGURE EXHAUST FAN (OPTIONAL)

For units configured with an exhaust fan, navigate to the Exhaust Fan Configuration screen (***Main Menu → System Config → Exhaust Fan Config***). Configure the exhaust fan control based on application requirements. See Fig. AN for exhaust fan configuration screen layout. See Table U for exhaust fan control configurations. When finished, press the save changes button Save at the bottom of the screen.

STEP N — CONFIGURE FREE COOLING (OPTIONAL)

For units configured 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. AO for free cooling configuration screen layout. See Table V for free cooling configurations. When finished, press the save changes button Save at the bottom of the screen.

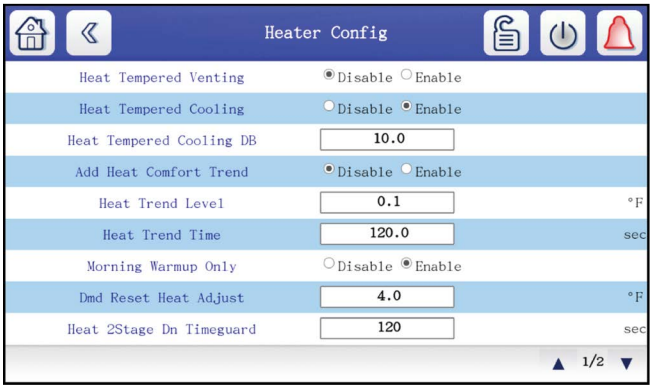


Fig. AM — Heater Configuration Screen

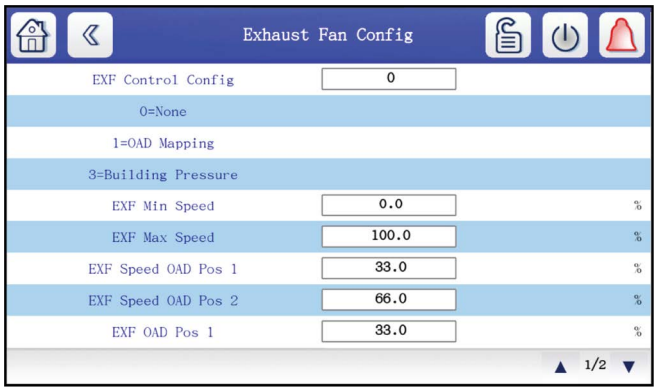


Fig. AN — Exhaust Fan Configuration Screen

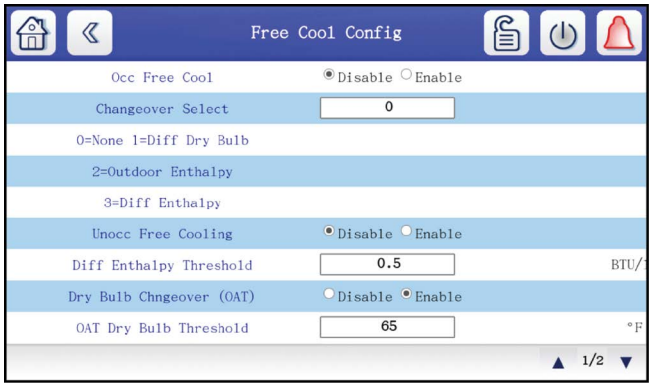


Fig. AO — Free Cooling Configuration Screen

Table T — Heater Configurations by Application

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Heat Tempered Venting	Enable	When there is a Vent Demand and the MAT is below the Vent SAT setpoint by the Vent Deadband, the system enables the heater to temper the MAT to the Vent SAT setpoint. Recommended for cold climates.	Requires a modulating heat source.
	Disable (Default)	Heat tempered vending is not performed.	—
Heat Tempered Cooling	Enable	When there is a cool demand and the MAT is below the SAT control point by the Heat Tempered Cooling DB, system enables the heater to temper the air to the effective SAT control point. The heat source turns on and modulates to maintain the SAT at the SAT control point. Recommended for cold climates. NOTE: A modulating heat source is required for heat tempered cooling.	Requires a modulating heat source.
	Disable (Default)	Heat tempered cooling is not performed.	Any
Heat Tempering Cooling Deadband	5 to 15°F, (10°F Default)	The temperature that the MAT must be below the effective SAT control point to enable heat tempered cooling.	Only used when Heat Tempered Cooling is enabled.
Add Heat Comfort Trend	Enable	Prevents the system from transitioning to a High Heat Demand until the Heat Trend Time has expired. Recommended to help reduce peak demand charges at equipment startup.	Requires the SPT cool/ heat demand source.
	Disable (Default)	Heat comfort trending is disabled.	—
Heat Trend Level	0.1 to 5°F (0.1°F Default)	The amount of SPT change required during the Comfort Trend Time to prevent honoring a High Heat demand.	Only used when Heat Comfort Trending is enabled.
Heat Trend Time	30 to 600 Sec. (120 Sec.Default)	The amount of time that comfort trending allows to pass before allowing a high cool demand.	
Occupied Heating Type	0 = Always	Heating mode is always allowed during the occupied period. Recommended for most applications.	—
	1 = One Heat Cycle	Heating mode is allowed once during the occupied period. Heating is prevented for the rest of the occupied period after a heating or cooling mode occurs. Recommended for applications that only require morning warm-up during the occupied period.	Heat tempered venting and heat tempered cooling do not count as heating modes. Heat tempered cooling counts as a cooling mode.
	2 = Until Cooling	Heating mode is allowed until a cooling mode occurs. Heating is prevented for the rest of the occupied period after a cooling mod occurs. Recommended for VAV applications with zone heat sources.	
TC Start Heat Factor	0 to 60 min./ºF (0 min. Default)	The system calculates the early start time in minutes, based on the TC Start Heat Factor * (Occupied Heating Setpoint - SPT) and will start heating when the current time is at the early start time before occupied. Setting the TC Start Factor to 0 disables the function. Recommended for applications that require morning warm-up during the unoccupied period.	Requires the SPT input to be enabled and a local SPT sensor or network SPT input. Requires the unoccupied IDF to be configured for demand. Requires a schedule.

Table U — Exhaust Fan Configurations by Application

<table>
<tr><th>ITEM</th><th>CONFIGURATION</th><th>DESCRIPTION</th><th>NOTES</th></tr>
<tr><td rowspan="5">EXF Control Configuration</td><td>0 = None</td><td>The exhaust fan (EXF) is disabled (default for units without power exhaust).</td><td>—</td></tr>
<tr><td rowspan="2">1 = OAD Mapping</td><td>Multi-Stage Power Exhaust (MSPE)
The EXF stages between off and four (20-50 ton) or six (60 ton) fan stages based on outdoor air damper (OAD) position (default for units without BP control). See below for EXF speeds based on OAD position:
<table><tr><th>OAD POSITION</th><th>EXHAUST FAN STAGE</th></tr><tr><td>< EXF OAD Pos 1</td><td>Off</td></tr><tr><td>≥ EXF OAD Pos 1,
< EXF OAD Pos 2</td><td>1</td></tr><tr><td>≥ EXF OAD Pos 2,
< EXF OAD Pos 3</td><td>2</td></tr><tr><td>≥ EXF OAD Position 3,
< EXF OAD Position 4</td><td>3</td></tr><tr><td>≥ EXF OAD Position 4,
< EXF OAD Position 5</td><td>4</td></tr><tr><td>≥ EXF OAD Position 5,
< EXF OAD Position 6</td><td>5 (60T only)</td></tr><tr><td>≥ EXF OAD Position 6</td><td>6 (60T only)</td></tr></table>Recommended for single-zone applications with SAV or CV IDF control to relieve building pressure during free cooling.</td><td rowspan="2">Requires the economizer and power exhaust to be configured for enabled. An air balance is required to set the exhaust fan and outdoor air damper positions based on application requirements. Improper exhaust fan control can cause building damage.</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
The EXF stages between two speeds based on outdoor air damper (OAD) position. 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. Recommended for single-zone applications with SAV or CV IDF control to relieve building pressure during free cooling.</td></tr>
<tr><td rowspan="2">2 = Third-party</td><td>Multi-Stage Power Exhaust (MSPE)
Not used.</td><td>—</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
The EXF modulates speed based on a third-party input signal. When the OAD is open, the EXF turns on and modulates between EXF min. speed and EXF max. speed based on a third-party signal. The EXF turns off when the OAD closes. Recommended for single-zone applications with SAV or CV IDF control to relieve building pressure during free cooling. Recommended for applications that require third-party control.</td><td>Requires third-party relief input to be configured for exhaust fan and a local or network speed modulation input.</td></tr>
<tr><td rowspan="2">3 = Building Pressure</td><td>Multi-Stage Power Exhaust (MSPE)
The EXF stages between off and four (20-50 ton units) or six (60 ton units) fan stages based on building pressure (BP) and the BP setpoint (default for units with BP control). When the OAD is open and the BP is above the BP setpoint + BP threshold for the BP time, the EXF stages up to the next available stage. When the OAD is open and the BP is below the BP setpoint - BP threshold for the BP time, the EXF stages down to the next available BP stage or off. When the OAD is closed, the EXF is off. Recommended for most applications.</td><td rowspan="2">Requires third-party EAD/BP input to be configured for BP and a local BP sensor or a network BP input. Requires the economizer and power exhaust to be configured for enabled.</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
The EXF modulates speed to maintain the building pressure at the BP setpoint (default for units with BP control). If the BP is above the BP setpoint +.02 in. wg, the EXF turns on and modulates between the min. and max. EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint -.02 in. wg, the EXF turns off. When the OAD is closed, the EXF is off. Recommended for most applications.</td></tr>
<tr><td>EXF Min. Speed</td><td>0 to 100%
0% Default</td><td>The minimum speed the exhaust fan operates at when enabled.</td><td rowspan="2">Only used when EXF control is configured for third-party or BP control. An air balance is required to set the exhaust fan airflow based on application requirements. Improper exhaust fan control can cause building damage.</td></tr>
<tr><td>EXF Max. Speed</td><td>0 to 100%
100% Default</td><td>The maximum speed the exhaust fan operates at when enabled.</td></tr>
</table>

