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 2.X

Installation and Start-up Instructions

CONTENTS

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

GENERAL

This installation instruction contains unit installation information and basic controls configuration and start-up information. Refer to the Advanced Controls, Operation, and Troubleshooting guide for guidance on service controls access and equipment and controls troubleshooting and service. Refer to the users guide 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 elevation 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.

In Canada refer to the current editions of the 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.

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

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⚠ WARNING

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

⚠ 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 UVC warning on panels or doors before opening. Disconnect UVC power before opening access doors, removing panels, or installing, maintaining, or servicing UVC lamps or fixtures. Do not operate UVC with open access doors or with panels removed. Do not operate UVC outside of unit cabinet. Exposure to UVC can cause harm to the eyes and skin. Review the UVC lamp accessory installation instructions for details on installing, testing, and maintaining UVC lamps.

⚠ ADVERTISSEMENT

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

⚠ WARNING

ELECTRICAL SHOCK HAZZARD

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

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

⚠ ADVERTISSEMENT

RISQUE DE CHOC ÉLECTRIQUE

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

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

⚠ WARNING

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

⚠ ADVERTISSEMENT

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

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

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

⚠ ADVERTISSEMENT

RISQUE DE BLESSURE CORPORELLE

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

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

A2L REFRIGERATION INFORMATION

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

⚠ WARNING

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

⚠ ADVERTISSEMENT

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

Transportation

Follow all local, state, or federal regulations when transporting equipment containing A2L refrigerant. Carrier applied 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	90
40	No	1224	113
	Yes	1459	135
50	No	1450	134
	Yes	1641	152
60	No	1626	151
	Yes	1905	177

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 has two sensors for sizes 20-50 or three sensors for size 60 refrigerant, and two dissipation control boards. See Table 2 for sensor and board part numbers. The A2L detection sensor communicates via a wiring harness to the dissipation board.

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 See certified drawings on page 27 for A2L dissipation board locations.

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

Table 2 — Refrigerant Leak Dissipation System (RLDS) Parts

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

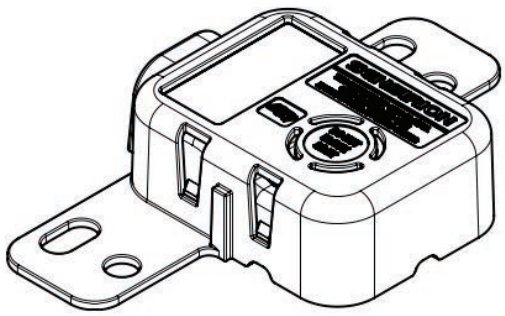


Fig. 1 — A2L Refrigerant Leak Sensor (ARLS)

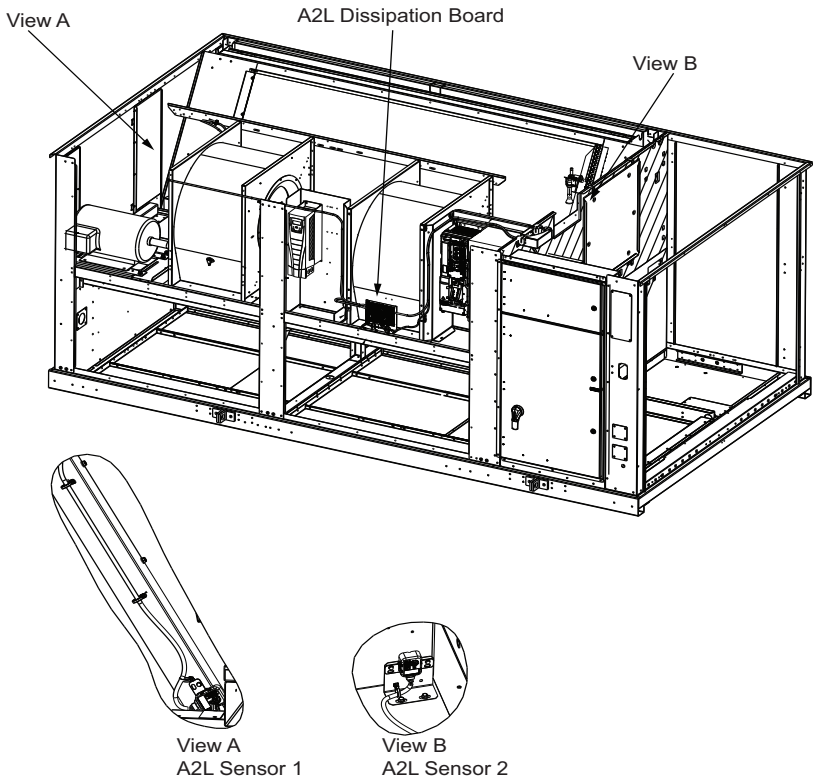


Fig. 2 — A2L Refrigerant Leak Sensor Locations

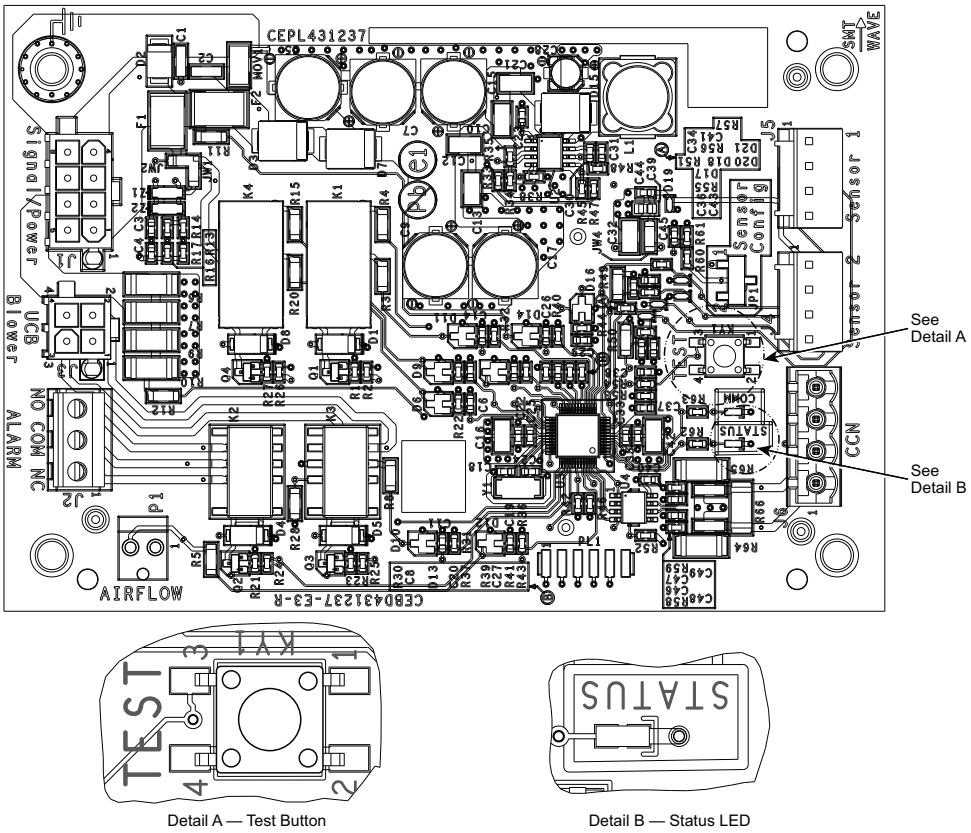


Fig. 3 — A2L Dissipation Board Details

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

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

1. Shut down cooling and heating.
2. Enable the zone damper override relay (ZDOR).
3. Enable the indoor fan (IDF) to operate at the IDF dissipation speed.
4. Enable the outdoor fans (ODF) to operate at the ODF dissipation speed.
5. If auto-restart is enabled, and no alarms are present that prevent operation, unit operation will restart.

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

All duct dampers, including zone dampers, fire dampers, or backdraft dampers, must be wired and controlled to open when the unit is performing A2L dissipation. A hardwired, normally open (N/O) Zone Damper Override Relay (ZDOR) output is provided to indicate when zone dampers are required to open for dissipation mode and other unit operating modes that require fully open zone dampers. See Step 14 “Install Control Wiring (Optional)” on page 43 for ZDOR wiring details. Zone Damper Override Relay status is also available as a BACnet point.

The IDF dissipation speed can be field adjusted based on application ventilation requirements for refrigerant dissipation. The IDF dissipation speed must be set to achieve no lower than the minimum dissipation circulation rate (Q_{min}), which is based on the unit refrigerant volume. See Table 3 for minimum dissipation circulation rate by unit size and configuration. Refer to physical data tables starting on page 13 for indoor fan performance information.

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

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

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

UNIT SIZE 50K	HUMIDI-MIZER® SYSTEM	(Q_{min})	
		cfm	M^3H
20	No	555	943
	Yes	767	1302
26	No	666	1132
	Yes	891	1513
30	No	653	1109
	Yes	864	1469
34	No	679	1154
	Yes	878	1491
40	No	1102	1873
	Yes	1314	2232
50	No	1306	2219
	Yes	1478	2511
60	No	1464	2488
	Yes	1716	2915

Duct System

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

⚠ CAUTION

Do not install ignition sources in the duct distribution system.

⚠ AVERTISSEMENT

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

Installation

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

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

Service

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

SERVICE PARTS

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

ELECTRICAL SAFETY

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

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

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

If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.

This shall be reported to the owner of the equipment so that all parties are aware of the temporary solution used.

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:

- 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 1-6 below for removal of refrigerant.

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

⚠ CAUTION

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

⚠ AVERTISSEMENT

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

The following procedure shall be adhered to:

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

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

⚠ CAUTION

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

⚠ AVERTISSEMENT

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

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

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

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer 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. Refer to Appendix C "50K MODEL NUMBER NOMENCLATURE" on page 95.

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.

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

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

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

Step 2 — Unload Equipment

Do not lift equipment with a fork truck. Unload units with a crane using the included base rail rigging lugs. Use a spreader bar when rigging equipment. See unit rigging label for unit rigging points, center of gravity, maximum weight, and spreader bar usage. See "Rigging Label" on page 12 for unit rigging label example.

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

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

Step 3 — Store Equipment (If Required)

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

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

1. Store units in a location that is:
   a. Level with adequate support along the full length of the base rail on each side of the unit.
   b. Secure and not accessible by the public. Provide protection against people and animals entering the unit.
   c. Away from traffic or construction and provides protection against damage.
   d. Meets the minimum total conditioned area (MCSA) requirement. Refer to Table 1.

      If the storage area is below the minimum total conditioned space area, evacuate the refrigerant charge or provide the required ventilation per local code, UL 60335-2-40, or ASHRAE standard 15.
2. Carrier recommends storing equipment indoors in a dry location, free from dust and debris. Follow the guidance below (Steps 2a-2h) when storing equipment outdoors (including the installation position), in humid or dirty environments:
   a. Elevate equipment to allow proper draining and prevent the base pan bottom from getting wet (for units with single wall bottom) when stored outdoors.
   b. Ensure all access panels are in place, close and secure all doors, and ensure door gasketing material is in place.
   c. Cover or block off the return and supply duct openings.
   d. Block off any primary or secondary condensate drain openings.
   e. Cover the openings in the side of the control and power box.
   f. Cover the outdoor air openings.
   g. Shut and secure barometric dampers (units with barometric relief or power exhaust).
   h. Make any other provisions necessary to isolate the unit airside section, control box, and power box from the environment.
3. Take precautions to prevent condensate formation inside the unit on panels, electrical components, and motors by:
   a. Removing the unit shipping shrink wrap. Leaving the wrap on the equipment can cause excessive heat and moisture condensation around and inside the equipment.
   b. Minimizing the introduction of ambient air used by following Steps 2a-2h above.
   c. Adding desiccant material to the unit airside section, control box, and power box.
   d. Providing mechanical ventilation or dehumidification (with proper drainage) in the airside section in very humid environments.
   e. Installing a small heat source in the power and control box.
   f. Applying rust-preventing compounds on panels inside the unit cabinet to prevent rusting or discoloration.

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

4. If the unit was operational prior to storage and will be out of operation for an extended period, prepare the unit for storage by:
   a. Turning off all motor protectors or breakers.
   b. Closing all refrigerant service valves and following lockout/tagout procedures.
   c. 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.

   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. Allow the time suggested for Capacitor reforming in variable frequency drive (VFD) and crankcase heater operation. Close any motor protectors or breakers that prevent component power.

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

INSTALLATION

Step 1 — Perform Jobsite Survey

Complete the following checks before installation.

1. Consult NEC (National Electrical Code) (ANSI/NFPA [American National Standards Institute/National Fire Protection Association] 70), CEC (Canadian Electric Code), and local codes for installation requirements.

2. Determine unit location (from project plans or from existing unit) or select unit location.

   a. Provide clearance around and above unit for airflow, safety, and service access. See certified drawings starting on page 27 for service clearance requirements.

   b. Do not install unit in an indoor location.

   c. Do not locate air inlets near exhaust vents or other sources of contaminated air.

   d. Do not locate condenser coils near sources of contaminated air.

   e. Do not restrict top (area above condenser fans).

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

   g. Ensure access and clearance complies with code requirements.

3. Develop a plan for unit utilities and ducting system.

4. Ensure unit operating conditions are within specified tolerances for airflow, temperature, and pressure. Unit is rated for operation with up to 4 in. of application static pressure.

5. Develop a plan for unit support, such as a curb mount, structure/beam mount, or slab mount.

6. Develop a rigging plan. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

7. Develop a plan for installation steps. Installation steps may vary between new construction or replacement applications.

Step 2 — Install Unit Support

Plan for unit support. See Tables 4-7 for physical data. See "Rigging Label" on page 12 (Fig. 5) 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 starting on page 21 (Fig. 6-9). Install insulation, cant strips, roofing, and counter flashing as required. For unit condensate drain to function properly, curb must be level or within tolerances shown in the roof curb dimensions starting on page 21 (Fig. 6-9).

STEEL BEAMS

If roof curb is not used, support unit with steel beams along its entire length and then support steel as required. For unit condensate drain to function properly, beams must be level or within tolerances shown in the roof curb dimensions starting on page 21 (Fig. 6-9).

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

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

SLAB MOUNT UNIT

Provide a level concrete slab that extends beyond unit cabinet at least 6 inches. Make a slab 8 in. thick with 4 in. above grade. Use gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow. Ensure that slab is of sufficient height to allow for condensate trap as described in "Connect Condensate Drain" on page 26. Ensure slab is level or within tolerances shown in the roof curb dimensions starting on page 21, 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.

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.

Step 3 — Install Field-Fabricated Ductwork

⚠ WARNING

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree elbow in the supply and return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Failure to follow these instructions could result in personal injury or property damage due to falling objects.

VERTICAL SUPPLY/VERTICAL RETURN

The 50K2,K3 units are designed for vertical supply/return. Field-fabricated ductwork must be attached to the roof curb, or to the support steel, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in the certified drawings starting on page 27. 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 units are designed for horizontal supply/return only. Connect to the unit with a single duct for all supply openings and with a single duct for all return openings. Splitting of the airflow into branch ducts should not be done at the unit.

Field-fabricated ductwork connects to the factory-provided flanges on the supply and return openings of the unit. Refer to certified drawings starting on page 27 for the flange sizes and locations. Remove shipping covers before installing ductwork.

VERTICAL SUPPLY/HORIZONTAL RETURN

The 50K2,K3 units are designed for vertical supply/return, but can be field converted to horizontal return following the steps below:

1. For units with no relief:
   Remove the large rectangular panels below the outdoor air intake. Size 20-50 units will have two panels; size 60 units 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). Size 20-50 units will have two assemblies; size 60 units 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. 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). Size 20-50 units will have two assemblies; size 60 units 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. 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. 4 for horizontal return duct dimension for field converted units.

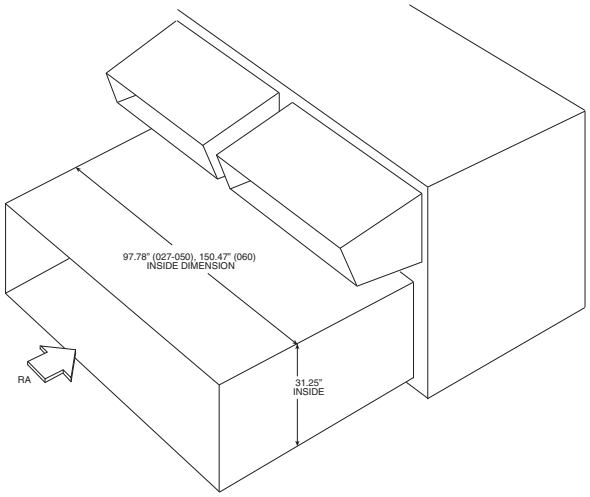


Fig. 4 — Side Return Air Conversion

Follow AMCA (Air Movement and Control Association) guidelines relating to ductwork connections to the unit. These guidelines recommend a minimum 2-1/2 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 "Power Exhaust Relocated to Side Return Duct (for CRP-WREXH033B00, 034B00, 035B00)" on page 25 for 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.

⚠ 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.

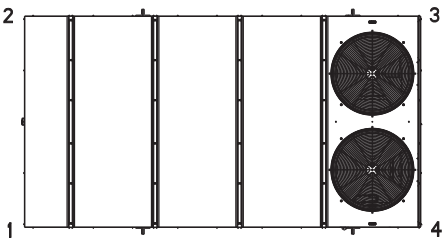
POSITION(S)			SIZE	CORNER WEIGHT								TOTAL WEIGHT		CENTER OF GRAVITY DIMENSIONS				LIFTING LUGS	
				1		2		3		4				A		B		C	
1-3	4	5		LBS	KG	LBS	KG	LBS	KG	LBS	KG	LBS	KGS	IN	MM	IN	MM	IN	MM
48K	2, 3	A, C, G	20 - 30	1273	577	1519	689	1330	603	1187	538	5308	2408	86.8	2206	47.4	1203	87.7	2227
			34	1322	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

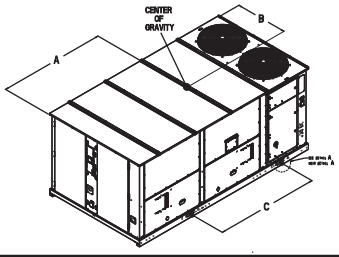
NOTE:
Weights and center of gravity are for the heaviest unit configuration by unit type and size. Refer to the unit submittal for as-built unit and corner weights.

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.





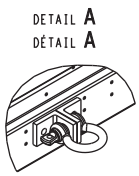


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Fig. 5 — Rigging Label

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 http://www.ecat.carrier.com for unit weights					
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)	19.3		23.5		23.0	
Circuit A Operating Charge with Humidi-MiZer Option (lb)	27.3		32.0		31.5	
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 Fan		Metal, Propeller Fan		Metal, Propeller Fan	
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 Qty...Size (in.)	1…1					
HUMIDI-MIZER COIL (OPTION)	Novation (Aluminum MCHX)					
Coil Circuit	A					
Coil Quantity	1		1		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	Centrifugal Type		Centrifugal Type		Centrifugal Type	
Qty...Size (in.)	2... 20 x 15		2 ... 20 x 15		2 ... 20 x 15	
Drive Type	Belt		Belt		Belt	
Nominal cfm	8,000		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 Dia. (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 Dia. (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	8.7	12.4/9.4	9.1/8.7
Nominal Fan Shaft Dia. (in.)	1-15/16					
Belt Quantity	1/2	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	15.3/15.0	15.5/15.5	14.8/15.0
Factory Speed Setting at 60 or Max Hz (rpm)	697/903	1107	697/970	1118/1197	697/826	1107/1197
Grease Fitting Qty...Fitting Type (in.)	2...1/8 NPT					
PRE-EVAPORATOR FILTERS						
2 in. MERV 5 (Standard) Qty… Size (in.)	10… 20 x 24 x 2					
2 in. MERV 8 (Option) Qty… Size (in.)	10… 20 x 24 x 2					
4 in. MERV 8 (Option) Qty… Size (in.)	5… 20 x 24 x 4, 5… 20 x 20 x 4					
4 in. MERV 13 (Option) Qty… Size (in.)	5… 20 x 24 x 4, 5… 20 x 20 x 4					
OUTDOOR-AIR SCREENS						
Quantity...Size (in.)	4… 16 x 25 x 2 4… 20 x 25 x 2		4… 16 x 25 x 2 4… 20 x 25 x 2		4… 16 x 25 x 2 4… 20 x 25 x 2	
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	27-72 kW					
Heater Auto Reset Temp. Limit	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 http://www.ecat.carrier.com for unit weights			
COMPRESSOR	Standard	Lead Digital (Option)	Standard	Lead Digital (Option)
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 (lb)	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 Fan	
Nominal cfm	19,500		32,000	
Qauntity...Diameter (in.)	2...30		4...30	
Motor Hp...rpm	1.5-1.75...850 (35 ton)/2.0-2.5...1140 (40 ton)			
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. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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	Centrifugal Type		Centrifugal Type	
Qty...Size (in.)	2... 20 x 15		2 ... 20 x 15	
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 Dia. (in.)	4.4 / 5.1	5.7 / 6.2	4.4 / 5.3	5.7 / 7.5
Nominal Motor Shaft Dia. (in.)	1-3/8, 1-5/8	1-5/8, 1-7/8	1-3/8, 1-5/8	1-5/8, 1-7/8
Fan Pulley Pitch Diameter (in.)	9.4/8.7	8.7/8.7	9.4/9.5	9.5/11.1
Nominal Fan Shaft Dia. (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	15.1/14.8	15.5/14.7	15.5/14.8
Factory Speed Setting at 60 or Max Hz (rpm)	826/1036	1156/1258	826/986	1059/1193
Grease Fitting Qty...Fitting Type (in.)	2...1/8 NPT			
PRE-EVAPORATOR FILTERS				
2 in. MERV 5 (Standard) Qty… Size (in.)	10… 20 x 24 x 2			
2 in. MERV 8 (Option) Qty… Size (in.)	10… 20 x 24 x 2			
4 in. MERV 8 (Option) Qty… Size (in.)	5… 20 x 24 x 4, 5… 20 x 20 x 4			
4 in. MERV 13 (Option) Qty… Size (in.)	5… 20 x 24 x 4, 5… 20 x 20 x 4			
OUTDOOR-AIR SCREENS				
Quantity...Size (in.)	4… 16 x 25 x 2 4… 20 x 25 x 2		8… 16 x 25 x 2 4… 20 x 25 x 2	
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			
Capacity Range	27-72 kW			
Heater Auto Reset Temp. Limit	Opens at 170°F, and Resets at 130°F			
Heater Manual Reset Temp. Limit	Opens at 160°F			
Heater Air Proving Switch Limit	—		—	

NOTE(S):

a. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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 http://www.ecat.carrier.com for unit weights			
COMPRESSOR	Standard	Lead Digital (Option)	Standard	Lead Digital (Option)
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		28.0	
Circuit A Operating Charge with Humidi-MiZer Option (lb)	30.0		37.0	
Circuit B Operating Charge - Standard (lb)	22.5		27.5	
High Pressure Switch Auto-Reset (psig)	500			
High Pressure Switch Cutout (psig)	650			
CONDENSER COIL	Novation (Aluminum MCHX)			
Quantity	2			
Total Face Area (sq ft)	65.6 (99.6 for 60 ton)			
CONDENSER FAN (STANDARD)	Metal Propeller Fan		Metal Propeller Fan	
Nominal cfm	35,000 (50 ton)/ 48,000 (60 ton)			
Quantity...Diameter (in.)	4...30 (50 ton)/ 6...30 (60 ton)			
Motor Hp...rpm	2.0-2.5...1140			
LOW SOUND CONDENSER FAN (OPTION)	Composite AeroAcoustic™		Composite AeroAcoustic™	
Nominal cfm	35,500 (50 ton)/ 48,000 (60 ton)			
Quantity...Diameter (in.)	4...30.5 (50 ton)/ 6...30.5 (60 ton)			
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 (Aluminum 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. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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

BASE UNIT SIZE 5K2, K3, K4, K5	50[a]		60 (VERTICAL)[a]	
NOMINAL CAPACITY (TONS)	**50**		**60**	
INDOOR FANS	Centrifugal Type		Centrifugal Type	
Qty...Size (in.)	2... 20 x 15		3 ... 20 x 15	
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 Dia. (in.)	5.3/5.7	6.2/6.7	5.7/5.3	5.9/6.5
Nominal Motor Shaft Dia. (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 Dia. (in.)	1-15/16			
Belt Quantity	2/2	2/2	2/3	3/3
Belt Type	5VX530/5VX550	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	16.1/15.7	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 (50 ton)/ 4...1/8 NPT (60 ton)			
PRE-EVAPORATOR FILTERS				
2 in. MERV 5 (Standard) Qty… Size (in.)	10… 20 x 24 x 2 (50 ton)/ 16… 20 x 24 x 2 (60 ton)			
2 in. MERV 8 (Option) Qty… Size (in.)	10… 20 x 24 x 2 (50 ton)/ 16… 20 x 24 x 2 (60 ton)			
4 in. MERV 8 (Option) Qty… Size (in.)	5... 20 x 24 x 4, 5... 20 x 20 x 4 (50 ton)/ 8... 20 x 20 x 4, 8... 20 x 24 x 4 (60 ton)			
4 in. MERV 13 (Option) Qty… Size (in.)	5... 20 x 24 x 4, 5... 20 x 20 x 4 (50 ton)/ 8... 20 x 20 x 4, 8... 20 x 24 x 4 (60 ton)			
OUTDOOR-AIR SCREENS				
Quantity...Size (in.)	8… 16 x 25 x 2 4… 20 x 25 x 2		12… 16 x 25 x 2 6… 20 x 25 x 2	
MUTLI-STAGE POWER EXHAUST (OPTION)				
Motor Type	PSC			
Motor Quantity...Hp	4...1		6...1	
Fan Quantity	4		6	
Fan Diameter...width (in.)	11.9x10.7		11.9x10.7	
ELECTRIC HEAT (50K ONLY OPTION)				
Heater Quantity	2			
Capacity Range	27-72 kW			
Heater Auto Reset Temp. Limit	Opens at 170°F, and Resets at 130°F			
Heater Manual Reset Temp. Limit	Opens at 160°F			
Heater Air Proving Switch Limit	—		—	

NOTE(S):

a. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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

BASE UNIT SIZE 50K2, K3, K4, K5	60 HORIZONTAL[a]	
NOMINAL CAPACITY (TONS)	**60**	
OPERATING WEIGHT (lb)	See http://www.ecat.carrier.com for unit weights	
COMPRESSOR	Standard	Lead Digital (Option)
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	Fixed/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)	28.0	
Circuit A Operating Charge with Humidi-MiZer Option (lb)	37.0	
Circuit B Operating Charge - Standard (lb)	27.5	
High Pressure Switch Auto-Reset (psig)	500	
High Pressure Switch Cutout (psig)	650	
CONDENSER COIL	Novation (Aluminum MCHX)	
Quantity	2	
Total Face Area (sq ft)	99.6	
CONDENSER FAN (STANDARD)	Metal Propeller Fan	
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 (Aluminum 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. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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

BASE UNIT SIZE 50K2, K3, K4, K5	60 HORIZONTAL[a]	
NOMINAL CAPACITY (TONS)	**60**	
INDOOR FANS	Centrifugal Type	
Qty...Size (in.)	3... 20 x15	
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.)	9.5/9.1	9.5/9.5
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)	1059/1028	1105/1200
Grease Fitting Qty...Fitting Type (in.)	4… 1/8 in. NPT	
PRE-EVAPORATOR FILTERS		
2 in. MERV 5 (Standard) Qty… Size (in.)	16… 20 x 24 x 2	
2 in. MERV 8 (Option) Qty… Size (in.)	16… 20 x 24 x 2	
4 in. MERV 8 (Option) Qty… Size (in.)	8… 20 x 20 x 4, 8… 20 x 24 x 4	
4 in. MERV 13 (Option) Qty… Size (in.)	8… 20 x 20 x 4, 8… 20 x 24 x 4	
OUTDOOR-AIR SCREENS		
Quantity...Size (in.)	12… 16 x 25 x 2, 6… 20 x 25 x 2	
MUTLI-STAGE POWER EXHAUST (OPTION)		
Motor Type	PSC	
Motor Quanitity...Hp	6...1	
Fan Quantity	6	
Fan Diameter...width (in.)	11.9 x 10.7	
ELECTRIC HEAT (50K ONLY OPTION)		
Heater Quantity	3	
Capacity Range	41-108 kW	
Heater Auto Reset Temp. Limit	Opens at 170°F, and Resets at 130°F	
Heater Manual Reset Temp. Limit	Opens at 160°F	
Heater Air Proving Switch Limit	—	

NOTE(S):

a. Sizes 40, 50 and 60: Circuit A uses the right condenser coil, Circuit B the left condenser coil when looking at the control panel.

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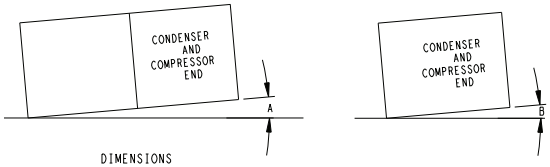
NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL DIM ARE TO OUTSIDE OF PART.
2. ROOFCURB ACCESSORY CRRFCURB005A00 IS SHIPPED DISASSEMBLED.
3. ALL ROOFCURB PARTS ARE TO BE 14 GA GALVANIZED STL.
4. UNITS WITH ELECTRIC HEAT MUST BE INSTALLED WITH 90° ELBOW ON THE SUPPLY DUCT PRIOR TO ANY SUPPLY TAKE OFFS OR BRANCHES.
5. DIMENSIONS IN [ ] ARE MILLIMETERS.

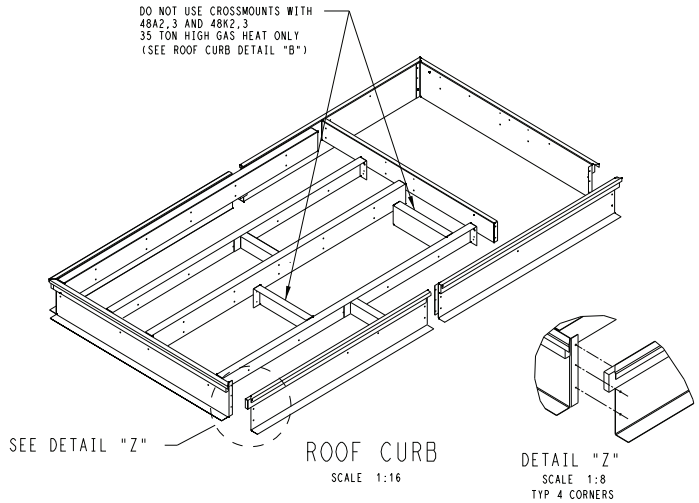
NOTE:
TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.



DIMENSIONS
(DEGREES AND INCHES)

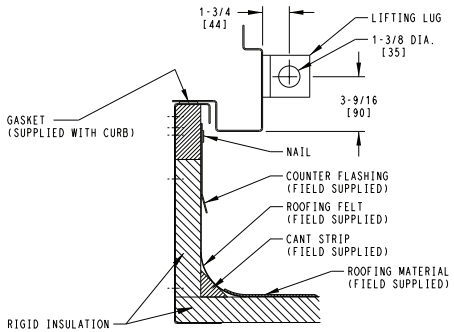
A			B		
DEG.	IN.	mm	DEG.	IN.	mm
1.0	2.9	73	.50	.75	19

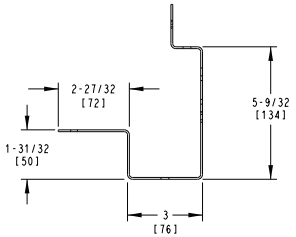
UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL



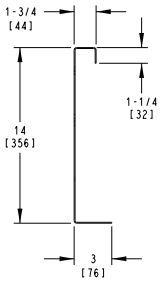
ROOF CURB
SCALE 1:16

DETAIL "Z"
SCALE 1:8
TYP 4 CORNERS

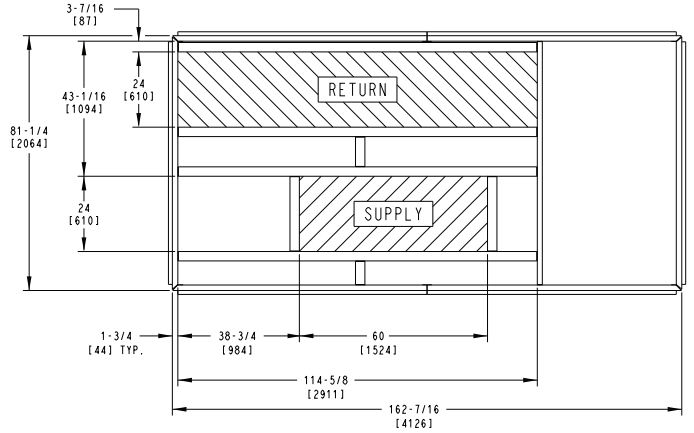




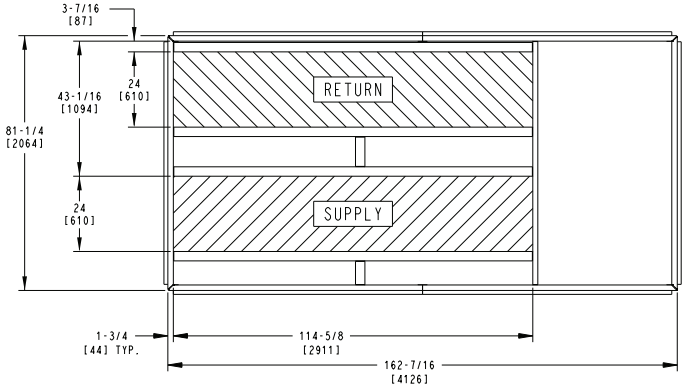
BASE RAIL CROSS SECTION
TYP 2 SIDES



ROOF CURB CROSS SECTION
TYP 4 SIDES



ROOF CURB DETAIL 'A"
(ALL OTHERS)



ROOF CURB DETAIL "B"
(48A2,3 AND 48K2,3
35 TON HIGH GAS HEAT ONLY)

DATE	SUPERCEDES	48/50A2-9 AND 48/50K2-5 20-35 TON	48EJ500067	REV
4/18/24	-			H

Fig. 6 — Roof Curb — 50K, Sizes 20-34

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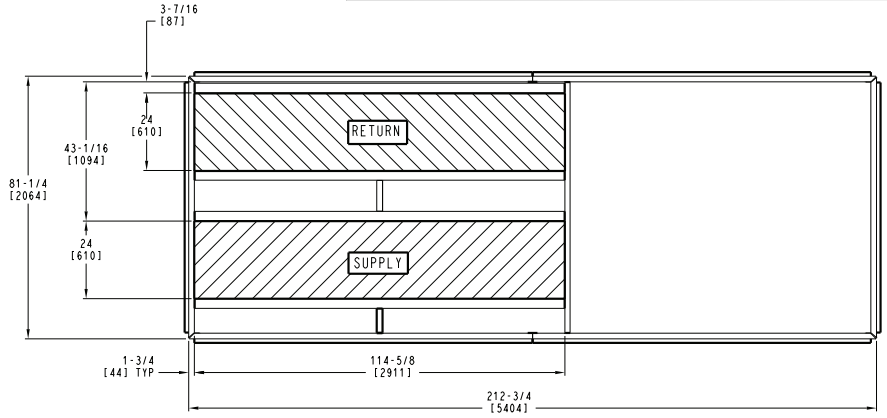
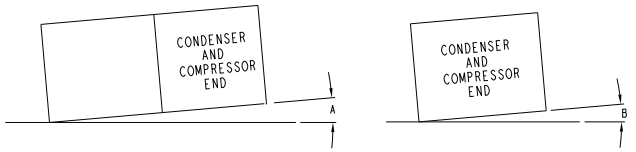
NOTE:

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.



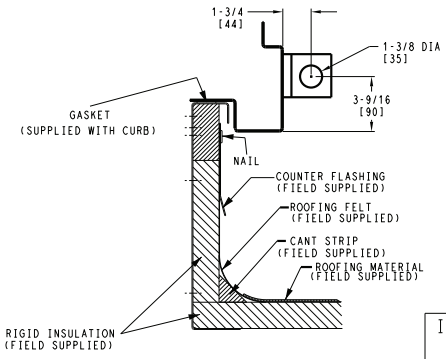
NOTE:
TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.