Table U — Exhaust Fan Configurations by Application (cont)

ITEM	CONFIGURATION	DESCRIPTION	NOTES
EXF Speed OAD Pos 1	0 to 100% 33% Default	The EXF speed when the OAD is at or above the EXF OAD Pos 1 and below EXF OAD Pos 2.	Only used with high-capacity power exhaust configured for OAD mapping. An air balance is required to set the exhaust fan and outdoor air damper positions based on application requirements. Improper exhaust fan control can cause building damage.
EXF Speed OAD Pos 2	0 to 100% 66% Default	The EXF speed when the OAD is at or above the EXF OAD Pos 2.	
EXF OAD Pos 1	0 to 100% 33% Default	The OAD position that triggers EXF Speed OAD Pos 1.	
EXF OAD Pos 2	0 to 100% 66% Default	The OAD position that triggers EXF Speed OAD Pos 2.	
EXF OAD Position 1	0 to 100% 45% Default	The OAD position that triggers EXF stage 1.	Only used with multi-stage power exhaust configured for OAD mapping. An air balance is required to set the exhaust fan and outdoor air damper positions based on application requirements. Improper exhaust fan control can cause building damage.
EXF OAD Position 2	0 to 100% 60% Default	The OAD position that triggers EXF stage 2.	
EXF OAD Position 3	0 to 100% 75% Default	The OAD position that triggers EXF stage 3.	
EXF OAD Position 4	0 to 100% 90% Default	The OAD position that triggers EXF stage 4.	
EXF OAD Position 5	0 to 100% 100% Default	The OAD position that triggers EXF stage 5.	Only used on 60 ton units with multi-stage power exhaust configured for OAD mapping. An air balance is required to set the exhaust fan and outdoor air damper positions based on application requirements. Improper exhaust fan control can cause building damage.
EXF OAD Position 6	0 to 100% 100% Default	The OAD position that triggers EXF stage 6.	
EXF Smoke Purge Speed	0 to 100% 0% Default	The EXF speed when smoke purge mode is activated.	Only used when smoke control inputs are enabled. An air balance is required to set the smoke control speed configurations based on application requirements. Improper smoke control mode configuration can cause building damage.
EXF Smoke Evac. Speed	0 to 100% 0% Default	The EXF speed when smoke evacuation mode is activated.	

Table V — Free Cooling Configurations

ITEM	CONFIGURATION	DESCRIPTION	NOTES
Occ. Free Cooling	Enable	Free cooling is allowed during the occupied period. Recommended for most applications.	Requires economizer to be configured for enabled. Ensure building pressure relief is available.
	Disable	Free cooling is prevented during the occupied period.	—
Unoccupied Free Cooling	Enable	Free cooling is allowed during the unoccupied period.	Requires economizer to be configured for enabled. Ensure building pressure relief is available.
	Disable	Free cooling is prevented during the occupied period.	—
Changeover Select	0 = None	Changeover check is not used.	—
	1 = Diff Dry Bulb	The control compares the outdoor air temperature (OAT) to the return air temperature (RAT). Free cooling is allowed when OAT ≤ RAT - Diff Dry Bulb Threshold. Recommended for dry climates.	—
	2 = Outdoor Enthalpy	The control checks the outdoor air enthalpy (OAE). Free cooling is allowed when OAE ≤ 28 btu/lb. Recommended for use in humid climates with dry bulb changeover.	Requires the OARH input to be enabled and a local OARH sensor or network OARH input. OAE is calculated from OAT and OARH.
	3 = Diff Enthalpy	The control compares the outdoor air enthalpy (OAE) to the return air enthalpy (RAE). Free cooling is allowed when OAE ≤ RAE - Diff Enthalpy Threshold. Recommended for humid climates.	Requires the OARH and RARH inputs to be enabled and local OARH and RARH sensors or network OARH and RARH inputs. OAE and RAE are calculated from OAT and OARH and RAT and RARH.
OAT Dry Bulb Threshold	–40°F to 120°F (65°F Default)	The temperature that the OAT must be at or below to allow free cooling.	Only used when Dry Bulb Changeover is enabled. For units without low ambient, it is recommended to set the OAT dry bulb threshold at the same value as the high cool or VAV cool SAT setpoint.
Dry Bulb Changeover	Enable (Default)	The control compares the outdoor air temperature (OAT) to the OAT Dry Bulb Threshold. Free cooling is allowed when OAT ≤ OAT Dry Bulb Threshold. Recommended for dry climates or for use with enthalpy changeover in humid climates. applications.	—
	Disable	The control does not check OAT to determine free cooling.	—
Diff Enthalpy Threshold	0 to 2 btu/hr., (0.5 btu/hr. Default)	The amount that the OAE must be below the RAE to allow free cooling.	Only used when Changeover Select is set to Diff Enthalpy.
OADP Limit Check	Enable	The control compares the outdoor air dew point (OADP) temperature to the OADP Threshold. Free cooling is allowed when OADP ≤ OADP Threshold. Recommended for applications in humid climates if enthalpy changeover isn't used.	Requires the OARH input to be enabled and a local OARH sensor or network OARH input. OADP is calculated from OAT and OARH.
	Disable (Default)	The control does not check OADP to determine if free cooling is available.	—
OADP Threshold	50°F to 62°F (60°F Default)	The temperature that the OADP must be at or below to allow free cooling.	Only used when OADP Limit Check is enabled.
Diff Dry Bulb Threshold	0°F to 10°F (2°F Default)	The temperature that the OAT must be below the RAT to allow free cooling.	Only used when Changeover Select is set to Diff Dry Bulb.
IAQ Switch OAD Pos Reset	–100°F to 0°F (55°F Default)	Sets the OAD Position Reset value when the IAQ switch input is inactive.	Requires IAQ reset to be configured for IAQ switch and the IAQ/OAQ input to be configured for IAQ switch and local or network IAQ switch input.

STEP O — 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. AP for indoor fan setpoint screen layout. See Table W for indoor fan setpoint details.

When finished, press the save changes button Save at the bottom of the screen.

STEP P — 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. AQ for cooling setpoint screen layout. See Table X for cooling setpoint details. When finished, press the save changes button Save at the bottom of the screen.

IMPORTANT: Units configured for RAT cool/heat demand source use the Occupied Heating setpoint for cool demand determination. See Fig. AQ for example of cooling setpoint screen options.

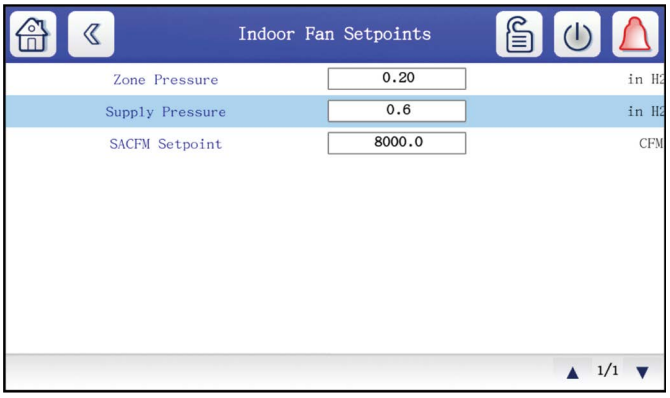


Fig. AP — Indoor Fan Setpoints Screen

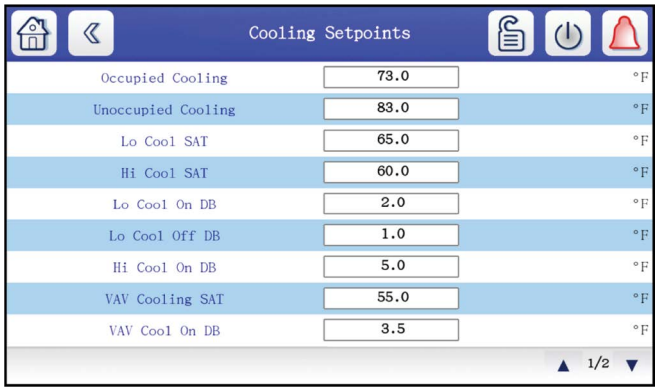


Fig. AQ — Cooling Setpoints Screen

Table W — Indoor Fan Setpoints

ITEM	SETPOINT	DESCRIPTION	NOTES
Supply Pressure	0.5 to 3 in H_2O, (1 in H_2O Default)	The SP control point used when the IDF is configured for SP control.	Only used when IDF is configured for SP control. For units with staged heat, the IDF behavior is SAV even when the IDF is configured for SP control.

Table X — Cooling Setpoints

ITEM	SETPOINT	DESCRIPTION	NOTES
Occupied Cooling Setpoint	50 to 100°F (73°F Default)	The cooling temperature used during the occupied period for SPT cool/heat demand source for demand determination. Also used to determine SAT reset for temperature based SAT reset sources (RAT, SPT, OAT). to determine the SP reset for temperature based (RAT, SPT, OAT) SP reset sources, and to determine temperature compensated (TC) start for cooling.	The RAT cool/heat demand source uses the Occupied Heating setpoint to calculate the effective cooling temperature during the occupied period. When Airside Linkage is active, the control will use the Linkage average zone cooling setpoints instead of the unit cooling setpoints.
Unoccupied Cooling Setpoint	50 to 100°F (80°F Default)	The cooling temperature used during the occupied period for SPT and RAT cool/heat demand sources for demand determination.	When Airside Linkage is active, the control will use the Linkage average zone cooling setpoints instead of the unit cooling setpoints.
Low Cool SAT	55 to 75°F (60°F Default)	The SAT control point with a Low Cool demand.	Only used with TSAT or SPT cool/heat demand source.
High Cool SAT	45 to 75°F (55°F Default)	The SAT control point with a High Cool demand.	—
VAV Cool SAT	45 to 75°F (55°F Default)	The SAT control point with a VAV Cool demand.	Only used with RAT cool/heat demand source.
Vent SAT	45 to 75°F (70°F Default)	The SAT control point with a Vent demand.	—
Low Cool On DB	0 to 2°F (1°F Default)	Used as part of SPT cool/heat demand processing to determine when a Low Cool demand starts during the occupied period. Also used as part of SPT and RAT cool/heat demand source to determine when a High Cool demand starts during the unoccupied period.	—
Low Cool Off DB	0.5 to 2°F (1°F Default)	Used as part of SPT cool/heat demand processing to determine when a Low Cool demand starts during the occupied period. Also used as part of SPT and RAT cool/heat demand source to determine when a High Cool demand starts during the unoccupied period.	—
High Cool On DB	0.5 to 20°F (2°F Default)	Used as part of SPT and RAT cool/heat demand sources to determine when a High Cool demand starts.	—
VAV Cool On DB	0 to 25ºF (3.5ºF Default)	Used as part of RAT cool/heat demand processing to determine when a VAV Cool demand starts during the occupied period.	Only used with RAT cool/heat demand source, which uses the **Occupied Heating setpoint plus the VAV Cool On Deadband** to start a VAV Cool demand during the occupied period. If the Occupied Heating setpoint is reduced, the VAV Cool On Deadband should be increased to prevent cooling from starting when the RAT is below 67°F.
VAV Cool Off DB	1 to 25ºF (2ºF Default)	Used as part of RAT cool/heat demand processing to determine when a VAV Cool demand stops during the occupied period.	Only used with RAT coo/heat demand source.

STEP Q — 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. AR for dehumidify setpoint screen layout. See Table Y for dehumidify setpoint details.

When finished, press the save changes button Save at the bottom of the screen.

STEP R — SET HEATING SETPOINTS

For units with heat, navigate to the Heating Setpoint screen (***Main Menu → Setpoints → Heating Setpoints***). Adjust the heating setpoints based on application requirements. See Fig. AS for heating setpoint screen layout. See Table Z for setpoint details. When finished, press the save changes button Save at the bottom of the screen.

IMPORTANT: Units configured for RAT cool/heat demand source use the Occupied Heating setpoint for cool demand determination. See Fig. AS for example of heating setpoint screen options.

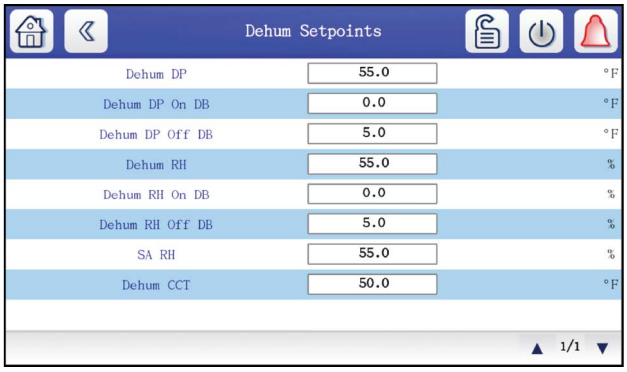


Fig. AR — Dehumidify Setpoints Screen

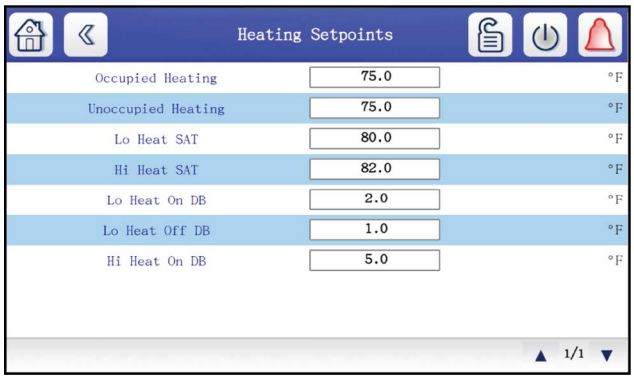


Fig. AS — Heating Setpoints Screen

Table Y — Dehumidify Setpoints

ITEM	SETPOINT	DESCRIPTION	NOTES
Dehum. RH	40 to 100% 55% Default	The relative humidity target used with SPRH or RARH dehumidify demand source for demand determination.	Only used when the dehumidify demand source is configured for RARH or SPRH.
Dehum. RH On DB	0 to 20% 0% Default	Used as part of RH dehumidify demand processing to determine when a dehumidify demand starts.	
Dehum. RH Off DB	1 to 20% 5% Default	Used as part of RH dehumidify demand processing to determine when a dehumidify demand stops.	
Dehum. CCT	40 to 60°F 50°F Default	The cooling coil temperature (CCT) control point used during dehumidification mode.	CCT approximates supply air dewpoint.

Table Z — Heating Setpoints

ITEM	SETPOINT	DESCRIPTION	NOTES
Occupied Heating	55 to 80°F (68°F Default)	The heating temperature used during the occupied period for RAT or SPT cool/heat demand source for demand determination. Also used to determine SAT reset for temperature based SAT reset sources (RAT, SPT, and OAT). to determine the SP reset for temperature based (RAT, SPT, and OAT) SP reset sources, and to determine temperature compensated (TC) start for heating.	The RAT cool/heat demand source uses the Occupied Heating setpoint to calculate the effective cooling temperature during the occupied period. When Airside Linkage is active, the control will use the Linkage average zone heating setpoints instead of the unit heating setpoints.
Unoccupied Heating	40 to 80°F (60°F Default)	The heating temperature used during the occupied period for SPT and RAT cool/heat demand sources for demand determination.	When Airside Linkage is active, the control will use the Linkage average zone heating setpoints instead of the unit heating setpoints.
Low Heat SAT	60 to 115°F (85°F Default)	The SAT control point with a Low Heat demand.	Not used with staged heat.
High Heat SAT	60 to 125°F (95°F Default)	The SAT control point with a High Heat demand.	
Low Heat On DB	0 to 2°F (1°F Default)	Used as part of RAT or SPT cool/heat demand processing to determine when a Low Heat demand starts. Also used as part of RAT cool/heat demand processing to determine when a VAV cool demand starts during the occupied period.	For RAT cool/heat demand source, If the low heat on deadband is reduced, the VAV cool on deadband must be increase.
Low Heat Off DB	0.5 to 2°F (1°F Default)	Used as part of RAT or SPT cool/heat demand processing to determine when a High Heat demand starts. Also used as part of RAT cool/heat demand processing to determine when a VAV cool demand starts during the occupied period.	—
High Heat On DB	0.5 to 20°F (2°F Default)	Used as part of RAT or SPT cool/heat demand processing to determine when a High Heat demand starts during the occupied or unoccupied period.	—

STEP S — 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***). Adjust the building pressure setpoint based on application requirements. See Fig. AT for exhaust fan setpoint screen layout. See Table AA for building pressure setpoint details.

When finished, press the save changes button Save at the bottom of the screen.

STEP T — 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 Network Integration 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, press the home button to exit to the home screen. When finished, press the save changes button Save at the bottom of the screen.

NOTE: The local schedule is ignored if the occupancy switch is enabled or if the primary BAS network is configured for CCN or BACnet on the CCN or BACnet configuration 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.

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

Occupancy Switch

The remote input can be configured for an occupancy switch. Refer to “STEP G — CONFIGURE EQUIPMENT FOR FIELD INSTALLED SWITCHES” on page 105 for guidance on configuring the remote switch. See Table AB for remote switch setpoint details.

Fig. AT — Exhaust Fan Setpoints Screen

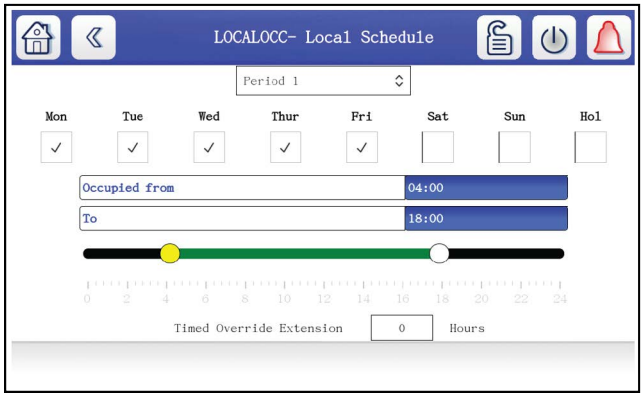


Fig. AU — Local Schedule Screen

Table AA — Exhaust Fan Setpoints

ITEM	SETPOINT	DESCRIPTION	NOTES
Building Pressure	–0.25 to 0.25 in H_2O (0.03 in H_2O Default)	The BP target used when the EXF is configured for BP control.	Only used with BP EXF control.