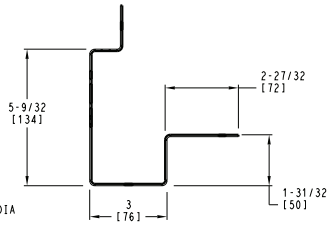


DIMENSIONS
(DEGREES AND INCHES)

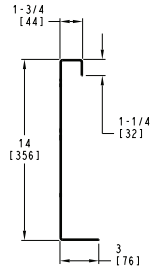
A			B		
DEG.	IN.	mm	DEG.	IN.	mm
1.0	2.9	73	.50	.75	19

UNIT LEVELING TOLERANCES
•FROM EDGE OF UNIT TO HORIZONTAL

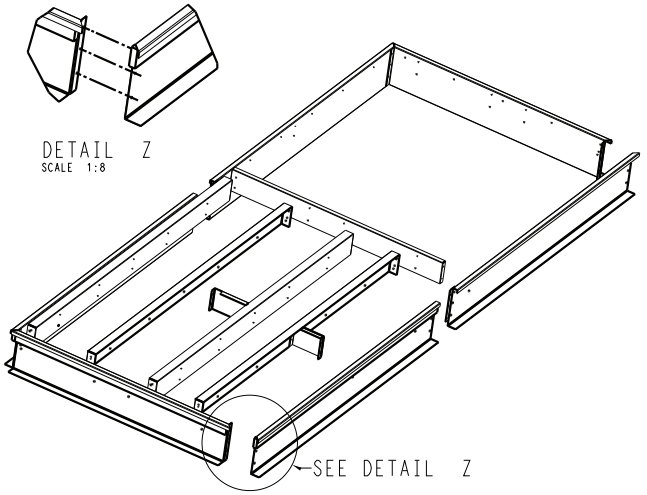




BASE RAIL CROSS SECTION
TYP (2) SIDES



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. 7 — Roof Curb — 50K, Sizes 40-50

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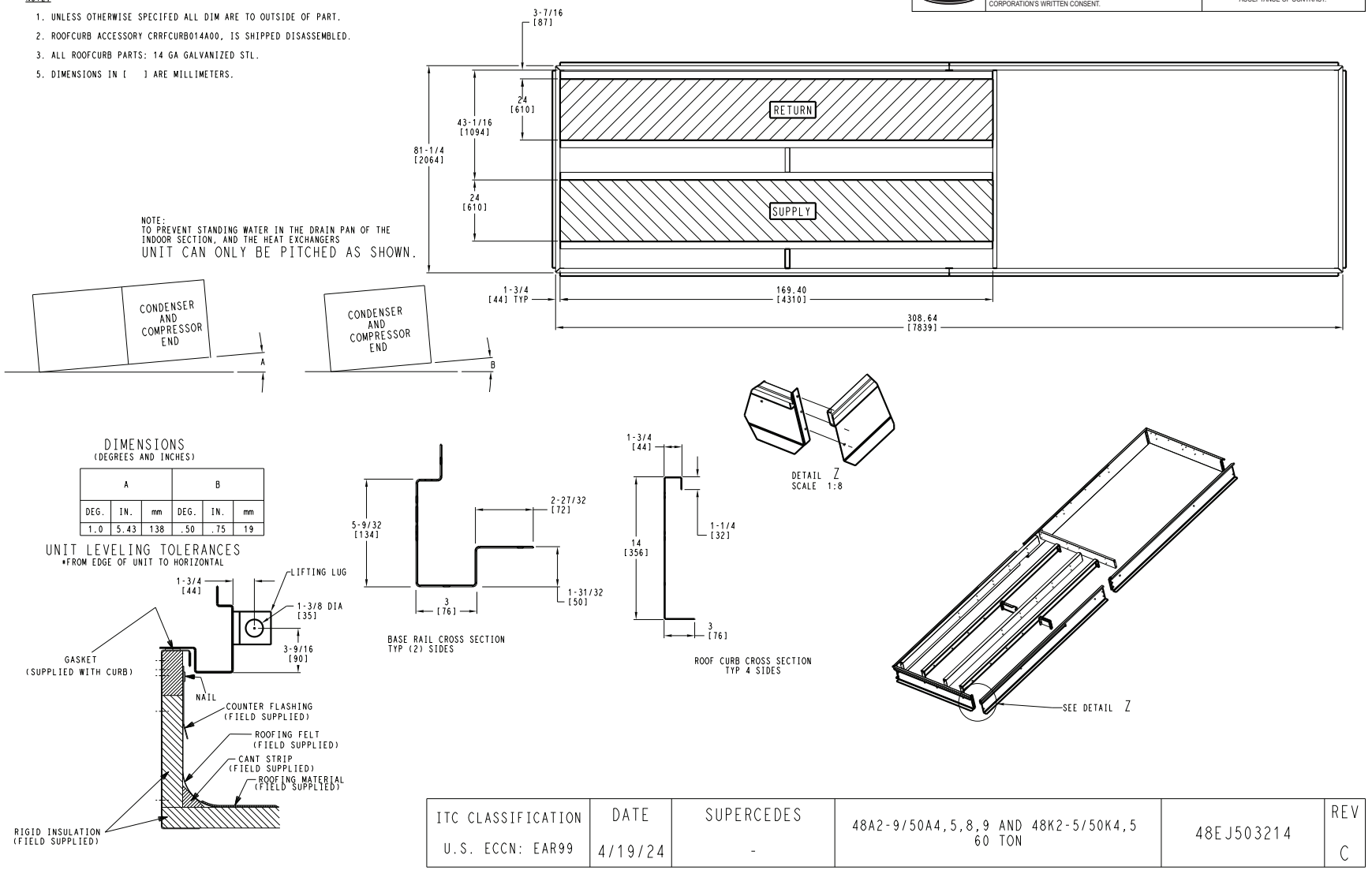

ITC CLASSIFICATION	DATE	SUPERCEDES	48A2-9/50A4,5,8,9 AND 48K2-5/50K4,5 60 TON	48EJ503214	REV
U.S. ECCN: EAR99	4/19/24	-			C

Fig. 8 — Roof Curb — 50K2,3 (Without Heat) and 50K4,5 Unit Size 60

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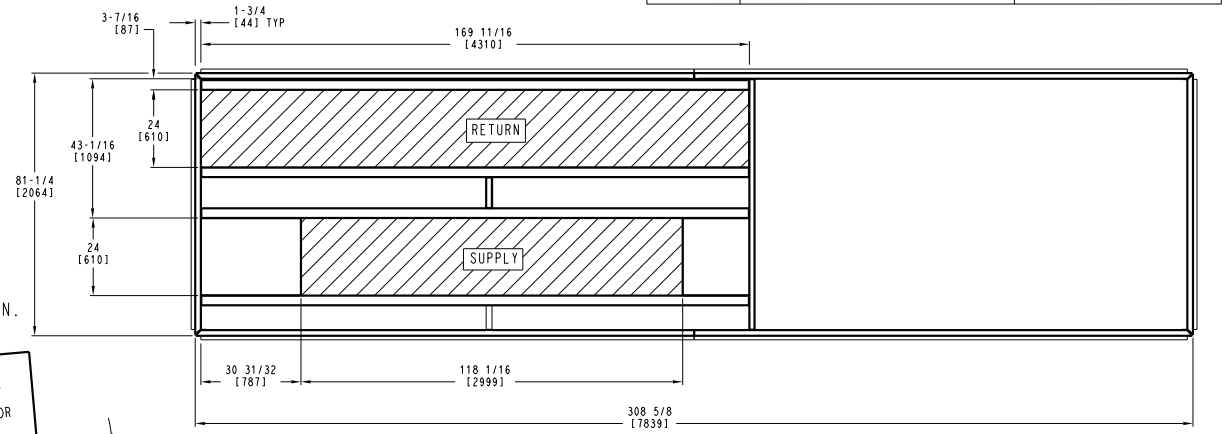
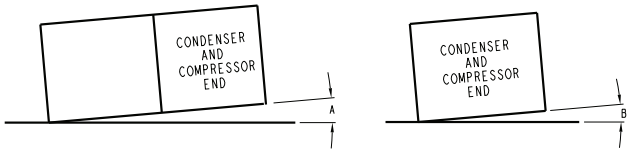
NOTE:

1. UNLESS OTHERWISE SPECIFED ALL DIM ARE TO OUTSIDE OF PART.
2. ROOFCURB ACCESSORY CRRFCURB009A00 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.



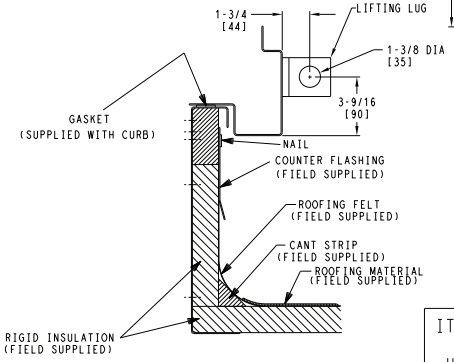
NOTE:
TO PREVENT STANDING WATER IN THE DRAIN PAN OF THE INDOOR SECTION, AND THE HEAT EXCHANGERS
UNIT CAN ONLY BE PITCHED AS SHOWN.

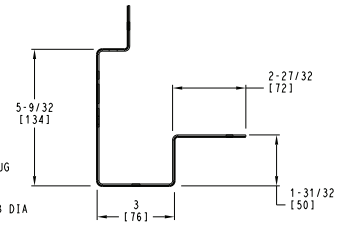


DIMENSIONS
(DEGREES AND INCHES)

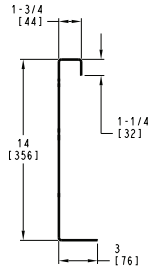
A			B		
DEG.	IN.	mm	DEG.	IN.	mm
1.0	5.43	138	.50	.75	19

UNIT LEVELING TOLERANCES
*FROM EDGE OF UNIT TO HORIZONTAL

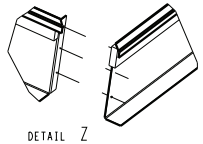




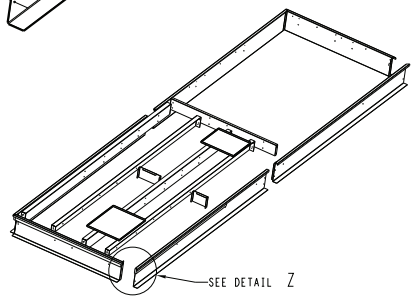
BASE RAIL CROSS SECTION
TYP (2) SIDES



ROOF CURB CROSS SECTION
TYP 4 SIDES



DETAIL Z
SCALE 1:8



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN: EAR99	1 OF 1	4/19/24	-	50A2,3,6,7 AND 50K2,3 60 TON	48EJ503211	C

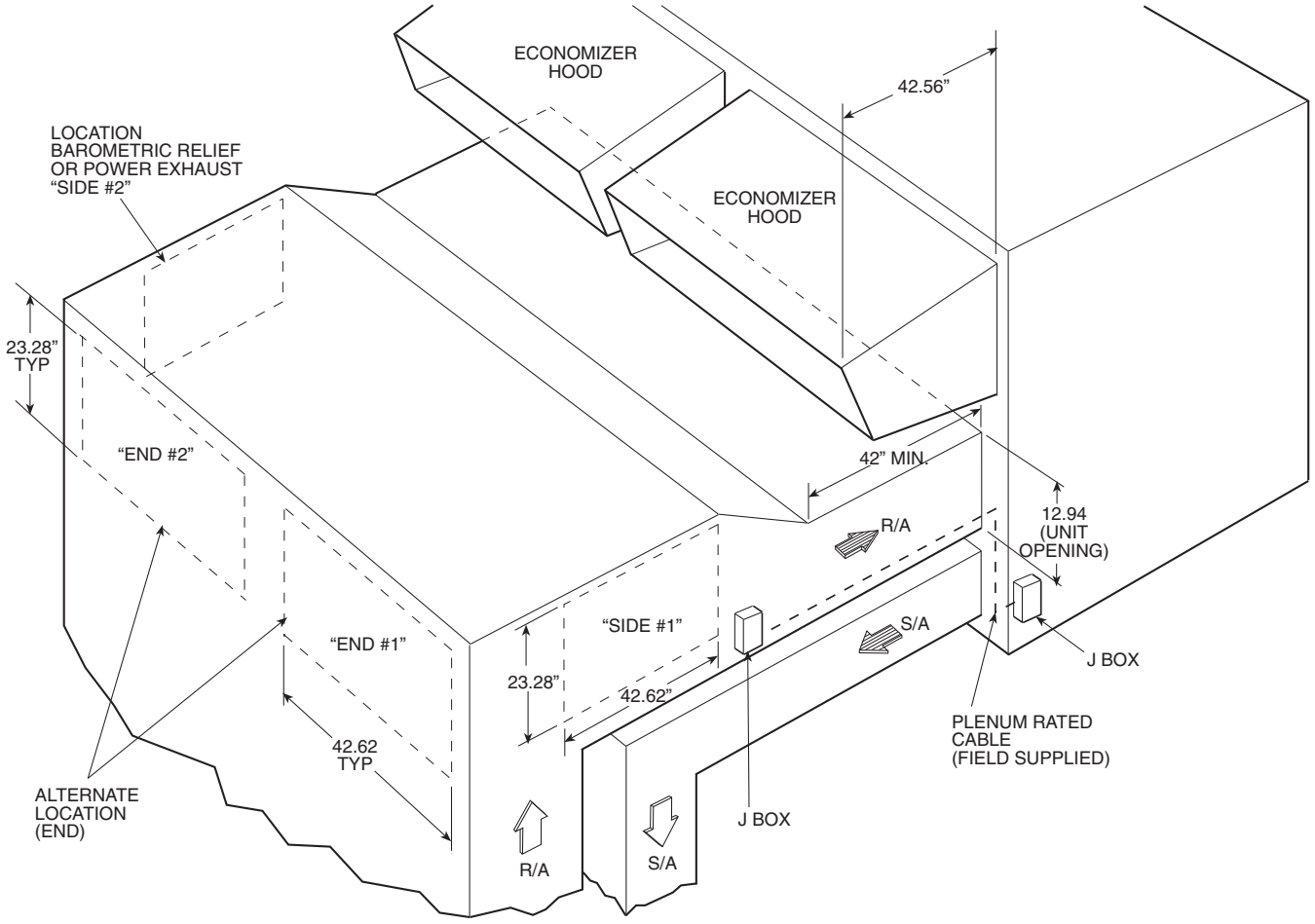
Fig. 9 — Roof Curb — 50K2, 3 Unit Size 60 (with Electric Heat)

Step 4 — Install Curb Gasketing (Vertical Supply or Return Units Only)

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

After ductwork has been connected to the roof curb or support structure, attach adhesive-backed gasketing on all end rails, cross rails, and duct rails of roof curb or curb adapter. Gasket material is included with Carrier accessory knock-down curbs. Otherwise, gasket material is field supplied. Be sure all joints and corners of gasket are square and flush to prevent possible air or water leaks. Follow all applicable building codes. See Fig. 10 for power exhaust relocation details.

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



NOTE: Confirm return sensor readings after converting a vertical return unit to horizontal return unit. Sensors may need to be relocated.

Fig. 10 — Power Exhaust Relocated to Side Return Duct (for CRPWREXH033B00, 034B00, 035B00)

Step 5 — Rig Unit

Units are designed to be lifted overhead 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.

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 the unit rigging label for lifting requirements, worst case corner weights, and center of gravity. Refer to Fig. 5 for rigging label example.

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

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

Step 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 27 to locate the drain connection.

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.

Fig. 11 — Primary Drain Connection Location

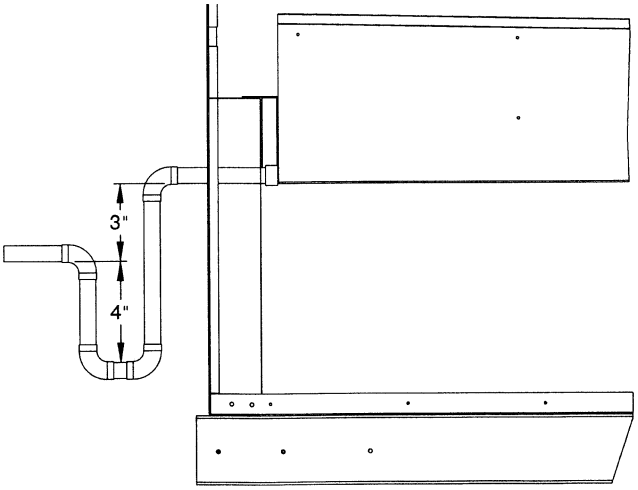


Fig. 12 — Primary Condensate Drain Piping Details

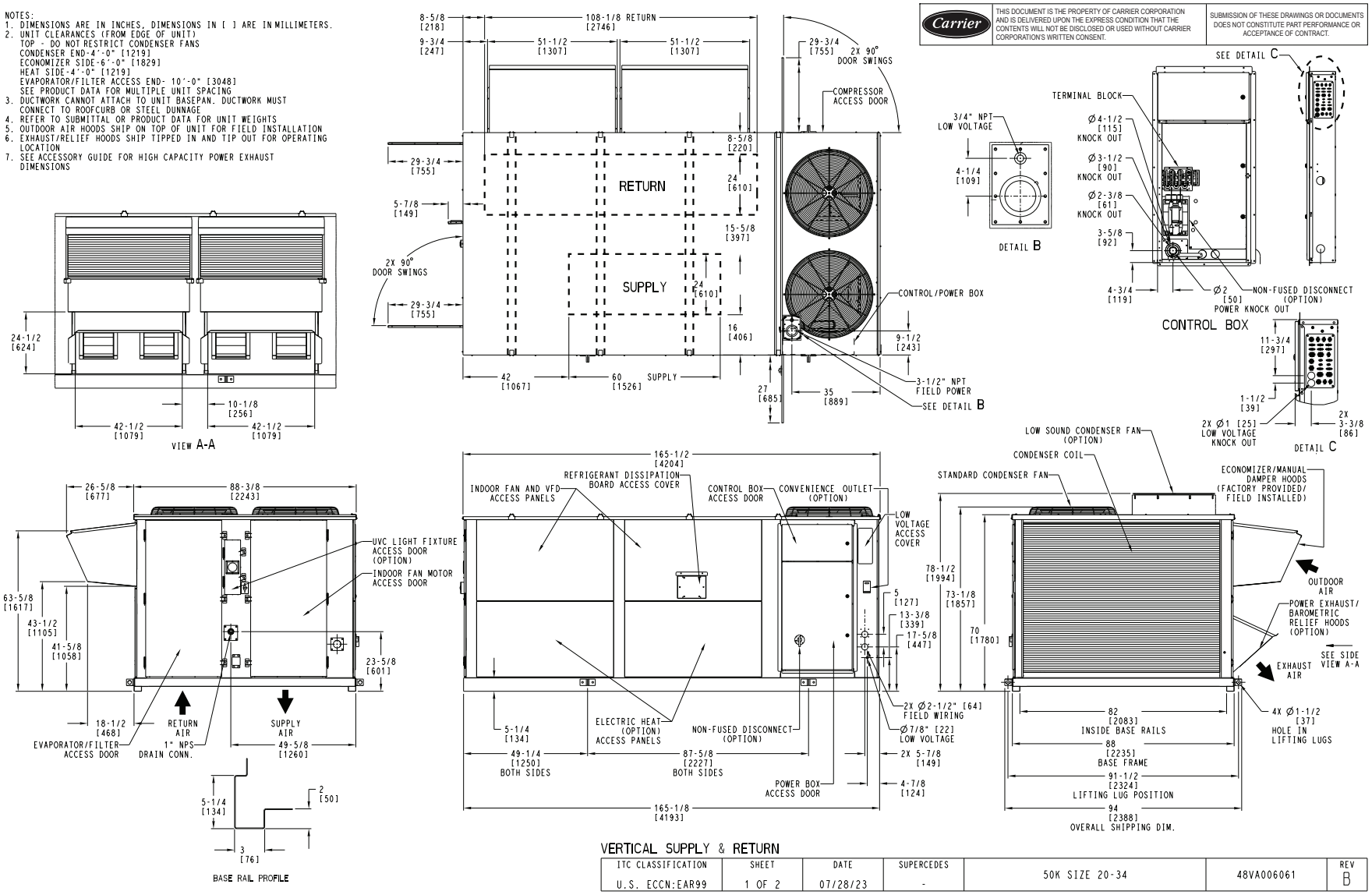


Fig. 13 — 50K, Sizes 20-34 Vertical Supply and Return

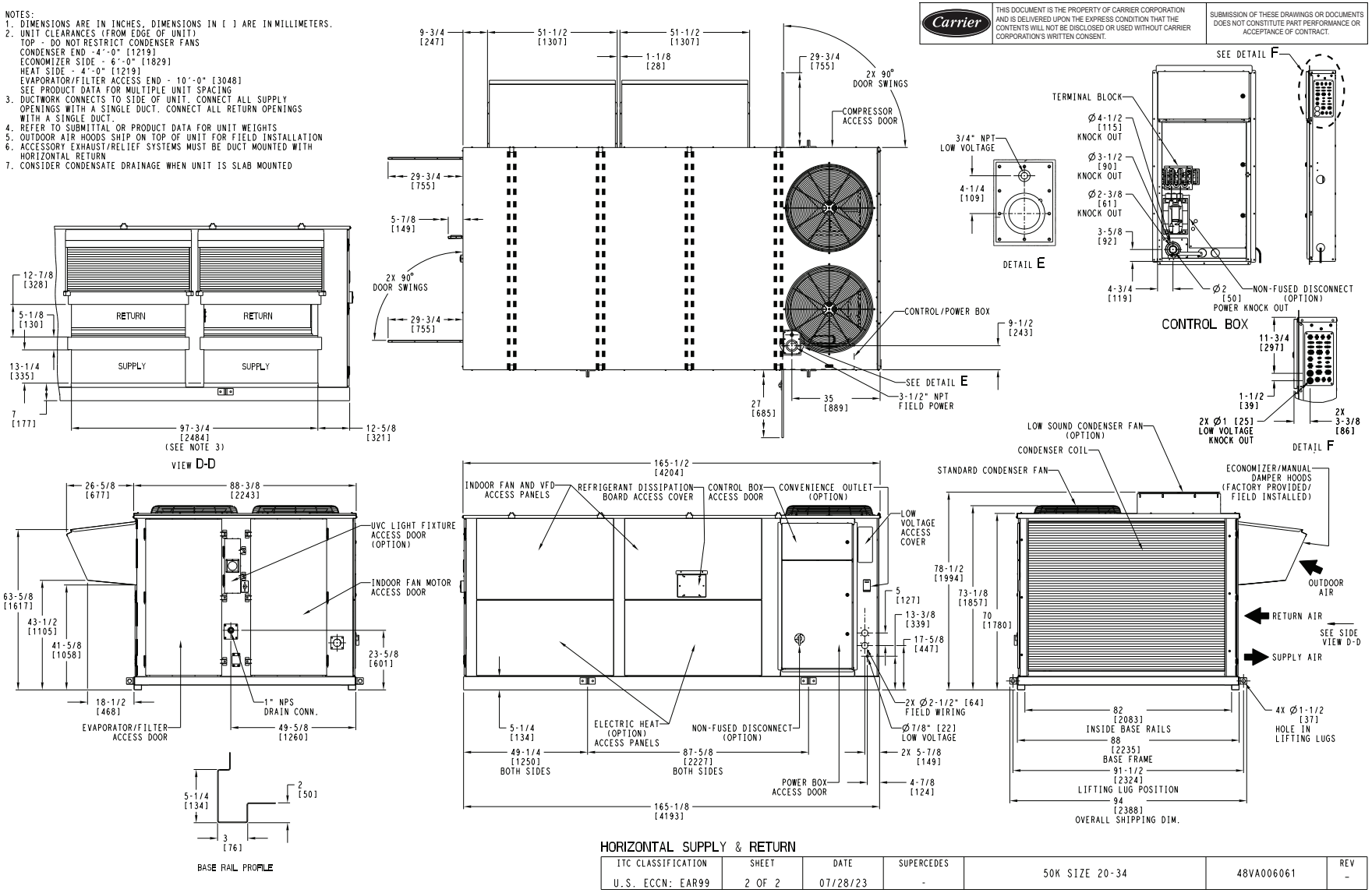


Fig. 14 — 50K, Sizes 20-34 Horizontal Supply and Return

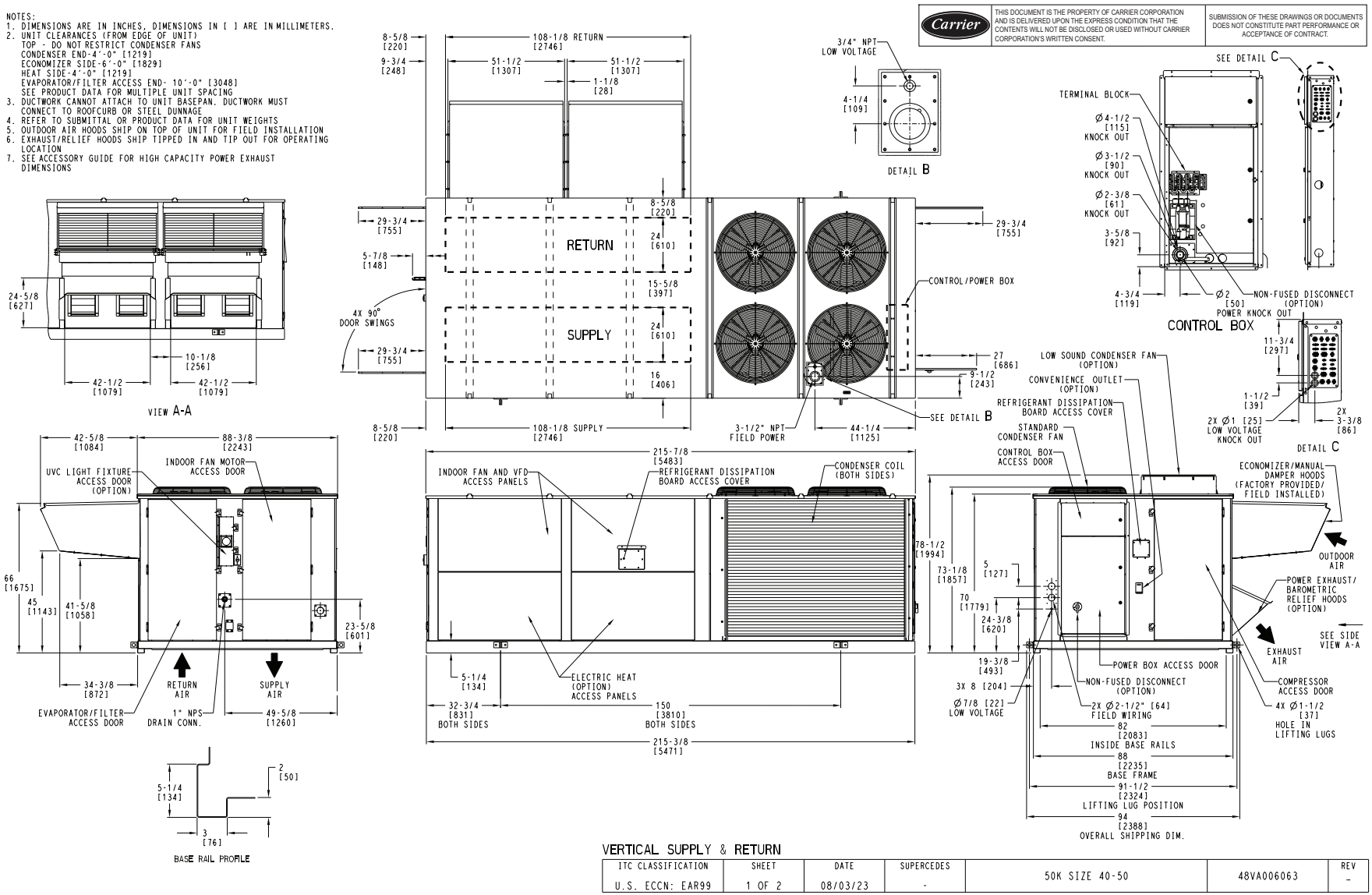


Fig. 15 — 50K, Sizes 40-50 Vertical Supply and Return

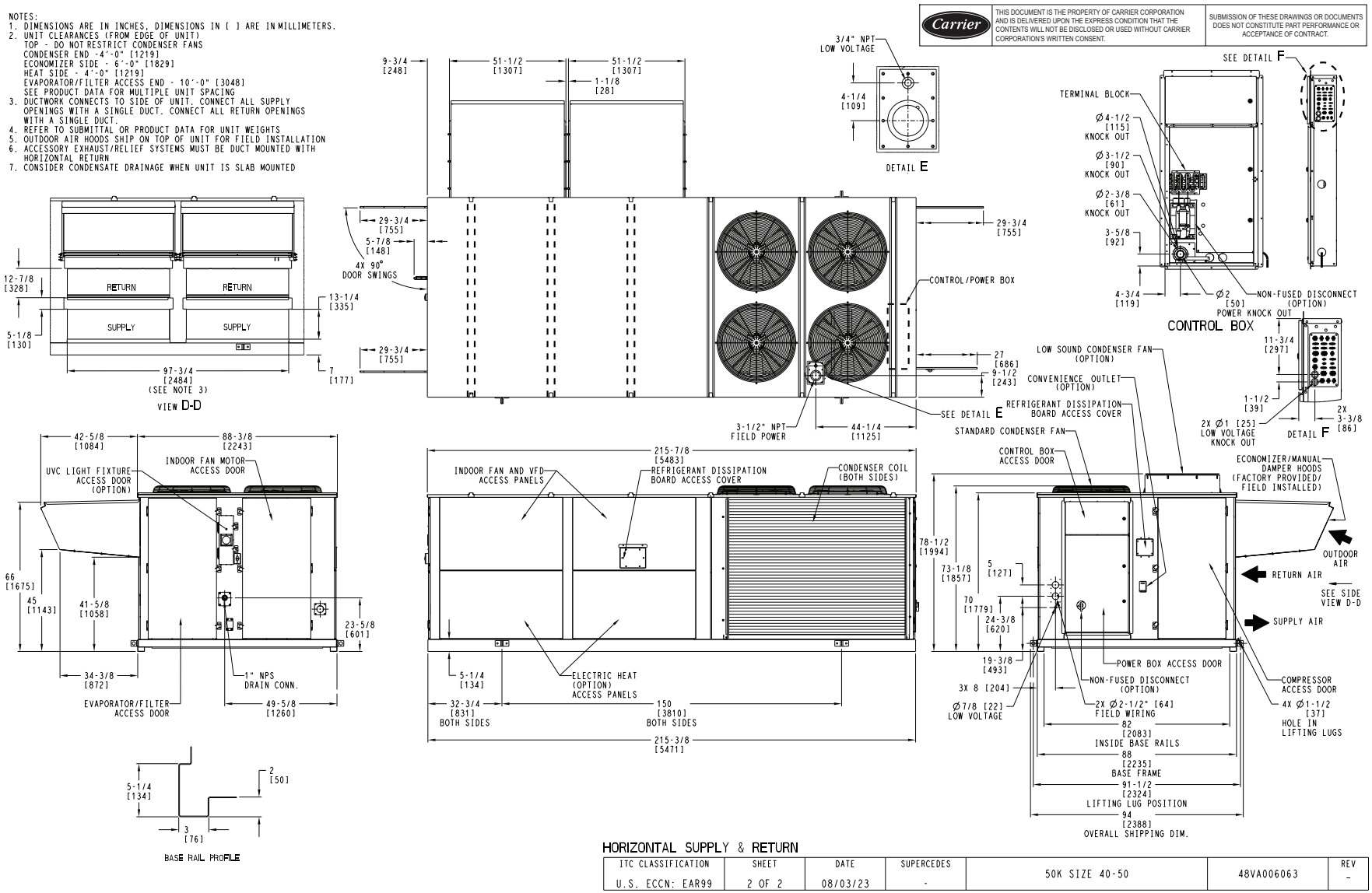


Fig. 16 — 50K, Sizes 40-50 Horizontal Supply and Return

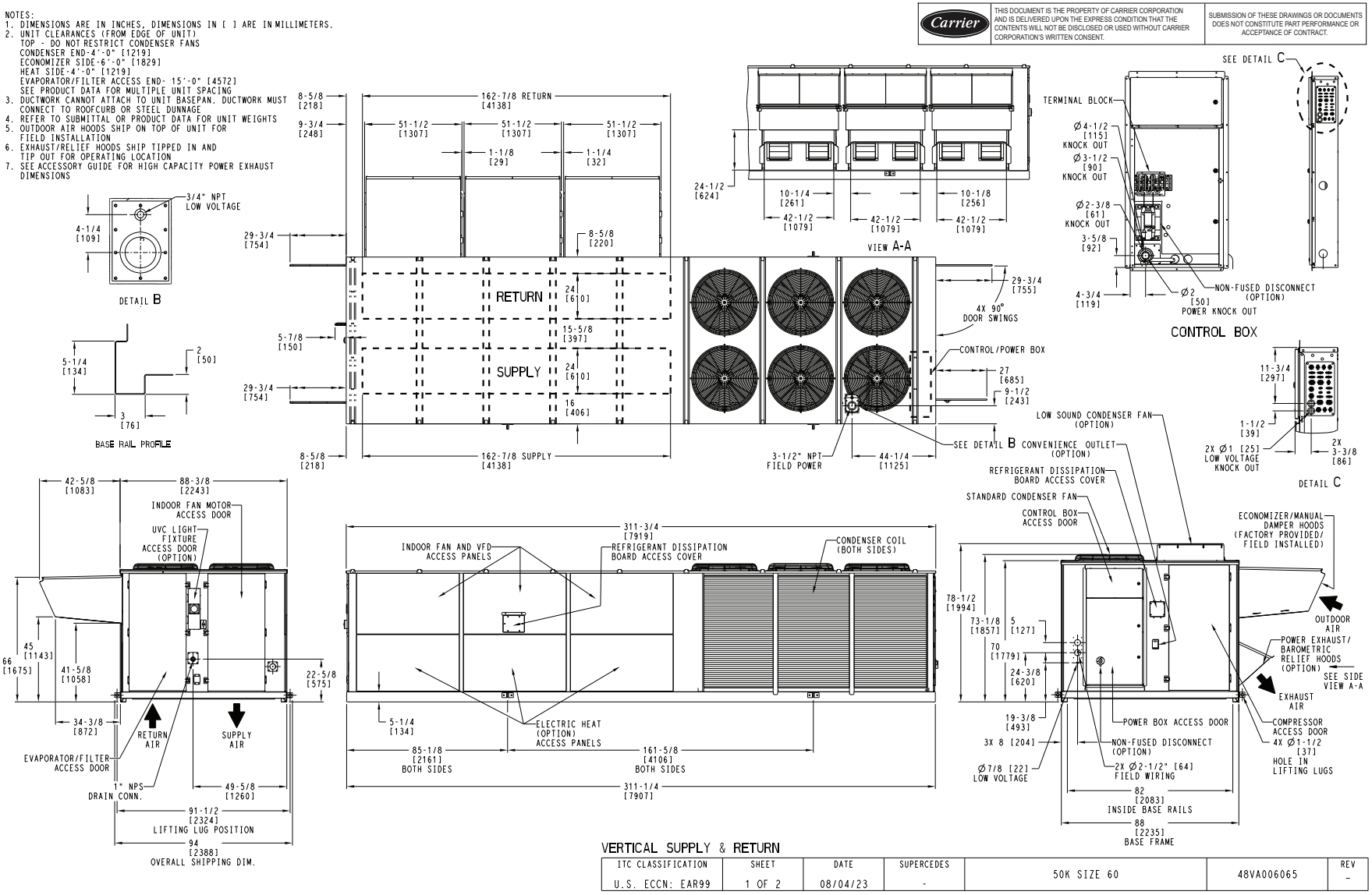


Fig. 17 — 50K, Size 60 Vertical Supply and Return

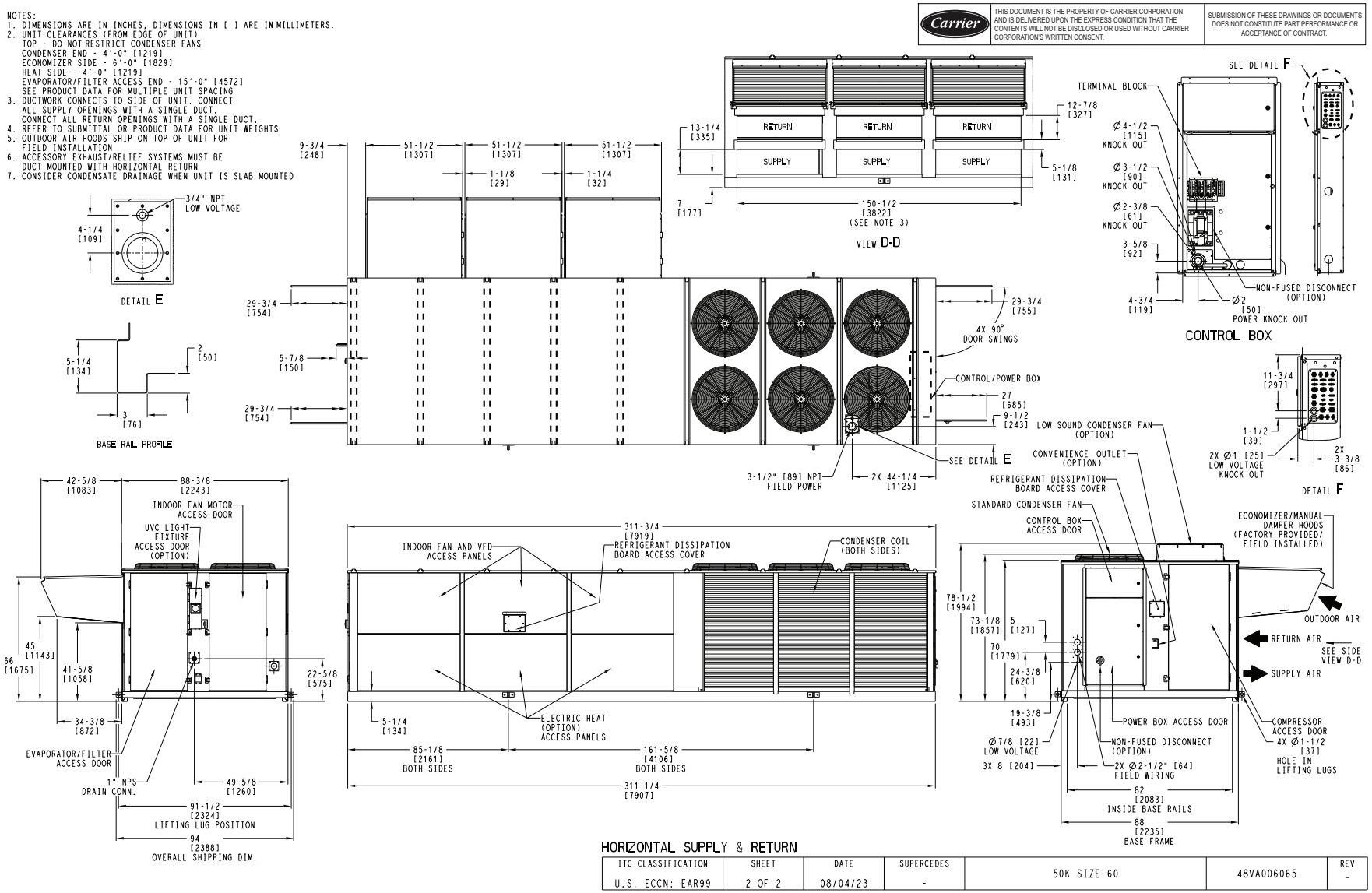


Fig. 18 — 50K, Size 60 Horizontal Supply and Return

Step 7 — Install Outdoor Air Hoods

Outdoor air hoods ship on top of unit for field installation. 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. Follow Steps 1-14 for assembling and installing the outdoor air hoods and screens.

NOTE: If an accessory barometric relief or power exhaust is used, install the accessory before 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 screw holes. See Fig. 19.
2. Add gray foam strip (provided) to cross members on bottom tray. See Fig. 20.
3. Assemble hood sides, top, and cross member with gasketed screws provided. See Fig. 21.
4. Attach speed clips (provided) to hood top. Engagement section of the clip faces inside hood. See Fig. 22.
5. Apply black seal strip (provided) to mounting flanges of hood sides being sure to cover mounting holes. See Fig. 23.
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.
7. Attach gray foam strip (provided) to block-off baffle on outer face of flange. See Fig. 24.
8. 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. 25.
9. Locate and mount block-off baffle using 3 screws. See Fig. 26.
10. 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. 27-29.
11. 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. 30.

    NOTE: Be sure the filters are installed with the airflow in the correct direction.
12. Attach filter track under the hood assembly. See Fig. 31.
13. 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. 32.
14. 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. 33.