Table AB — 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

APPENDIX H — 48/50K SMARTVU CONTROL NAVIGATION

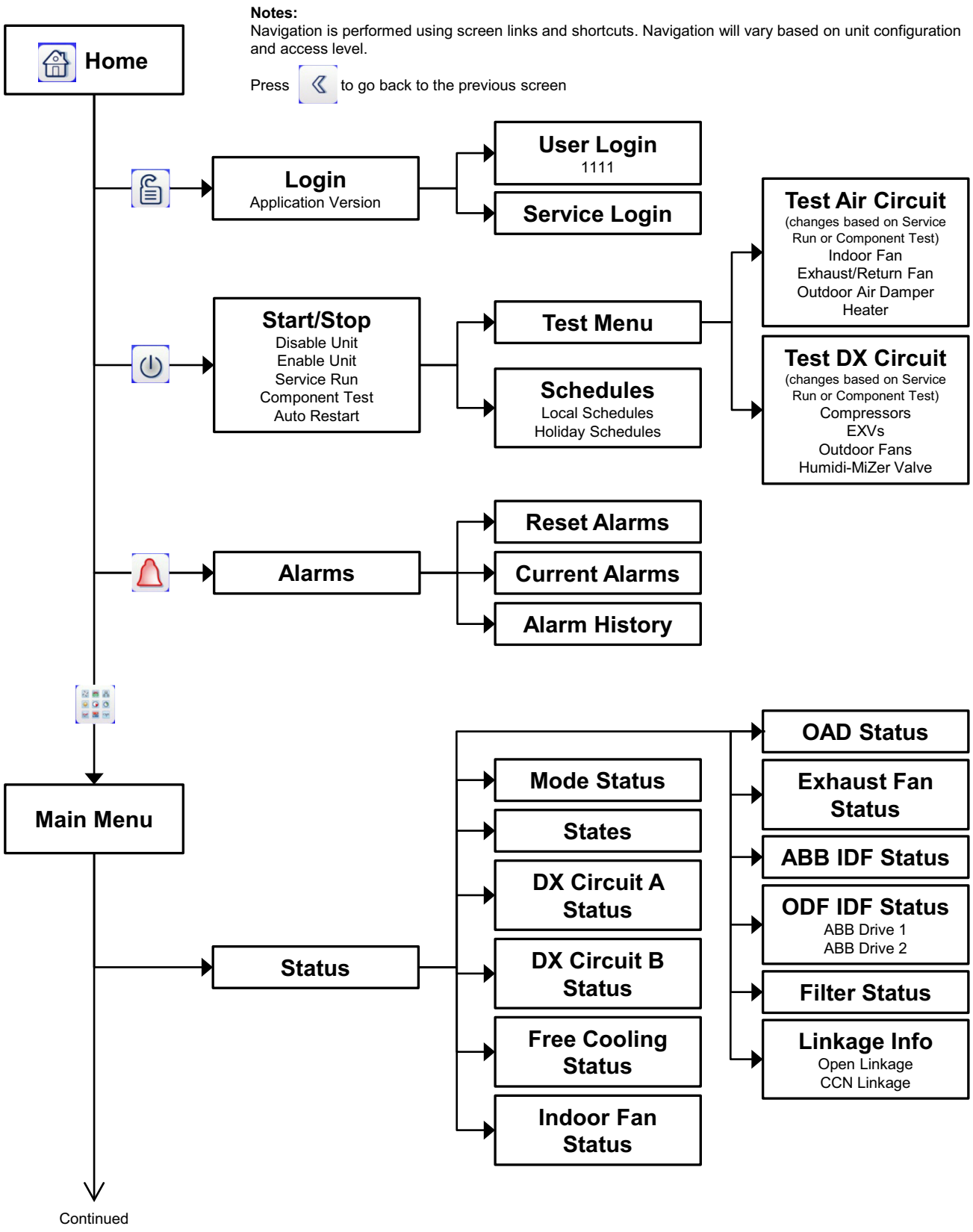


Fig. AV — 48/50K SmartVu Control Navigation V3.3

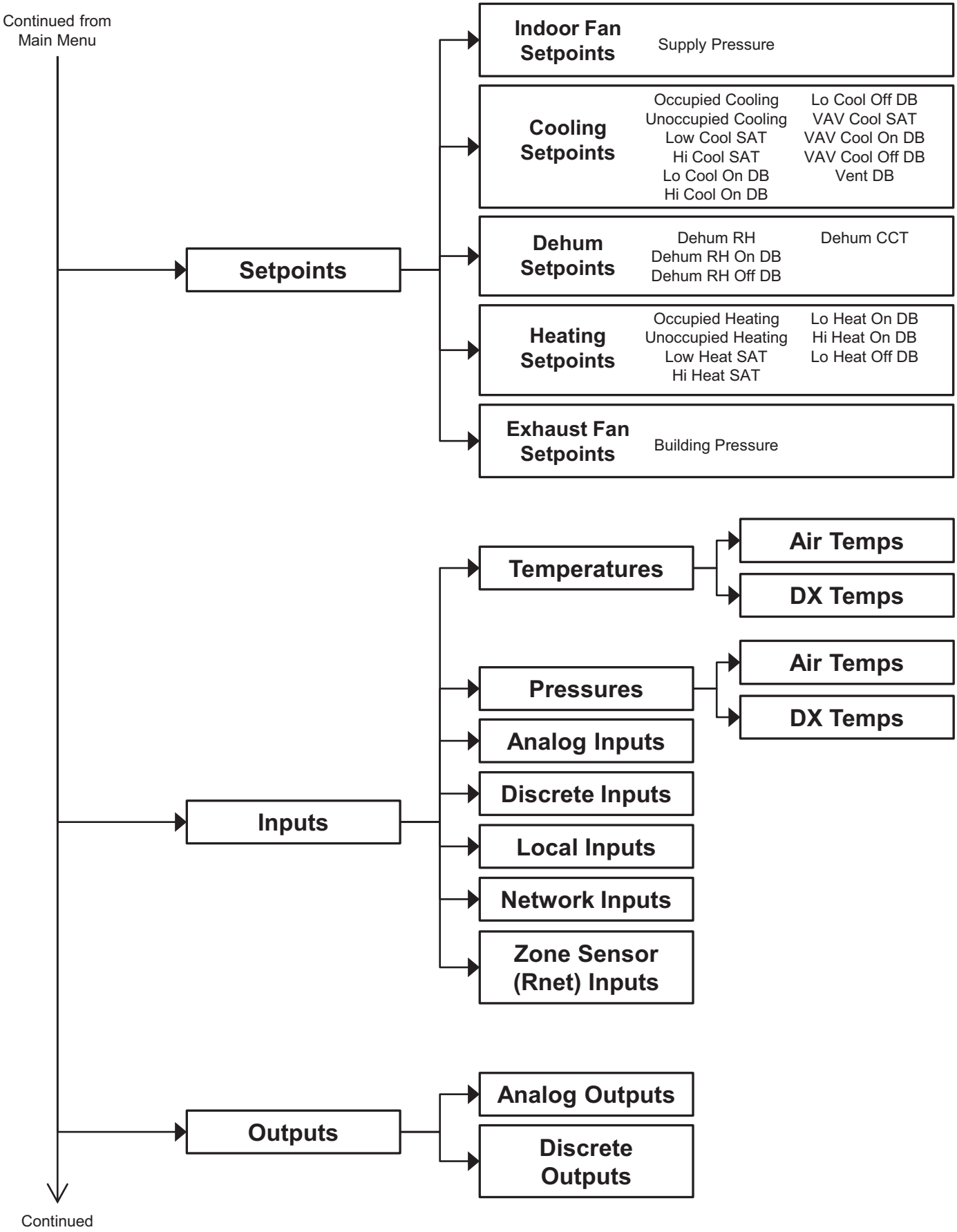


Fig. AV — 48/50K SmartVu Control Navigation V3.3 (cont)

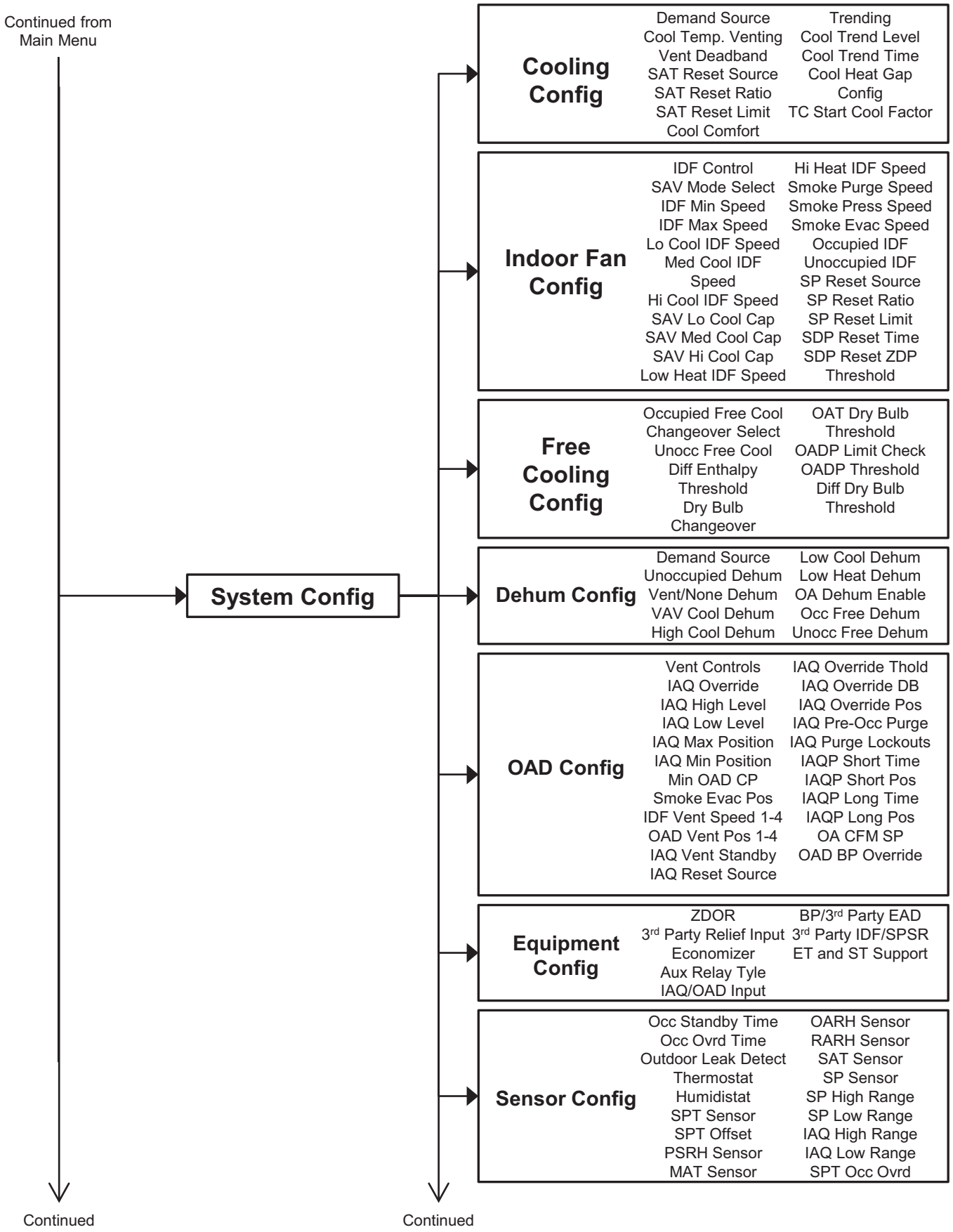


Fig. AV — 48/50K SmartVu Control Navigation V3.3 (cont)