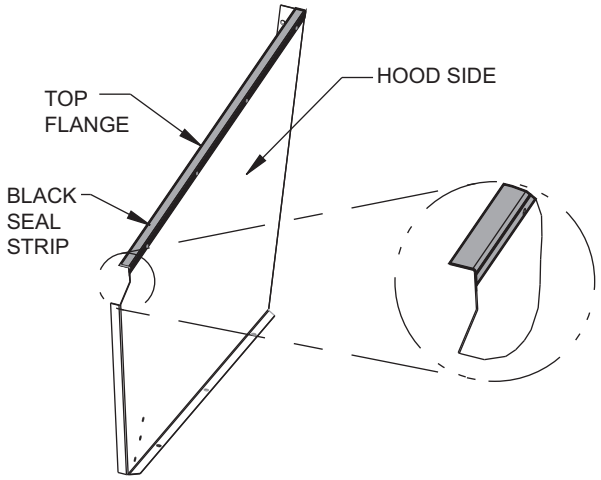


Fig. 19 — Adding Seal Strip to Top of Hood Sides

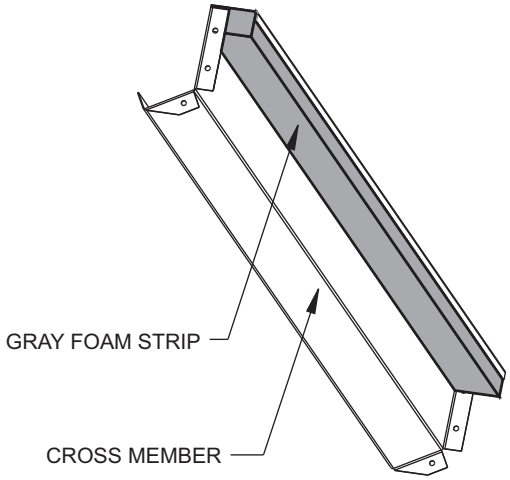


Fig. 20 — Adding Foam Strip to Cross Member

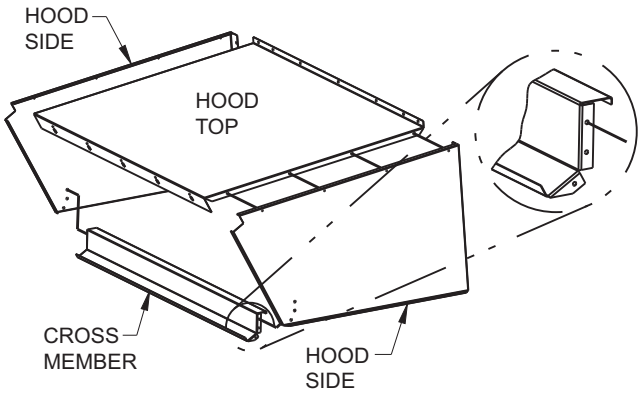


Fig. 21 — Economizer Hood Assembly

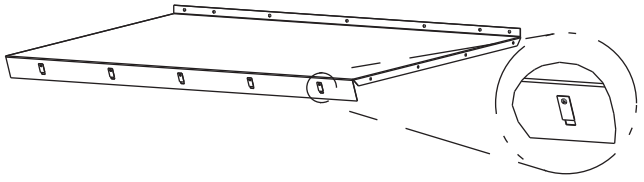


Fig. 22 — Top Hood with Speed Clips

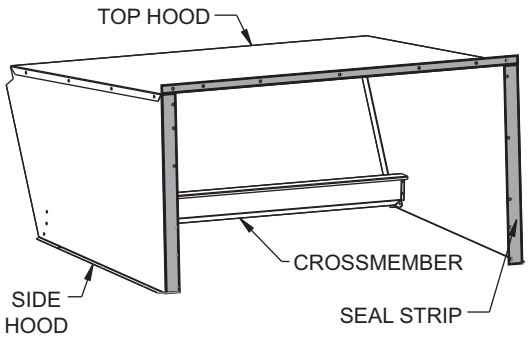


Fig. 23 — Adding Seal Strip to Hood Top and Side Hoods

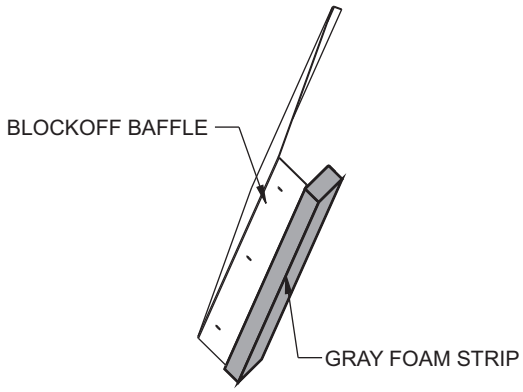


Fig. 24 — Adding Foam Strip to Block-Off Baffle

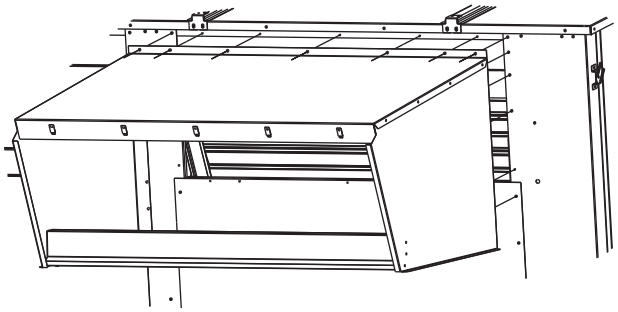


Fig. 25 — Removing Screws from the Outdoor Air Opening of Unit

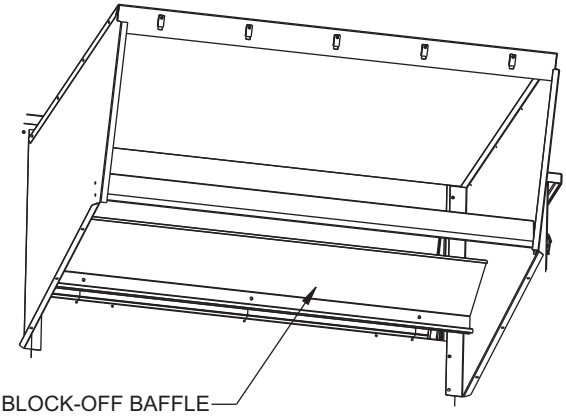


Fig. 26 — Mounting Block-Off Baffle to the Unit

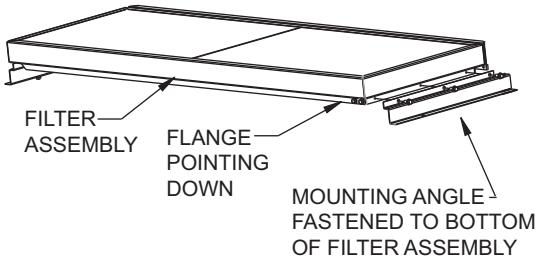


Fig. 27 — Correctly Assembled Bottom Filter Assembly (Sizes 020-035 Only)

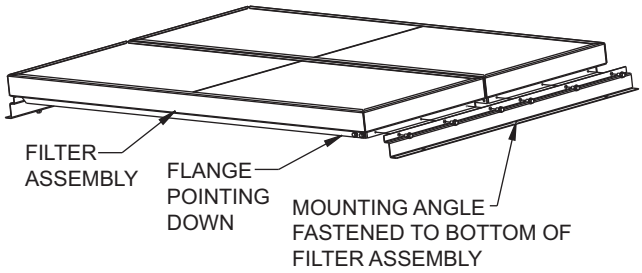


Fig. 28 — Correctly Assembled Bottom Filter Assembly (Sizes 040-060 Only)

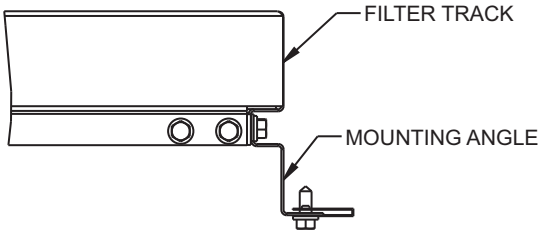


Fig. 29 — Flange and Mounting Angle Pointing Down

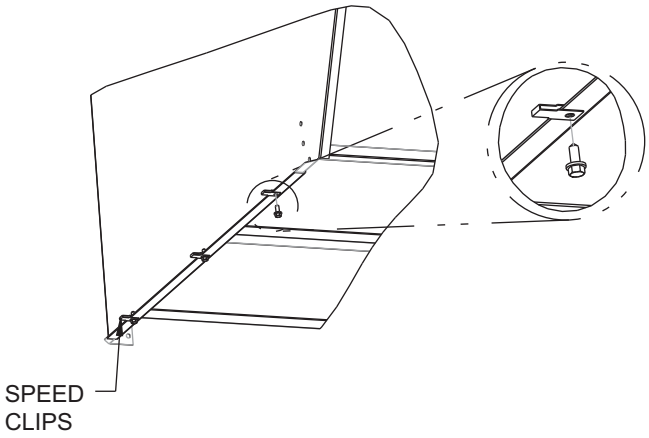


Fig. 30 — Bottom Filters Installed with Flange Pointing Down

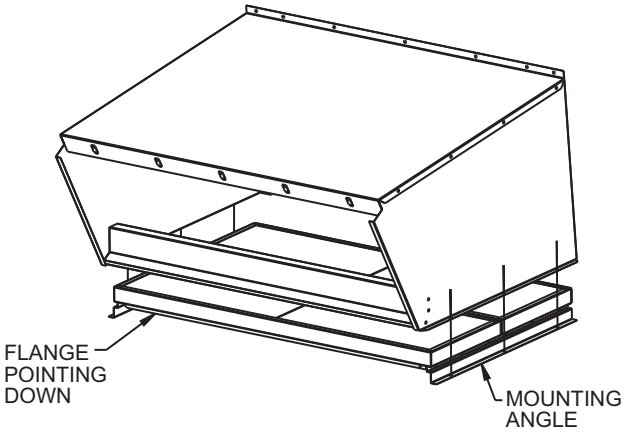


Fig. 31 — Bottom Filters Installed with Flange Pointing Down

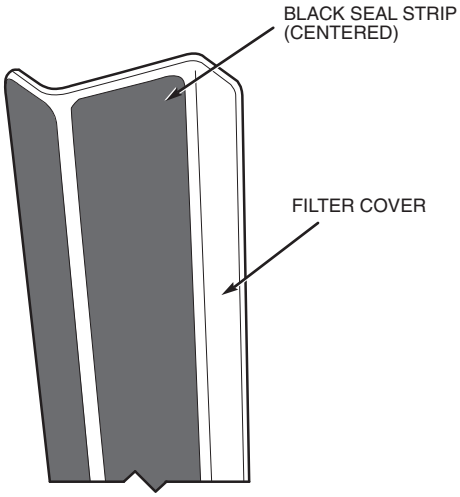


Fig. 32 — Attaching Seal Strip to Filter Cover

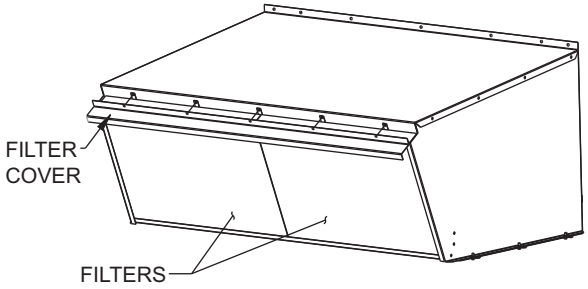


Fig. 33 — Filters and Filter Cover

Step 8 — Set up Barometric Relief or Multi-Stage Power Exhaust (Optional)

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. 34 for relief/exhaust shipping and operating orientation and Fig. 35 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. See Fig. 34 and 35. 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.

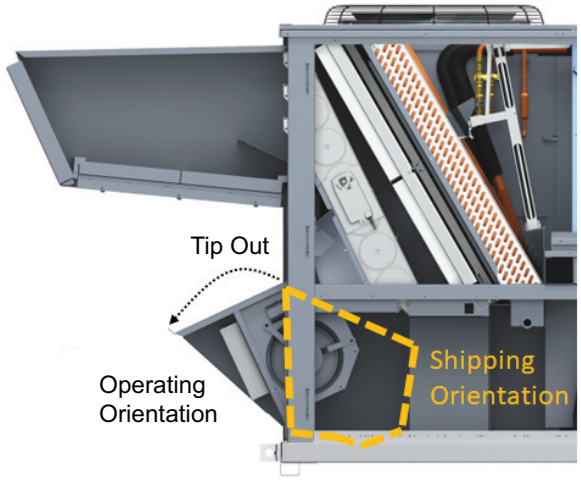


Fig. 34 — Exhaust/Relief Shipping and Operating Locations

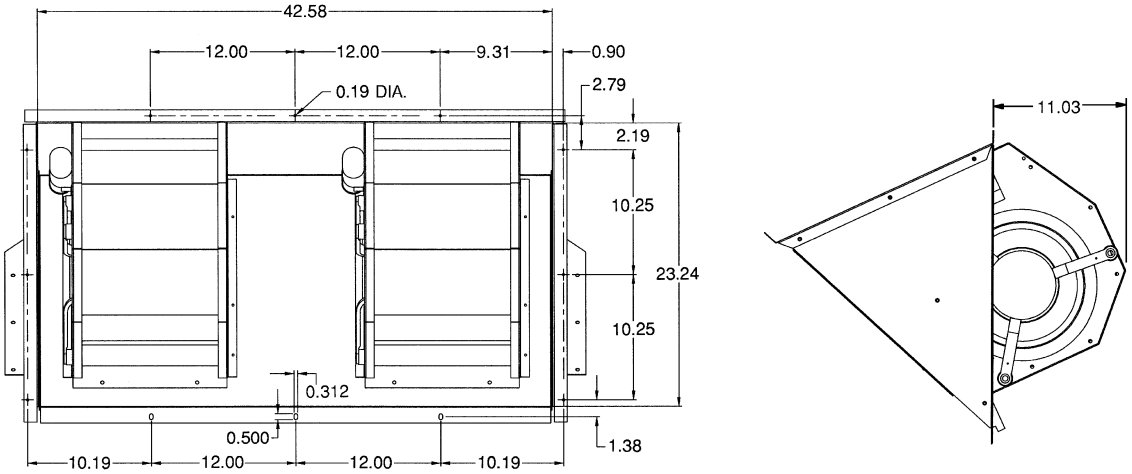


Fig. 35 — Exhaust/Relief Details

Step 9 — Route Field Wiring

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

UNIT POWER FEED

Units are single point power as standard. Refer to the Fig. 13-18 unit wiring diagrams and nameplate for power wiring details. Units may be special ordered for dual point power feeds with terminal block connections. Refer to the unit wiring diagrams and supplemental nameplate for dual point power feed information. See APPENDIX E — "TYPICAL WIRING DIAGRAMS" on page 102 for wiring details.

UNPOWERED CONVENIENCE OULET

Units with unpowered convenience outlet require a separate 115-v, 15A power feed to power the outlet. The convenience outlet is typically located near the unit power box. The field power connection is made at the outlet. Refer to the Fig. 13-18 unit certified drawings for convenience outlet location. Refer to the unit wiring diagram for details. Ensure that a warning label is present, noting that the outlet is powered separate from the unit power feed.

ULTRA-VIOLET LIGHT (UV-C) FIXTURES

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

POWER WIRE SIZING

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

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

Units without Factory-Installed Non-Fused Disconnect

Power wire terminations are made at a terminal block in the power box. See Fig. 36. 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 102 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. 37. 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 102 for wiring details.

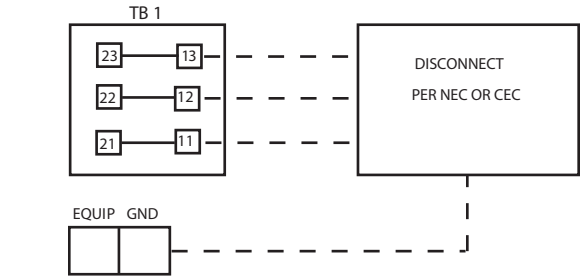
NOTE: Refer to the label on the disconnect for the torque specifications.

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

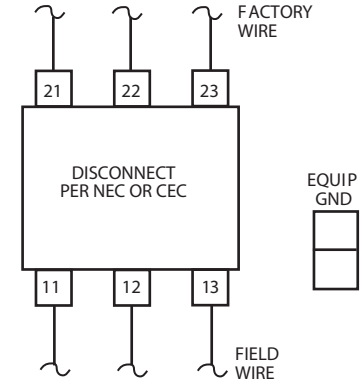
LEGEND

AWG — American Wire Gauge
MCM — Maximum Circular Mils



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

Fig. 36 — Terminal Block Field Wiring Connections



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

Fig. 37 — Non-Fused Disconnect Field Wiring Connections

OPERATING VOLTAGE

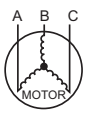
Units are factory wired for the voltage shown on the unit nameplate. Operating voltage to the unit must be within the voltage range indicated on the unit nameplate. Voltages between phases must be balanced within 2%, and the current must be balanced within 10%. See Table 9 for component amp draws by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

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

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

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

GROUND WIRING

All units must be grounded. Grounding must be in compliance with NEC, CEC, and local codes. Units include two ground lugs in the power box. Both ground lugs must be used when parallel power wires are used. The ground lug wire size range is 6 AWG (American Wire Gauge) to 250 MCM (thousands of circular mils). Refer to Fig. 36 and 37 for typical ground lug wiring. See APPENDIX E — "TYPICAL WIRING DIAGRAMS" on page 102 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 (31 Nm).

OVERCURRENT PROTECTION

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

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

SHORT CIRCUIT CURRENT PROTECTION

Units with Standard Short Circuit Current Rating (SCCR)

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

Units with High Short Circuit Current Rating (High SCCR)

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

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

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

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	253	28.7	207.5	40.8	270.0	—	—	—	—	2	6.8	2	5.8	4.8
	230-3-60	187	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	253	28.7	207.5	49.0	386.3	—	—	—	—	2	6.8	2	5.8	4.8
	230-3-60	187	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	253	33.3	255.0	49.0	386.3	—	—	—	—	2	6.8	2	5.8	4.8
	230-3-60	187	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	253	45.9	335.5	49.0	396.3	—	—	—	—	2	6.8	2	5.8	4.8
	230-3-60	187	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	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
	230-3-60	187	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	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
	230-3-60	187	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	253	3.3	255.0	49.0	386.3	3.3	255.0	49.0	386.3	6	6.8	6	5.8	4.8
	230-3-60	187	253	3.3	255.0	49.0	386.3	3.3	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 — 50K Electrical Data – Component Amp Draw (cont)[a]

50K UNIT SIZE	IFM								ELECTRIC HEAT				POWER EXHAUST				POWERED C/O
									LOW		HIGH		MULTI-STAGE		HIGH CAPACITY		
	HP	FLA (ea)	HP	FLA (ea)	HP	FLA (ea)	HP	FLA (ea)	kW	FLA	kW	FLA	Qty	FLA (ea)	Qty	FLA (ea)	FLA
20	5	15.4	10	30.5	15	44.6	—	—	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		14.5		27.9		41.3		—	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		7.3		14.0		20.7		—	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		5.8		11.6		16.6		—	36	34.6	72	69.3	4	2.4	4	2.4	1.7
26	5	15.4	10	30.5	15	44.6	20	58.3	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		14.5		27.9		41.3		53.4	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		7.3		14.0		20.7		26.7	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		5.8		11.6		16.6		21.6	36	34.6	72	69.3	4	2.4	4	2.4	1.7
30	5	15.4	10	30.5	15	44.6	20	58.3	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		14.5		27.9		41.3		53.4	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		7.3		14.0		20.7		26.7	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		5.8		11.6		16.6		21.6	36	34.6	72	69.3	4	2.4	4	2.4	1.7
34	10	30.5	15	44.6	20	58.3	25	72.6	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		27.9		41.3		53.4		68.8	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		14.0		20.7		26.7		34.1	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		11.6		16.6		21.6		27.0	36	34.6	72	69.3	4	2.4	4	2.4	1.7
40	10	30.5	15	44.6	20	58.3	25	72.6	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		27.9		41.3		53.4		68.8	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		14.0		20.7		26.7		34.1	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		11.6		16.6		21.6		27.0	36	34.6	72	69.3	4	2.4	4	2.4	1.7
50	15	44.6	20	58.3	25	72.6	30	85.8	27	75.1	54.1	150.1	4	5.9	4	6.4	5.3
		41.3		53.4		68.8		80.3	36	86.6	72	173.2	4	5.9	4	6.4	4.8
		20.7		26.7		34.1		40.2	36	43.3	72	86.6	4	3.1	4	3.2	2.2
		16.6		21.6		27.0		31.2	36	34.6	72	69.3	4	2.4	4	2.4	1.7
60	20	58.3	25	72.6	30	85.8	40	113.3	40.6	112.6	81.1	225.2	6	5.9	6	6.4	5.3
		53.4		68.8		80.3		105.1	54	129.9	108	259.8	6	5.9	6	6.4	4.8
		26.7		34.1		40.2		52.3	54	65	108	129.9	6	3.1	6	3.2	2.2
		21.6		27.0		31.2		42.2	54	52	108	103.9	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.

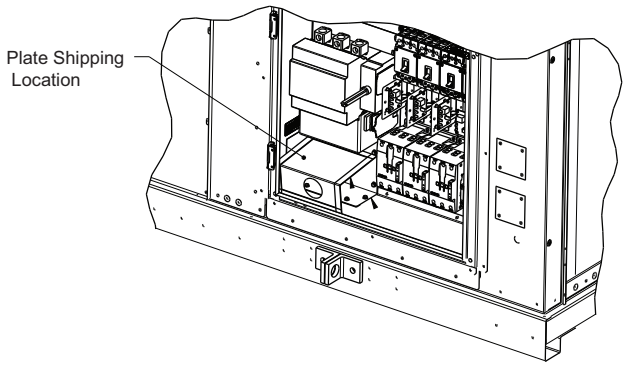
Ensure the wiring is properly secured when connected to or near a moving component, including compressors and fan motors, to prevent wear or loosening from vibration.

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.

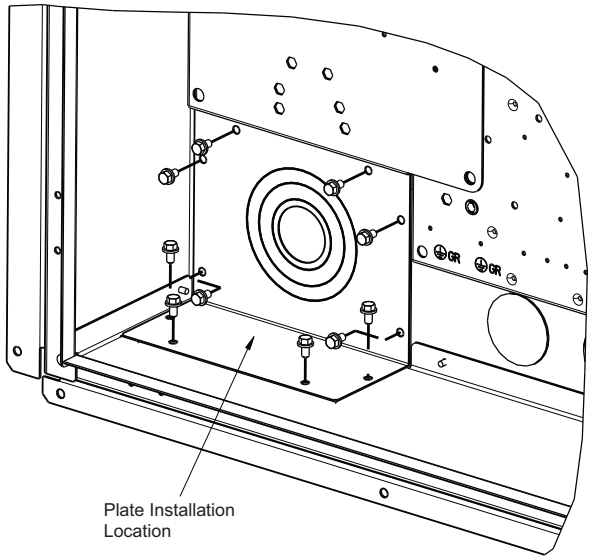
The alternate cover plate without knockouts ships in the power box. This plate has a bottom hole to allow power wire to enter through the bottom of the power box and is recommended for units with factory-installed non-fused disconnects or for thru-the-basepan wiring, where the high voltage coupling is partially obstructed. See Fig. 38 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. 39.
3. Remove the cover plate with knockouts and discard (not used).
4. Install the alternate cover plate in the installation location using the saved screws. Ensure the hole faces the bottom of the power box.



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

Fig. 38 — 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. 39 — Cover Plate Installation Location

Thru-the-Base Wiring

All units include a 3-1/2 in. FPT coupling in the condenser section for thru-the-base high voltage wiring and knockouts for thru-the-side high voltage wiring penetrations. See Fig. 40 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. 41 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. 40 for corner post side knockout locations and Fig. 41 for power box layout.

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

Thru-The-Side Wiring

All units include knockouts for thru-the-side high voltage wiring penetrations. See Fig. 40 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. 41 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. 40 for corner post high voltage knockout locations and Fig. 41 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.

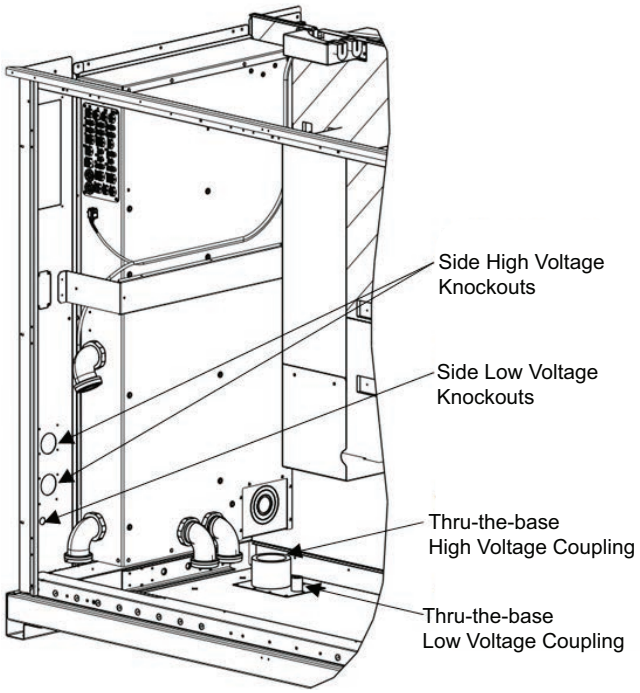


Fig. 40 — Basepan Coupling Locations and Side Knockouts for Power and Control Wiring

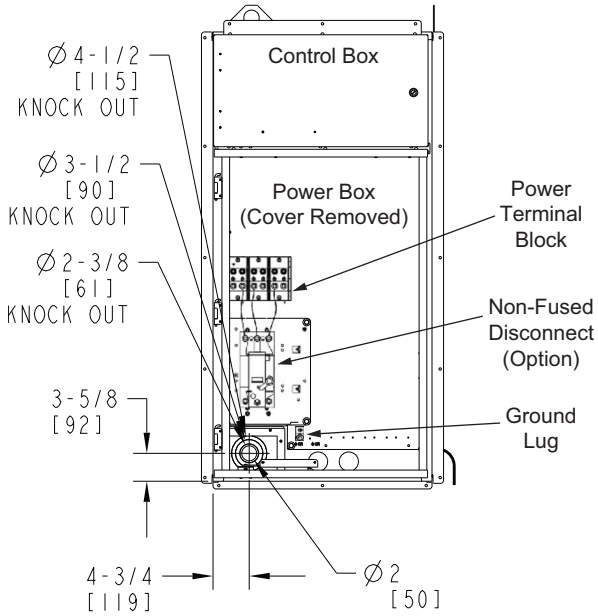
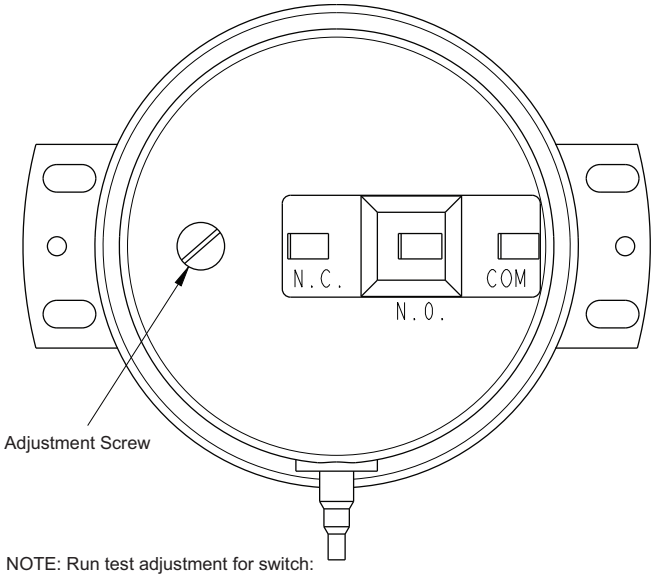


Fig. 41 — Power Box Layout and Knockouts

Step 10 — 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. 42 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. 43 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. 42 — Pre-Filter Status Switch Adjustment Screw

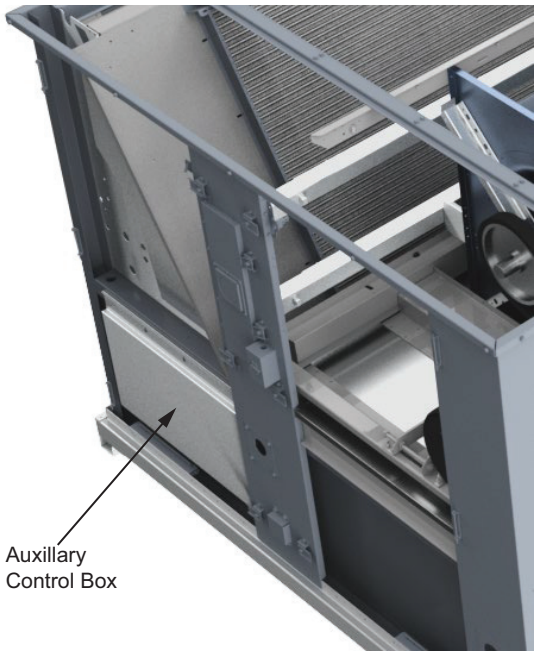


Fig. 43 — Auxiliary Control Box Location

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 11 — Connect Air Pressure Tubing (VAV or BP Control Units Only)

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. See Fig. 43 for auxiliary control box location. See Fig. 44 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.

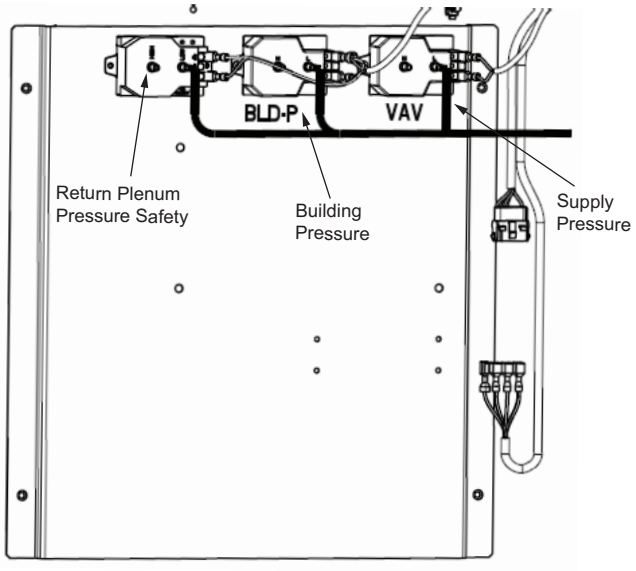


Fig. 44 — Pressure Transducer Locations

Step 12 — Install Supply-Air Temperature Sensor (Modulating Electric Heat Units Only)

A factory-provided, field installed supply air temperature (SAT) sensor is only included for units with modulating electric heat. The SAT sensor is a 10K-2 thermistor with a probe that ships inside the unit power box. Refer to Fig. 13-18 for power box location by unit size.

NOTE: The SAT sensor is only required for modulating electric heat. The SAT sensor can be field-provided and installed for no heat or two-stage electric heat units.

The SAT sensor should be installed in the supply duct per the following criteria. The supply duct should be located:

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

The SAT sensor must be field wired back to the SAT wire harness in the low voltage wire bundle by the unit control box. See Fig. 45 for SAT wire harness location. The SAT wire harness connects to plug 22 (pins 5 and 6) in the low voltage plug panel. The low voltage plug panel is on the right side of the control box. See Fig. AA in Appendix E for low voltage plug panel layout.

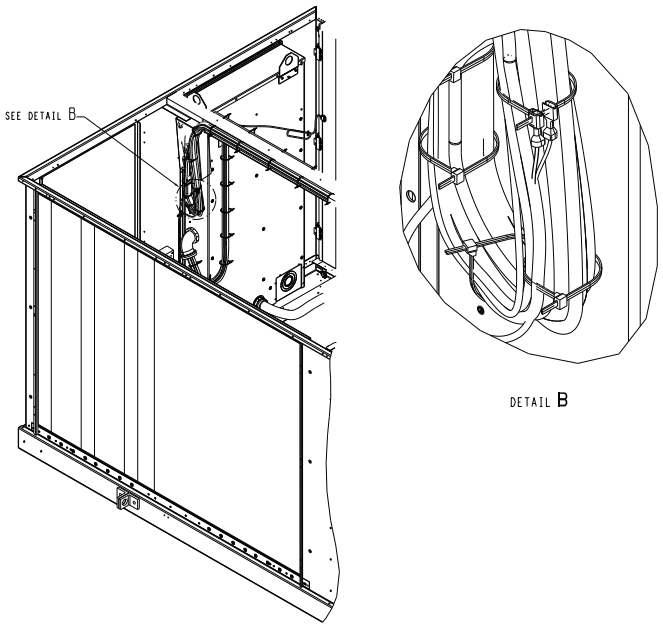


Fig. 45 — SAT Sensor Harness

Step 13 — 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.

Step 14 — Install Control Wiring (Optional)

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

ROUTE WIRING

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

All units include a 3/4 in. FPT coupling in the unit base pan for thru-the-base low voltage wiring and a knockout in the corner post by the power box for thru-the-side low voltage wiring penetrations. Refer to Fig. 40 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. 46 for knockout locations (shown with cover removed). Remove the two thumb screws at the top of the cover to detach cover.

FIELD USE TERMINAL STRIPS

Terminal strips for field use control devices and sensors are includes for each wiring to the unit controls. See "Typical Control Box Layout" on page 47 for control terminal strip location.

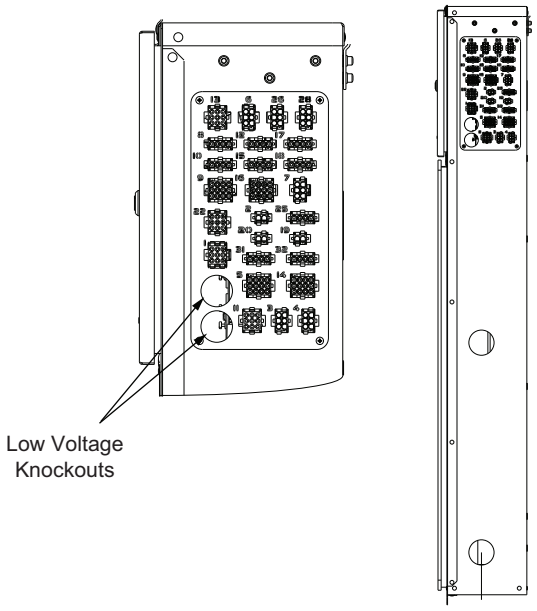


Fig. 46 — Control Knockouts Locations

Terminal Block 4 (TB)

See Fig. 47 and Table 10 for TB4 layout and descriptions.

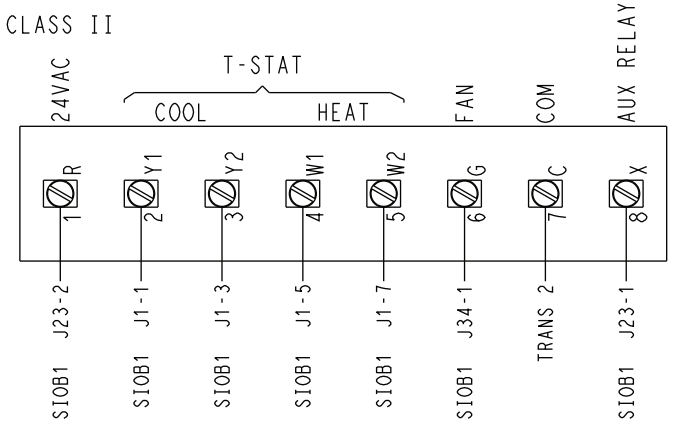


Fig. 47 — TB4 Layout

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

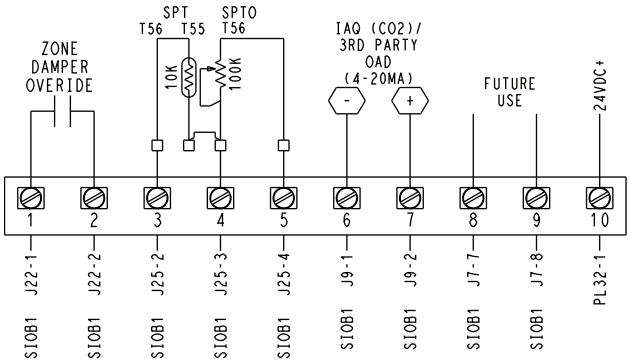
Terminal strip inputs and outputs are shown in Table 10.

Table 10 — TB4 Details

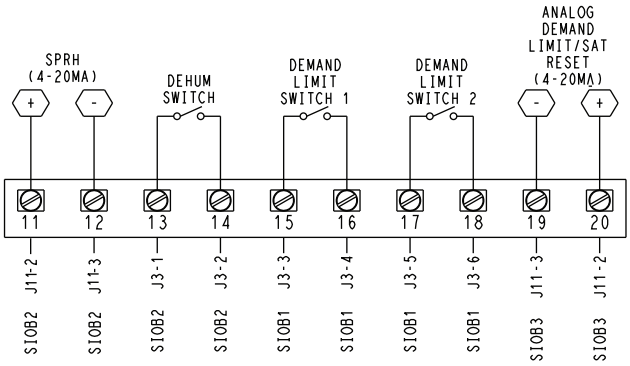
INPUTS AND OUTPUTS	LABEL	DESCRIPTION
1	R	24 vac to power field-use devices, such as thermostats (1A max. between C and R).
2	Y1	Low Cool Input: Used with TSTAT cool/heat demand source. A low cool demand is initiated when the low cool input is shorted (normally open).
3	Y2	High Cool Input: Used with TSTAT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

Terminal Block 5 (TB5)

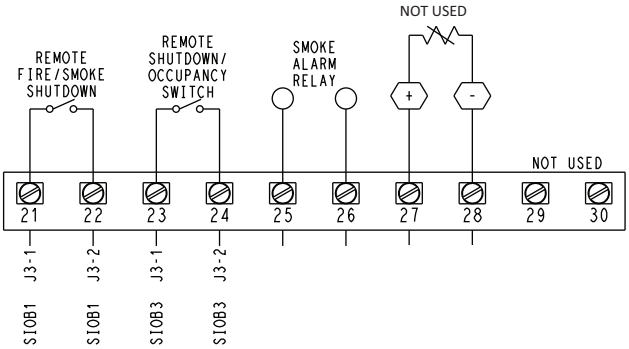
See Fig. 48 and Table 11 for TB5 layout and sensor accessory options.



TB5 (Terminals 1-10)



TB5 (Terminals 11-20)



TB5 (Terminals 21-30)

Fig. 48 — TB5 Layout

Table 11 — TB5 Details

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

Terminal Block (TB6)

See Fig. 49 and Table 12 for TB6 layout and input options.

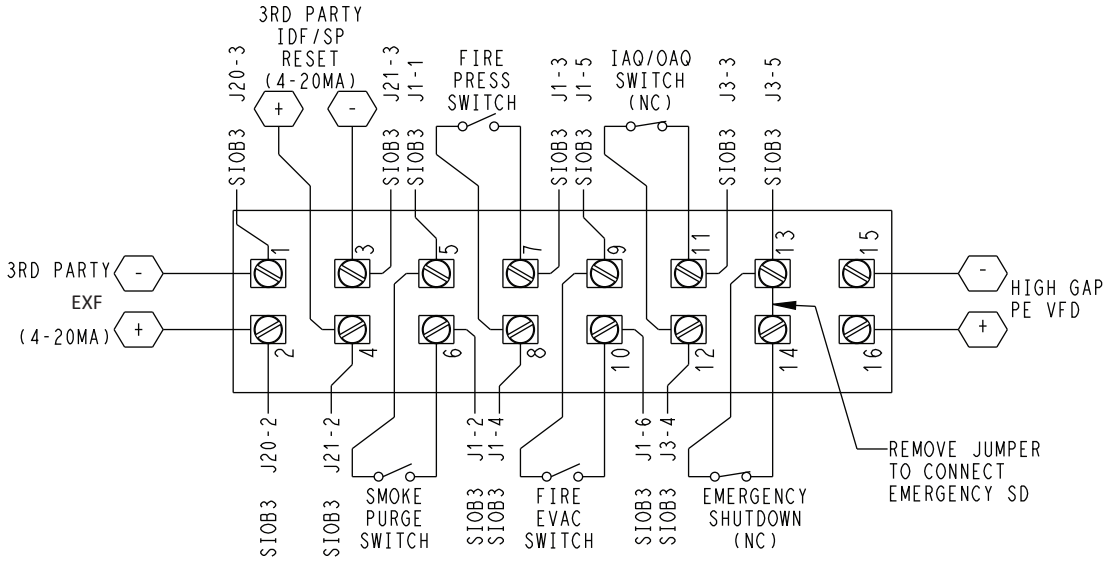


Fig. 49 — TB6 Layout

Table 12 — TB6 Input Options

TERMINALS	DEVICE	DESCRIPTION
1 and 2	**Third-Party Exhaust Fan Modulation**	Used for third-party modulation of exhaust fan speed. Requires input (4-20mA). Only available with High Capacity Power Exhaust (HCPE) accessory.
3 and 4	**Third-Party Indoor Fan Modulation/Static Pressure (SP) Reset**	Configurable for third-party modulation of indoor fan speed or for third-party supply duct static pressure reset. Requires input (4-20 mA).
5 and 6	**Smoke Purge Switch**	Smoke purge mode is triggered when smoke input is shorted (normally opened).
7 and 8	**Fire Pressurization Switch**	Fire pressurization mode is triggered when fire evacuation input is shorted (normally opened).
9 and 10	**Fire Evacuation Switch (EVAC)**	Fire evacuation mode is triggered when fire evacuation input is shorted (normally opened).
11 and 12	**Indoor Air Quality (IAQ) / Outdoor Air Quality (OAQ) Switch**	Can be configured for ventilation reset based on indoor air quality or ventilation disable based on outdoor air quality (normally open).
13 and 14	**Emergency Shutdown (EMER SD)**	Emergency shutdown is triggered when emergency shutdown switch input is opened (normally open).
15 and 16	**High Capacity Power Exhaust (HCPE)**	Provides modulation signal for accessory high-capacity power exhaust (HCPE). Provides 2-10 vdc signal.