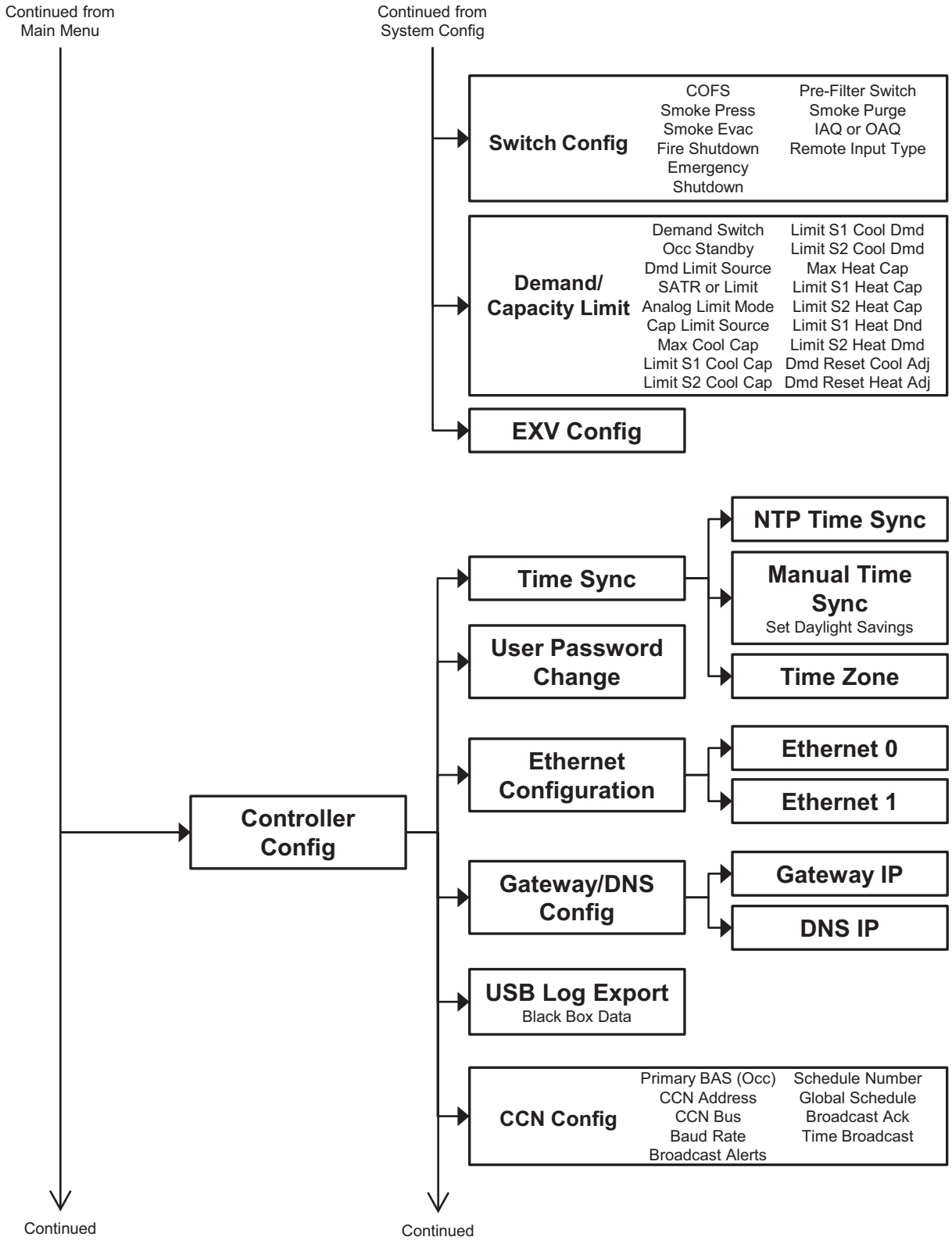


Fig. AV — 48/50K SmartVu Control Navigation V3.3 (cont)

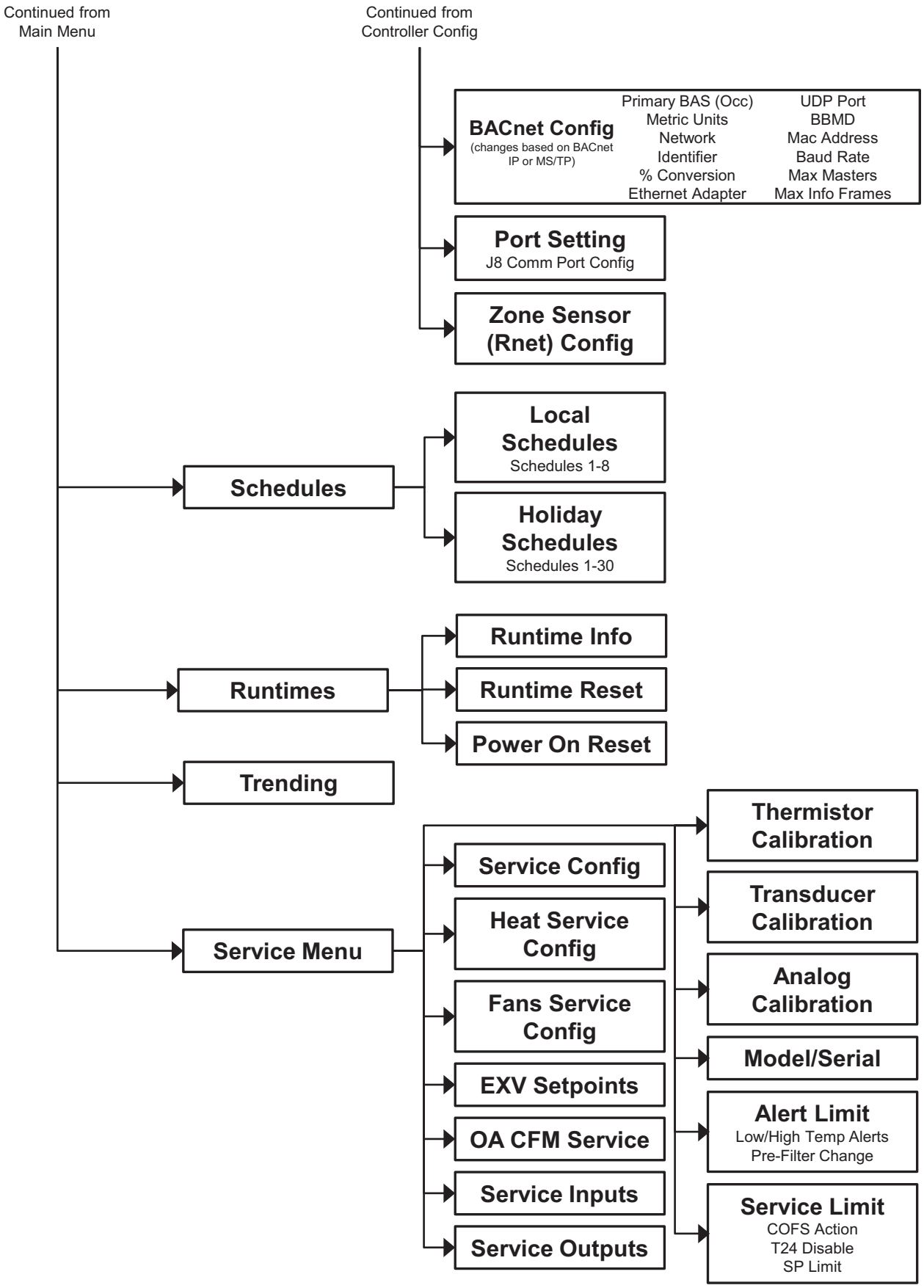


Fig. AV — 48/50K SmartVu Control Navigation V3.3 (cont)

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

Catalog No. 04-53500513-01 Printed in U.S.A. Form No. 50K-3SI Pg 132 4-26 Replaces: 50K-2SI

50K PRE-START-UP CHECKLIST

(The pre-start-up checklist must be completed by installing contractor. The pre-start-up checklists must be submitted to the Carrier start-up team prior to scheduling factory start-up. Fill in all blanks and circle items in brackets.
Save a copy of the pre-start-up-checklists with the unit.)

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, wear personal protective equipment (PPE), and adhere to the safety considerations/information as outlined in preceding sections of this Installation and Start-Up Instruction document.

I. UNIT INFORMATION

MODEL NUMBER: _____
UNIT/TAG NAME: _____
SERIAL NUMBER: _____
BUILDING NAME: _____
SOFTWARE UPDATED: _____ (Y/N)

Carrier recommends updating to the latest software prior to configuring the unit controls or performing start-up. Visit http://www.HVACPartners.com or contact your local Carrier applied sales office to obtain the latest SmartVu software.

FACTORY APPLICATION VERSION:_____ CURRENT APPLICATION VERSION:_____

Application version listed on the login screen (***HOME→LOGIN***).

II. INSTALLATION CHECKS

Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Record any issues in the Start-up Notes section.