Step 15 — Inspect Indoor Fan Bearing 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; size 60 units have 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's 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.

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.

CONTROLS OPERATION AND SETUP

Introduction

The WeatherMaker® 50K features the Carrier SmartVu™ control system with PIC 6.1 hardware, which controls and monitors the unit operation. This manual provides, step by step guidance on control set-up and unit operation for typical applications. For information on controls service access, refer to the 48/50K Advanced Controls, Troubleshooting, and Service manual 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. 50 and 13-17 (certified drawings) for control box location and Fig. 51 for typical control box layout. See Fig. 52 for SmartVu display connections.The SmartVu controls include multiple standard and optional factory-installed sensors. See Table 13 for air sensor listing. Refer to Fig. 53 for air sensor locations.

Fig. 50 — Control Box Location

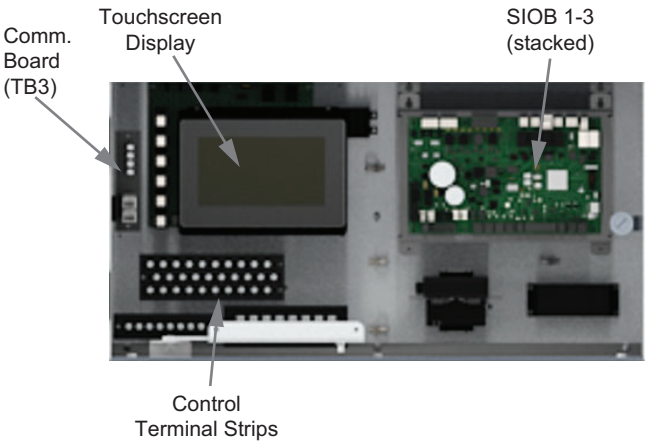


Fig. 51 — Typical Control Box Layout

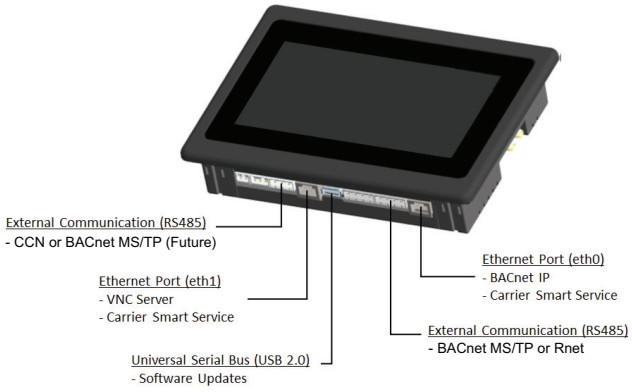


Fig. 52 — Carrier SmartVu™ Display Connections

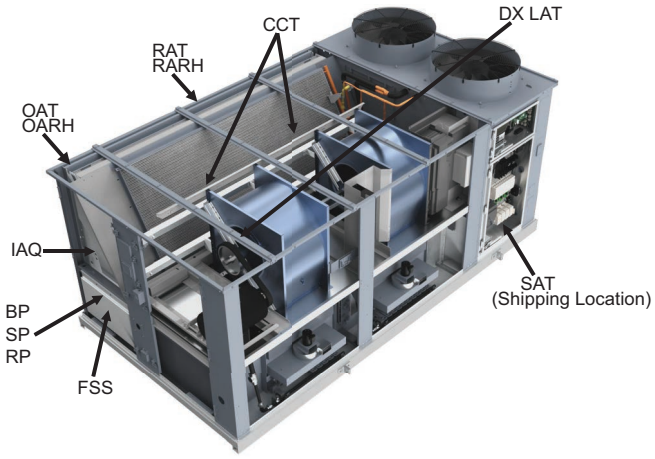


Fig. 53 — Air Sensor Locations

Table 13 — Factory-Installed Air Sensors

NAME	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[a]	Supply Air Temperature	Ships in power box, field-installed in supply duct.	HH79NZ043	Modulating/Multi-stage 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. 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. 52 for display layout and port locations.

VNC VIEWER

The SmartVu controls can be accessed using a hardwired ethernet connection at ethernet port 0 (on the bottom right side of the touchscreen display) and a VNC Viewer, such as RealVNC. Refer to Fig. 52 (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	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.

Screens can contain multiple pages of information. When additional pages are present, the page up/down button will be displayed at the bottom of the screen and the number after will show as 2 or more. Pressing the page up/down button will scroll through the available pages. See Fig. 54 for an example of a screen with multiple pages.

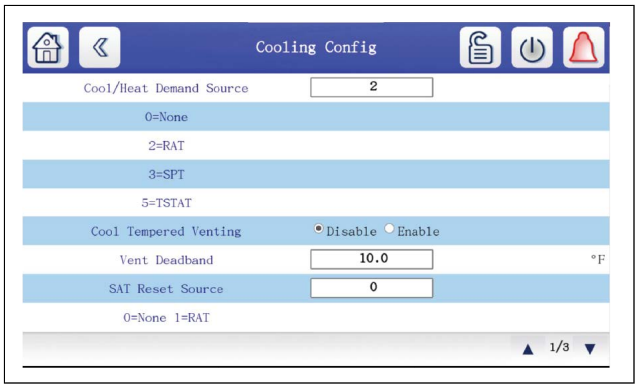


Fig. 54 — Page Up/Down Buttons

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.
	Status Button	Goes to the status screen for the associated component.
	Technical Documents	Only shown on web user interface. Opens technical documents in a new browser tab.
	Help	Only shown on web user interface. Opens help document in a new browser tab.

NAVIGATION CONVENTION

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

Based on the above guidance, the user must go to the main menu screen (by pressing the Main Menu button from the home screen or other screens), then go to the System Configuration screen (by pressing the system configuration icon on the main menu screen), then go to the Cooling Configuration screen (by pressing the cooling configuration icon on the system configuration screen). See Fig. 55 for the screen views and press points for this example. NOTE: Sufficient access level (user or higher) is required to access certain screens.

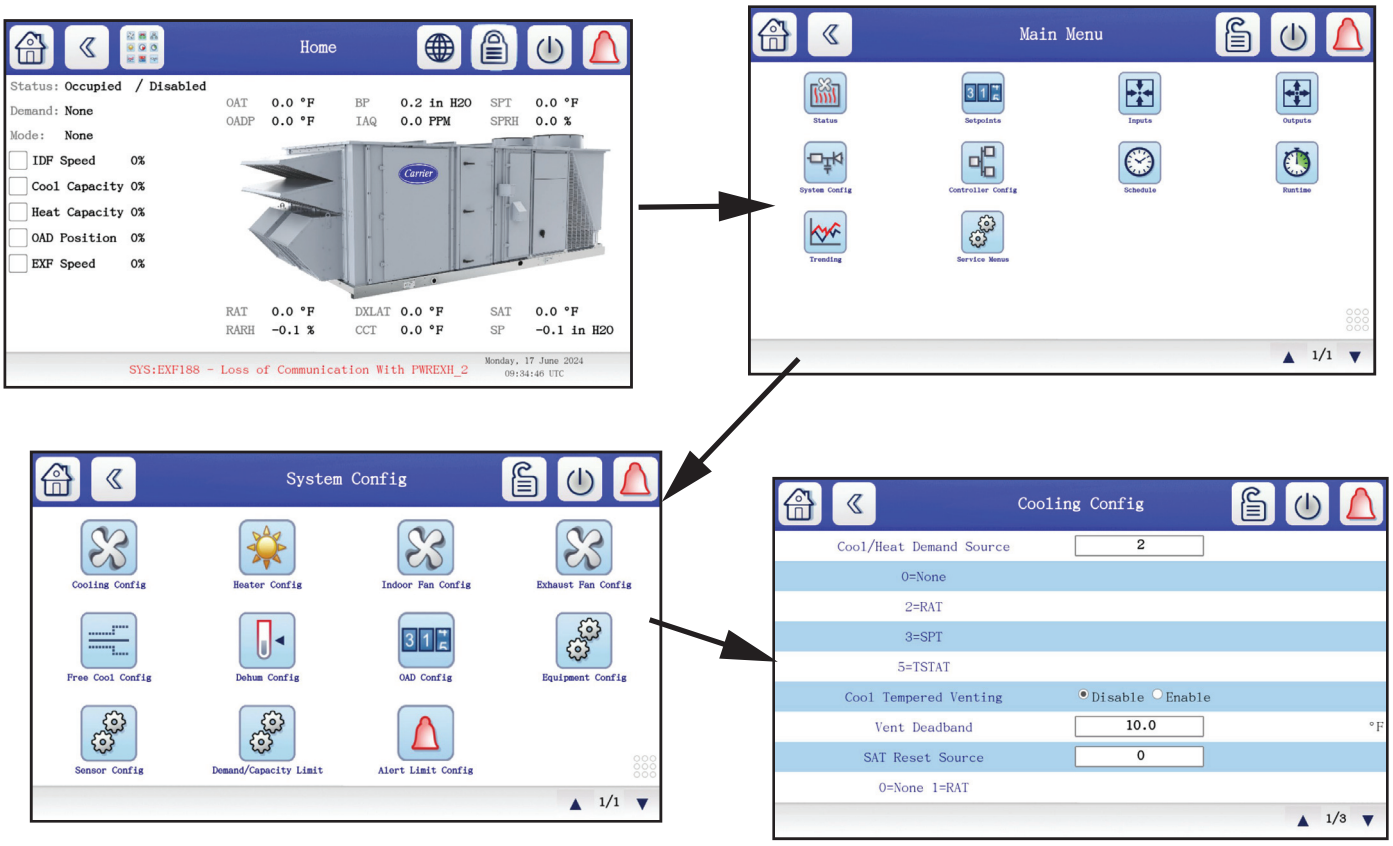


Fig. 55 — Equipment Configuration Screen Navigation Example

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. 56 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. 57 for keyboard touchscreen layout.

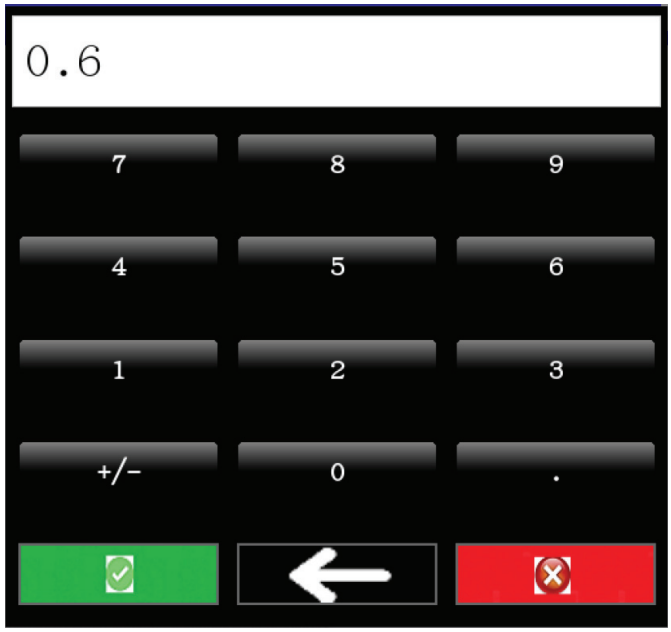


Fig. 56 — Keypad Layout

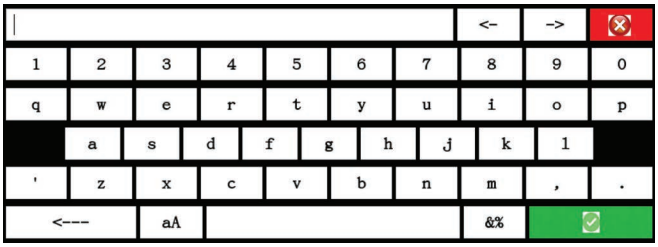


Fig. 57 — Keyboard Layout Touchscreen

For settings that have 2 configurations options, option buttons are used to indicate the configuration. See Fig. 58 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. 59 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. 58 — Enable/Disable Configuration Example

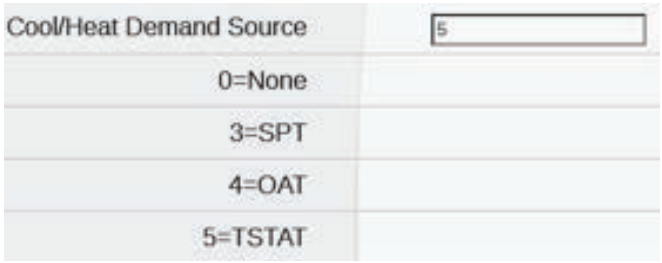


Fig. 59 — Configured Device Example

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 Carrier Controller is powered on and will be shown for 2-3 minutes. See Fig. 60. 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. 61 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. 62 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. 63 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. 64 on page 54 for typical home screen layout.

Fig. 60 — Welcome Screen Example

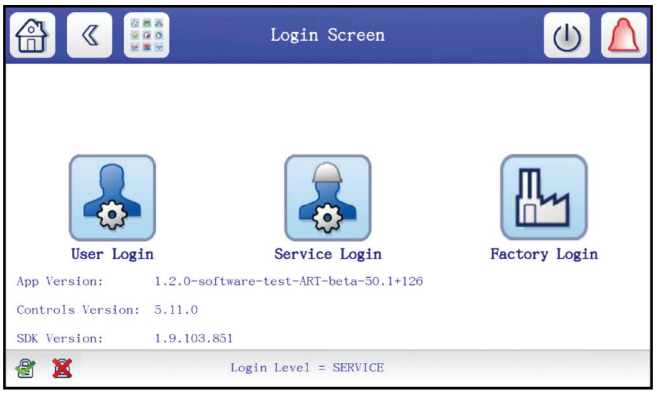


Fig. 61 — Login Screen

Fig. 62 — User Login Screen

Fig. 63 — 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.

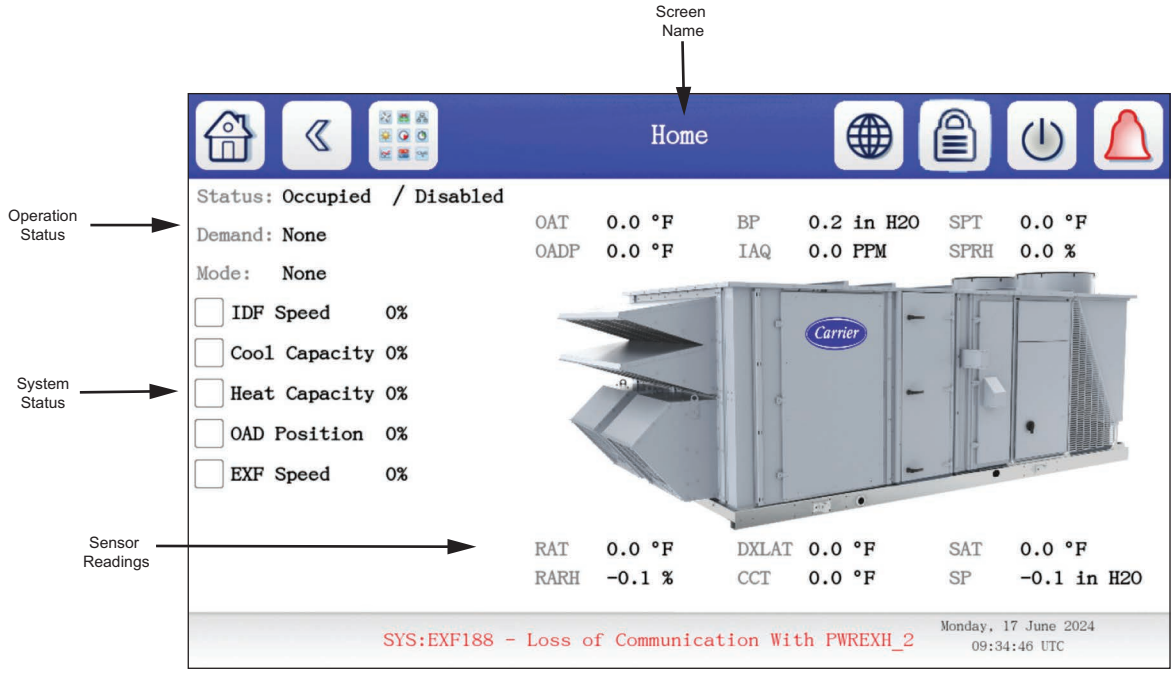


Fig. 64 — Home Screen Example

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. 65 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. 66 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. 67 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. 68 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. 69 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. 70 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. 65 — Status Screen

Fig. 66 — Setpoint Screen

Fig. 67 — System Configuration Screen

Fig. 68 — Controller Configuration Screen

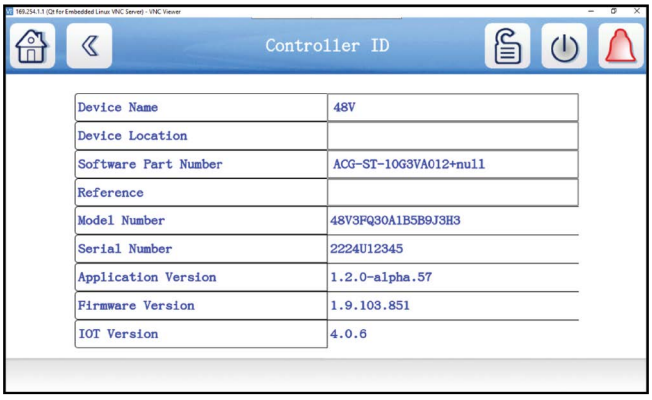


Fig. 69 — Controller ID Screen

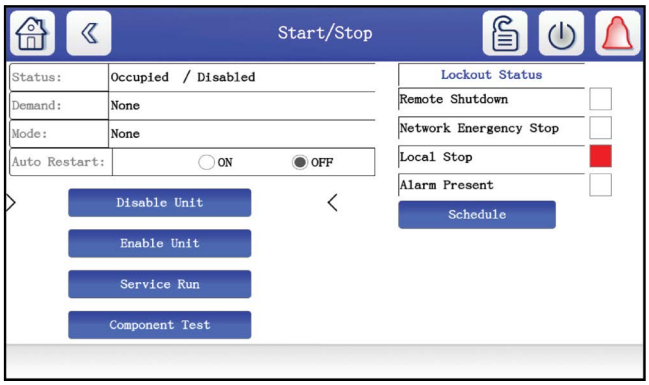


Fig. 70 — Start/Stop Screen

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.

Control Set Up

The 50K can be used in a wide variety of applications. The remainder of the control section provides step by step directions and actions for control set up for typical applications, including single zone air conditioning (single-zone) and multi-zone air conditioning (multi-zone) with air terminal units. See Table 19 for an overview of the typical control set-up steps. See the Advanced Control, Service, and Troubleshooting guide for service control configuration. See the SmartVu integration guide for set up direction for network communication or communicating sensors.

Table 19 — 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 indoor fan.
H	Optional: configure the outdoor air damper (only units with economizer).
I	Configure the cooling system.
J	Optional: configure the dehumidification system (only units with Humidi-MiZer).
K	Configure the heating system (only units with heat).
L	Optional: configure the exhaust fan (only units with exhaust fan).
M	Optional: configure free cooling.
N	Optional: configure demand/capacity limiting.
O	Optional: configure alerts.
P	Optional: set indoor fan setpoints (only SP indoor fan control).
Q	Set cooling setpoints.
R	Optional: set dehumidify setpoints (only units with Humidi-MiZer).
S	Set heating setpoints.
T	Optional: set exhaust fan setpoint (BP exhaust fan control only).
U	Set up occupancy control method or schedule.

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

STEP A — POWER ON THE CONTROL

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

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

If the touchscreen or control boards do not power on, refer to the Advanced Controls, Operation, 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)***. See Fig. 71 for daylight savings time screen layout. Set the start and stop days for daylight savings installation location. When finished, press the save changes button at the bottom of the page.

The system automatically updates the current time based on when DST is enabled, and the current time and date is in between the start and stop conditions. DST start or stop status is indicated in the upper right-hand corner of the screen. See Table 20 for DST configurations.

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

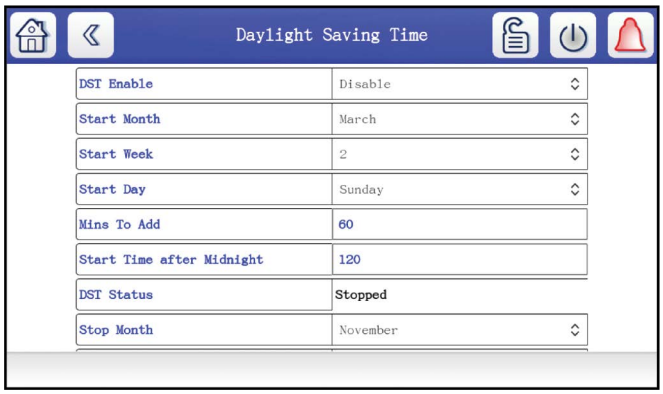


Fig. 71 — Daylight Savings Time Screen

Table 20 — Daylight Savings Time Configurations

CONFIGURATION	VALUE	DESCRIPTION
DST Enable	Enable	Daylight savings time is enabled; the system time will automatically be adjusted based on the DST configuration.
	Disable	Daylight savings time is not used.
Start Month	Jan. to Dec.	The month that DST will start.
Start Week	1 to 5	The week of the month that DST will start.
Start Day	Mon. to Sun.	The day of the week that DST will start.
Minutes To Add	60 min.	The amount of daylight savings time change (addition).
Start Time After Midnight	0 to 720	Time after 0:00 to apply the daylight savings time change.
Start Month	Jan. to Dec.	The month that DST will stop.
Start Week	1 to 5	The week of the month that DST will stop.
Start Day	Mon. to Sun.	The day of the week that DST will stop.
Minutes To Add	60 min.	The amount of daylight savings time change (subtraction).
Start Time At Midnight	0 to 720	Time after 0:00 to apply the daylight savings time change.

STEP D — SET DATE AND TIME

Navigate to the Manual Time Sync screen (***Main Menu→ Controller Config→Time Sync→Manual Time Sync***). See Fig. 72 for manual time sync screen layout. Set date and time for the installation location. When finished, press the save changes button at the bottom of the page.

Time and date are used as part of the unit occupancy schedule and must be set based on application requirements. To change the date, press on the box containing the date to bring up the calendar. Use the arrow buttons on the left and right of the month/year to increase or decrease the month or press on the month or year to bring up a drop-down list. Once the calendar is at the correct month and year, press on the current date to finalize the date selection.

NOTE: The date will show on this screen in month/day/year format.

To change the time, press on the box containing the time to bring up the time adjuster. Use the up and down arrows to change the hours, minutes, and seconds.
NOTE: Time is in 24-hour (military) format. Press OK to complete the time setting.

STEP E — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED DEVICES

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

Navigate to the Equipment Configuration screen (***Main Menu→System Config→Equipment Config***). Review the device listing and enable or configure any field-installed or field-use devices. See Fig. 73 for equipment configuration screen layout. When finished, press the save changes button at the bottom of the page.

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

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

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

See Table 21 for equipment configurations by application. All devices in this screen are disabled by default, except when the device is included as a factory-installed option (based on unit model number).

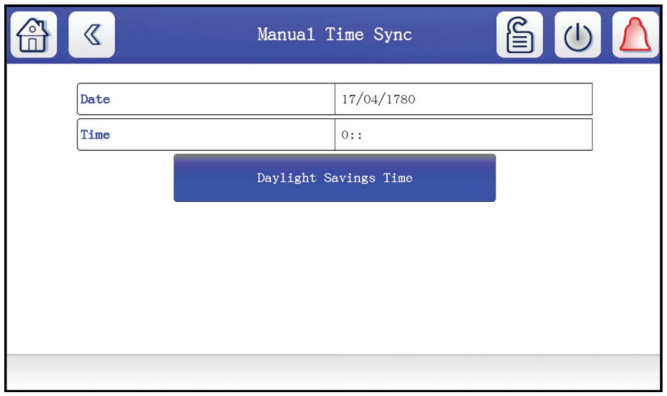


Fig. 72 — Manual Time Sync Screen

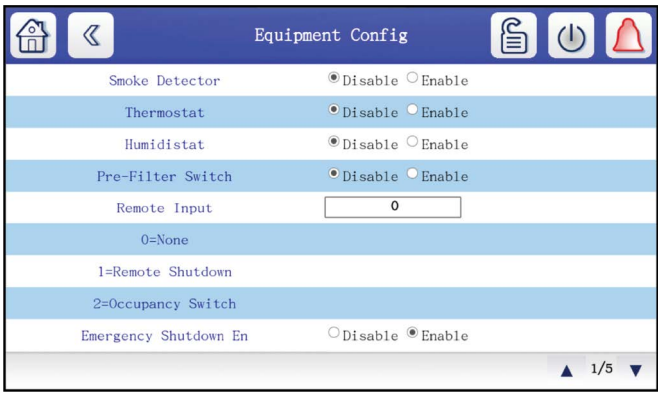


Fig. 73 — Equipment Configuration Screen

Table 21 — Equipment Configuration by Application

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

Table 21 — Equipment Configuration by Application (cont)

ITEM	VALUE	DESCRIPTION	APPLICATION
IAQ/OAD Input Config.	0 = Not Used (Default)	The system disables the IAQ/OAD input.	Any
	1 = IAQ Sensor	Enables the input and assigns it to IAQ sensor, such as CO_2. Used when ventilation control configuration is set to IAQ mapping or IAQ reset source configuration is set to IAQ sensor NOTE: The IAQ/OAQ input defaults to IAQ for units with factory RA CO_2 sensor.	Any
	2 = Third-Party OAD Mod	Enables the input and assigns it to the third-party signal to modulate the outdoor air damper position. Used when the ventilation control configuration is set to third-party vent or full.	Any
	3 = Third-Party IAQ Reset	Enables the input and assigns it for third-party signal to reset the outdoor air damper ventilation position. Used when the IAQ reset configuration is set to third-party.	Any
	4=Third-Party OA CFM Reset	Enables the input and assigns it for 3rd party signal to reset the outdoor air flow setpoint. Used if the IAQ reset source configuration is set to third party and the unit is equipped with an OA CFM sensor.	Any
IAQ/OAQ Switch Config.	0 = Not Used (Default)	The system disables the IAQ/OAQ switch input.	Any
	1= IAQ Switch	Enables the input and assigns it to IAQ switch. Used when the IAQ reset source configuration is set to IAQ switch.	Any
	2 = OAQ Switch	The system monitors the input for OAQ switch to disable free cooling and ventilation when OAQ is poor.	Any
Occupied Standby Time	5 to 30 min. 5 min. Default	The amount of time the space is continuously unoccupied for before occupied setback starts.	Any
Occupied Override Time	0t o 4 Hours 2 Hours Default	The amount of time the system is in occupied override when occupied override mode is active.	Any

STEP F — CONFIGURE EQUIPMENT FOR FIELD-INSTALLED SENSORS

Navigate to the Sensor Configuration screen (***Main Menu → System Config→ Sensor Config)***. Review the sensor listing and enable or configure any field-installed sensors. See Fig. 74 for sensor configuration screen layout. When finished, press the save changes button at the bottom of the page.

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

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

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

See Table 22 for a listing of commonly used sensors by application. All devices in this screen are disabled by default, except when the device is included as a factory-installed option (from model number).

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

STEP G — CONFIGURE INDOOR FAN

Navigate to the Indoor Fan configuration screen (***Main Menu →System Config → Indoor Fan Config***). Configure the indoor fan operation and operating speeds based on application requirements. See Fig. 75 for indoor fan configuration screen layout. When finished, press the save changes button at the bottom of the screen.

The indoor fan operation, including the control type, occupied operation, and unoccupied operation, and indoor fan speeds must be configured to match application requirements. See Table 23 for indoor fan control configurations by application.

NOTE: Fan speed configurations are in percent of maximum operating speed (rpm). Review the unit submittal or the fan tables in the Product Data documents to identify the required operating rpm to achieve the applications airflow.

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

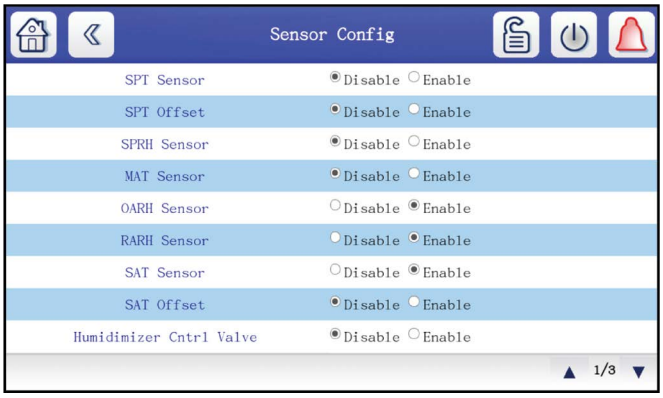


Fig. 74 — Sensor Configuration Screen Layout

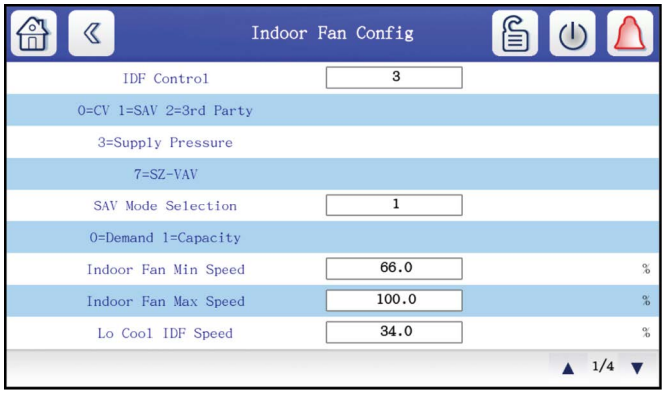


Fig. 75 — Indoor Fan Configuration Screen

Table 22 — Sensor Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SPT Sensor	Enable	The system enables a local space temperature (SPT) sensor input. Used when the cool/heat demand source is configured for SPT or for SAT or SP reset based on SPT.	Single Zone
	Disable (Default)	The system disables the local space temperature sensor input.	Any
SPT Offset	Enable	The system monitors a local space temperature sensor offset.	Single Zone
	Disable (Default)	The system does not monitor the local space temperature offset input.	Any
SPT OCC Override	Enable	The system monitors the local space temperature sensor for occupied override during the unoccupied period.	Single Zone
	Disable (Default)	The system does not monitor for local occupancy override.	Any
OCC Override Time	0 to 4 Hours, 0 Default	When SPT occupied override is activated, this is the occupied override time applied when the button is first pressed.	Single Zone
OCC Override 2nd Press	0 = Reset (Default)	When occupied override is in effect and the override button is pressed a second time during the override period, the override period is restarted at the occupied override time.	Single Zone
	1 = Clear	When occupied override is in effect and the override button is pressed a second time during the override period, the override time is cleared, and the unit is returned to unoccupied.	Single Zone
MAT Sensor	Enable	The system monitors a local mixed air temperature (MAT) sensor. MAT is used for cooling and heating mode determination.	Single Zone
	Disable (Default)	The system does not monitor the local MAT sensor. NOTE: If an MAT sensor isn't available, then the system calculates MAT based on OAT, RAT, and the OAD position.	Any
OARH Sensor	Enable	The system enables a local outdoor air relative humidity (OARH) sensor.OARH is used with OAT to calculate OAE and OADP, which are used for free cooling control for OADP limit check, enthalpy changeover, and differential enthalpy changeover. NOTE: OARH is enabled by default for units with the humidity and enthalpy sensing option.	Any
	Disable	The system disables the local OARH sensor. Disabled by default for units without the humidity and enthalpy sensing option.	Any
RARH Sensor	Enable	The system enables the local return air relative humidity (RARH) sensor. RARH is used when the dehumidify demand source is configured for RARH or for differential enthalpy free cooling changeover. NOTE: RARH is enabled by default on units with the humidity and enthalpy sensing option.	Any
	Disable	The system disables the local RARH sensor. Disabled by default for units without the humidity and enthalpy sensing option.	Any
SAT Sensor	Enable	The system monitors a local supply air temperature (SAT) sensor. SAT is used for cooling, venting, and modulating/multi-stage heat operation. NOTE: SAT is enabled by default for units with modulating or multi-stage heat.	Any
	Disable	The unit will not monitor the local SAT sensor input. NOTE: The system uses the DX LAT sensor reading as SAT for cooling and venting operation if a SAT sensor is not available.	Any
SP Sensor	Enable	The system enables the local duct supply pressure sensor. Used when the indoor fan control configuration is set to SP. SP is used for multi-zone VAV applications. SP control can also be used for true constant volume applications to account for pressure drop from filter loading. NOTE: SP is enabled by default for VAV units.	Multi-zone
	Disable	The system disables local duct supply pressure sensor. NOTE: SP is disabled by default for SAV units.	Single Zone
BP Sensor	Enable	The system enables the local building pressure sensor. Used when the exhaust fan control configuration is set to BP. NOTE: Enabled by default for units with power exhaust with building pressure control.	Any
	Disable	The system disables the local building pressure sensor. Disabled by default for units without power exhaust with building pressure control.	Any
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 5 in H_2O for the factory installed SP sensor	Any
SP Low Range	0 to 5 in H_2O 0 in H_2O Default	The high pressure range of the supply pressure transducer. Must be 0 in H_2O for the factory installed SP sensor	Any
BP High Range	–1 to1 in H_2O 0.25 in H_2O Default	The high pressure range of the building pressure transducer. Must be 0.25 in H2O for the factory installed BP sensor	Any
BP Low Range	–1 to 1 in H_2O –0.25 in H_2O Default	The low pressure range of the supply pressure transducer. Must be –0.25 in H_2O for the factory installed BP sensor	Any
IAQ High Range	0 to 5000 PPM 5000 PPM Default	The high PPM range of the IAQ sensor. Must be 5000 PPM for the factory installed RA CO_2 sensor	Any
IAQ Low Range	0 to 5000 PPM 0 PPM Default	The low PPM range of the IAQ sensor. Must be 0 PPM for the factory installed RA CO_2 sensor	Any

Table 23 — Indoor Fan Configurations by Application

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="5">Indoor Fan Control</td><td>0 = Constant Volume</td><td>The indoor fan operates at the IDF high cool speed with a cool, vent, or dehum demand, and the IDF high heat speed with a heat demand. CV IDF control is common for process applications, can be used in select single zone applications (where code allows).</td><td>Single Zone</td></tr>
<tr><td>1 = Staged Air Volume (SAV™)</td><td>The indoor fan speed stages based on demand level or cooling and heating capacity level. SAV is common for single-zone air conditioning applications. See the SAV mode selection for more details on specific operation for SAV demand and SAV capacity. SAV can only be used with SPT or TSTAT cool/heat demand source. NOTE: SP is default for SAV units.</td><td>Single Zone</td></tr>
<tr><td>2 = Third-Party IDF Modulation[a]</td><td>The indoor fan speed modulates between minimum and maximum speed based on a third-party input. Requires a local third-party IDF modulation input or network third-party IDF modulation signal.</td><td>Any</td></tr>
<tr><td>3 = Supply Pressure (SP)[a]</td><td>The indoor fan speed modulates between minimum and maximum speed to maintain the supply pressure at the supply pressure setpoint. Most common for multi-zone VAV applications with air terminal units or true constant volume operation (compensates for filter loading). Requires the local or supply pressure sensor or network supply pressure reading. NOTE: SP is default for VAV units.</td><td>Multi-zone</td></tr>
<tr><td>7 = Single Zone VAV (SZVAV)[a]</td><td>The indoor fan speed modulates between minimum and maximum IDF speeds based on space temperature and the Occupied Cooling and Occupied Heating setpoints. Requires SPT cool/heat demand source.</td><td>Single Zone</td></tr>
<tr><td rowspan="2">SAV Mode Selection</td><td>0 = Demand</td><td>The indoor fan speed is based on the demand level. See below for SAV demand IDF speed details.<table><tr><th>DEMAND</th><th>INDOOR FAN SPEED</th></tr><tr><td>Vent</td><td>IDF Min. Speed</td></tr><tr><td>Low Cool</td><td>IDF Low Cool Speed</td></tr><tr><td>High Cool And Dehumidify</td><td>IDF High Cool Speed</td></tr><tr><td>Low Heat</td><td>IDF Low Heat Speed</td></tr><tr><td>High Heat</td><td>IDF High Heat Speed</td></tr></table>The IDF control must be set to SAV for SAV demand operation. SAV demand is recommended in single zone air conditioning applications for tighter space temperature control.</td><td>Single Zone</td></tr>
<tr><td>1 = Capacity (Default)</td><td>The indoor fan speed is based on the demand level or the cool or heat capacity level. See below for SAV demand IDF speed details.<table><tr><th>DEMAND/CAPACITY</th><th>INDOOR FAN SPEED</th></tr><tr><td>Vent Demand</td><td>IDF Min Speed</td></tr><tr><td>Dehum Demand</td><td>IDF High Cool Speed</td></tr><tr><td>Cool Capacity < SAV Low Cool Threshold</td><td>IDF Min. Speed</td></tr><tr><td>SAV Low Cool Threshold ≤ Cool Capacity < SAV Med. Cool Threshold</td><td>IDF Low Cool Speed</td></tr><tr><td>SAV Med. Cool Threshold ≤ Cool Capacity < SAV Hi Cool Threshold</td><td>IDF Med Cool Speed</td></tr><tr><td>Cool Capacity ≥ SAV High Cool Threshold</td><td>IDF High Cool Speed</td></tr><tr><td>1% < Heat Capacity ≤ 75%</td><td>IDF Low Heat Speed</td></tr><tr><td>Heat Capacity > 75%</td><td>IDF High Heat Speed</td></tr></table>During free cooling mode, integrated free cooling mode, or heat tempered venting mode, the IDF speed will follow the demand level (IDF Low Cool Speed with Low Cool Demand or IDF High Cool Speed with High Cool Demand). The IDF control must be set to SAV for SAV capacity operation. SAV capacity is recommended in single-zone air conditioning applications for most efficient operation.</td><td>Single Zone</td></tr>
<tr><td>IDF Min. Speed</td><td>0 to 100%
34% Default</td><td>IDF min. speed is used directly for SAV, SP, and ZP indoor fan control types. The system will prevent any other IDF speed configuration from being below the IDF min. speed configuration.</td><td>Any</td></tr>
<tr><td>IDF Max. Speed</td><td>0 to 100%,
100% Default</td><td>IDF max. speed is used directly for SP and ZP indoor fan control types. The system will prevent any other IDF speed configuration from being above the IDF max. speed configuration.</td><td>Any</td></tr>
<tr><td>IDF Low Cool Speed</td><td>0 to 100%,
54% Default</td><td>IDF low cool speed is only used as part of SAV demand or SAV capacity IDF control.</td><td>Single Zone</td></tr>
<tr><td>IDF Med. Cool Speed</td><td>0 to 100%,
55% Default</td><td>IDF med. cool speed is only used as part of SAV capacity IDF control.</td><td>Single Zone</td></tr>
<tr><td>IDF High Cool Speed</td><td>0 to 100%,
81% Default</td><td>IDF high cool speed is used as part of CV, SAV demand, or SAV capacity IDF control.</td><td>Any</td></tr>
</table>

Table 23 — Indoor Fan Configurations by Application (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SAV Low Cool Cap. Threshold	0 to 100%, 0% Default	SAV low cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
SAV Med. Cool Cap. Threshold	0 to 100%, 50% Default	SAV med. cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
SAV High. Cool Cap. Threshold	0 to 100%, 75% Default	SAV high cool capacity threshold is only used with SAV capacity IDF control.	Single Zone
IDF Low Heat Speed	0 to 100%, 67% Default	IDF lo heat speed is only used as part of SAV demand or SAV capacity IDF control for units with a heat source.	Single Zone
IDF High Heat Speed	0 to 100%, 100% Default	IDF high heat speed is used as part of CV, SAV demand, or SAV capacity IDF control for units with a heat source.	Any
Occupied Fan	0 = Demand Based	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify during the occupied period. Demand based IDF should only be used for single zone A/C applications where the RTU does not provide zone ventilation.	Single Zone
	1 = Continuous (Default)	The IDF will operate continuously during the occupied period. Recommended for 100% OA applications or single zone A/C applications where the RTU provides zone ventilation.	Any
Unoccupied Fan	0 = Disabled	The IDF is off during the unoccupied period. Required for 100% OA applications.	Any
	1 = Demand Based (Default)	The IDF will only operate when there is a demand for cool, heat, vent, or dehumidify during the unoccupied period. This configuration must be set for the RTU to provide unoccupied cooling, heating, dehumidification, or venting.	Single Zone
IDF Smoke Purge Speed	0 to 100% 34% Default	The speed that the indoor fan operates at when smoke purge mode is activated	Any
IDF Smoke Press Speed	0 to 100% 34% Default	The speed that the indoor fan operates at when smoke pressurization mode is activated	Any
IDF Smoke Evac Speed	0 to100% 34% Default	The speed that the indoor fan operates at when smoke evacuation mode is activated	Any
SP Reset Source	0 = None (Default)	SP reset is not performed	Any
	1 = RAT	The system monitors RAT for SP reset. When there is a cool or vent demand and the RAT is < the Occupied Cooling setpoint, the SP reset is calculated by (Occupied Cooling setpoint - RAT)*(IDF Reset Ratio config). The SP reset value is limited by the SP Reset Limit config. SP reset requires SP indoor fan control.	Multi-Zone VAV
	2 = SPT	The system monitors SPT for SP reset. When there is a cool or vent demand and the SPT is < the Occupied Cooling setpoint, the SP reset is calculated based on the (Occupied Cooling setpoint - SPT)*(IDF Reset Ratio config). The SP reset value is limited by the SP Reset Limit config. Requires SP indoor fan control and local or network SPT sensor.	Multi-Zone VAV
	3 = Third-Party	The system monitors the hardwired 3rd party IDF input or network SP reset input for SP reset. When there is a cool or vent demand and the SPT is < the Occupied Cooling setpoint, the SP is reset is set based on the network SP reset value (in H_2O) or the analog input value (2V=0 in H_2O, 10V=3 in H_2O), down to the SP Reset Limit config.	Multi-Zone VAV
SP Reset Ratio	0 to 3 in H_2O/°F 0.2 in H_2O/°F Default	The value used for calculating SP reset for RAT and SPT for SP reset source.	Multi-Zone VAV
SP Reset Limit	0 to 3 in H_2O 0.75 in H_2O Default	The maximum allowable value for SP Reset when using RAT or SPT for SP reset source.	Multi-Zone VAV

NOTE(S):

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

STEP H — CONFIGURE OUTDOOR AIR DAMPER (OPTIONAL)

For units with economizer, navigate to the Outdoor Air Damper Configuration screen (***Main Menu → System Config → OAD Config***). Review the OAD position configurations and adjust as need. See Fig. 76 for outdoor air damper configuration screen layout. When finished, press the save changes button at the bottom of the screen.

⚠CAUTION

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

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

The OAD configuration screen is used to set the OAD operation, ventilation control, and position restrictions. Free cooling is configured on a separate screen. All OAD positions are based on 0 to 100% range. See Table 24 for outdoor air damper configurations by application.

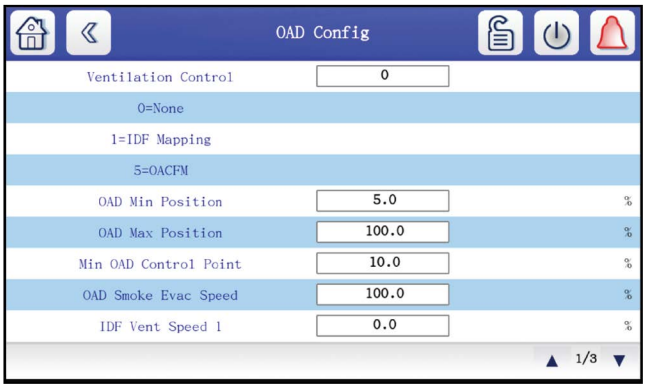


Fig. 76 — Outdoor Air Damper Configuration Screen

Table 24 — Outdoor Air Damper Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Vent Control	0 = None (Default)	Ventilation is not performed. This configuration should only be used on equipment without an economizer (OAD).	Any
	1 = IDF Mapping	The OAD ventilation position is modulated linearly based on the indoor fan speed and IDF/OAD vent positions 1-4 configurations. See below for IDF mapping OAD position details.To achieve a constant ventilation rate, the OAD position has to increase as the IDF speed decreases. **IDF SPEED** / **OAD POSITION** **IDF VENT SPEED 1** — OAD vent pos 1 **IDF VENT SPEED 2** — OAD vent pos 2 **IDF VENT SPEED 3** — OAD vent pos 3 **IDF VENT SPEED 4** — OAD vent pos 4 When the IDF speed is in between 2 IDF vent speed configurations, the OAD vent position is linearly calculated based on the IDF speed and the closest OAD vent position configurations. For example, if IDF Vent Speed 1 = 30%, IDF Vent Speed 2 = 50%, OAD Vent Pos 1 = 40%, OAD Vent Pos 2 = 30%, and the IDF speed was 40%, the OAD position would be 35%.	Any
	2 = Third-Party Full	The OAD position modulates between the minimum and maximum OAD positions based on a third-party input. Free cooling or IAQ reset will not override the third-party commanded OAD position. Requires the local third-party IDF input or a network third-party IDF modulation signal.	Any
	3 = Third-Party Vent Only	The OAD ventilation position modulates between the minimum and maximum OAD positions based on a third-party input. Free cooling or IAQ reset will override the third-party commanded OAD position. Requires the local third-party IDF input or a network third-party IDF modulation signal.	Any
OAD Min. Position	0 to 100% Default 5%	This is the minimum OAD position that the system is allowed to operate at while ventilation or free cooling is being performed. No other OAD position configuration can be lower the OAD minimum position.	Any
OAD Max. Position	0 to 100% Default, 98%	This is the maximum OAD position that the system is allowed to open to. No other OAD position configuration can be higher than the OAD maximum position.	Any
IDF Vent Speed 1	0 to 100%, Default 34%	IDF vent speed 1 is only used when the OAD control type is set to IDF mapping. The IDF vent speed 1 should match the lowest configured IDF speed, typically the IDF min speed. IDF vent speed 1 cannot be below IDF min speed or more than IDF vent speed 2.	Any
IDF Vent Speed 2	0 to 100%, Default 44%	IDF vent speed 2 is only used when the OAD control type is set to IDF mapping. For SAV IDF control, the IDF vent speed 2 should match the low cool IDF speed. IDF vent speed 2 cannot be below IDF vent speed 1 or more than IDF vent speed 3.	Any
IDF Vent Speed 3	0 to 100%, Default 66%	IDF vent speed 3 is only used when the OAD control type is set to IDF mapping. For SAV IDF control, the IDF vent speed 3 should match the med. cool IDF speed (if used) or be between the low cool and high cool IDF speeds. IDF vent speed 3 cannot be below IDF vent speed 2 or more than IDF vent speed 4.	Any

Table 24 — Outdoor Air Damper Configurations by Application (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
IDF Vent Speed 4	0 to 100%, Default 100%	IDF vent speed 4 is only used when the OAD control type is set to IDF mapping. The IDF vent speed 4 should match the highest configured IDF speed, typically the IDF max. speed or the IDF high cool speed. IDF vent speed 4 cannot be below IDF vent speed 3 or more than IDF max. speed.	Any
OAD Vent Pos 1	0 to 100%, Default 50%	OAD vent pos 1 is only used when the OAD control type is set to IDF mapping and is the highest of the vent positions. OAD vent position 1 cannot be below OAD vent position 2 or above max. OAD position.	Any
OAD Vent Pos 2	0 to 100%, Default 40%	OAD vent pos 2 is only used when the OAD control type is set to IDF mapping. OAD vent position 2 cannot be below OAD vent position 3 or above OAD vent position 1.	Any
OAD Vent Pos 3	0 to 100%, Default 30%	OAD vent pos 3 is only used when the OAD control type is set to IDF mapping. OAD vent position 3 cannot be below OAD vent position 4 or above OAD vent position 2.	Any
OAD Vent Pos 4	0 to 100%, Default 20%	OAD vent pos 4 is only used when the OAD control type is set to IDF mapping and is the lowest of the vent positions. OAD vent position 4 cannot be below the minimum OAD position or above the vent OAD position 3.	Any
IAQ Override Config.	0 = None (Default)	IAQ reset is not performed	Any
	1 = Over Thresh Override	IAQ reset is performed (damper position increased) when the IAQ PPM reading is above the IAQ Override Threshold setpoint by the IAQ Override Deadband. IAQ reset is stopped when the IAQ is below the IAQ Override Threshold by the IAQ Override Deadband.	Any
	1 = Under Thresh Override	IAQ reset is performed (damper position decreased) when the IAQ PPM reading is below the IAQ Override Threshold setpoint by the IAQ Override Deadband. IAQ reset is stopped when the IAQ is above the IAQ Override Threshold by the IAQ Override Deadband.	Any
OAD Smoke Evac. Position	0 to 100% 100% Default	The position that the OAD goes to when smoke evacuation mode is activated.	Any
IAQ Vent Standby Demand	Disable (Default)	Prevents high IAQ PPM from triggering a vent demand.	Any
	Enable	High IAQ PPM from an IAQ switch, IAQ sensor, or Linkage IAQ will trigger a vent demand during the occupied period.	Any
IAQ Reset Source	0 = None (Default)	IAQ reset is not performed.	Any
	1 = IAQ Switch	IAQ reset is performed based on an IAQ switch.	
	2 = IAQ PPM Sensor	IAQ reset is performed based on an IAQ sensor.	
	3 = Third-Party Reset	IAQ reset is performed based on an third-party hardwired input or network point.	Any
IAQ Override Threshold	0 to 5000 PPM 1200 PPM Default	The IAQ (CO2 PPM) target. Used when ventilation configurator is set to IAQ Mapping or IAQ reset is set to IAQ Sensor.	Any
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 Override Threshold to trigger IAQ reset to start or stop (based on the IAQ Override Config) or the amount that the IAQ PPM reading needs to be above the IAQ Override Threshold to trigger a Vent demand when IAQ Standby Vent Demand is enabled.	Any
IAQ Override Position	–100 to 100% –10% Default	The amount that the OAD position is reset when IAQ reset is active. The value must be negative to decrease the OAD position during IAQ reset (common when IAQ Override Config is set for Under Threshold) or positive to increase the OAD position during IAQ reset (common when IAQ Override Config is set for Over Threshold).	Any
IAQ Pre-Occ Purge	Disable (Default)	Disables pre-occupancy purge.	Any
	Enable	Pre-occupancy purge is allowed to operate if the unit is unoccupied, the next occupied time is within 1-2 hours, the OAQ is above the IAQ Purge Low Lockout and below the IAQ Purge OAT High Lockout and temperature compensated start is not active.	Any
IAQ Purge OAT Low Lockout	0 to 50°F 45°F Default	Pre-occupancy purge is disabled when the OAT is at or below this temperature.	Any
IAQ Purge OAT High Lockout	85 to 115°F 95°F Default	Pre-occupancy purge is disabled when the OAT is at or above this temperature.	Any
IAQ Purge Low Temp 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.	Any
IAQ Purge High Temp 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.	Any
IAQ OA CFM Reset	0 to 40000 CFM 500 CFM Default	The amount the OA CFM control point is reduced when IAQ reset is active when the ventilation configuration is set to OA CFM.	Any
Purge Short Duration	0 to 60 min. 20 min. Default	The pre-occupancy purge duration used with the IAQ Purge Hi Temp Pos when the OAT is above the Occupied Heating setpoint - Low Heat On deadband and below the Occupied Cooling setpoint + Low Cool On deadband.	Any
Purge Long Duration	0-60 min. 60 min. Default	The pre-occupancy purge duration used with the IAQ Purge Lo Temp Pos when the OAT is below the Occupied Heating setpoint - Low Heat On deadband and above the Occupied Cooling setpoint + Low Cool On deadband.	Any
OA CFM Setpoint	0-40000 CFM 2000 CFM Default	The OA CFM setpoint used when the ventilation control configuration is set to OA CFM.	Any

STEP I — CONFIGURE THE COOLING SYSTEM

Navigate to the Cooling Configuration screen (***Main Menu*** → ***System Config*** → ***Cooling Config***). Configure the cool/heat demand source based on application requirements. See Fig. 77 for cooling configuration screen layout. When finished, press the save changes button at the bottom of the screen.

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

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

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

See Table 25 for cooling configurations by application.

STEP J — CONFIGURE THE DEHUMIDIFICATION SYSTEM (OPTIONAL)

For units with Humidi-MiZer dehumidification, navigate to the Dehumidify Configuration screen ***(Main Menu →System Config →Dehum Config)***. Configure the dehumidify demand source based on application requirements. See Fig. 78 for dehumidify configuration screen layout. When finished, press the save changes button at the bottom of the screen.

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

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

See Table 26 for dehumidification configurations by application.

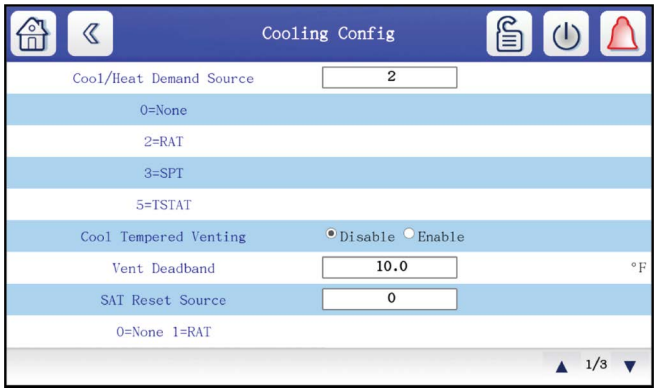


Fig. 77 — Cooling Configuration Screen

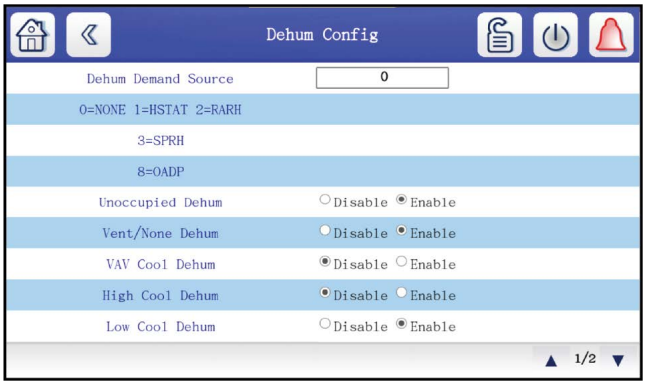


Fig. 78 — Dehumidification Configuration Screen

Table 25 — Cooling Configurations by Application

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="4">Cool/Heat Demand Source</td><td>0 = None (Default)</td><td>Cooling and heating is disabled.</td><td>None</td></tr>
<tr><td>1 = SPT</td><td>The control compares the space temperature sensor (SPT) reading to the occupied/unoccupied cooling (and heating) setpoints to determine if there is a cooling (or heating) demand. Used for single-zone applications. Requires a local SPT sensor or network SPT value.</td><td>Single Zone</td></tr>
<tr><td>2 = RAT</td><td>During the occupied period, the control compares the return air temperature (RAT) reading to the occupied heating setpoint to determine if there is a cool or heat demand. During the unoccupied period, the control compares the RAT to the unoccupied cooling and heating setpoints to determine if there is a cool or heat demand. Commonly used for multi-zone applications.
Requires a local RAT sensor or network RAT value.</td><td>Multi-zone</td></tr>
<tr><td>4 = TSTAT</td><td>The control monitors the thermostatic inputs (Y1, Y2, W1, W2) to determine a cooling (or heating) demand. Used for single-zone space air conditioning applications with 2-stage heat/cool thermostat. Requires a local thermostat or network thermostat values. See below for demand mapping based on input:
<table>
<tr><th>ACTIVE INPUT</th><th>DEMAND LEVEL</th></tr>
<tr><td>Y1</td><td>Low Cool</td></tr>
<tr><td>Y2</td><td>High Cool</td></tr>
<tr><td>W1</td><td>Low Heat</td></tr>
<tr><td>W2</td><td>High Heat</td></tr>
<tr><td>G</td><td>Vent</td></tr>
</table>
NOTE: If Y2 or W2 are active without Y1 or W1 also active, the demand level will be set to high heat or cool, but the control will trigger an alert. If any Y1/2 and W1/2 inputs are active at the same time, the control will trigger an alarm and will disable cooling and heating.</td><td>Single Zone</td></tr>
<tr><td rowspan="2">Cool Tempered Venting</td><td>Enable</td><td>When there is a Vent demand and the MAT is above the vent SAT setpoint by the vent deadband for more than 2 minutes, the system will enable mechanical cooling to temper the MAT to the vent SAT setpoint.</td><td>Any</td></tr>
<tr><td>Disable (Default)</td><td>Cool tempered venting is disabled.</td><td>Any</td></tr>
<tr><td>Vent Deadband</td><td>10 to 20°F,
Default 10°F</td><td>The system compares the MAT to the vent SAT setpoint minus the vent deadband for heat tempered venting or the vent SAT setpoint plus the vent deadband for cool tempered venting.</td><td>Any</td></tr>
<tr><td rowspan="6">SAT Reset Source</td><td>0 = None (Default)</td><td>SAT reset is not performed.</td><td>Any</td></tr>
<tr><td>1 = RAT</td><td>SAT reset is performed based on RAT. When there is a cooling demand and the RAT is below the Occupied Cooling setpoint, the SAT reset is calculated based on SAT Reset Ratio * (Occupied Cooling setpoint – RAT). NOTE: RAT reset is not available when the demand source is RAT.</td><td>Any</td></tr>
<tr><td>2 = SPT</td><td>SAT reset is performed based on SPT. When there is a cooling demand and the SPT is below the Occupied Cooling setpoint, the SAT reset is calculated based on SAT Reset Ratio * (Occupied Colling setpoint – SPT). Requires hardwired SPT sensor or network SPT input. NOTE: SPT reset is not available when the demand source is SPT.</td><td>Any</td></tr>
<tr><td>3 = OAT</td><td>SAT reset is performed based on OAT. When there is a cooling demand and the OAT is below the Occupied Cooling setpoint, the SAT reset is calculated based on SAT Reset Ratio * (Occupied Cooling setpoint – OAT).</td><td>Any</td></tr>
<tr><td>4 = Analog Input</td><td>SAT reset is calculated linearly based on an analog input. When the input is 4mA, the SAT reset is set to 0°F. When the input is 20mA, the SAT reset is set to the SAT Reset Limit config. Requires the Demand Limiting/SAT reset input to be configured for third-party SAT reset.</td><td>Any</td></tr>
<tr><td>5 = Setpoint</td><td>SAT reset is performed based on the SAT Reset Limit as fixed setpoint. SAT Reset Limit is available as a writable network point.</td><td>Any</td></tr>
<tr><td>SAT Reset Ratio</td><td>1 to 10°F
3°F Default</td><td>The ratio that the SAT is reset for every 1°F that the SAT reset source is below the Occupied Cooling Setpoint.</td><td>Any</td></tr>
<tr><td>SAT Reset Limit</td><td>1 to 20°F
10°F Default</td><td>The maximum value of SAT Reset that is allowed.</td><td>Any</td></tr>
<tr><td rowspan="2">Cool Comfort Trending</td><td>Enable</td><td>Prevents the system from going directly from a None or Vent demand to a High Cool Demand. The system sets the demand to Low Cool until the Cool Trend Time has expired. Requires the cool/heat demand source to be configured for SPT.</td><td>Single Zone</td></tr>
<tr><td>Disable (Default)</td><td>Cool comfort trending is disabled.</td><td>Any</td></tr>
<tr><td>Cool Trend Time</td><td>1 to 5 min.
5 min. Default</td><td>The amount of time that comfort trending allows to pass before allowing a high cool demand.</td><td>Single Zone</td></tr>
<tr><td>Cool Heat Gap Config.</td><td>2 to 10°F
5°F Default</td><td>The minimum temperature difference between the Occupied Cooling and Occupied Heating setpoints.</td><td>Any</td></tr>
<tr><td>TC Start Cool Factor</td><td>0 to 60 min.
0 min. Default</td><td>When TC Start Cool Factor is set above 0 min., the system calculates an optimal start time prior to occupancy based on the TC Start Cool Factor * (Cool/Heat Demand Source Temp [SPT or RAT] – Occupied Cooling Setpoint). Once the time before occupancy = the calculated optimal start time, temperature compensated start mode is activated and the unit cools the space, while remaining unoccupied.
Requires the Unoccupied IDF configuration to be set for Demand Based.
NOTE: Setting the TC Start Cool Factor to 0 disables the function.</td><td>Any</td></tr>
</table>

Table 26 — Dehumidify Configurations by Application[a]

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

NOTE(S):

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

STEP K — CONFIGURE THE HEATING SYSTEM (OPTIONAL)

For units with a heat source, navigate to the Heating Configuration screen (***Main Menu → System Config→Heating Config***). The heater configuration screen will only show if the unit is equipped with a heat source. Set the heater configurations based on the application requirements. See Fig. 79 for heater configuration screen layout. When finished, press the save changes button at the bottom of the screen.

The heater must be configured based on application requirements. Select configurations that govern the heater operation are included in the cooling configuration screen, including the cool/heat demand source and venting deadband. See Table 27 for heater configurations and applications.

STEP L — CONFIGURE EXHAUST FAN (OPTIONAL)

For units with an exhaust fan, navigate to the Exhaust Fan Configuration screen (***Main Menu → System Config → Exhaust Fan Config***). The exhaust fan screen will only show if the exhaust is enabled in the equipment configuration. Configure the exhaust fan control based on application requirements. See Fig. 80 for exhaust fan configuration screen layout. When finished, press the save changes button at the bottom of the screen.

The exhaust configuration governs how the fan operates when it is on and what speeds it operates at. See Table 28 for exhaust fan control configurations and descriptions by application.

STEP M — CONFIGURE FREE COOLING (OPTIONAL)

For units with economizer that require free cooling, navigate to the Free Cooling Configuration screen (***Main Menu → System Config → Free Cooling Config***). Configure the free cooling configuration based on application requirements. See Fig. 81 for free cooling configuration screen layout. When finished, press the save changes button at the bottom of the screen.

Single-zone and multi-zone A/C units with an outdoor air damper can be configured to provide free cooling. When free cooling is enabled, the system will check to see if free cooling or integrated cooling (free cooling + mechanical cooling) is available, prior to starting mechanical cooling mode. Multiple free cooling checks can be enabled and used simultaneously. All enabled free cooling checks must pass to allow free cooling or integrated cooling. See Table 29 for free cooling configurations.

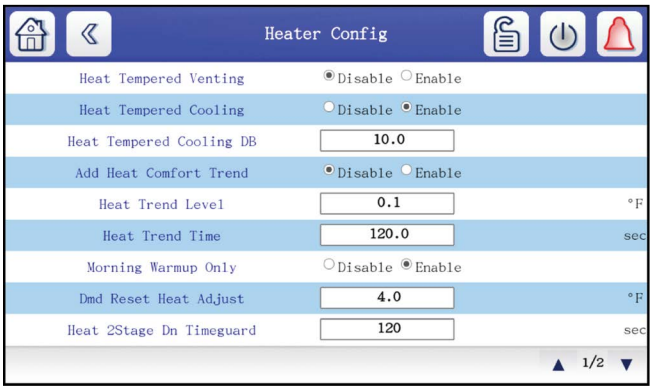


Fig. 79 — Heater Configuration Screen

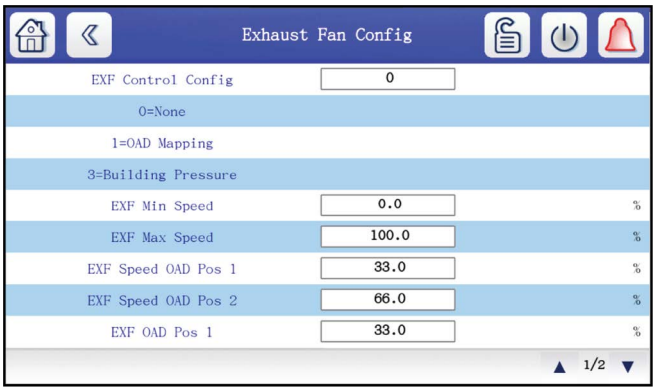


Fig. 80 — Exhaust Fan Configuration Screen

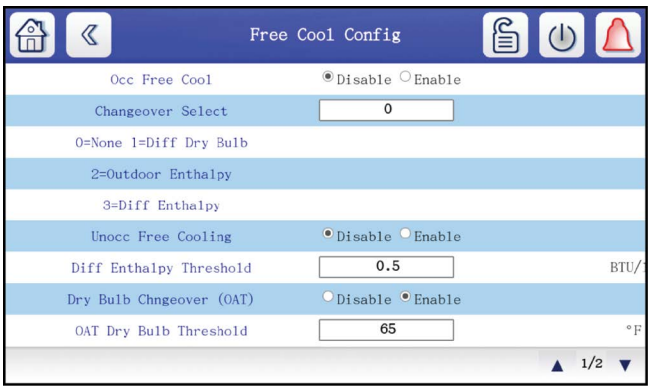


Fig. 81 — Free Cooling Configuration Screen

Table 27 — Heater Configurations by Application

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Heat Tempered Venting	Enable	When there is a Vent Demand and the MAT is below the Vent SAT setpoint by the Vent Deadband for more than 2 minutes, the system will enable the modulating or multi-stage heat source to temper the MAT to the Vent SAT setpoint. NOTE: A modulating or multi-stage heat source is required for heat tempered venting.	Any
	Disable	Heat tempered vending is not performed.	Any
Heat Tempered Cooling	Enable	When there is a cooling demand and the MAT is below the SAT control point by the Heat Tempered Cooling DB, heat tempered cooling mode is enabled. The heat source turns on and modulates to maintain the SAT at the SAT control point for a minimum of 5 minutes and until the Cool demand stops or the MAT rises above the SAT control point – 1/2 Heat Tempering DB. NOTE: A modulating or multi-stage heat source is required for heat tempered cooling.	Any
	Disable	Heat tempered cooling is not performed.	Any
Heat Tempering Deadband	5 to 15°F, 10°F Default	Used as part of heat tempered cooling.	Any
Heat Comfort Trending	Enable	Prevents the system from going directly from a None or Vent demand to a High Heat Demand. The system sets the demand to Low Heat until the Heat Trend Time as expired. Requires the cool/heat demand source to be configured for SPT.	Single Zone
	Disable (Default)	Heat comfort trending is disabled	Any
Heat Trend Time	1 to 5 min. 5 min. Default	The amount of time that comfort trending allows to pass before allowing a high cool demand.	Single Zone
Occupied Heating	Enable (Default)	Heating mode is allowed at any time during the occupied period.	Multi-Zone
	Disable	Heating mode is allowed until a cooling mode occurs during the occupied period. After that, heating mode is prevented for the remainder of the occupied period. NOTE: Requires the cool/heat demand source to be configured for RAT.	Any
TC Start Heat Factor	0 to 60 min. 0 min. Default	When TC Start Heat Factor is set above 0 min., the system calculates an optimal start time prior to occupancy based on the TC Start Heat Factor * (Occupied Heating setpoint – Cool/Heat Demand Source Temp [SPT or RAT]). Once the time before occupancy = the calculated optimal start time, temperature compensated start mode is activated and the unit heats the space, while remaining unoccupied. Requires the Unoccupied IDF configuration to be set for Demand Based. NOTE: Setting the TC Start Heat Factor to 0 disables the function.	Any

Table 28 — Exhaust Fan Configurations by Application

<table>
<tr><th>CONFIGURATION</th><th>VALUE</th><th>DESCRIPTION</th><th>APPLICATION</th></tr>
<tr><td rowspan="6">EXF Control Configuration</td><td>0 = None</td><td>NOTE: Default configuration for units without power exhaust. The exhaust fan is disabled.</td><td>All</td></tr>
<tr><td rowspan="2">1 = OAD Mapping</td><td>Multi-Stage Power Exhaust (MSPE)
Default configuration for units MSPE without building pressure (BP) control. The exhaust fan stages between off and four (20-50 ton) or six (60 ton) fan stages based on outdoor air damper position. Requires the outdoor air damper and exhaust fan to be enabled in the equipment configuration. See below for exhaust fan speeds based on OAD position configurations.
<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><td rowspan="2">Single Zone</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
When the OAD is below EXF OAD Pos 1, the EXF is off. When the OAD is at or above EXF OAD Pos 1, the EXF is at EXF SPEED OAD Pos 1. When the OAD is at or above EXF OAD Pos 2, the EXF is at EXF Speed OAD Pos 2. When the OAD is closed, the EXF is off.</td></tr>
<tr><td rowspan="2">3 = Building Pressure</td><td>Multi-Stage Power Exhaust (MSPE)
NOTE: Default configuration for units MSPE with building pressure (BP) control. 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. Requires hardwired BP sensor or network BP value.</td><td rowspan="2">All</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
NOTE: Default configuration for units HCPE with building pressure (BP) control. If the building pressure is above the BP setpoint, the EXF turns on and modulates between the minimum and maximum EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF turns off. When the OAD is closed, the EXF is off. Requires hardwired BP sensor or network BP value.</td></tr>
<tr><td rowspan="2">4 = Third-party Input</td><td>Mullti-Stage Power Exhaust (MSPE)
Not used.</td><td rowspan="2">All</td></tr>
<tr><td>High-Capacity Power Exhaust (HCPE)
The EXF modulates between off or between the minimum and maximum EXF speed based on a third-party signal. When the OAD is closed, the EXF is off. Requires a hardwired third-party input or network third-party EXF speed value.</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>Any</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><td>Any</td></tr>
<tr><td>EXF Speed OAD Pos 1</td><td>0 to 100%
33% Default</td><td>The speed that the exhaust fan operates at when the OAD is at or above the EXF OAD Pos 1 configuration. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be high capacity PE.</td><td>Single Zone</td></tr>
<tr><td>EXF Speed OAD Pos 2</td><td>0 to 100%
66% Default</td><td>The speed that the exhaust fan operates at when the OAD is at or above the EXF OAD Pos 2 configuration. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be high capacity PE.</td><td>Single Zone</td></tr>
</table>

Table 28 — Exhaust Fan Configurations by Application (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
EXF OAD Pos 1	0 to 100% 33% Default	The position that the OAD must be at or above to trigger EXF Speed OAD Pos 1. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be high capacity PE.	Single Zone
EXF OAD Pos 2	0 to 100% 66% Default	The position that the OAD must be at or above to trigger EXF Speed OAD Pos 2. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be high capacity PE.	Single Zone
EXF OAD Position 1	0 to 100% 25% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 1. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE.	Single Zone
EXF OAD Position 2	0 to 100% 50% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 2. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE.	Single Zone
EXF OAD Position 3	0 to 100% 75% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 3. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE.	Single Zone
EXF OAD Position 4	0 to 100% 100% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 4. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE.	Single Zone
EXF OAD Position 5	0 to 100% 100% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 5. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE and unit size to be 60 tons.	Single Zone
EXF OAD Position 6	0 to 100% 100% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 6. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE and unit size to be 60 tons.	Single Zone
EXF OAD Position 5	0 to 100% 100% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 5. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE and unit size to be 60 tons.	Any
EXF OAD Position 6	0 to 100% 100% Default	The position that the OAD must be at or above to trigger multi-stage exhaust stage 6. Requires EXF Control to be configured for OAD Mapping and the exhaust fan type to be multi-stage PE and unit size to be 60 tons.	Any
EXF Smoke Purge Speed	0 to 100% 0% Default	The speed that the exhaust fan operates at when smoke purge mode is activated.	Any
EXF Smoke Evac. Speed	0 to 100% 0% Default	The speed that the exhaust fan operates at when smoke evacuation mode is activated.	Any

Table 29 — Free Cooling Configurations

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

STEP N — CONFIGURE DEMAND/CAPACITY LIMITING (OPTIONAL)

For applications that require demand or capacity limiting, navigate to the Demand/Capacity Limit screen ***(Main Menu → System Config → Demand/Capacity Limit Config)***. Configure the demand and capacity limiting configurations based on application requirements. When finished, press the save changes button at the bottom of the screen.

Demand and capacity limiting can be used to increase the effective cooling and heating temperatures or restrict the DX circuit and heat source capacity to save energy, limit energy usage, or prevent system operation. See Table 30 for demand and capacity limiting configurations.

STEP O — CONFIGURE ALERTS (OPTIONAL)

To adjust limited for unit alerts and filter change reminders, navigate to the Alert Configuration screen ***(Main Menu → System Config→Alert Config)***. Configure the alerts based on application requirements. When finished, press the save changes button at the bottom of the screen.

Alerts can be used to notify users of abnormalities in the system, such as unexpected temperatures or pressures. An alert can also be configured for filter change reminder. See Table 31 for alert configurations.

Table 30 — Demand/Capacity Limiting Configuration

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Demand Switch Enable	Enable	Enables the demand/capacity limit switch inputs.	Any
	Disable (Default)	Disables the demand/capacity limit switch inputs.	Any
Demand Analog Enable	Enable	Enables the demand/capacity limit analog input.	Any
	Disable (Default)	Disables the demand/capacity limit analog input.	Any
Demand Limit Source	0 = None (Default)	Demand limiting is not performed.	Any
	1 = Setpoint	Demand limiting is performed using the Demand Reset Cool Adjust configuration or network point for cooling and the Demand Reset Cool Adjust configuration or network point for heating.	Any
	2 = Analog	Demand limiting is performed based on a hardwired analog input where 4mA/2V = 0°F demand limit and 20mA/10V = 10°F demand limit. Requires the Demand Limit/SAT reset input to be configured for Demand Limit. NOTE: The limiting analog input can only be used for one of demand limiting or capacity limiting.	Any
	3 = Switches	Demand limiting is performed based on hardwired discrete input switches 1 and 2. The effective occupied cooling temperature is reset by the Cool Demand Limit S1 configuration when limit switch 1 is active and by the Cool Demand Limit S2 configuration when limit switch 2 is active. The effective occupied heating temperature is reset by the Heat Demand Limit S1 configuration when limit switch 1 is active and by the Heat Demand Limit S2 configuration when limit switch 2 is active. NOTE: the limit switches can only be used for one of demand limiting or capacity limiting.	Any
Demand Analog Mode	0 = Heat and Cool	Demand/capacity analog input applies to heating/heat source and cooling/DX circuit.	Any
	1 = Heat Only	Demand/capacity analog input applies to heating/heat source only.	Any
	2 = Cool Only	Demand/capacity analog input applies to cooling/DX circuit only.	Any
Capacity Limit Source	0 = None (Default)	Capacity limiting is not performed.	Any
	1 = Setpoint	Capacity limiting is performed using the Max. Cool and Max. Heat Capacity configuration or network Cool and Heat Capacity points.	Any
	2 = Analog	Capacity limiting is performed based on a hardwired analog input where 4mA/2V = 100% capacity allowed, and 20mA/10V = 0% capacity allowed. Requires the Demand Limit/SAT reset input to be configured for Capacity Limit. NOTE: The limiting analog input can only be used for one of demand limiting or capacity limiting.	Any
	3 = Switches	Capacity limiting is performed based on hardwired discrete input switches 1 and 2. The available DX circuit capacity is set to the Cool Capacity Limit S1 configuration when limit switch 1 is active and by the Cool Capacity Limit S2 configuration when limit switch 2 is active. The available heat source capacity is set to the Heat Capacity Limit S1 configuration when limit switch 1 is active and by the Heat Capacity Limit S2 configuration when limit switch 2 is active. NOTE: The limit switches can only be used for one of demand limiting or capacity limiting.	Any
Max. Cool Capacity	0 to100% 100% Default	The maximum allowable capacity of the DX circuit when the Capacity Limit Source configuration is set to Setpoint.	Any
Cool Capacity Limit S1	0 to100% 100% Default	The maximum allowable capacity of the DX circuit when the Capacity Limit Source configuration is set to Switches and switch 1 is active.	Any
Cool Capacity Limit S2	0 to100% 100% Default	The maximum allowable capacity of the DX circuit when the Capacity Limit Source configuration is set to Switches and switch 2 is active	Any
Cool Demand Limit S1	0 to 10% 4°F Default	The amount that the effective cooling temperature is increased when Demand Limit Source configuration is set to Switches and switch 1 is active.	Any
Cool Demand Limit S2	0 to 10% 6°F Default	The amount that the effective cooling temperature is increased when Demand Limit Source configuration is set to Switches and switch 2 is active.	Any
Max. Heat Capacity	0 to100% 100% Default	The maximum allowable capacity of the DX circuit when the Capacity Limit Source configuration is set to Setpoint.	Any

Table 30 — Demand/Capacity Limiting Configuration (cont)

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
Heat Capacity Limit S1	0 to100% 100% Default	The maximum allowable capacity of the heat source when the Capacity Limit Source configuration is set to Switches and switch 1 is active.	Any
Heat Capacity Limit S2	0 to100% 100% Default	The maximum allowable capacity of the heat source when the Capacity Limit Source configuration is set to Switches and switch 2 is active.	Any
Heat Demand Limit S1	0 to10% 4°F Default	The amount that the effective heating temperature is increased when Demand Limit Source configuration is set to Switches and switch 1 is active.	Any
Heat Demand Limit S2	0 to10% 6°F Default	The amount that the effective heating temperature is increased when Demand Limit Source configuration is set to Switches and switch 2 is active.	Any
Demand Reset Cool Adjust	0 to10% 4°F Default	The amount that the effective cooling temperature is increased when Demand Limit Source configuration is set to Setpoint.	Any
Demand Reset Heat Adjust	0 to10% 4°F Default	The amount that the effective heating temperature is increased when Demand Limit Source configuration is set to Setpoint.	Any

Table 31 — Alerts Configurations

CONFIGURATION	VALUE	DESCRIPTION	APPLICATION
SAT Low Occ Limit	–40 to 245°F 40°F Default	When the SAT is at or below this temperature during the occupied period, a low SAT alert is triggered.	Any
SAT High Occ Limit	–40 to 245°F 40°F Default	When the SAT is at or above this temperature during the occupied period, a high SAT alert is triggered.	Any
SAT Low Unocc Limit	–40 to 245°F 40°F Default	When the SAT is at or below this temperature during the unoccupied period, a low SAT alert is triggered.	Any
SAT High Unocc Limit	–40 to 245°F 40°F Default	When the SAT is at or above this temperature during the unoccupied period, a high SAT alert is triggered.	Any
RAT Low Occ Limit	–40 to 245°F 40°F Default	When the RAT is at or below this temperature during the occupied period, a low RAT alert is triggered.	Any
RAT High Occ Limit	–40 to 245°F 40°F Default	When the RAT is at or above this temperature during the occupied period, a high RAT alert is triggered.	Any
RAT Low Unocc Limit	–40 to 245°F 40°F Default	When the RAT is at or below this temperature during the unoccupied period, a low RAT alert is triggered.	Any
RAT High Unocc Limit	–40 to 245°F 40°F Default	When the RAT is at or above this temperature during the unoccupied period, a high RAT alert is triggered.	Any
SP Low Limit	0 to 0.5 in H_2O 0.1 in H_2O Default	When the SP is at or below this pressure, a low SP alert is triggered.	Any
SP High Limit	1.5 to 2.2 in H_2O 2.0 in H_2O Default	When the SP is at or above this pressure, a high SP alert is triggered.	Any
BP Low Limit	–0.5 to 0 in H_2O –0.1 in H_2O Default	When the BP is at or below this pressure, a low BP alert is triggered.	Any
BP High Limit	0 to 0.15 in H_2O 0.1 in H_2O Default	When the BP is at or above this pressure, a high BP alert is triggered.	Any
SAT Low Limit	–40 to 245°F 45°F Default	When the SAT is at or below this temperature, a SAT low alert is triggered.	Any
SAT High Limit	–40 to 245°F 130°F Default	When the SAT is at or above this temperature, a high SAT alert is triggered.	Any
OAT Low Limit	–40 to 245°F 40°F Default	When the OAT is at or below this temperature, a SAT low alert is triggered.	Any
OAT High Limit	–40 to 245°F 150°F Default	When the OAT is at or above this temperature, a high SAT alert is triggered.	Any
IAQ High Limit	0 to 5000 PPM 1200 PPM Default	When the IAQ PPM is at or above this reading, a high IAQ alert is triggered.	Any
Pre-filter Source	0 = None	The system does not alert for dirty filters.	Any
	1 = Timer	The system alerts for dirty filters based on change time.	Any
	2 = Switch	The system alerts for dirty filters based on a pre-filter status switch. NOTE: Default for units with factory installed pre-filter status switch.	Any
	3 = Measuring	The system alerts for dirty filters based on a measured pre-filter pressure drop. NOTE: Default for units with factory installed pre-filter measuring.	Any
Pre-filter Change Time	0 to 8800 Hours 2000 Hours Default	When the pre-filter source is configured for timer, and the filter run time exceeds the pre-filter change time, a dirty filter alert is triggered. NOTE: Setting 0 hours disables the alert.	Any
Pre-filter Press Limit	0.5 to 5 in H_2O 1.5 in H_2O Default	When the pre-filter source is configured for measuring, and the filter pressure drop exceeds the pre-filter press limit, a dirty filter alert is triggered. NOTE: Setting 0 hours disables the alert.	Any

STEP P — 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. 82 for indoor fan setpoint screen layout. When finished, press the save changes button at the bottom of the screen.