1. Verify packing materials have been removed from the unit. (Y/N) _____
2. Verify the unit is free of damage. If damage exists, contact your local Carrier sales representative. (Y/N) _____
3. Verify the unit has been installed in accordance with the service clearances in the installation instructions. (Y/N) _____
4. Verify the unit support structure (curb, etc.) has been installed as instructed in the installation instructions. (Y/N) _____
5. Verify the unit is within level tolerances to promote proper condensate drainage. (Y/N) _____
6. Verify a properly sized condensate drain with trap has been installed and is free from obstructions. (Y/N) _____
7. Verify gasket sealing material has been applied around all duct openings or curb openings. (Y/N) _____
8. Verify the outdoor air temperature sensor assembly has been relocated to the outdoor air hood. (Y/N) _____
9. Verify the outdoor air hoods and screens have been installed and are free from obstruction. (Y/N) _____
10. Verify the unit power feed is installed, and the wire size meets the nameplate MCA for each connection. (Y/N) _____
11. Verify the power feed voltage and phasing have been verified to match the unit voltage and phasing. (Y/N) _____
12. Verify overcurrent protection (fuse or breaker) is installed and does not exceed the nameplate MOCP. (Y/N) _____
13. Verify the unit ground wire has been connected to a proper grounding source. (Y/N) _____
14. Verify a means of disconnecting and locking out electrical service at the unit has been provided. (Y/N) _____
15. Verify all electrical connections and terminals are tight, and all terminals are free from corrosion. (Y/N) _____
16. Verify 208-v units, the control transformer voltage has been changed. (Y/N) _____
17. Verify thru-the-base power and control wire connections have been sealed. (Y/N) _____
18. Verify applications with air terminal units, the terminal controls are configured to open dampers and disable electric heaters when the unit is in A2L dissipation mode. (Y/N) _____
19. Verify all A2L leak dissipation requirements (minimum space area, minimum airflow, etc.) have been met. (Y/N) _____
20. Verify all temperature sensors are reading correctly (***HOME→MAIN MENU→INPUTS→TEMPERATURES***). (Y/N) _____
21. Verify all pressure sensors are reading correctly (***HOME→MAIN MENU→INPUTS→PRESSURES***). (Y/N) _____
22. Verify all analog inputs are reading correctly ***(HOME→MAIN MENU→INPUTS→ANALOG INPUTS).*** (Y/N) _____

III. FACTORY-INSTALLED OPTION CHECKS

Refer to the unit model number and model number nomenclature in Appendix C on page 92 for factory-installed options. Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Record any issues in the Start-up Notes section.

1. Units with manual outdoor air dampers: Damper stops have been set for application airflow. (Y/N) _____
2. Units with outdoor air measuring: Airflow probes have been relocated to the outdoor air intake. (Y/N) _____
3. Units with barometric relief: Relief assembly has been tipped out to the operating position. (Y/N) _____
4. Units with power exhaust: Exhaust assembly has been tipped out to the operating position. (Y/N) _____
5. Units with building pressure control: A field-supplied space pressure pickup port has been installed in the space and connected with pneumatic tubing to the high side of the transducer. (Y/N) _____
6. Units with power and control for an accessory exhaust: Exhaust system has been installed and power and control wiring (if applicable) connected according to the installation instructions. (Y/N) _____
7. Units with humidity and enthalpy sensing: Outdoor air relative humidity sensor has been relocated to the outdoor air hood (with outdoor air temperature sensor). (Y/N) _____
8. Units with supply pressure (VAV) control: Field-supplied duct pressure pickup port has been installed in the duct and connected with pneumatic tubing to the high side of the transducer. (Y/N) _____
9. Units with hot water heat: All field provided devices (including actuated hot water valve and freeze stat) have been installed. The valve actuator and freeze-stat have been wired back to the control harness. (Y/N) _____
10. Units with modulating electric or hot water heat: The supply air temperature sensor has been installed in the supply ductwork per the installation instructions and wired back to the supply air temperature harness. (Y/N) _____
11. Units with pre-filter status switch: Pre-filter status switch pressure has been set. (Y/N) _____
12. Units with unpowered convenience outlet: A 115-v power supply has be connected to the convenience outlet. (Y/N) _____
13. Units with high SCCR: Current limiting, "J" type fuses, not exceeding 600A, have been installed in the line side of the unit power feed. (Y/N) _____
14. Units with UV-C fixtures: A 115-v power supply has been connected to the UV disconnect. (Y/N) _____
15. Units with service pack: Compressor and filter drier isolation valves are open. (Y/N) _____

IV. ACCESSORY CHECKS

Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Fill in all blanks within the activity if applicable. Record any issues in the Start-up Notes section.

1. Units with UV-C fixtures: accessory UV emitters have been installed. (Y/N) _____
2. The following accessories have been installed:_____ (Y/N) _____
3. The following sensors have been installed: _____ (Y/N) _____
4. The following switches/relays have been installed: _____ (Y/N) _____

V. EQUIPMENT CHECKS

Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Fill in all blanks within the activity. Record any issues in the Start-up Notes section.

NOTE: Some of the following activities require the unit to be powered on to verify functionality. Ensure the unit is disabled on the Start/Stop screen to prevent operation. Do not operate the cooling or heating systems until start-up has been performed.

⚠ WARNING

Do not access the unit interior while the unit is powered. The unit may operate unexpectedly.

1. Verify the indoor air filters are installed with the correct airflow direction and are clean. Y/N_____
2. Verify the indoor coil(s) is clean and free from defects. Y/N_____
3. Verify the indoor fan rotates freely and is free from defects. Y/N_____
4. Verify the indoor fan drive belt is tight and the fan and motor are properly aligned. Y/N_____
5. Verify a sealing bead of grease is visible at all indoor fan bearing seals. If not, grease bearings as needed using Regal AFB-2 or similar. Y/N_____
6. Verify the outdoor coils are clean and free from obstructions and defects. Y/N_____
7. Verify the outdoor fans rotate freely and are free from defects. Y/N_____
8. For units with economizer: Verify the outdoor and return air dampers rotate the correct direction and without binding. Y/N_____
9. For units that have been in storage: Verify the unit has been prepared for operation according to the installation instructions. Y/N_____
10. Verify all compressor crank case heaters are confirmed to be operational. The crank case heaters will automatically operate when the unit is powered, the compressors are off, and the outdoor air temperature is below 80°F (26.6°C). Component Run Test can also be used to enable crank case heaters. Refer to Appendix A "START-UP CONTROL OPERATION" on page 87 for instructions. Y/N_____

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).

_____

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VI. CONTROL CONFIGURATION

Control configuration is not included in factory start-up. Fill in the table to record the unit control settings after unit control has been configured. Refer to Appendix G "CONTROL QUICK SETUP" on page 111 for instructions.

Schedule

CONFIGURATION	VALUE	
(Main Menu →Schedules →Local Schedule)		
Period 1	**Mon Tue Wed Thu Fri Sat Sun**	
	Occ From:	To:
Period 2	**Mon Tue Wed Thu Fri Sat Sun**	
	Occ From:	To:
Period 3	**Mon Tue Wed Thu Fri Sat Sun**	
	Occ From:	To:
Period 4	**Mon Tue Wed Thu Fri Sat Sun**	
	Occ From:	To:
Other Periods		

Equipment Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → Equipment Config)	
ZDOR	Enable/Disable
Third-Party Relief Input	0=None
	2= Power Exhaust
Economizer (OAD)	Enable/Disable
Auxiliary Relay	0=Not Used
	1=Alarm Status
	2=OCC Status
IAQ/OAD Input	0=Not Used
	1=IAQ Sensor
	2=Third-party OAD Mod.
	3=Third-Party OAD Reset
	4=Third-Party OACFM Reset
BP Sensor/ Third-Party EAD Input	0=None
	2=BP Sensor
Third-Party IDF Input	0=None
	1=Third-party IDF Mod.
	2=Third-party IDF SPRH
Equipment and System Touch	Enable/Disable

Sensor Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → Sensor Config)	
Occupied Standby Time	Min.
Occupied Override Time	Hrs.
Thermostat	Enable/Disable
Humidistat	Enable/Disable
SPT Sensor	Enable/Disable
SPT Offset	Enable/Disable
SPRH Sensor	Enable/Disable
MAT Sensor	Enable/Disable
OARH Sensor	Enable/Disable
RARH Sensor	Enable/Disable
SAT Sensor	Enable/Disable
SP Sensor	Enable/Disable
Occ Override Second Press	0=Reset
	1=Clear

Switch Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → Equipment Config)	
COFS	Enable/Disable
Pressurization Switch	Enable/Disable
Fire Shutoff Switch	Enable/Disable
Emergency Shutdown Switch	Enable/Disable
Pre-filter Switch	Enable/Disable
Smoke Purge Switch	Enable/Disable
IAQ or OAQ Input	0= Not Used
	1=IAQ Switch
	2=OAQ Switch
Remote Input	0=Not Used
	1=Remote Shutdown
	2=Remote Occupancy

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)
	7 = Single-Zone VAV
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)
IDF Low Heat Speed	% (SAV only)
IDF High Heat Speed	% (SAV only)
Occupied Fan	0=Demand
	1=Continuous
Unoccupied Fan	0=Disabled
	1=Demand
IDF Purge Speed	%
IDF Press Speed	%
IDF Evac. Speed	%
SP Reset Source	0=None
	1=RAT
	2=SPT
	4=Third-Party
	5= Average ZPD
SP Reset Ratio	in H_2O/°F
SP Reset Limit	in H_2O
SP Reset ZSP Threshold	%

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
	5=OACFM
	6=IAQ
IAQ Low Level	PPM
IAQ High Level	PPM
IAQ Min. Position	%
IAQ Max. Position	%
OAD Min. Position	%
OAD Max. Position	%
OAD Evac. 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)
IAQ Vent Standby	Enable/Disable
IAQ Reset Source	0=None
	1= IAQ Switch
	2= IAQ Sensor
	3= Third-Party Input
IAQ Override Threshold	PPM
IAQ Override Deadband	PPM
IAQ Override Position	%
IAQ Pre-Occ Purge	Enable/Disable
IAQ Purge OAT Low Lockout	°F
IAQ Purge OAT High Lockout	°F
IAQ Purge Short Position	%
IAQ Purge Long Position	%
IAQ OA CFM Reset	CFM
Purge Short Duration	Min.
Purge Long Duration	Min.
BP Override Enable	Enable/Disable
BP Override Threshold	in H_2O
BP Override Deadband	in H_2O
OACFM Setpoint	CFM

Cooling Configurations

CONFIGURATION	VALUE
(Main Menu→System Config →Cooling Config)	
Cool/Heat Demand Source	0= None
	2 = SPT
	3 = RAT
	5 = TSTAT
Cool Tempered Venting	Enable/Disable
Vent Deadband	°F
SAT Reset Source	0=None
	1=RAT
	2=SPT
	3=OAT
	4=Third-Party Input
	5= Fixed Setpoint
SAT Reset Ratio	°F
SAT Reset Limit	°F
Cool Comfort Trending	Enable/Disable
Cool Trend Level	°F
Cool Trend Time	Min.
Cool/Heat Gap	%
TC Start Cool Factor	°F/Min.