For units configured for supply pressure (SP) control (IDFControl = 3), the supply pressure or zone pressure setpoints can be adjusted on the Indoor Fan Setpoint screen. For all other indoor fan control configurations, the indoor fan setpoints do not need to be adjusted. See Table 32 for indoor fan setpoints.

STEP Q — SET COOLING SETPOINTS (OPTIONAL)

Navigate to the Cooling Setpoints screen (***Main Menu→ Setpoints → Cooling Setpoints***). Adjust the cooling setpoints as needed based on application requirements. See Fig. 83 for cooling setpoint screen layout. When finished, press the save changes button at the bottom of the screen.

The occupied and unoccupied cooling setpoints, setpoint deadbands, and the cooling supply air temperature (SAT) setpoints can be adjusted on the cooling setpoint screen. See Table 33 for setpoint information and descriptions by application type.

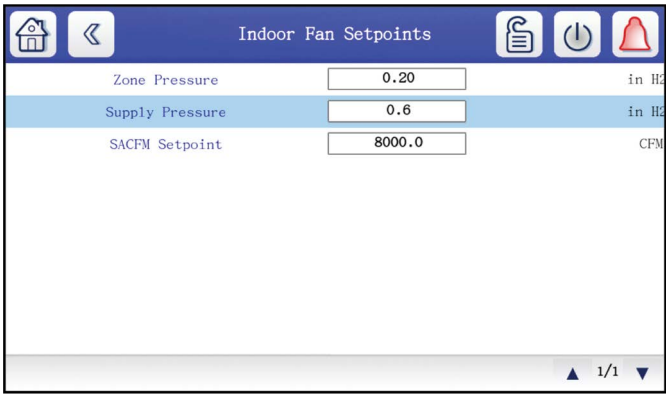


Fig. 82 — Indoor Fan Setpoints Screen

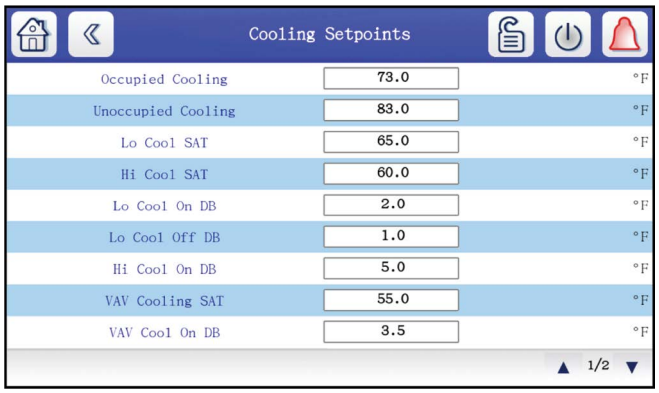


Fig. 83 — Cooling Setpoints Screen

Table 32 — Indoor Fan Setpoints

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

Table 33 — Cooling Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Cooling	55 to 80°F, Default 72°F	SPT	In the occupied period, the system compares the demand source temperature to the occupied cooling setpoint and setpoint deadbands to determine cooling demands. For RAT demand source, the system uses the occupied heating setpoint during the occupied period to determine a cooling demand.
Unoccupied Cooling	55 to 110°F, Default 85°F	SPT or RAT	In the unoccupied period, the system compares the demand source temperature to the unoccupied cooling setpoint and setpoint deadbands to determine cooling demands.
Low Cool SAT	55 to 75°F, Default 65°F	SPT, TSTAT, and unoccupied RAT	The effective SAT setpoint with a low cool demand.
High Cool SAT	45 to 75°F, Default 55°F	SPT, TSTAT, or RAT (unoccupied only)	The effective SAT setpoint with a high cool demand.
VAV Cool SAT	45 to 75°F, Default 55°F	RAT	The effective SAT setpoint with a VAV cool demand.
Vent SAT	55 to 85°F, Default 70°F	All	The effective SAT setpoint with a vent demand.
Low Cool On DB	0 to 2°F, Default 1°F	SPT or unoccupied RAT	The amount that the demand source temperature needs to be above the effective cooling setpoint to initiate a low cool demand.
Low Cool Off DB	0.5 to 2°F, Default 1°F	SPT or unoccupied RAT	The amount that the demand source temperature needs to be below the effective cooling setpoint to stop a low cool demand.
High Cool On DB	0.5 to 20°F, Default 2°F	SPT or unoccupied RAT	The amount that the demand source temperature needs to be above a low cool demand to initiate a high cool demand.
VAV Cool On DB	0 to 25ºF, Default 3ºF	RAT (occupied only)	The amount that the demand source temperature needs to be above the effective heating setpoint minus the low heat on deadband plus the high heat on deadband to initiate a VAV cool demand. NOTE: If the occupied heating setpoint is decreased, the VAV Cool On DB must be increased to prevent cooling from starting with a low RAT.
VAV Cool Off DB	1 to 25ºF, Default 2ºF	RAT (occupied only)	The amount that the demand source temperature needs to be below the effective heating setpoint minus the low heat on deadband, plus the high heat on deadband, plus the VAV cool on deadband initiate a VAV cool demand.

STEP R — 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. 84 for dehumidify setpoint screen layout. When finished, press the save changes button at the bottom of the screen.

The dehumidify RH and DP setpoints can be adjusted on the Dehumidify Setpoint screen. See Table 34 for setpoint information and descriptions.

STEP S — SET HEATING SETPOINTS

For units with heat, navigate to the Heating Setpoint screen (***Main Menu → Setpoints → Heating Setpoints***). The heating setpoints screen will only show if the unit is equipped with a heat source. Adjust the heating setpoints based on application requirements. See Fig. 85 for heating setpoint screen layout. When finished, press the save changes button at the bottom of the screen.

The occupied or unoccupied heating setpoints and the heating supply air temperature (SAT) setpoints can be adjusted from the heating setpoint screen. See Table 35 for setpoint information and descriptions.

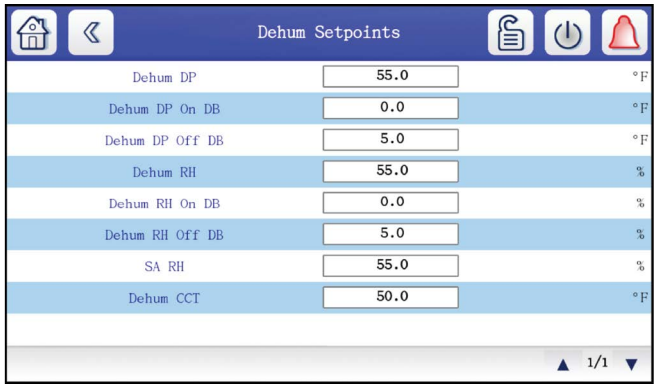


Fig. 84 — Dehumidify Setpoints Screen

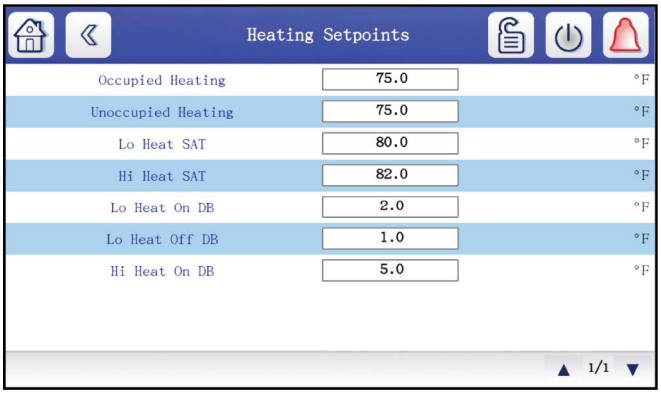


Fig. 85 — Heating Setpoints Screen

Table 34 — Dehumidify Setpoints

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

Table 35 — Heating Setpoints

SETPOINT	RANGE	COOL/HEAT DEMAND SOURCE CONFIG.	DESCRIPTION
Occupied Heating	55 to 80°F, Default 68°F	SPT or RAT	The system compares the demand source temperature to the occupied heating setpoint to determine an occupied heating demand. If the demand source is set to RAT, the unit also uses the occupied heating setpoint to determine if there is a VAV cooling demand during the occupied period. See Fig. 88 for occupied RAT demand processing. NOTE: For RAT cool/heat demand source, if the occupied heating setpoint is decreased, the VAV Cool On DB must be increased to prevent cooling from starting with a low RAT.
Unoccupied Heating	40 to 80°F, Default 60°F	SPT or RAT	The system compares the SPT to the occupied heating setpoint to determine an unoccupied heating demand. Only used if unoccupied indoor fan is configured for demand.
Low Heat SAT	60 to 115°F, Default 75°F	All	The effective SAT setpoint with a low heat demand.
High Heat SAT	60 to 125°F, Default 85°F	All	The effective SAT setpoint with a high heat demand.
Low Heat On DB	0 to 2°F, Default 1°F	SPT or RAT	The amount that the demand source temperature needs to be below the effective heating setpoint to initiate a low heat demand. Also used as part of VAV cooling determination during the occupied period with RAT demand source.
Low Heat Off DB	0.5 to 2°F, Default 1°F	SPT or RAT	The amount that the demand source temperature needs to be above the effective heating setpoint to stop a low heat demand. Also used as part of VAV cooling determination during the occupied period with RAT demand source.
High Heat On DB	0.5 to 20°F, Default 2°F	SPT or RAT	The amount that the demand source temperature needs to be below a low heat demand to initiate a high heat demand.

STEP T — SET EXHAUST FAN SETPOINTS (OPTIONAL)

For units with exhaust fans configured for building pressure control, navigate to the exhaust fan setpoint screen (***Main Menu→Setpoints→Indoor Fan Setpoints***). The Exhaust Fan Setpoints screen will only show when the exhaust fan is enabled. See Fig. 86 for exhaust fan setpoint screen layout. Adjust the building pressure setpoint as needed based on application requirements. When finished, press the save changes button at the bottom of the screen.

For units with exhaust fan configured for building pressure (BP) control, the building setpoint is adjusted on the Exhaust Fan Setpoint screen. See Table 36 for setpoint information and descriptions.

STEP U — SET UP OCCUPANCY CONTROL

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

Local Schedule

Navigate to the Local Schedule screen ***(Main Menu →Schedules →Local Schedules).*** Local schedules are often used for standalone applications. The default schedule 1 is set for 24/7 occupied. Adjust the local schedule as needed based on application requirements. When finished, press the home button to exit to the home screen. When finished, press the save changes button at the bottom of the screen.

Up to 8 different local schedules can be configured. To configure a schedule, use the page/up down arrows to change schedule number. Select which days the schedule is active by activating the check box below the day of the week. Enter the occupancy start time next to "occupied from." Enter the occupied stop time next to "to." NOTE: Time is in 24-hour (military) time.

In the example in Fig. 87, the schedule is active for Monday through Friday. The unit will be in the occupied period from 4AM (4:00) to 6 PM (18:00).

Occupancy Switch

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

When the remote switch is configured for occupancy, the system will monitor inputs 23 and 24 on TB5. Refer to Fig. 48 for TB5 wiring details. When the inputs show open, the unit is unoccupied. When the input show closed (short), the unit is occupied. See Table 37 for remote switch configuration details.

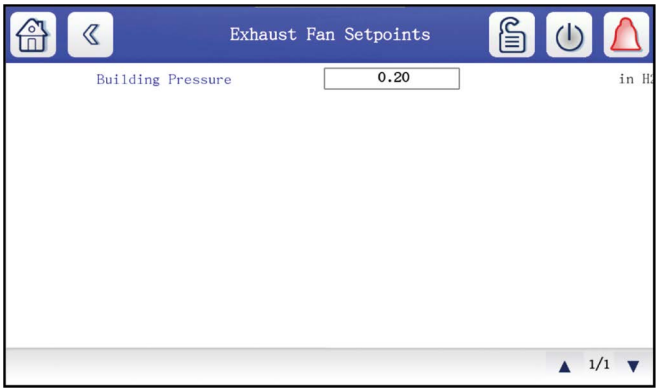


Fig. 86 — Exhaust Fan Setpoints Screen

Fig. 87 — Local Schedule Screen

Table 36 — Exhaust Fan Setpoints

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

Table 37 — Remote Switch Configuration

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

OPERATION

Prior to enabling full unit operation, Carrier recommends performing an air balance, completing the pre-start-up checklist, 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 recommends performing a start-up on the equipment system that requires temporary operation, such as heating or cooling. Performing a start-up on the system will help ensure proper operation. Consider the following if operating the unit before the system is full commissioned:

1. Ensure all duct systems are connected and complete.
2. Ensure all air terminal units (VAV or VVT boxes) and fire dampers are fully open.
3. Verify sufficient power service.
4. Verify the minimum cooling and heating airflows are achieved during operation. Refer to the unit product data and fan tables for fan speeds by unit size and type.
5. Verify the fan max. static pressure is not exceeding during operation. Refer to the unit product data and fan tables.
6. If the appropriate sensors have not been installed for normal operation, consider unit control using a field provided and installed thermostat or using the factory installed RAT sensor.
   a. Set up the cool/heat demand source for TSTAT or RAT. See "STEP I — CONFIGURE THE COOLING SYSTEM" on page 66 of the Control Quick Setup Section on page 56.
   b. For intermittent supply fan and no ventilation (outdoor air), leave the unit in the unoccupied period and configure the unoccupied IDF to demand. See "STEP G — CONFIGURE INDOOR FAN" on page 60 of the Control Quick Setup Section on page 56.
   c. For constant supply fan and ventilation (outdoor air), configure a unit schedule and configure the occupied IDF for continuous. See "STEP G — CONFIGURE INDOOR FAN" on page 60 of the Control Quick Setup Section on page 56.
   d. 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 Max. Cool Capacity to 0 to lock out cooling or set the Max. Heat Capacity to 0 to lock out heating.
7. If the unit will be operating for extended periods, maintenance must be performed on the equipment to ensure proper operation. Damage or failures that can be attributed to improper maintenance or lack of maintenance 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

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

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

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

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

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

Cool/Heat Demand Sources

RETURN AIR TEMPERATURE (RAT)

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

See Table 38 for available demands for the RAT cool/heat demand source, the start and stop conditions for each demand, and the applicable supply air temperature setpoint. See Fig. 88 and 89 for RAT demand processing.

SPACE TEMPERATURE (SPT)

The control monitors the SPT and compares the reading to the occupied and unoccupied cooling and heating setpoints to determine if there is a Low Cool, High Cool, Low Heat, or High Heat demand. Deadbands are used to adjust when the demand starts and stops versus the cooling and heating setpoints. During the occupied or unoccupied period, if there is not a cool or heat demand and the IDF is on, the demand is set to Vent. If the IDF is off during the occupied or unoccupied period, the demand is set to None. SPT is recommended for single-zone applications with a space temperature sensor. SPT is required for single-zone VAV.

See Table 39 for available demands for the SPT cool/heat demand source. See Fig. 90 for SPT demand processing.

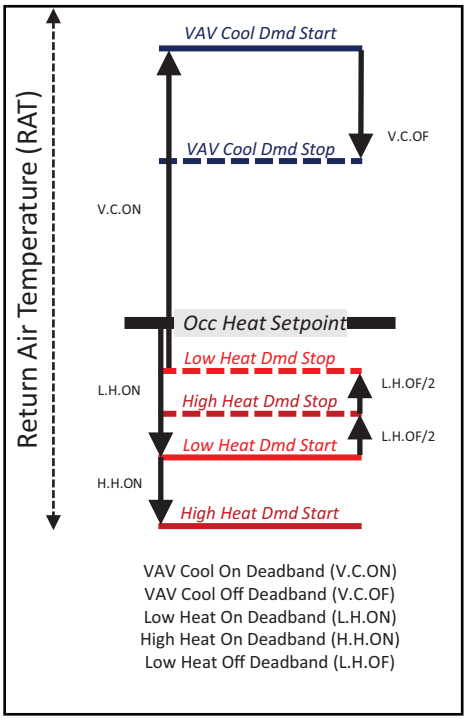


Fig. 88 — Occupied RAT Demand Processing

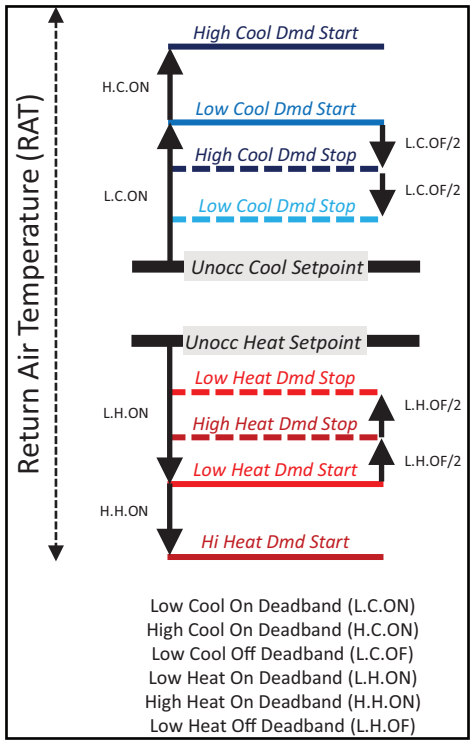


Fig. 89 — Unoccupied RAT Demand Processing

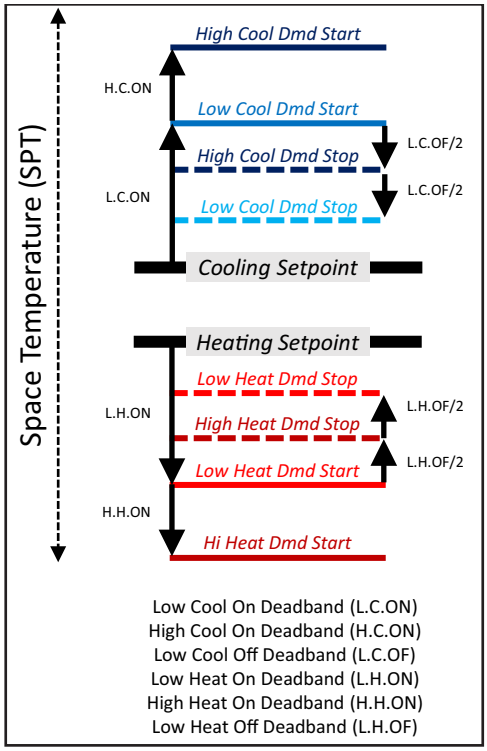


Fig. 90 — SPT Demand Processing

THERMOSTAT (TSAT)

The control monitors the local network thermostat inputs (Y1, Y2, W1, W2) to determine if there is a Low Cool, High Cool, Low Heat, or High Heat demand. During the occupied period, if there is not a cool or heat demand and the IDF is on, the demand is set to Vent. If the IDF is off during the occupied or unoccupied period, the demand is set to None. TSTAT is recommended for single-zone applications with a thermostat or for third-party control of unit cooling and heating.

See Table 40 for available demands for the RAT cool/heat demand source.

Table 38 — RAT Demand Levels

DEMAND	START CONDITION	STOP CONDITION
None	Unoccupied only. There is no cool or heat demand.	Vent, VAV Cool, Low Cool, or Low Heat demand starts.
Vent	Occupied only. RAT is below the Occupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband and above the Occupied Heating setpoint minus the Low Heat On deadband.	VAV Cool or Low Heat demand starts.
VAV Cool	Occupied only. RAT rises above the Occupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband.	RAT drops below the Occupied or Unoccupied Heating setpoint, minus the Low Heat On deadband, plus the Low Heat Off deadband, plus the VAV Cool On deadband, minus the VAV Cool Off deadband.
Low Cool	Unoccupied only. RAT rises above the Unoccupied Cooling setpoint plus the Low Cool On deadband.	RAT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband minus the Low Cool Off deadband or a High Cool demand starts.
High Cool	Unoccupied only. RAT rises above the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband.	RAT drops below the Unoccupied Cooling setpoint plus the Low Cool On deadband plus the High Cool On deadband minus the 1/2 Low Cool Off deadband.
Low Heat	RAT drops below the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband.	RAT rises above the Occupied or Unoccupied Heating setpoint minus the Low Heat On deadband plus the Low Heat Off deadband or High Heat demand starts.
High Heat	RAT drops below the Unoccupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband.	RAT rises above the Occupied Heating setpoint minus the Low Heat On deadband minus the High Heat On deadband plus the 1/2 Low Heat Off deadband.

Table 39 — SPT Demand Levels

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

Table 40 — TSAT Demand Levels

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

Supply Air Temperature Control Point

When the system establishes a cool or heat demand, the system sets the SAT control point to the effective demand level SAT set point. The SAT control point is used as part of the mode determination process. Once a cooling or heating mode is selected, the system will operate the cooling or modulating/multi-stage heat system 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, vent).

Dehumidify Demand Sources

RETURN AIR RELATIVE HUMIDITY (RARH)

The control monitors RARH and compares it to the dehumidify relative humidity setpoint to determine if there is a dehumidify demand. Deadbands are used to adjust when the demand starts and stops compared to the dehumidify setpoint. RARH is recommended for single or multi-zone applications. See Table 41 for RARH demand levels and Fig. 91 for RARH demand determination.

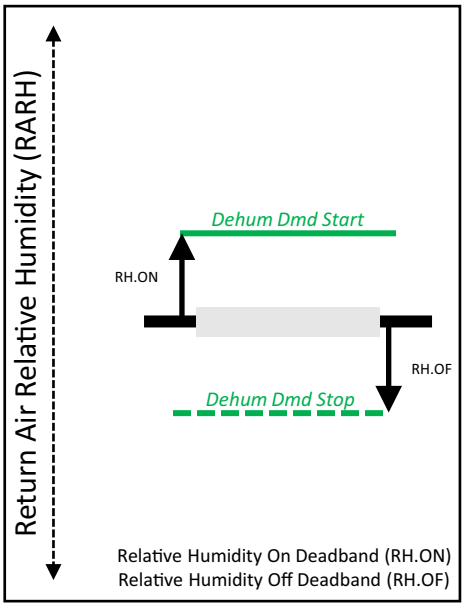


Fig. 91 — RARH Demand Processing

SPACE RELATIVE HUMIDITY (SPRH)

The control monitors SPRH and compares it to the dehumidify relative humidity setpoint to determine if there is a dehumidify demand. Deadbands are used to adjust when the demand starts and stops compared to the dehumidify setpoint. SPRH is recommended for single-zone applications. See Table 41 for SPRH demand levels and Fig. 92 for SPRH demand determination.

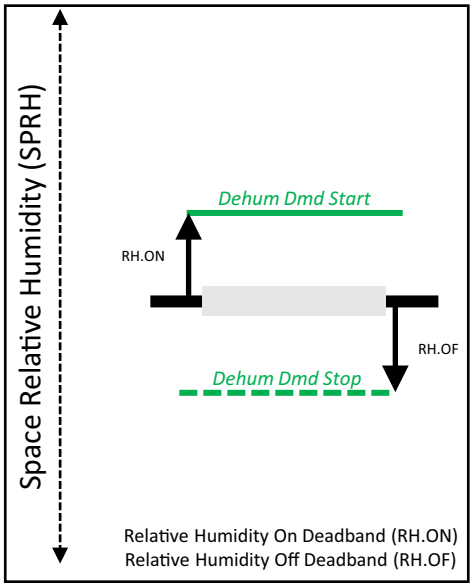


Fig. 92 — SPRH Demand Processing

HUMIDISTAT (HSTAT)

The control monitors the dehumidify input to determine if there is a dehumidify demand. A dehumidify demand can co-exist with a cool demand or a vent demand. A Dehumidify demand can co-exist with a VAV Cool, Low Cool, High Cool, Vent, or Low Heat demand. Recommended for single-zone applications or third-party control of unit dehumidification. See Table 42 for available demands for HSTAT demand source.

Cooling Coil Temperature Control Point

When the system establishes a dehumidify, the system sets the CCT control point to the dehum. CCT set point. The CCT control point is used as part of the mode determination process. Once a dehumidification mode is selected, the system will operate the compressors to maintain the CCT at the CCT control point. The system will modulate the Humidi-Mizer system to maintain the unit SAT at the SAT control point, based on the active cool/heat demand level

Indoor Fan

CONSTANT VOLUME (CV)

Constant volume indoor fan is recommended for sound sensitive or process applications, where allowed by code. See Table 43 for sequence of operation.

Table 41 — 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 42 — HSTAT Demand Levels[a]

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

NOTE(S):

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

Table 43 — CV Indoor Fan Sequence of Operation

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

NOTE(S):

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

STAGED AIR VOLUME (SAV) CAPACITY

Staged air volume capacity indoor fan is recommended for single-zone applications with low sensible heat ratio. This is the default setting for units ordered as SAV. See Table 44 for sequence of operation.

SUPPLY PRESSURE CONTROL (SP)

Supply pressure indoor fan control is recommended for multi-zone applications with air terminal units. SP control can also be used for true constant volume operation to account for filter loading. This is the default setting for units ordered as VAV. See Table 45 on page 84 for sequence of operation.

THIRD-PARTY INPUT CONTROL (THIRD-PARTY)

Third-party input control allows a third-party system to enable and disable the indoor fan and modulate the fan speed under most conditions. The G fan input is used to command the IDF on and off. The third-party IDF input is used for the fan speed control. See Table 46 on page 84 for sequence of operation.

SINGLE-ZONE VAV (SZ-VAV)

Single-zone VAV is recommended for single-zone applications with high sensible loads or that are sound sensitive to fan staging. See Table 47 on page 85 for sequence of operation.

Table 44 — SAV Demand Indoor Fan Sequence of Operation

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

NOTE(S):

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

Table 45 — Supply Pressure Indoor Fan Sequence of Operation

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

NOTE(S):

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

Table 46 — Third-Party Input Indoor Fan Sequence of Operation

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

NOTE(S):

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

Table 47 — Single-Zone VAV Indoor Fan Sequence of Operation

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

NOTE(S):

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

Cooling and Heating Modes

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

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

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

MECHANICAL COOLING

Mechanical cooling mode uses the unit cooling circuit (compressors, evaporator, condenser fans, condenser, EXVs) to provide cooling. See Table 48 for mechanical cooling mode operation.

HEAT TEMPERED COOLING MODE

For units in cold climates in applications with constant cooling loads, the modulating/multi-stage heat source can be used to prevent delivery of very cold air to the space with a cooling demand. See Table 49 for heat tempered cooling mode operation.

VENTING MODES

Venting mode is intended to provide neutral ventilation air to the space when ventilation is required but there is no active cooling or heating demand. See Table 50 for venting mode operation.

MODULATING HEATING MODE

The modulating/multi-stage heat source is used to provide heating based on the effective SAT control point. See Table 51 for modulating heating mode operation.

TWO-STAGE HEATING MODE

The two-stage heat source is used to provide demand-based heating operation when there is a heat demand. See Table 52 for two-stage heating mode operation.

Table 48 — Mechanical Cooling Mode Sequence of Operation

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

Table 49 — Heat Tempered Cooling Mode Sequence of Operation

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

Table 50 — Venting Mode Sequence of Operation

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

Table 51 — Modulating Heating Mode Sequence of Operation

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

Table 52 — Two-Stage Heating Mode Sequence of Operation

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

Dehumidification Modes

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

NOTE: Dehumidification will only occur during the unoccupied period if the indoor fan is configured for intermittent unoccupied operation. See Table 53 for dehumidification checks and Table 54 for sequence of operation.

Outdoor Air Damper

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

VENTILATION

When the economizer is configured to provide ventilation, the outdoor air damper opens during the occupied period. The outdoor air damper is controlled to a ventilation position based on the selected configuration. The OAD typically does not provide ventilation during the unoccupied period and is closed. See Table 55 for a list of outdoor air damper ventilation control configurations and the associated sequence of operation.

FREE COOLING

The economizer can be configured to provide free cooling during the occupied or unoccupied periods. A series of user adjustable checks are available to determine if free cooling is available. If any of the enabled checks prevent free cooling, then free cooling is made unavailable. See Table 56 on page 88 for a list of available free cooling checks. See Table 57 on page 88 for free cooling sequence of operation.

Exhaust Fan

For units with an exhaust fan (EXF), the EXF can be configured to provide building pressure control based on OAD position, a third-party input signal, or a building pressure sensor. The EXF is on whenever the OAD is open. The EXF is off whenever the OAD is closed. See Table 58 on page 88 for exhaust fan sequence of operation.

OTHER OPERATION FUNCTION

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

Table 53 — 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 54 — Humidi-MiZer Dehumidification Sequence of Operation

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

Table 55 — Ventilation Control Sequence of Operation

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

Table 56 — Free Cooling Checks

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

NOTE(S):

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

Table 57 — Free Cooling Sequence of Operation

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

Table 58 — Exhaust Fan Sequence of Operation

EXF CONTROL	CONDITION	OPERATION
None	All	The EXF is off.
OAD Mapping	Multi-stage Exhaust	The exhaust fan stages between off and four (20-50 ton) or six (60 ton) fan stages based on outdoor air damper position. Requires the outdoor air damper and exhaust fan to be enabled in the equipment configuration. See below for exhaust fan speeds based on OAD position configurations:
OAD Mapping	High Capacity Exhaust	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.
Building Pressure	Multi-stage Exhaust	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.
Building Pressure	High Capacity Exhaust	If the building pressure is above the BP setpoint, the EXF turns on and modulates between the minimum and maximum EXF speeds to maintain the building pressure at the BP setpoint. If the building pressure drops below the BP setpoint, the EXF turns off. When the OAD is closed, the EXF is off.
Third-Party Input	Multi-stage Exhaust	Not used.
Third-Party Input	High Capacity Exhaust	The EXF modulates between off and the max EXF speed based on a third-party signal. When the OAD is closed, the EXF is off.

OAD POSITION	EXHAUST FAN STAGE
< EXF OAD Pos 1	Off
≥ EXF OAD Pos 1, < EXF OAD Pos 2	1
≥ EXF OAD Pos 2, < EXF OAD Pos 3	2
≥ EXF OAD Position 3, < EXF OAD Position 4	3
≥ EXF OAD Position 4, < EXF OAD Position 5	4
≥ EXF OAD Position 5, < EXF OAD Position 6	5 (60T only)
≥ EXF OAD Position 6	6 (60T only)

Emergency Modes

Emergency modes are a special set of unit operations that are triggered by unit inputs and user inputs based on the unit configuration. See Table 59 for emergency mode sequences of operation.

Table 59 — Emergency Mode Sequence of Operation

MODE	CONDITION	OPERATION
Leak Mitigation	The A2L mitigation board indicates a refrigerant leak.	Cooling and heating are stopped. The OAD closes, the EXF turns off. The IDF turns on and operates at the leak mediation speed. The ODFs turn on and operate at max speed.
Smoke Shutdown	The smoke detector switch is enabled and the switch closes.	Cooling, heating, the IDF, and EXFs all turn off, the OAD closes.
Smoke Purge	The smoke purge switch is enabled and the switch closes.	Heating and cooling are stopped. 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. 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. 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).

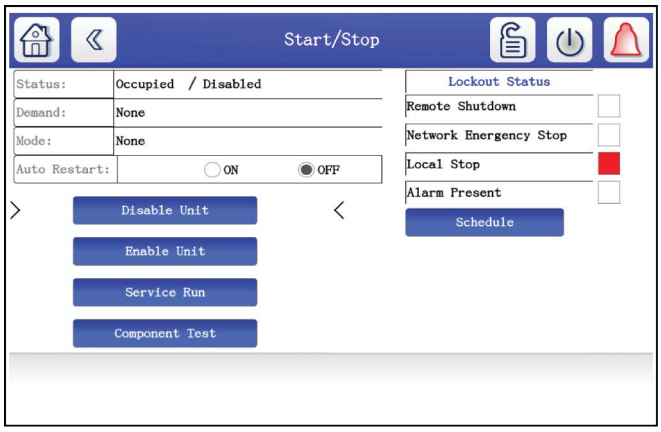


Fig. A — Start/Stop Screen in Test Mode

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.

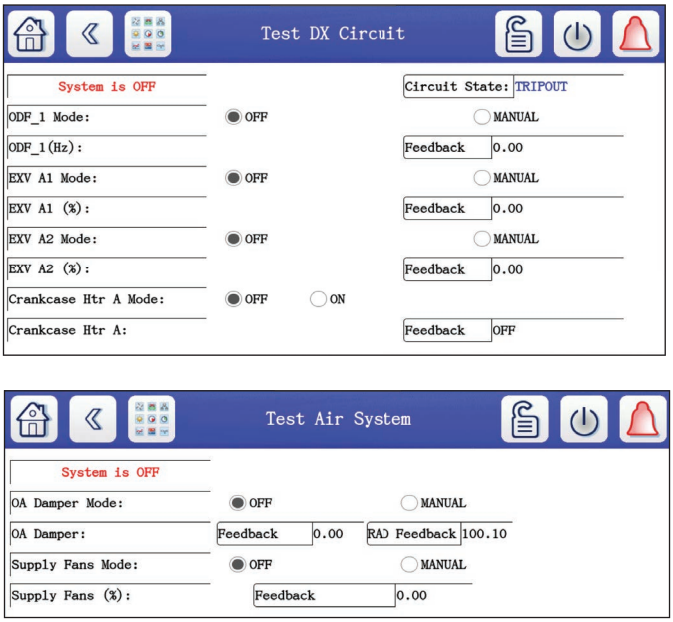


Fig. B — Test DX Circuit and Test Air System Screens (Component Test)

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.

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)

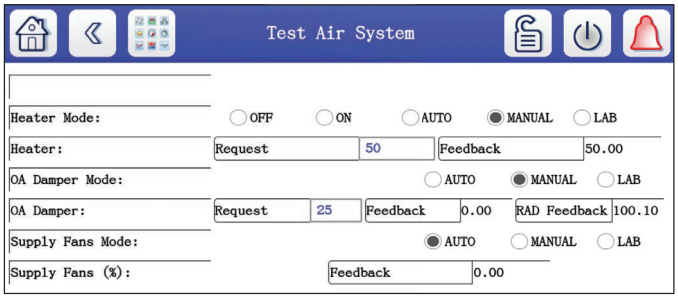


Fig. F — Test Air System Example (Service Run)

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-E for component configurations.

Step 1 — Login with the User Access Level

The User access level is required to enable component tests and set configurations and setpoints. To login, navigate to the User Login screen (*press on the top bar→**User Login***), 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 90 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.

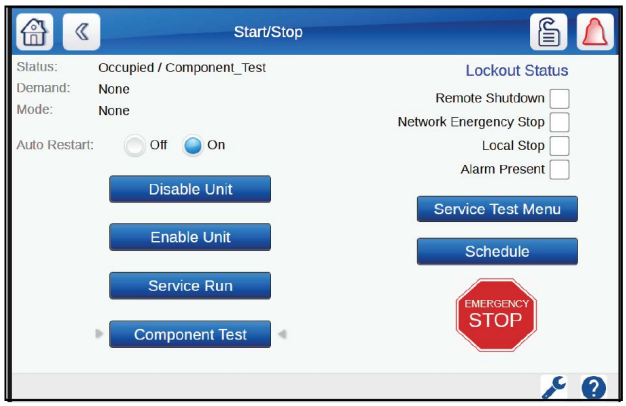


Fig. G — Start/Stop Screen in Test Mode

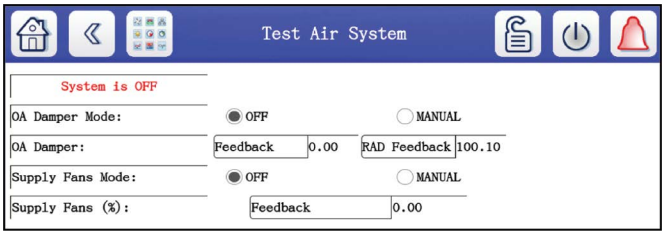


Fig. H — Test Air System Screens (Component Test)

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, ZP, or third-party IDF control configurations.
IDF Max. Speed	%	Maximum speed the IDF can operate at, typically the higher of the cooling or heating design airflows. Used for SP, SZ-VAV, or third-party IDF control configurations.
IDF Low Cool Speed	%	IDF speed with a low cool demand or low cool capacity. If unknown, target 50%-66% of design cooling airflow. Used with SZ-VAV, SAV demand or SAV capacity IDF control configurations.
IDF Med Cool Speed	%	IDF speed with 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 SZ-VAV, SAV demand, SAV capacity, or CV IDF control configurations.
IDF Low Heat Speed	%	IDF speed with a low heat demand or low heat capacity. If unknown, target 66%-75% of design heating airflow. Used with SZ-VAV, SAV demand, SAV capacity, or CV IDF control configurations. NOTE: Also used with SP or third-party control for units with 2-stage heat.
IDF High Heat Speed	%	IDF speed with a high heat demand or high heat capacity, typically the design heating airflow. Used with SZ-VAV, SAV demand, SAV capacity, or CV IDF control configurations. NOTE: Also used with SP or third-party control for units with 2-stage heat.
OAD Smoke Evac. Position	%	The OAD position when smoke evacuation mode is activated.
OA CFM Setpoint	CFM	The OA CFM setpoint used with OA CFM ventilation control.

Table B — Indoor Fan Setpoints

SETPOINT	VALUE	DESCRIPTION
(Main Menu→Setpoints→IDF Setpoints)		
Supply Pressure (SP)	in. wg	The required supply pressure to achieve the peak design airflow. Used with SP IDF control configuration.

Table C — Outdoor Air Damper Configurations

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

Table D — Exhaust Fan Configurations

CONFIG/SETPOINT	VALUE	DESCRIPTION
(Main Menu→System Config →EXF Config)		
EXF Min. Speed	%	The minimum speed the EXF operates at when on, typically based on the ventilation airflow or partial free cooling airflow. Used with OAD mapping, third-party, or building pressure exhaust fan control with high-capacity power exhaust only.
EXF Max. Speed	%	The maximum speed the EXF can operate at, based on the max design exhaust airflow (usually during free cooling). Used with OAD mapping, third-party, or building pressure exhaust fan control 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 Pos 1	%	The OAD position where the exhaust fan turns on and operates at EXF Speed OAD Pos 1 with OAD mapping and high-capacity power exhaust.
EXF OAD Pos 2	%	The OAD position where the exhaust fan operates at EXF Speed OAD Pos 1 with OAD mapping and 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.
EXF Smoke Purge Speed	%	EXF speed when smoke purge mode is activated.
EXF Smoke Evac Speed	%	EXF speed when smoke evacuation mode is activated.