Heater Configurations

CONFIGURATION	VALUE
(Main Menu→System Config →Cooling Config)	
Heat Tempered Venting	Enable/Disable
Heat Tempered Cooling	Enable/Disable
Heat Tempered Deadband	°F
Heat Comfort Trending	Enable/Disable
Heat Trend Level	°F
Heat Trend Time	Min.
Occupied Heating Type	0=Always
	1-One Cycle Heat
	2=Until Cooling
TC Start Cool Factor	°F/Min.

Dehumidify Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config→Dehum Config)	
Demand Source	0=None
	1 = HSTAT
	2 = RARH
	3 = SPRH
Unoccupied Dehumidification	Enable/Disable
Vent/None Dehumidification	Enable/Disable
High Cool Dehumidification	Enable/Disable
Low Cool Dehumidification	Enable/Disable
Low Heat Dehumidification	Enable/Disable
High Heat Dehumidification	Enable/Disable
OA Dehum. Enable	Enable/Disable
Occupied Free Dehum.	Enable
	Enable/Disable
Unoccupied Free Dehum.	Enable/Disable
	Enable/Disable

Exhaust Fan Configurations

CONFIGURATION	VALUE
(Main Menu→System Config→Exhaust Fan Config)	
Exhaust Fan Control	0 = None
	1 = OAD Mapping
	2 = Third-Party
	3 = Building Pressure
EXF Max. Speed	%
EXF Speed OAD Pos 1	% (OAD Map with HCPE Only)
EXF Speed OAD Pos 2	% (OAD Map with HCPE Only)
EXF OAD Pos 1	% (OAD Map with HCPE Only)
EXF OAD Pos 2	% (OAD Map with HCPE Only)
EXF OAD Position 1	% (OAD Map with MSPE Only)
EXF OAD Position 2	% (OAD Map with MSPE Only)
EXF OAD Position 3	% (OAD Map with MSPE Only)
EXF OAD Position 4	% (OAD Map with MSPE Only)
EXF OAD Position 5	% (OAD Map with MSPE Only)
EXF OAD Position 6	% (OAD Map with MSPE Only)
EXF Purge Speed	%
EXF Evacuation Speed	%

Free Cooling Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config→Free Cool Config)	
Occupied Free Cooling	Enable/Disable
Unoccupied Free Cooling	Enable/Disable
Changeover Select	0 = None
	1 = Diff Dry Bulb
	2 = Outdoor Enthalpy
	3 = Diff Enthalpy
OADP Limit Check	Enable/Disable
Dry Bulb Changeover	Enable/Disable
OAT Dry Bulb Threshold	°F
OADP Threshold	°F
Differential Dry Bulb Threshold	°F
Differential Enthalpy Threshold	Btu/lb
IAQ Switch OAD Pos Reset	%

CONFIGURATION NOTES:_____

_____

_____

_____

_____

VII. CONTROL SETPOINTS

Control setpoint setup is not included in factory start-up. Fill in the tables to record the unit control configuration values. Refer to Appendix G "CONTROL QUICK SETUP" on page 111 for instructions.

Indoor Fan Setpoints

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

Cooling Setpoints

(Main Menu → Setpoints →Cooling Setpoints)	
SETPOINT	**VALUE**
Occupied Cooling	°F
Unoccupied Cooling	°F
Low Cool SAT	°F
High Cool SAT	°F
Low Cool On DB	°F
Low Cool Off DB	°F
High Cool On DB	°F
VAV Cool SAT	°F
VAV Cool On DB	°F
VAV Cool Off DB	°F
Vent SAT	°F

Dehumidify Setpoints

(Main Menu → Setpoints →Dehum Setpoints)	
SETPOINT	**VALUE**
Dehum. DP	°F
Dehum. DP On DB	°F
Dehum. DP Off DB	°F
Dehum. RH	°F
Dehum. RH On DB	°F
Dehum. RH Off DB	°F
Dehum. CCT	°F

Heating Setpoints

(Main Menu → Setpoints →Heating Setpoints)	
SETPOINT	**VALUE**
Occupied Heating	°F
Unoccupied Heating	°F
Low Heat SAT	°F
High Heat SAT	°F
Low Heat On DB	°F
Low Heat Off DB	°F
High Heat On DB	°F

Exhaust Fan Setpoints

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

CONTROL SETPOINT NOTES:_____

_____

_____

_____

_____

VIII. APPLICATION CHECKS

The installing contractor is responsible for verifying the equipment operates according the project specifications and within the operating limits in the product data manual. Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Fill in all blanks within the activity. Record any issues in the Notes section.

1. Verify an air balance has been performed on the system.
   Refer to Appendix B"AIR BALANCE INSTRUCTIONS" on page 89 for air balance instructions.
   Include a copy of the air balance with the pre-start-up checklist. Y/N_____
2. Verify the supply fan sheaves and belt have been changed from the factory configuration. Y/N_____
3. Verify the supply fan total static pressure (supply static - return static) is below the maximum total external static pressure listed in the supply fan performance table. Y/N_____
4. Verify the supply fan minimum and maximum cooling airflows are within the listed cooling airflow range. Y/N_____
5. Verify the supply fan minimum and maximum heating airflows are within the listed heating airflow range. Y/N_____
6. Verify the supply fan leak dissipation airflow is above the minimum dissipation airflow requirements. Y/N_____
7. Verify the exhaust fan total static pressure (return static) is below the maximum total external static pressure listed in the exhaust fan performance table. Y/N_____
8. For applications with air terminal units: Verify all air terminal units are functional and the total system minimum and maximum airflows are within the minimum and maximum cooling and heating airflow limits listed in the product data. Y/N_____

Checklist Completion

COMPLETED BY (NAME):_____ COMPANY NAME:_____

DATE:_____ CONTACT PHONE:_____

TITLE:_____ CONTACT EMAIL:_____

NOTES:_____

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48/50K FACTORY START-UP INFORMATION

For projects requiring factory start-up, the factory start-up information sheet and the pre-start-up checklist must be provided to the factory start-up team prior to scheduling factory start-up. Fill in all blanks and select the appropriate option to indicate item complete.

CONTRACTOR INFORMATION

COMPANY NAME:_____
ADDRESS:_____
CITY:_____
STATE/PROVINCE:_____
POSTAL CODE:_____

CONTACT NAME:_____
CONTACT PHONE:_____
CONTACT EMAIL:_____

JOBSITE INFORMATION

BUSINIESS NAME:_____
ADDRESS:_____
CITY:_____
STATE/PROVINCE:_____
POSTAL CODE:_____
BUIDLING NAME:_____

CONTACT NAME:_____
CONTACT PHONE:_____
CONTACT EMAIL:_____
BUSINESS HOURS:_____
LADDER NEEDED: Y/N_____ APPROX. FT:_____

START-UP INFORMATION

QUANTITY OF CARRIER 48/50K UNITS BEING STARTED:_____
SERIAL NUMBER(S):_____

_____

REQUEST EARLY FACTORY HEATING START-UP: (Y/N) _____

Carrier factory start-up for 48/50K units includes a cooling start-up and a heating start-up. Cooling can only be started if the air temperature is above 60°F (15.5°C) and the crankcase heaters have been operating for at least 24 hours. Circle yes to request heating be started before cooling is available to be started.

Record any information the start-up technician must be aware of, such as special access requirements (fall protection, etc.), training or escort requirements, time of access restrictions (days/ time where site is available), or additional contact information that may be needed (BAS contractor, electrician, utility provider, etc.).

NOTES:_____

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50K START-UP CHECKLIST

The start-up checklist must be filled out by the contractor for self-start-up or CCS for factory start-up. The checklist must be provided to the Carrier start-up team after start-up is completed. Fill in all blanks, circle applicable items in brackets, or write Y or N. If the activity does not apply, write N/A. Save a copy of the start-up checklists with the unit.

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, wear personal protective equipment (PPE), and adhere to the safety considerations/information as outlined in preceding sections of this Installation and Start-Up Instruction document.

I. UNIT INFORMATION

MODEL NUMBER: _____

UNIT/TAG NAME: _____

SERIAL NUMBER: _____

APPLICATION VERSION: _____

Application version listed on the login screen (***HOME→ LOGIN***)

II. PRE-START-UP CHECKS

Check to verify the activity has been completed, then write Y or N. If the activity does not apply, write N/A. Record any issues or defects in the Notes section.

1. Verify pre-start-up checklist has been reviewed and there are no obvious errors or omissions. (Y/N) _____
2. Verify unit is free from damage or defects. If damage exists, contact your local Carrier sales representative. (Y/N) _____
3. Verify there is no damage. If damage exists, verify damage does not prevent start-up. (Y/N) _____
4. Verify outdoor air screens are installed and clean. (Y/N) _____
5. Verify indoor air filters are installed and clean. (Y/N) _____
6. Verify outdoor coil is clean and free from defects. (Y/N) _____
7. Verify supply and return duct systems are installed and complete. (Y/N) _____
8. Verify all fire dampers and air terminal units are open. (Y/N) _____
9. Units with hot water coil: Verify hot water piping, actuated control valve, and freeze-stat are installed. NOTE: Service access is required to enable hot water control (Heat Service screen). (Y/N) _____
10. For units with modulating electric or hot water heat: Verify supply air temperature sensor has been installed and is reading correctly. (Y/N) _____
11. Verify the unit is on grid power. NOTE: Cooling start-up cannot be performed on generator power. (Y/N) _____
12. Verify condensate drain with trap has been installed and free from obstructions. (Y/N) _____
13. Verify no construction, remodeling, or major renovation is occurring in the building or around the unit that prevent start-up. (Y/N) _____
14. Verify no safety concerns exist that prevent start-up. (Y/N) _____
15. Verify no installation or application concerns exist that prevent start-up. (Y/N) _____
16. Verify there are no unit alarms that prevent start-up. (Y/N) _____
17. Verify crank case heaters have been operating for a minimum of 24 hours prior to cooling start-up. (Y/N) _____
18. Verify outdoor air temperature is at or above 60°F (15.5°C) to allow cooling start-up. (Y/N) _____
19. Verify air balance has been performed, and a copy of the air balance report has been provided. (Y/N) _____
20. Verify all temperature sensors are reading correctly. (Y/N) _____
21. Verify all pressure sensors and analog inputs are reading correctly. (Y/N) _____

START-UP LOG

The start-up log must be filled out by the contractor for self-startup or CCS for factory heating start-up. The start-up log must be provided to the Carrier start-up team after start-up is completed. Fill in all blanks and check boxes to indicate status. Save a copy of the start-up log with the unit.