Table E — Exhaust Fan Setpoints

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

APPENDIX C — 50K MODEL NUMBER NOMENCLATURE

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

Heat Type (1,2)
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
A – No Heat
B – Low Electric Heat, 2-Stage
D – High Electric Heat, 2-Stage
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

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

Construction (9)
- – Single Wall
A – Double Wall
B – Agion®[1] Double Wall
C – Single Wall, Double Wall Bottom
D – Double Wall, Double Wall Bottom
E – Agion® Double Wall, Double Wall Bottom

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

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

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

[1]Thrid-party trademarks and logos are the property of their respective owners.

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

APPENDIX D — CHARGING CHARTS

Table F — 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

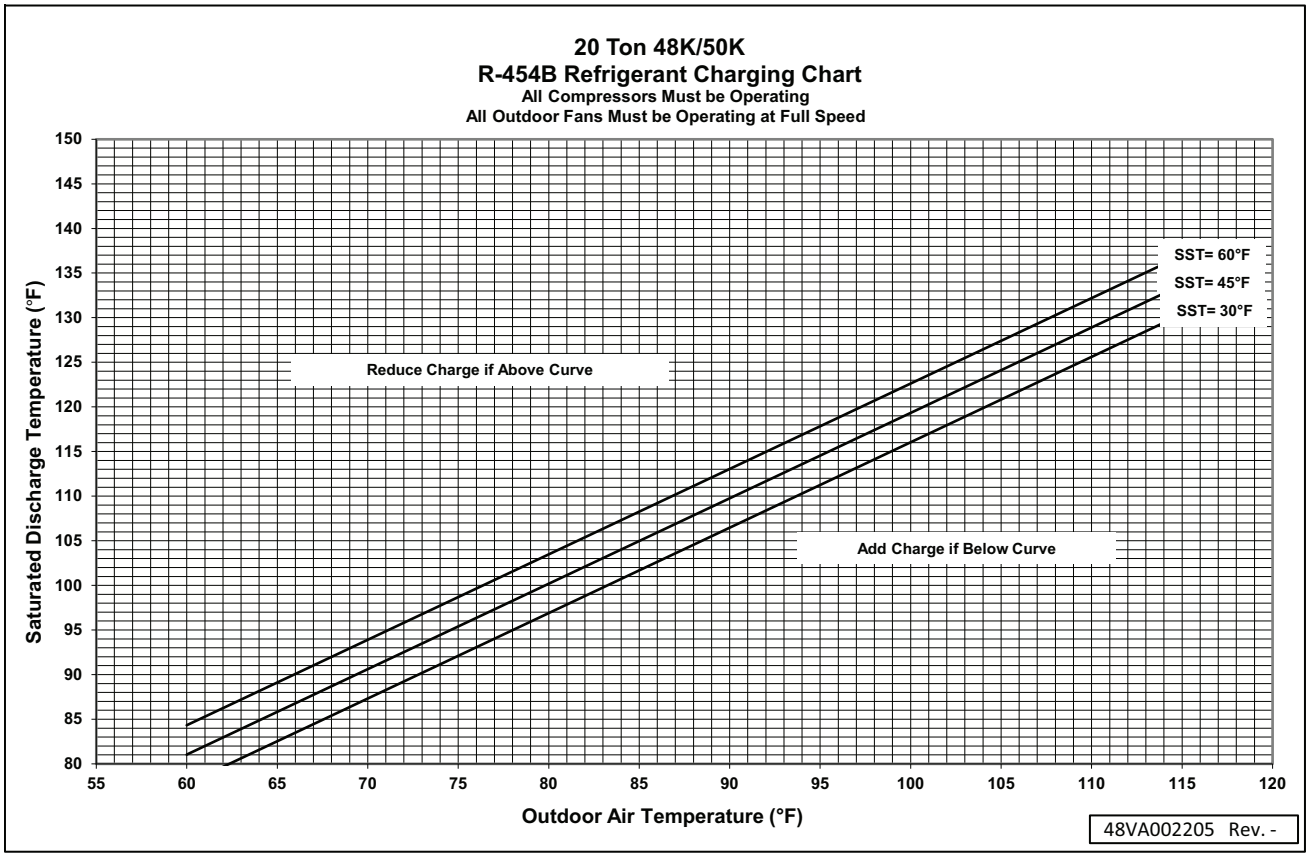


Fig. J — 50K Refrigerant Charging Charts (R-454B) 20 Ton

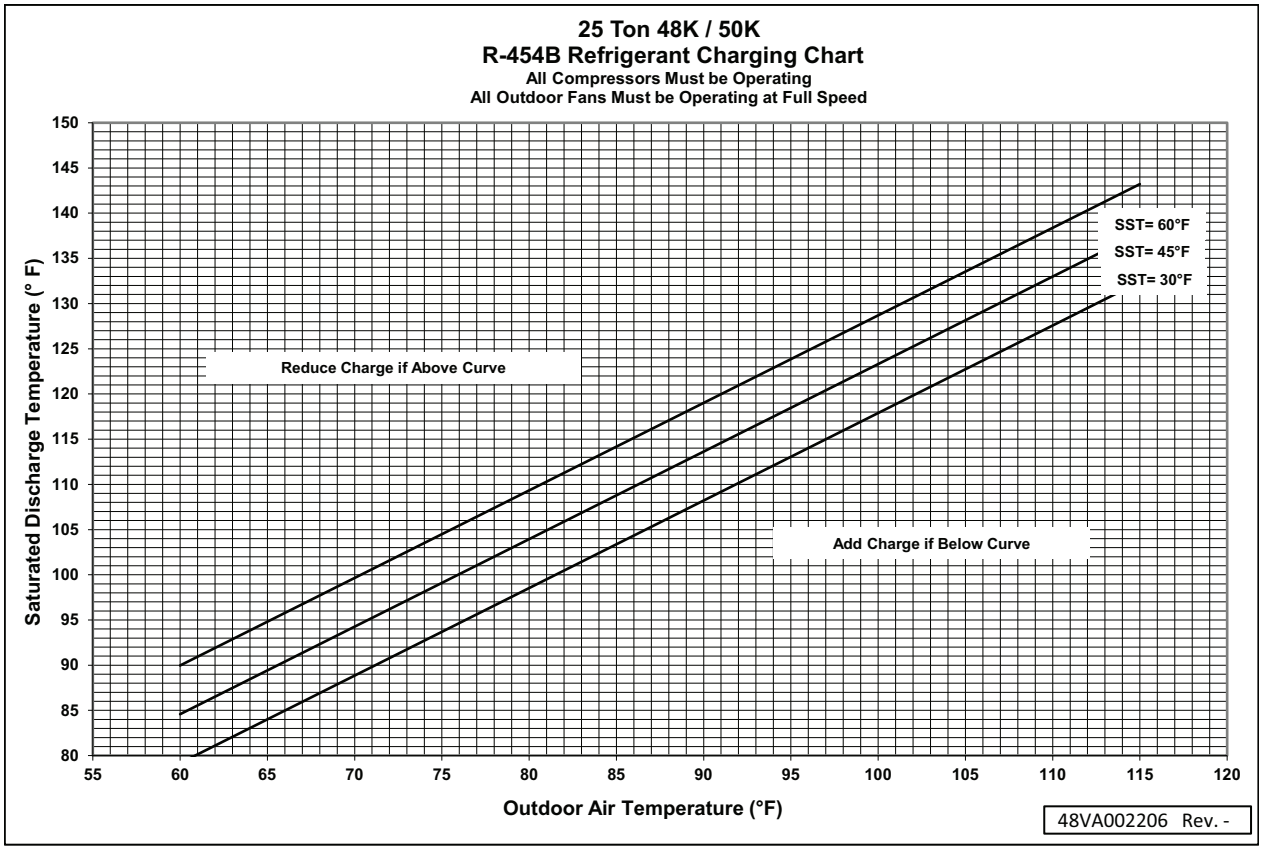


Fig. K — 50K Refrigerant Charging Charts (R-454B) 25 Ton

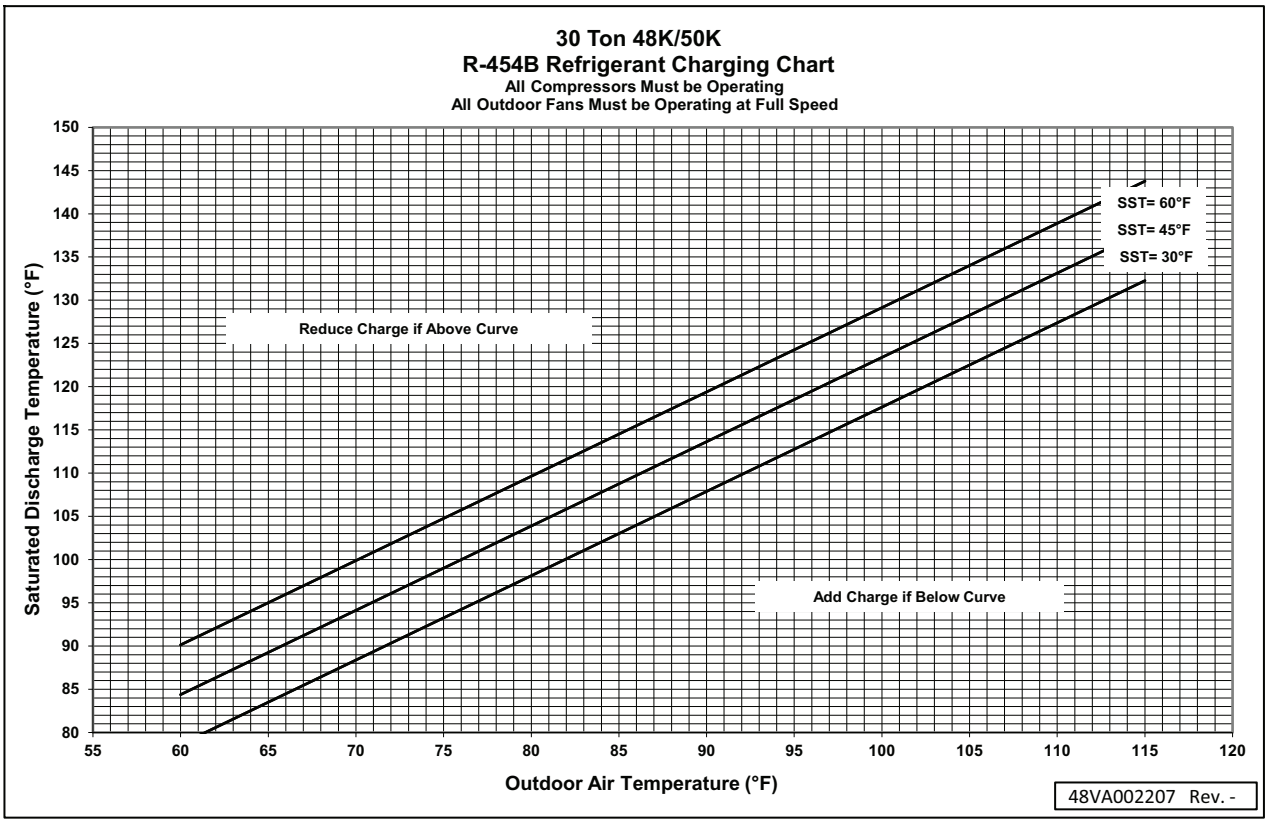


Fig. L — 50K Refrigerant Charging Charts (R-454B) 30 Ton

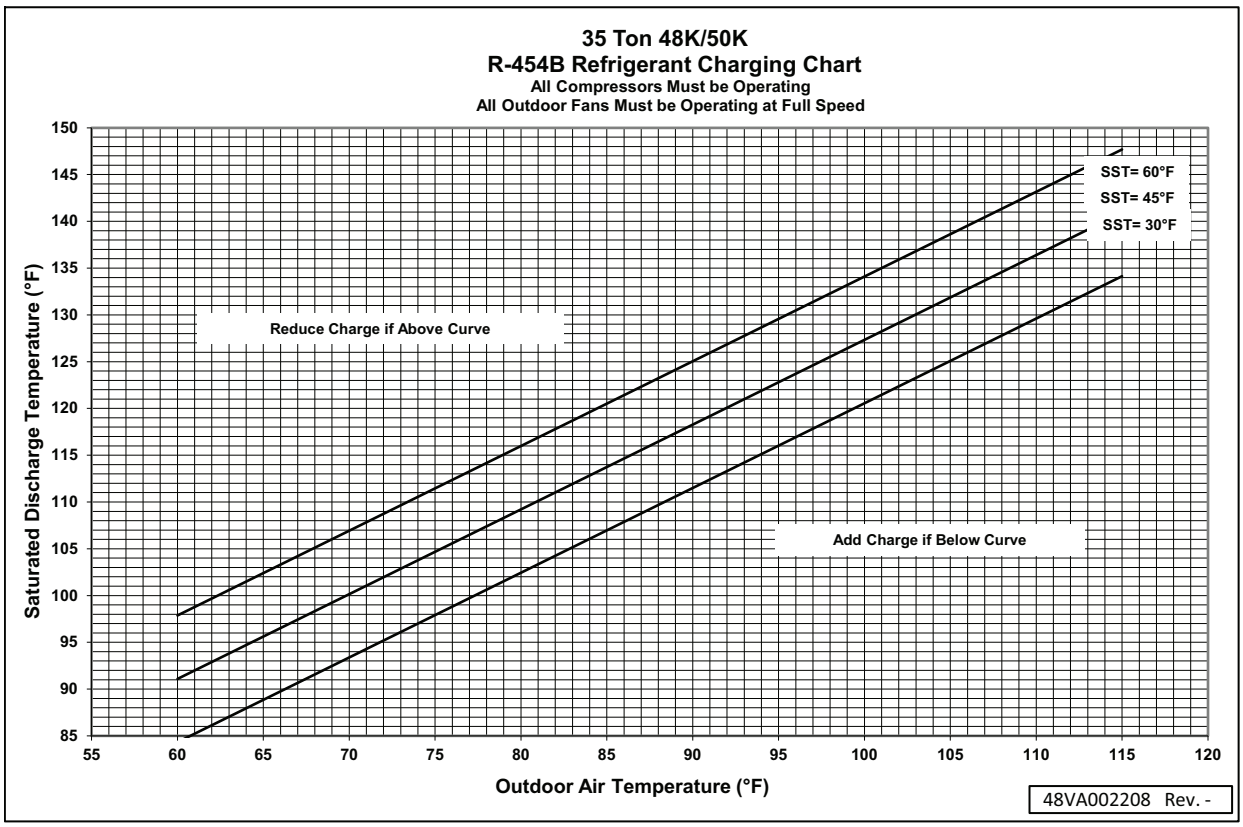


Fig. M — 50K Refrigerant Charging Charts (R-454B) 35 Ton

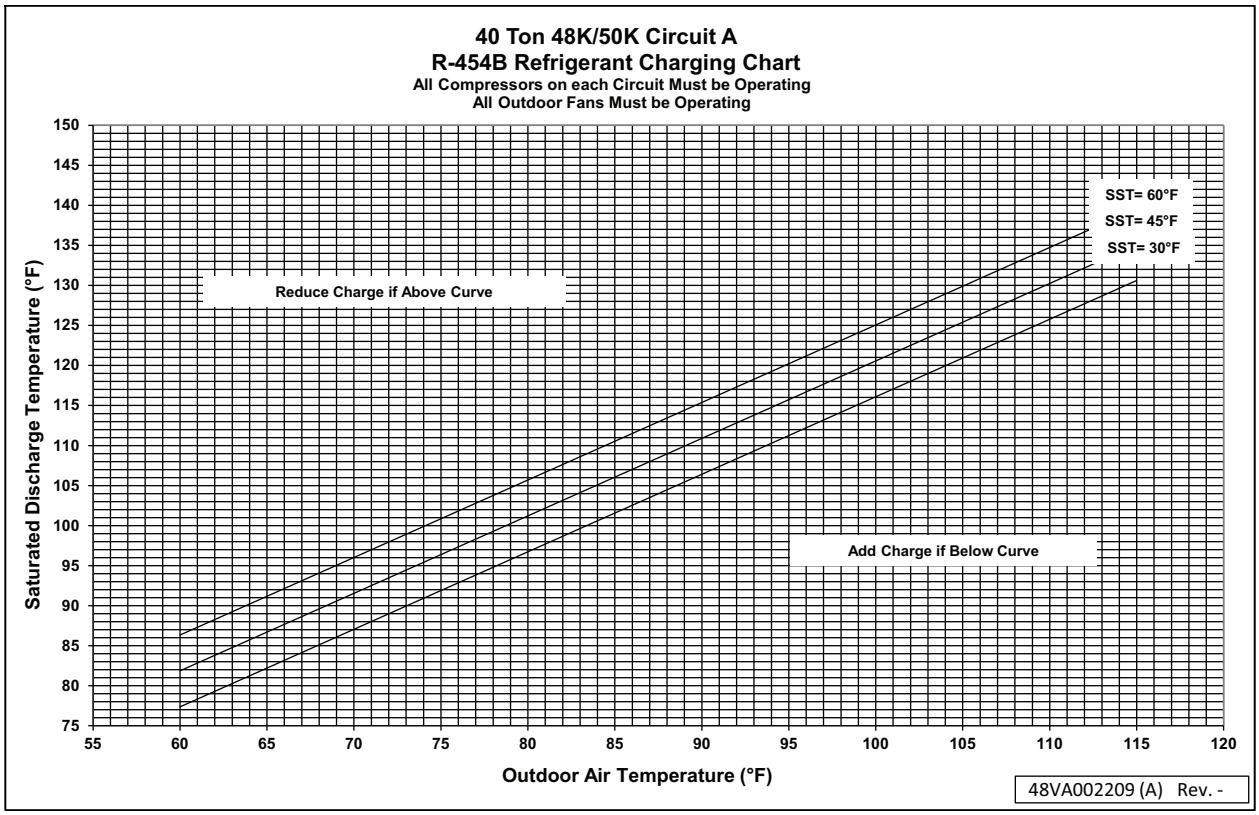


Fig. N — 50K Refrigerant Charging Charts (R-454B) 40 Ton, Circuit A

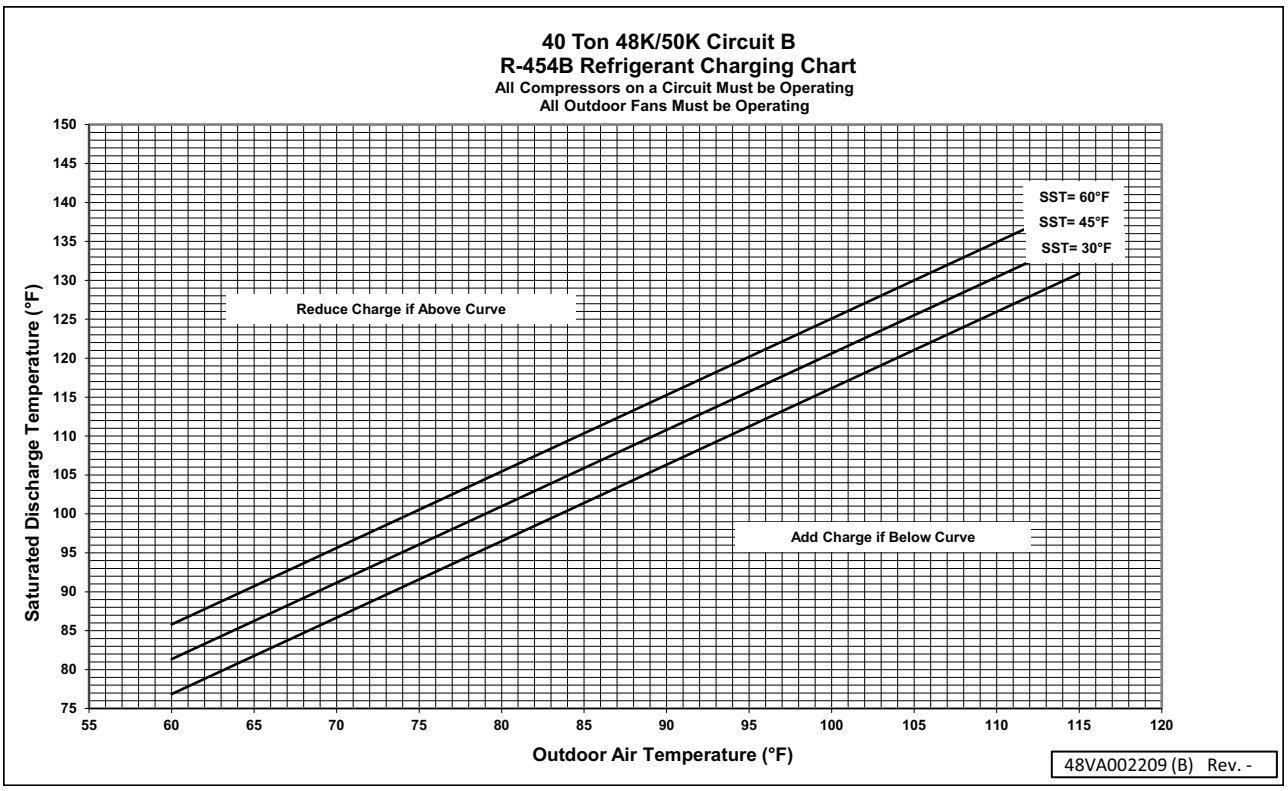


Fig. O — 50K Refrigerant Charging Charts (R-454B) 40 Ton, Circuit B

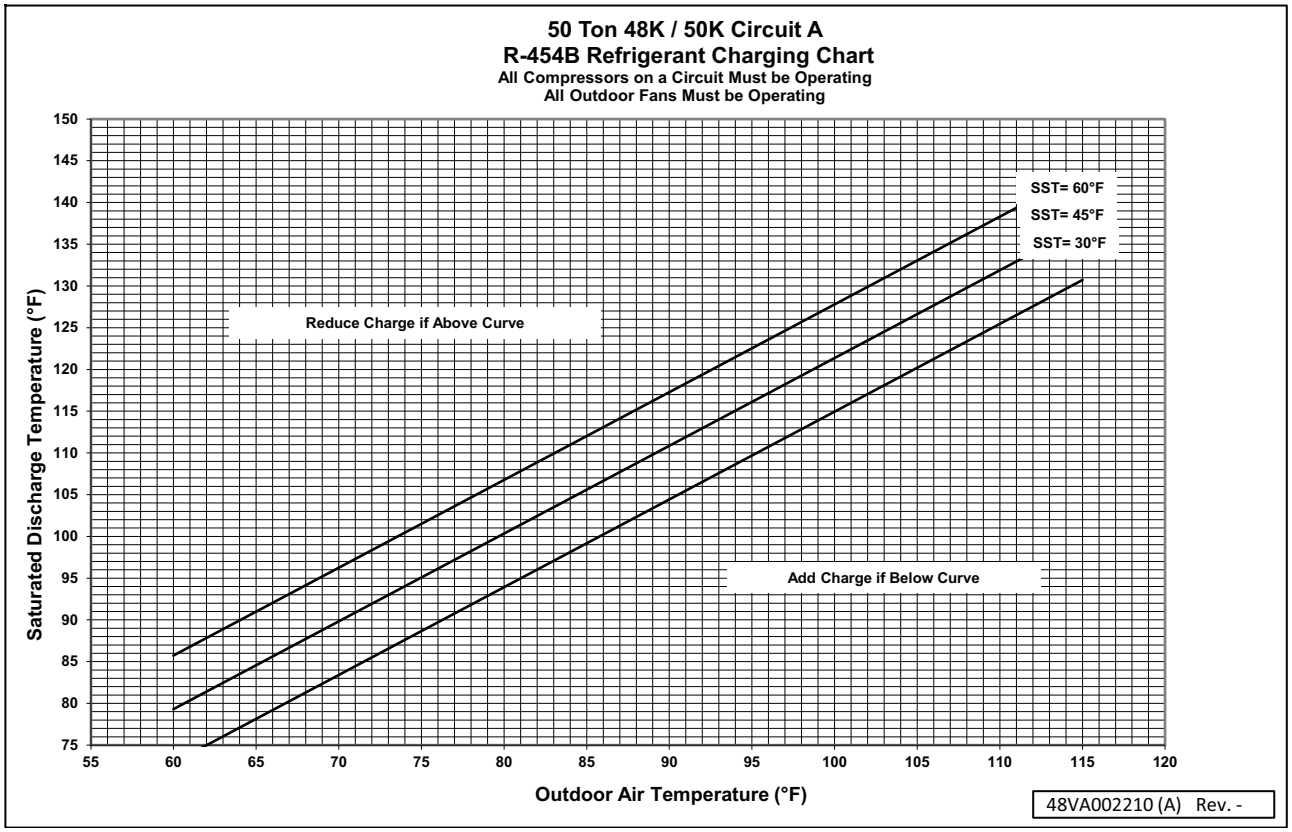


Fig. P — 50K Refrigerant Charging Charts (R-454B) 50 Ton, Circuit A

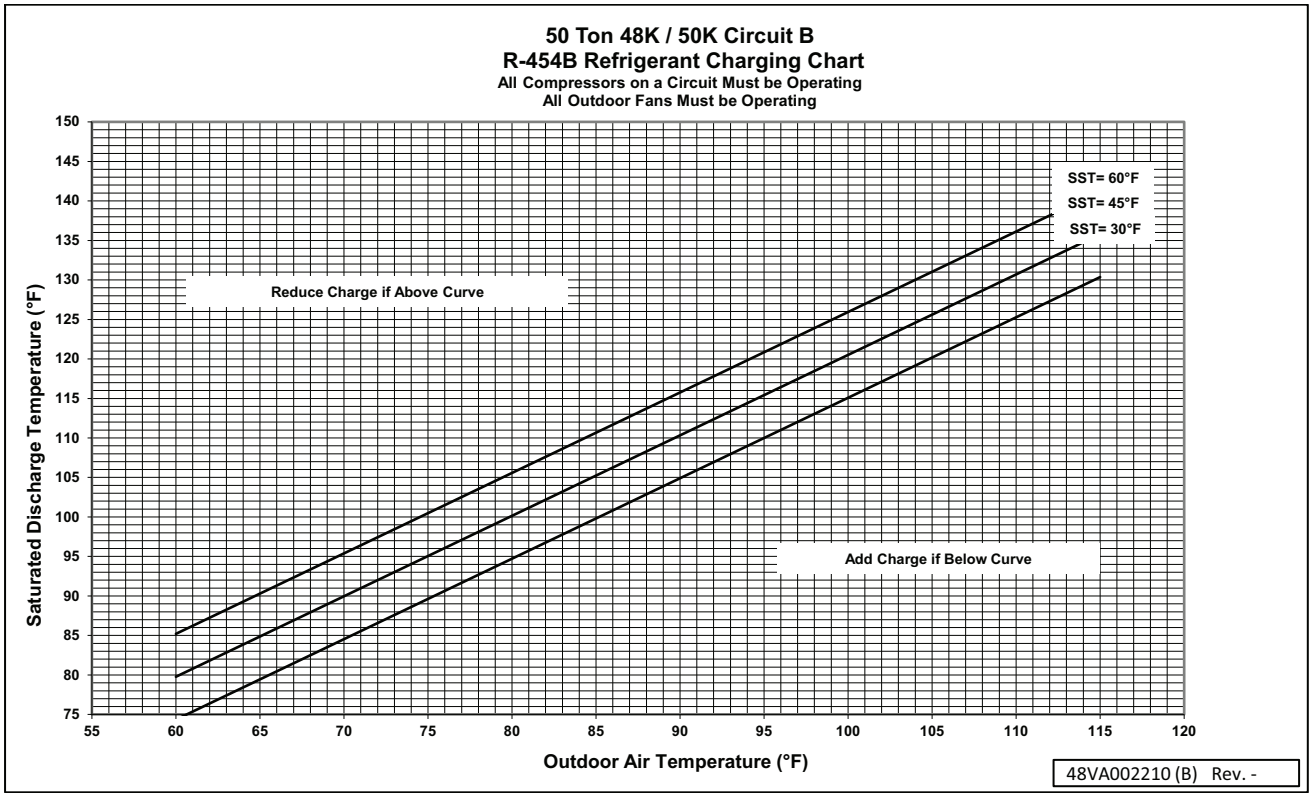


Fig. Q — 50K Refrigerant Charging Charts (R-454B) 50 Ton, Circuit B

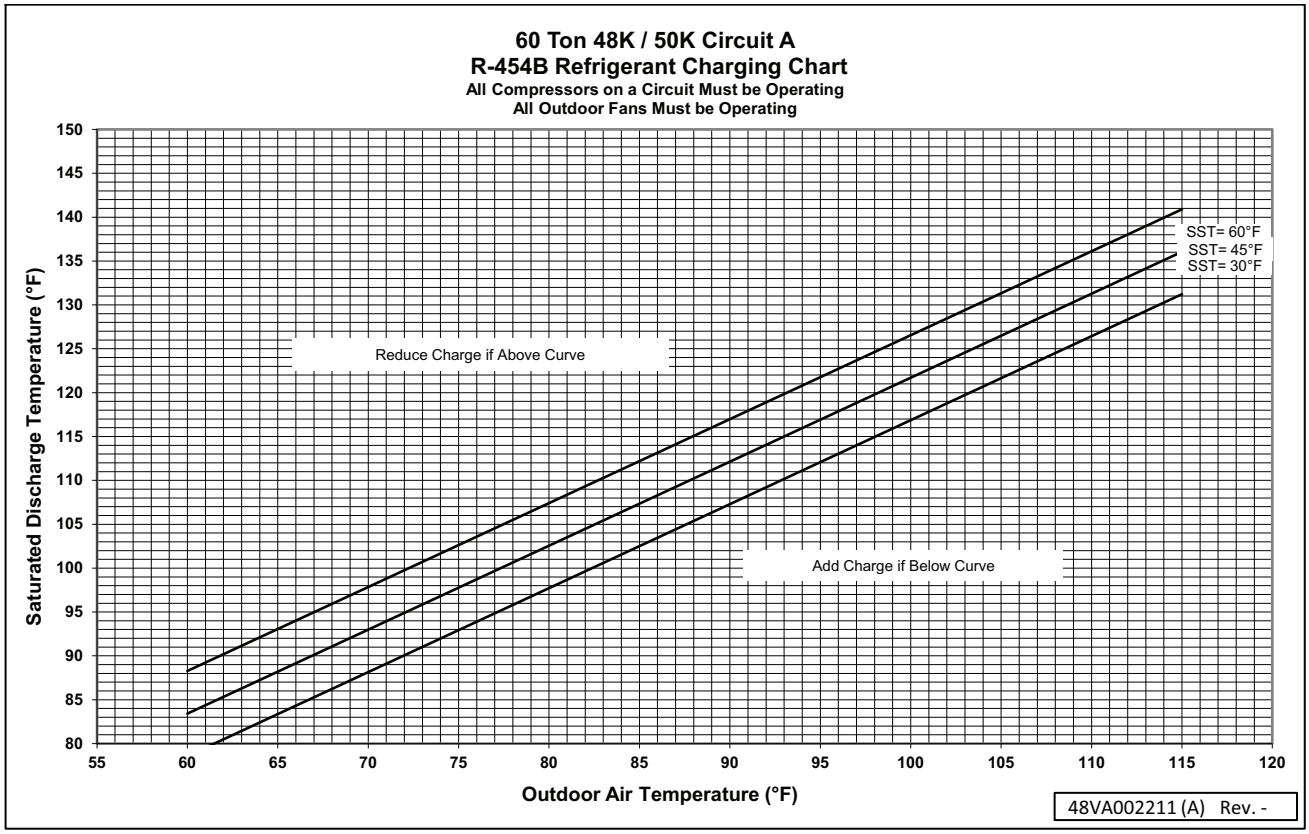


Fig. R — 50K Refrigerant Charging Charts (R-454B) 60 Ton, Circuit A

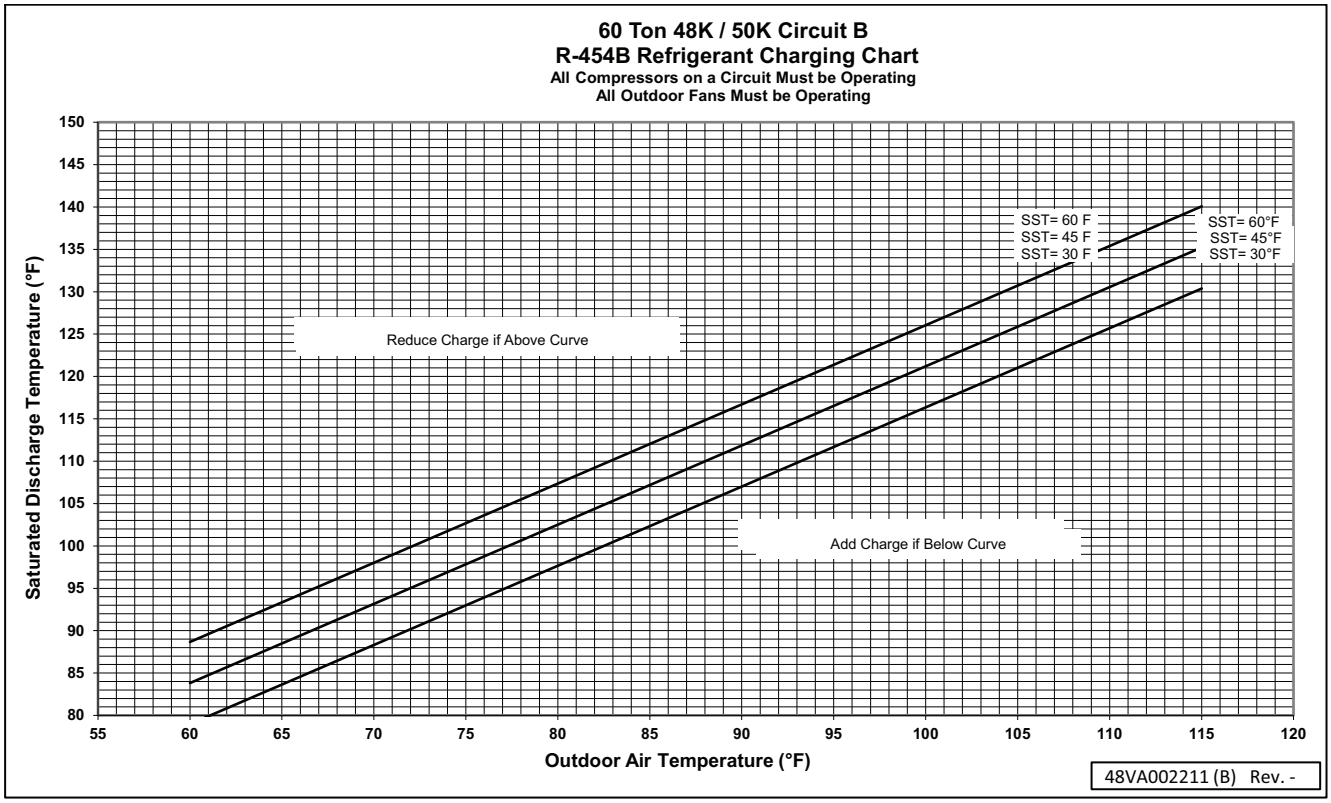
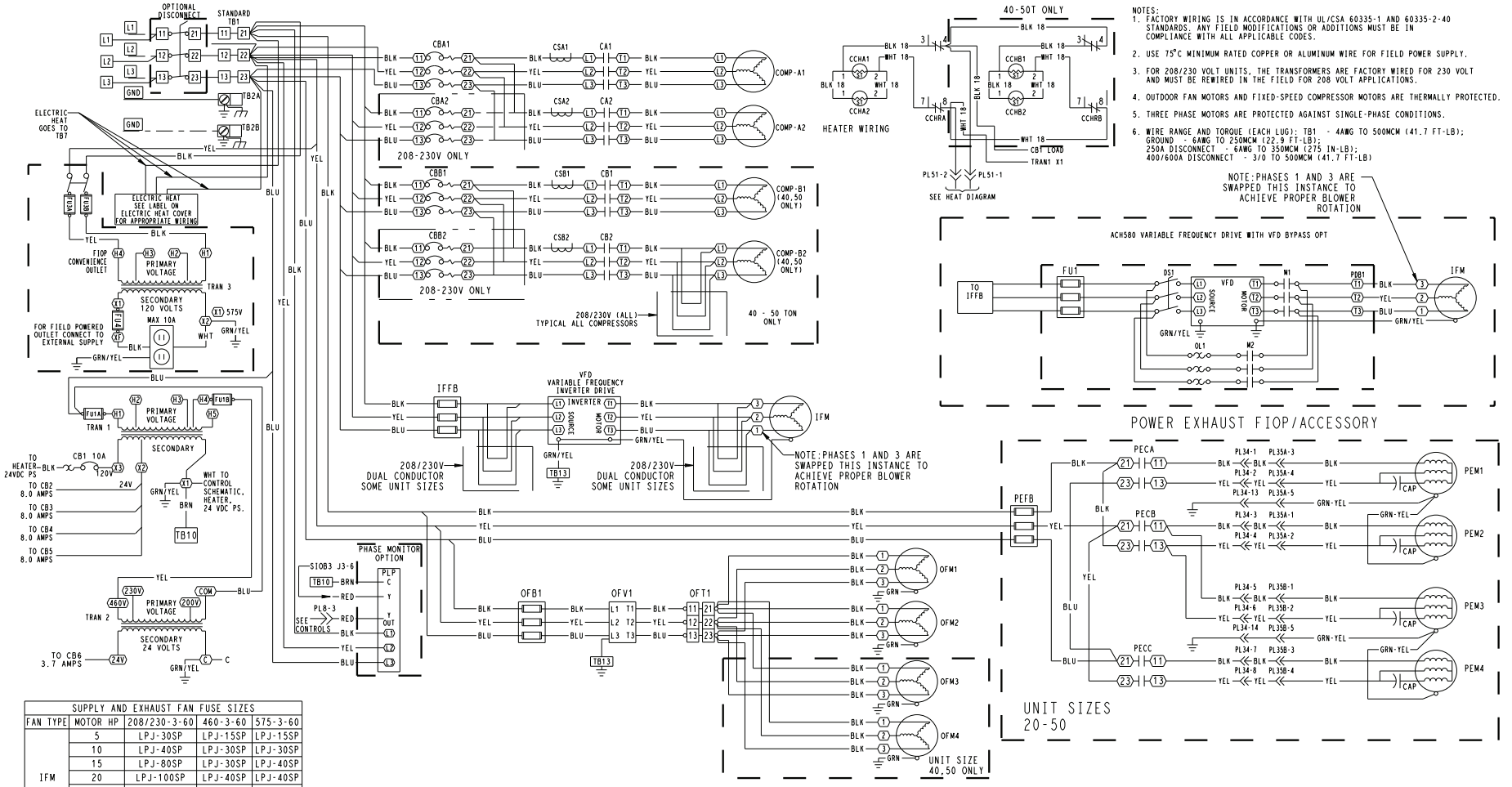