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, wear personal protective equipment (PPE), and adhere to the safety considerations/information as outlined in preceding sections of this Installation and Start-Up Instruction document.

I. ELECTRICAL

Power Phasing (L1-L2, L3) is correct: Y/N_____

Incoming Voltage (Leg to Leg): L1-L2_____ L1-L3_____ L2-L3_____

Average Voltage: _____ (L1-L2+L1-L3+L2-L3)/3

Voltage Tolerance: _____(Average Voltage-Nameplate Voltage)/Nameplate Voltage x 100%

Maximum Deviation: _____ Volts

Maximum deviation is the maximum voltage difference between the most extreme incoming voltage (L1-L2, L2-L3, or L2-L3) and the average voltage. Maximum deviation must always be a positive value. If the line voltage is above the average, subtract the average from the line voltage. If the line voltage is below the average, subtract the line voltage from the active. Example, if L1-L2 = 461-v, L2-L3=457-v, L2-L3=462-v, and Avg = 460-v, the maximum voltage deviation would be 3-v (460v - 457v).

Voltage Imbalance: _____Maximum Deviation/ Average Voltage x 100%

IMPORTANT: Do not proceed with start-up or operation if voltage tolerance exceeds 10% or voltage imbalance exceeds 2%.

II. FAN SYSTEMS

1. Use Component Test Mode to test fan operation. Refer to Appendix A "START-UP CONTROL OPERATION" on page 87.
2. Amp readings should be taken at full load airflow (100% fan speed or maximum airflow per air balance).

Supply Fan

Unit Nameplate Amps:_____ Operating Amps:_____ Operating rpm:_____

NOTE: Refer to unit nameplate indoor fan motor amps, not motor nameplate amps.

Exhaust Fan

Exhaust Fan 1 Amps_____ Exhaust Fan 2 Amps_____ Exhaust Fan 3 Amps_____

III. A2L LEAK DISSIPATION SYSTEM

1. Locate the A2L dissipation board on the unit. Refer to Fig. 2 and Fig. 13-18 for refrigerant dissipation board location.
2. Press the test button on the A2L dissipation board for approximately 1 second to enter test mode. The test will last approximately 60 seconds. Refer to Fig. 3 for dissipation board layout and test button location.
3. During the test, the unit should enter A2L dissipation mode. In A2L dissipation mode, the unit mode will change to emergency, the indoor fan will turn on at the A2L dissipation speed (default 25%), and all cooling and heating will be disabled. The outdoor fans may remain on during A2L dissipation mode.

IMPORTANT: If the A2L dissipation mode does not function, the unit must be set for continuous occupancy with the indoor fan on at above the A2L dissipation speed.

IV. ELECTRIC/HOT WATER HEATING SYSTEM

1. Use Service Run Mode to test heating operation at low heat (request 25% capacity for modulating electric heat or 50% for two-stage gas heat) and at high heat (request 100% capacity). Refer to Appendix A "START-UP CONTROL OPERATION" on page 87.
2. Heating start-up should occur at full load airflow (100% fan speed or maximum heating airflow per air balance).
3. Set the OA Damper mode to manual and request 0% during test.

	High Heat (100% Capacity)
Return Air Temperature:	_____°F DB
Supply Air Temperature:	_____°F DB

NOTE: If unit does not have a SAT sensor, take a temperature reading at the supply diffuser nearest the unit.

Temperature Rise (SAT - RAT):	_____°F DB		
Entering Water Temperature (EWT):	_____°F DB		
Leaving Water Temperature (EWT):	_____°F DB		
Electric Heater 1/2/3 Amps:	_____	_____	_____

COOLING START-UP LOG

The cooling start-up log must be filled out by the contractor for self-start-up or CCS for factory start-up. The start-up log must be provided to the Carrier start-up team after start-up is completed. Fill in all blanks, circle applicable items in brackets, or write Y or N. If the activity does not apply, write N/A or as noted. Save a copy of the start-up log with the unit.

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, wear personal protective equipment (PPE), and adhere to the safety considerations/information as outlined in preceding sections of this Installation and Start-Up Instruction document.

IMPORTANT: Do not proceed with cooling start-up unless the following are verified:

- Crankcase heaters have been confirmed to be operating for 24 hours prior to cooling start-up. Y/N_____
- The outdoor air temperature is above 60°F (15.5°C). Y/N _____

I. COMPRESSOR OIL LEVEL

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

Compressor A1	Compressor A2	Compressor B1	Compressor B2
 3/4 1/2 Top sight glass 1/4	 3/4 1/2 Top sight glass 1/4	 3/4 1/2 Top sight glass 1/4	 3/4 1/2 Top sight glass 1/4

II. COOLING SYSTEM CHECKS

1. Use Service Run Mode to test cooling with all compressors and all outdoor fans on circuit running at full capacity. Set the compressors on the other circuit to off during the test. Refer to Appendix A "START-UP CONTROL OPERATION" on page 87.
2. Cooling start-up should occur at full load airflow (100% fan speed or maximum cooling airflow per air balance).
3. Set the OA Damper mode to manual and request 0% during test.
4. For units with Humidi-MiZer system, wait 5 minutes for Humidi-MiZer purge to expire prior to recording Circuit A data. Verify HGRH and reheat 3-way valve are set to off or 0% during test.
5. Refer to the Inputs screen (***Main Menu→Inputs***) for air temperatures, refrigerant temperatures, refrigerant pressures, and EXV positions (Analog Inputs).

Circuit A

Compressor A1 Voltage: L1-L2_____L1-L3_____ L2-L3_____Amps_____

Compressor A2 Voltage: L1-L2_____L1-L3_____ L2-L3_____Amps_____

NOTE: Verify performance versus charging charts and adjust charge before recording data. Refer to Appendix D "CHARGING CHARTS" on page 94.

Outdoor Air Temperature (OAT):_____° F Charge Adjustment: ±_____lb
Saturated Suction Temp: Temp_____°F Press_____PSIG Superheat_____°F
Saturated Discharge Temp: Temp_____°F Press_____PSIG Subcooling_____°F

EXV A1 Position:_____% A1 Suction Gas Temp:_____°F
EXV A2 Position:_____% A2 Suction Gas Temp:_____°F

Return Air Temperature (RAT): _____° F DB
DX Leaving Air Temperature (DXLAT):_____° F DB

Circuit B
Compressor B1 Voltage: L1-L2_____L1-L3_____ L2-L3_____Amps_____
Compressor B2 Voltage: L1-L2_____L1-L3_____ L2-L3_____Amps_____

NOTE: Verify performance versus charging charts and adjust charge before recording data. Refer to Appendix D "CHARGING CHARTS" on page 94.

Outdoor Air Temperature (OAT):_____° F Charge Adjustment: ±_____lb
Saturated Suction Temp: Temp_____°F Press_____PSIG Superheat_____°F
Saturated Discharge Temp: Temp_____°F Press_____PSIG Subcooling_____°F

EXV B1 Position:_____% B1 Suction Gas Temp:_____°F
EXV B2 Position:_____% B2 Suction Gas Temp:_____°F

Return Air Temperature (RAT): _____° F DB
DX Leaving Air Temperature (DXLAT):_____° F DB

III. HUMID-MIZER SYSTEM CHECKS (IF EQUIPPED)

Use Component Test Mode to verify Humidi-MiZer operation (A circuit only).

1. Humidi-MiZer on/off reheat valve (3-way valve) functions Y/N_____
2. Humidi-MiZer modulating reheat valve (HGRH valve) functions. Y/N_____

Checklist Completion

COMPLETED BY (NAME):_____ COMPANY NAME:_____

DATE:_____ CONTACT PHONE:_____

TITLE:_____ CONTACT EMAIL:_____

NOTES:_____

_____

_____

_____

_____

_____

TEMPORARY HEATER OPERATION DURING CONSTRUCTION

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

1. Prior to the finishing stage of construction, ensure that return air and vent openings are covered to minimize penetration of dust and construction debris into the unit. (Y/N)_____
2. Interior drywall installation shall be completed and covered with paint or primer prior to unit operation. (Y/N)_____
3. Premises shall be substantially free of debris and dust. (Y/N)_____
4. Ensure all return and vent coverings have been removed. (Y/N)_____
5. Verify the return ducts and supply ducts are connected, are free from obstructions, are clean, and are properly sealed. (Y/N)_____
6. Verify the seal bead of grease is at the indoor fan bearing. Grease bearings as needed using Regal AFB-2 or similar. (Y/N)_____
7. Heater to be set to operate under appropriate control to ensure proper operation. (Y/N)_____
8. Minimum MERV 11 air filters to be installed during the finishing stages of construction. (Y/N)_____
9. Return air temperature to be maintained between 55°F (13°C) and 80°F (27°C). (Y/N)_____
10. Heater shall be set up to operate in accordance with installation instructions and shall be verified for operating conditions including airflow, amp draw, and temperature rise. (Y/N)_____
11. Ensure the equipment is maintained as outlined in the users guide.
12. Install new filters as per installation instructions prior to final occupancy. (Y/N)_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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

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