Fig. S — 50K Refrigerant Charging Charts (R-454B) 60 Ton, Circuit B

APPENDIX E — TYPICAL WIRING DIAGRAMS



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

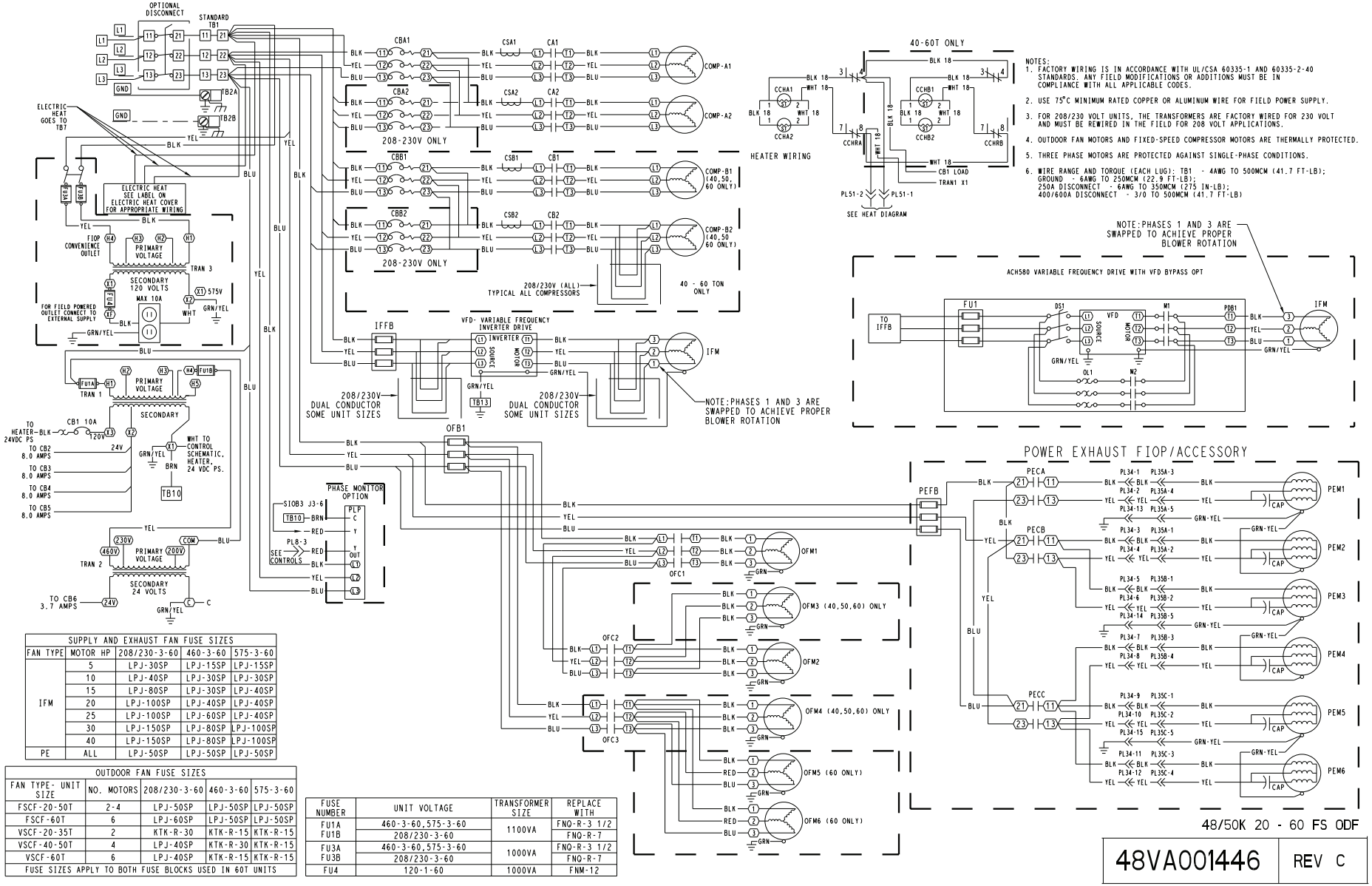
OUTDOOR FAN FUSE SIZES				
FAN TYPE- UNIT SIZE	NO. MOTORS	208/230-3-60	460-3-60	575-3-60
FSCF-20-50T	2-4	LPJ-50SP	LPJ-50SP	LPJ-50SP
FSCF-60T	6	LPJ-60SP	LPJ-50SP	LPJ-50SP
VSCF-20-35T	2	KTK-R-30	KTK-R-15	KTK-R-15
VSCF-40-50T	4	LPJ-40SP	KTK-R-30	KTK-R-15
VSCF-60T	6	LPJ-40SP	KTK-R-15	KTK-R-15
FUSE SIZES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

48/50K 20 - 50, VS ODF

48VA001445	REV -

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



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)

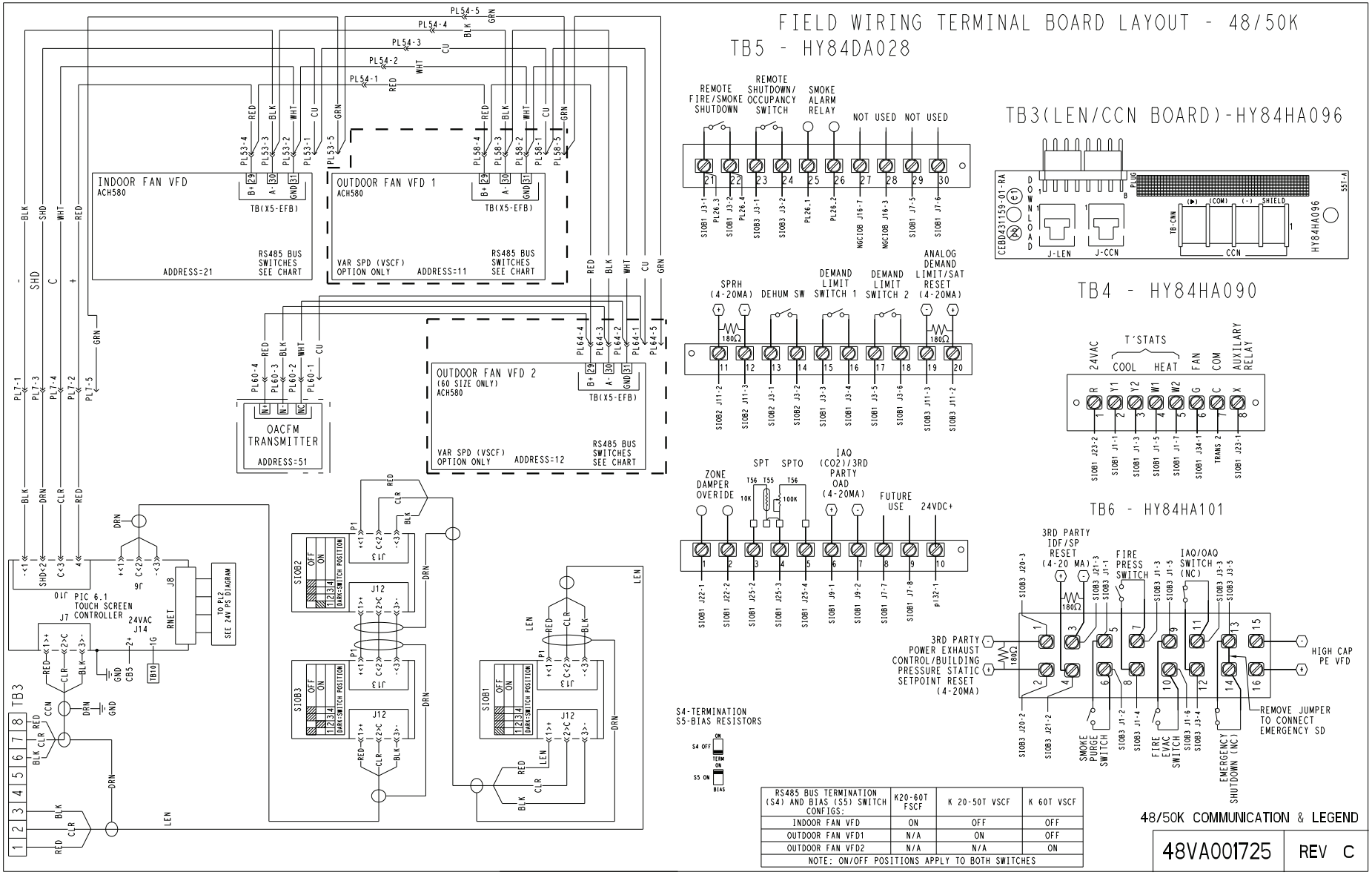


Fig. V — 48/50K PIC6 Communication Schematic

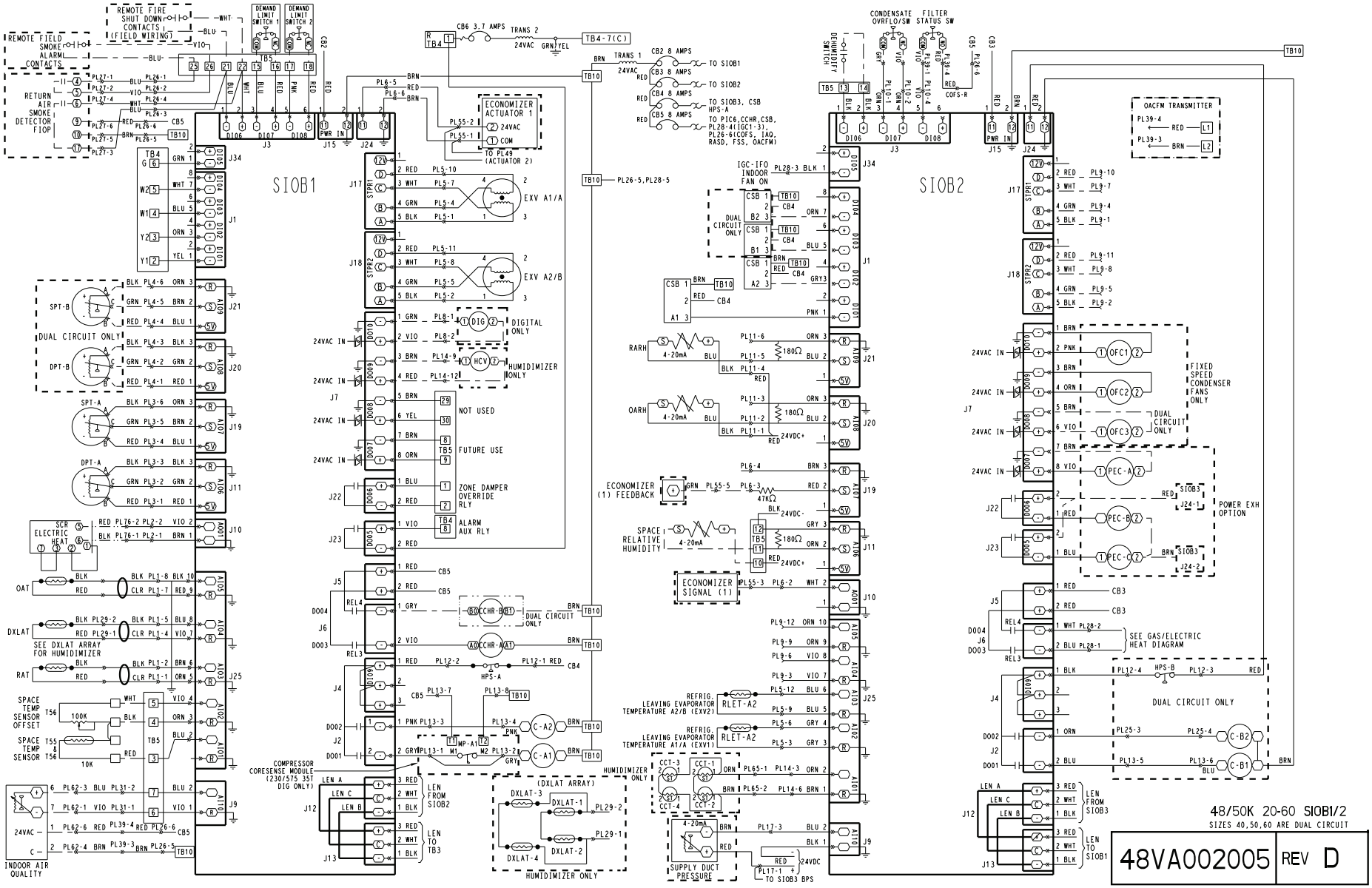


Fig. W — 48/50K SIOB 1/2 (Sizes 20-60)

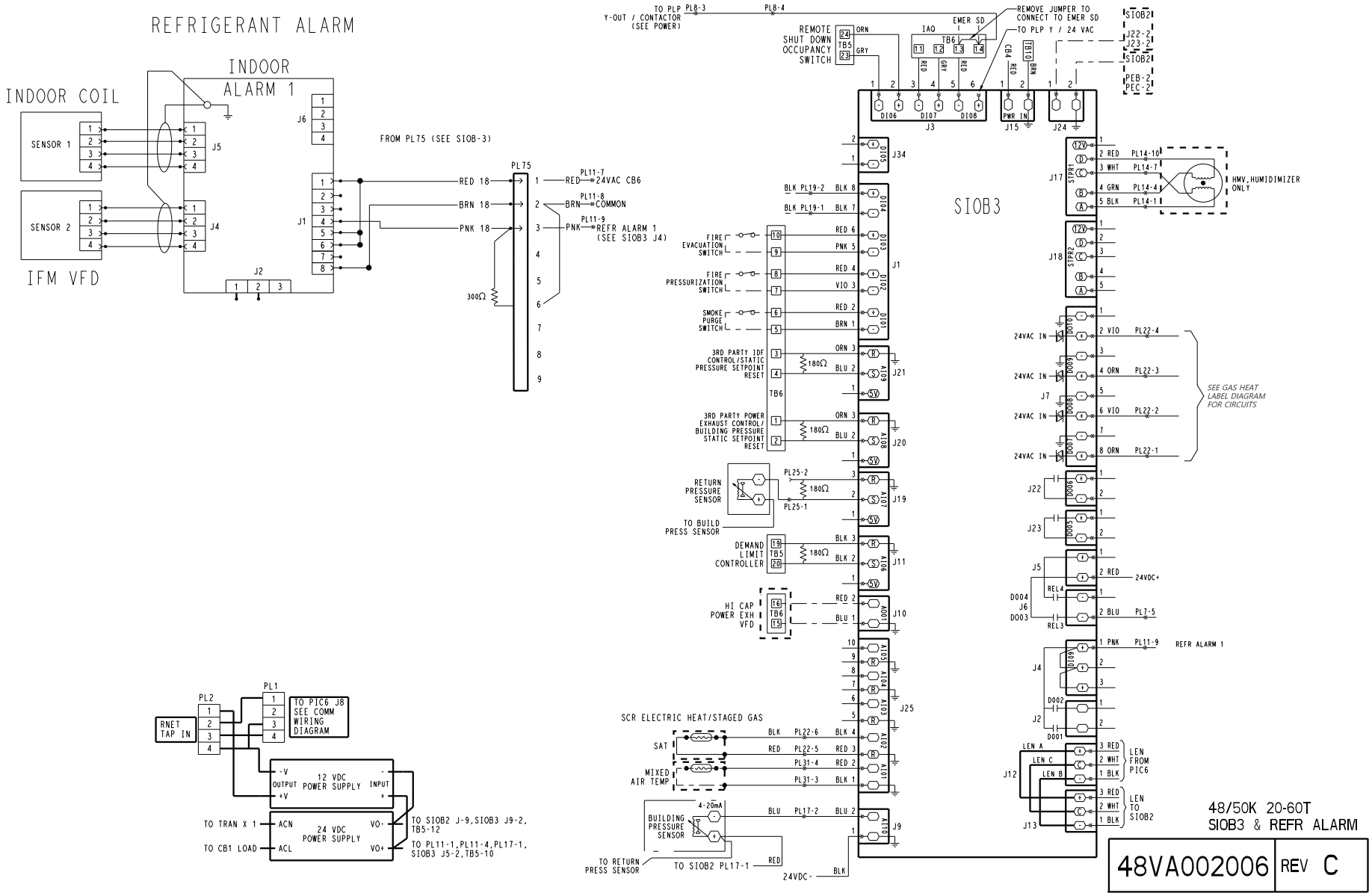


Fig. X — 48/50K SIOB3 and Refrigerant Alarm (Sizes 20-60)

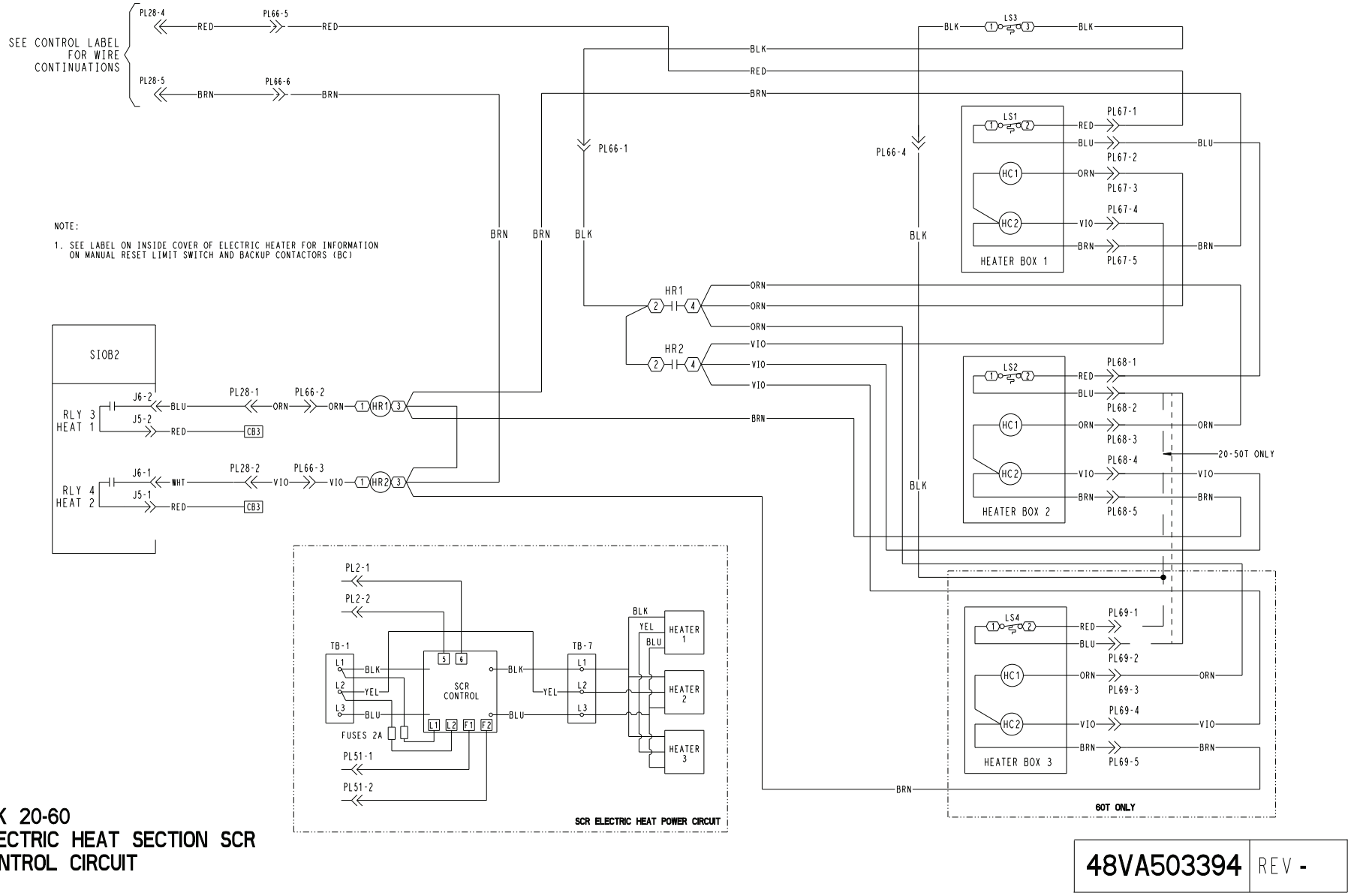


Fig. Y — 50K Electric Heat Section SCR Control Circuit (Sizes 20-60)

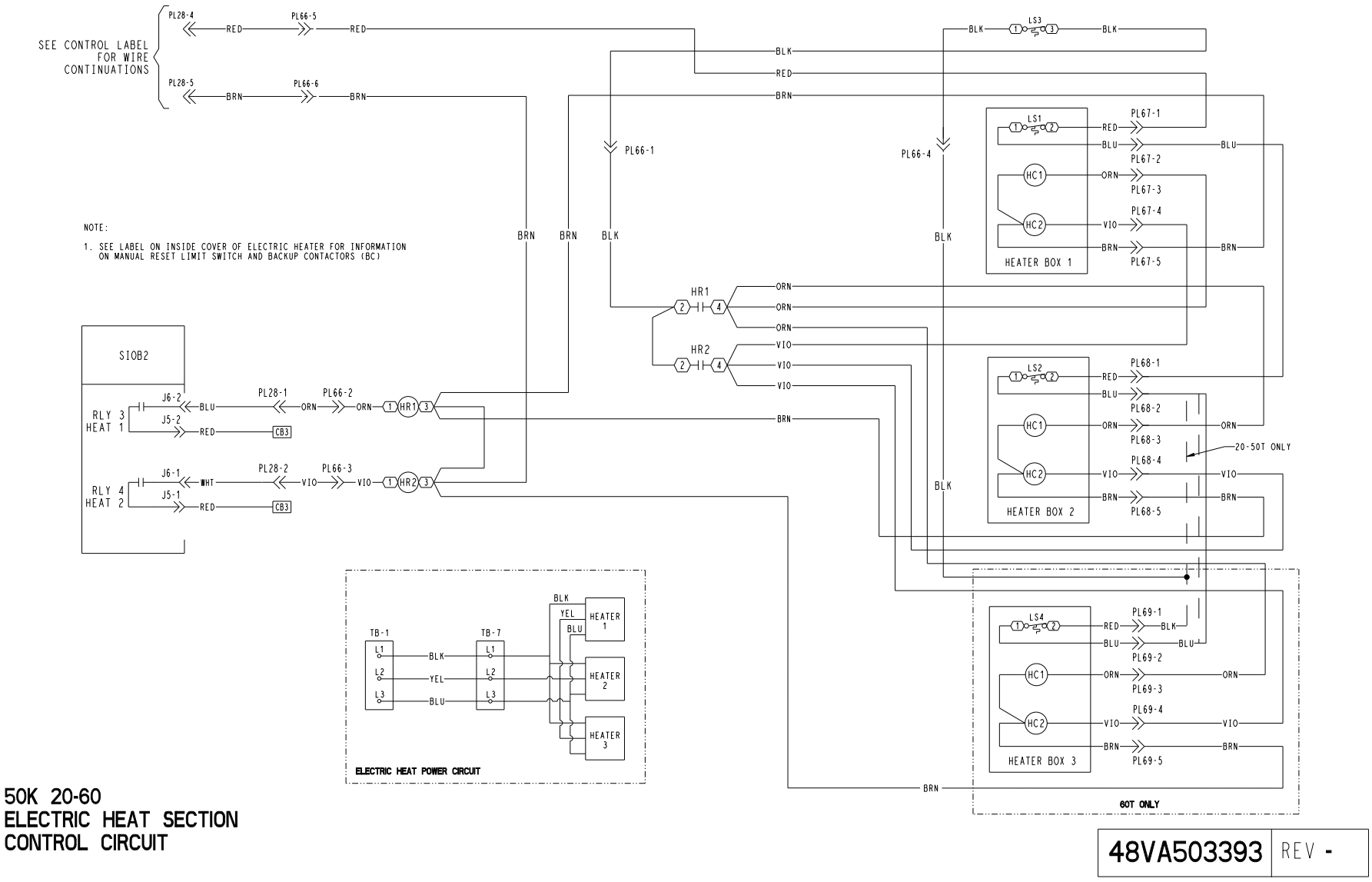


Fig. Z — 50K Electric Heat Section Control Circuit (Sizes 20-60)

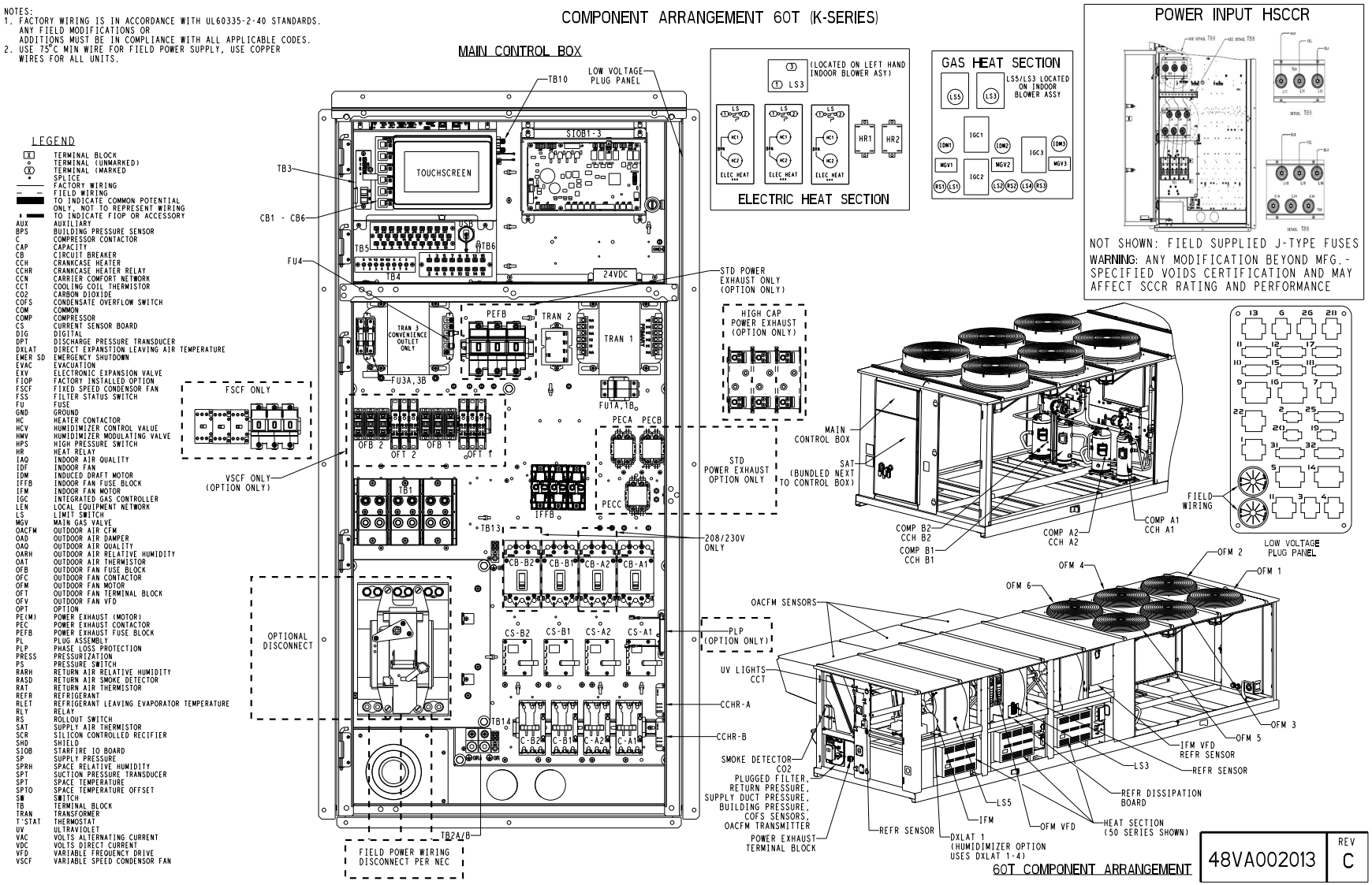


Fig. AA — 48/50K Component Arrangement (Size 60 Horizontal and Vertical)

APPENDIX F — CONTROL BOARD I/O POINTS

Table G — 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 Cooling-Stage 1 (Y1)	24VAC, NO
Discrete Input	DI2	J1-3	TB4-Y2	TSTAT_Y2	Thermostat Cooling-Stage 2 (Y2)	24VAC, NO
Discrete Input	DI3	J1-5	TB4-W1	TSTAT_W1	Thermostat Heat-Stage 1 (W1)	24VAC, NO
Discrete Input	DI4	J1-7	TB4-W2	TSTAT_W2	Thermostat Heat-Stage 2 (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 H — 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 I — 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

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50K PRE-START-UP INFORMATION FOR CHECKLIST

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

NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices, and adhere to the safety considerations/information as outlined in preceding sections of this Installation Instruction document.

I. PROJECT INFORMATION

PROJECT NAME_____
ADDRESS _____
CITY _____.
STATE/PROVIDENCE/ZIPCODE _____
INSTALLER_____
CONTACT NAME_____
CONTACT PHONE _____
CONTACT EMAIL _____

Unit Information

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

Application Information

APPLICATION TYPE: SINGLE-ZONE_____MULTI-ZONE_____OTHER_____
SUPPLY AIRFLOW_____cfm SUPPLY EXTERNAL STATIC_____in. wg
EXHAUST AIRFLOW_____cfm EXHAUST ETERNAL STATIC_____in. wg
OUTDOOR AIRFLOW_____cfm
OCCUPANCY AIRFLOW:_____LOCAL SCHEDULE_____OCCUPANCY SWITCH_____BAS_____
COMMUNICATION TYPE:_____NONE_____CCN_____BACNet MS/TP_____BACnet IP_____
COMMUNICATION DETAILS:_____

START-UP NOTES:

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

_____
_____
_____
_____
_____
_____
_____

II. PRE-START-UP CHECKLIST

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

Verify packing materials have been removed from the unit. (Y/NA) _____
Verify the unit is free of damage. If damage exists, contact your local Carrier sales representative. (Y/NA) _____
Verify the unit has been installed in accordance with the service clearances in the installation instructions. (Y/NA) _____
Verify the supply and return ductwork have been installed per the unit installation instructions. (Y/NA) _____
Verify the unit is within level tolerances to promote proper condensate drainage. (Y/NA) _____
Verify all factory-supplied, field-installed components (hoods, sensors, etc.) have been installed. (Y/NA) _____
Verify the unit power feed is installed, and the phasing is correct (L1, L2, L3). (Y/NA) _____
Verify the unit voltage and frequency have been verified to match the incoming power feed. (Y/NA) _____
Verify the incoming power voltage is steady and within 10% tolerance from nameplate. (Y/NA) _____
Verify the power feed wire size meets the MCA requirements on the unit nameplate. (Y/NA) _____
Verify an overcurrent production device (fuse or breaker) has been installed upstream of the unit and is compliant with the MOCP requirements indicated on the unit nameplate. (Y/NA) _____
Verify a means of disconnecting and locking out electrical service at the unit has been provided (units without non-fused disconnect or HACR breaker). (Y/NA) _____
Verify for units with high SCCR, field provided J type fuses have been installed before the unit terminal block. (Y/NA) _____
Verify all electrical connections and terminals are tight; all terminals are free from corrosion. (Y/NA) _____
Verify the air-cooled condenser coil(s) is clean and free from obstructions and defects. (Y/NA) _____
Verify the crank case heaters are operational and will operate 24 hours prior to performing cooling start-up. (Y/NA) _____
Verify the evaporator filters and outdoor air hood screens are installed and are clean. (Y/NA) _____
Verify a properly sized condensate drain trap has been installed and is free from obstructions. (Y/NA) _____
Verify the refrigerant circuit is free from leaks. Grease bearings as needed using Regal AFB-2 or similar. (Y/NA) _____
Verify a sealing bead of grease is visible at all indoor fan bearing seals. (Y/NA) _____
Verify all included accessories (roof curbs, exhaust fans, flue vents, etc.) have been installed. (Y/NA) _____

Factory-Installed Options (If Equipped)

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

Air Balance

See Appendix B on page 92 for air balance instructions.

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

Software Update

Carrier recommends updating to the latest software prior to configuring the unit controls or starting the equipment. Visit the post-sales support service software download center on http://www.HVACPartners.com or contact your local Carrier applied sales office to obtain the latest software and download instructions.

III. CONTROL CONFIGURATION

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

Schedule

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

Equipment Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → Equipment Config)	
Smoke Detector	Enable/Disable
Thermostat	Enable/Disable
Humidistat	Enable/Disable
Pre-Filter Switch	Enable/Disable
Remote Switch	0 = None
	1 = Remote Shutdown
	2 = Remote Occupancy
Phase Monitor	Enable/Disable
Fire Shutdown	Enable/Disable
ZDOR	Enable/Disable
IDF Third-Party Mod	Enable/Disable
EXF Third-Party Mod	Enable/Disable
OAD Third-Party Mod	Enable/Disable
Exhaust Fan	Enable/Disable
Economizer (OAD)	Enable/Disable
COFS	Enable/Disable
Auxiliary Relay	0=Not Used
	1=Alarm Status
	2=OCC Status
IAQ/OAD Input Configuration	1=Not Used
	2=Third-party OAD
	3=Third-party IAQ
	4=Third-party OA CFM Reset
IAQ Switch Config.	1=Not Used
	2=IAQ Switch
	3=OAQ Switch
Occupied Standby Time	Min.
Occupied Override Time	Hrs

Sensor Configurations

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

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 Smoke Purge Speed	%
IDF Smoke Press Speed	%
IDF Smoke Evac. Speed	%
SP Reset Source	0=None (Default)
	1=RAT
	2=SPT
	3=Third-Party
SP Reset Ratio	in H_2O
SP Reset Limit	in H_2O

Outdoor Air Damper Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config → OAD Config)	
Vent Control	0 = None
	1= IDF Mapping
	2 = Third-Party Full
	3 = Third-Party Vent Only
OAD Min. Position	%
OAD Max. Position	%
IDF Vent Speed 1	%(IDF Map Only)
IDF Vent Speed 2	%(IDF Map Only)
IDF Vent Speed 3	%(IDF Map Only)
IDF Vent Speed 4	%(IDF Map Only)
OAD Vent Pos 1	%(IDF Map Only)
OAD Vent Pos 2	%(IDF Map Only)
OAD Vent Pos 3	%(IDF Map Only)
OAD Vent Pos 4	%(IDF Map Only)
IAQ Override Config.	0=None (Default)
	1= Over Thresh Override
	1= Under Thresh Override
OAD Smoke Evac. Position	%
IAQ Vent Standby Demand	Disable (Default)
	Enable
IAQ Reset Source	0=None (Default)
	1= IAQ Switch
	2= IAQ PPM Sensor
	3= Third-Party Reset
IAQ Override Threshold	PPM
IAQ Override Deadband	PPM
IAQ Override Position	%
IAQ Pre-Occ Purge	Disable (Default)
	Enable
IAQ Purge OAT Low Lockout	°F
IAQ Purge OAT High Lockout	°F
IAQ Purge Low Temp Position	%
IAQ Purge High Temp Position	%
IAQ OA CFM Reset	CFM
Purge Short Duration	Min.
Purge Long Duration	Min.
OA CFM Setpoint	CFM

Cooling Configurations

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

Dehumidify Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config→Dehum Config)	
Demand Source	0=None
	1 = HSTAT
	2 = RARH
	3 = SPRH
Unoccupied Dehumidification	Enable/Disable
Vend/None Dehumidification	Enable/Disable
High Cool Dehumidification	Enable/Disable
Low Cool Dehumidification	Enable/Disable
Low Heat Dehumidification	Enable/Disable
VAV Cool Dehum.	Enable/Disable
Occupied Free Dehum	Enable
	Enable/Disable
Unoccupied Free Dehum	Enable
	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 Min. Speed	%
EXF Max. Speed	%
EXF Speed OAD Pos 1	% (OAD Mapping Only)
EXF Speed OAD Pos 2	% (OAD Mapping Only)
EXF OAD Pos 1	% (OAD Mapping Only)
EXF OAD Pos 2	% (OAD Mapping Only)
EXF OAD Position 1	% (OAD Mapping Only)
EXF OAD Position 2	% (OAD Mapping Only)
EXF OAD Position 3	% (OAD Mapping Only)
EXF OAD Position 4	% (OAD Mapping Only)
EXF OAD Position 5	% (OAD Mapping Only)
EXF OAD Position 6	% (OAD Mapping Only)
EXF Smoke Purge Speed	%
EXF Smoke Evac. Speed	%

Heater Configurations

CONFIGURATION	VALUE
(Main Menu→System Config →Heater Config)	
Heat Tempered Venting	Enable/Disable
Heat Tempered Cooling	Enable/Disable
Heat Tempering Deadband	°F
Heat Comfort Trending	Enable (Disable)
Heat Trend Time	Min.
Morning Warmup Only	Enable (Disable)
TC Start Heat Factor	Min.

Free Cooling Configurations

CONFIGURATION	VALUE
(Main Menu→ System Config→Free Cool Config)	
Free Cooling	Enable/Disable
Unoccupied Free Cooling	Enable/Disable
Changeover Select	0 = None
	1 = Diff Dry Bulb
	2 = Enthalpy
	3 = Diff Enthalpy
OADP Limit Check	Enable/Disable
OAT Dry Bulb Limit Check	Enable/Disable
OAT Dry Bulb Threshold	°F
OADP Threshold	°F
Differential Dry Bulb THreshold	°F
Differential Enthalpy Threshold	Btu/hr.

CONFIGURATION NOTES:_____

_____

_____

_____

_____

IV. CONTROL SETPOINTS

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

Indoor Fan Setpoints

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

Cooling Setpoints

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

Dehumidify Setpoints

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

Heating Setpoints

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

NOTE(S):

a. For RAT cool/heat demand source, if the occupied heating setpoint is decreased, the VAV Cool On DB must be increased to prevent cooling from starting with a low RAT.

Exhaust Fan Setpoints

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

SETPOINT NOTES:_____

_____

_____

_____

_____

START-UP CHECKLIST

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

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 instruction.

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

START-UP PERFORMED BY:

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

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

UNIT INFORMATION:

MODEL NUMBER: _____
UNIT TAG/NAME: _____
SERIAL NUMBER: _____
SOFTWARE VERSION: _____
(***Home → Login → App Version***)

INSTRUCTIONS:

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

PRE-START CHECK

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

START-UP LOG

ELECTRICAL

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

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

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

INDOOR FANS AND EXHAUST FAN CHECKS

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

INDOOR FANS AND EXHAUST FANS LOG

Use Component Test Mode to test component operation (see Appendix A on page 90, choose (Y/N) for start-up control operation).
NOTE: Motor amp readings should be taken at full load airflow (per air balance).

Indoor Fan 1_____rpm _____amps Indoor Fan 4_____rpm_____amps Exhaust Fan 1_____rpm _____amps
Indoor Fan 2 _____ rpm _____amps Indoor Fan 5_____rpm_____amps Exhaust Fan 2_____rpm_____amps
Indoor Fan 3_____rpm _____amps Indoor Fan 6_____rpm_____amps Exhaust Fan 3_____rpm_____amps

COOLING CHECKS

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

IMPORTANT: Do not proceed with cooling 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_____
- Ambient condition is above 60°F and will allow for cooling start-up. Y/N _____

COOLING LOG

Use Service Run Mode to test cooling operation (see Appendix A on page 90).

NOTE: Cooling start-up should only occur when the outdoor air temperature is above 60°F and at full load airflow (per air balance). Force economizer closed (for recirculating applications) and disable Humidi-MiZer system (if equipped) when measuring cooling performance.

COMPRESSOR OIL LEVEL

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

Circuit A Compressor 1

Circuit A Compressor 2

Circuit B Compressor 1

Circuit B Compressor 2

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

Circuit A

Compressor 1 Voltage	L1-L2_____	L1-L3_____	L2-L3_____	Amps_____	A
Compressor 2 Voltage	L1-L2_____	L1-L3_____	L2-L3_____	Amps_____	A

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

Circuit B

Compressor 1 Voltage	L1-L2_____	L1-L3_____	L2-L3_____	Amps_____	A
Compressor 2 Voltage	L1-L2_____	L1-L3_____	L2-L3_____	Amps_____	A

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

Verify factory refrigerant charge using the charging charts. See Appendix D on page 96. _____

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

Charge Adjustment ±_____lb.

ELECTRIC HEATING CHECKS

The heater has been inspected and is free from defects. Y/N_____

The supply air temperature (SAT) sensor has been installed (units with modulating heat only). Y/N_____

ELECTRIC HEATING LOG

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

Outdoor Air Temperature (OAT)	_____° F DB
Return Air Temperature (RAT)	_____° F DB (if recirculating)
Unit Supply Air A Temperature (SAT)	_____°F DB at 100% capacity
Heater Amp Draw	_____A at 100% capacity

START-UP 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.
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

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