UNITED COOLAIR

VertiCool Premium

Indoor Packaged Air Conditioner

Installation, Operation and Maintenance Manual

Effective October 2023

Vertical, Air-Cooled

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AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
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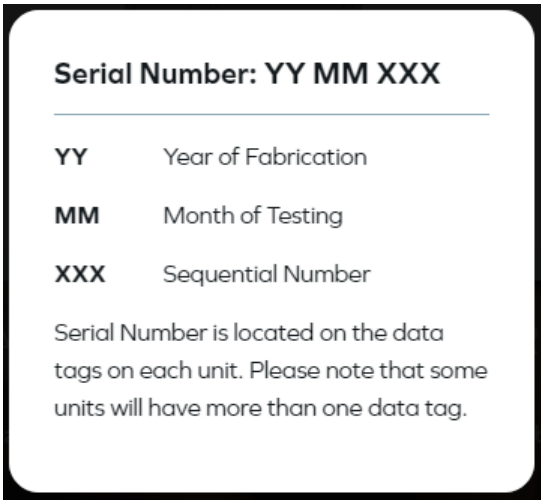
Contents

Contents 3
Electrical Diagram 4
Safety Introduction and Labeling Guide 5
Installation. 6
Unit Description 6
Inspection Of Equipment 6
Handling 6
Application Data 6
Installation Overview 6
Mounting and Setting in Place 7
Clearance 8
Unit Vibration Isolation 8
Condenser Intake and Discharge Louver Location 8
General Louver Recommendations 8
General Ductwork Recommendations 9
Length of Ductwork for Discharge Air 10
Condensate Drain Connection 10
Electrical 11
Transformer 11
Wiring 11
Blower Rotation 12
Controls 12
Pressure Switches 12
High Pressure 12
Low Pressure 12
System Options 12
Hot Water Coils 12
Subcooling Coil for Dehumidification 13
Air Side Economizer 13
Condensate Pump 13
Maintenance Procedures 14
Filters 14
Blowers 14
Blower Motors 14
Blower Speed Adjustment 14
Blower Bearing Lubrication 14
Belts 15
Refrigerant Systems 16
Evaporator and Condenser Coils 16
Finned Coil Cleaning 16
Sequence Of Operation Cooling 16
Troubleshooting Guide 17
Limited Warranty 20
Pre-Start Checklist 22
Startup Procedures 23
Product Nomenclature 27
Maintenance Log 28
Addendum ‘A’ - Dimensional Drawings 30
Addendum ‘B’ - Field Convert Evaporator Blower . . . 33
Addendum ‘C’ - Typical Electrical Diagram 35

Electrical Diagram

To retrieve the unit electrical diagram, scan the electrical diagram QR Code label affixed near the unit data tag. This will link to the www.unitedcoolair.com website. Scroll down to the Search By Serial Number box and enter the unit serial number.

The serial number is a combination of the year, month and sequential order of build date.



This will return the Model Number, Job Number and the Wiring Diagram for viewing as well as downloading.

Electrical diagrams are available for units shipped since November 2016. For older units, please contact the factory at www.unitedcoolair.com/general-inquiry/.

Safety Introduction and Labeling Guide

Your Safety is Important to Us!

Please follow and understand the rules and the instructions contained herein carefully. Failure to do so could cause a malfunction of the HVAC equipment, resulting in injury, death and/or property damage.

Throughout this manual, and in specific places on the unit itself, the signal words ELECTRICAL HAZARD, WARNING and CAUTION are used to identify levels of hazard seriousness. INFORMATION will be used in areas where there is important information but not hazard related.

ELECTRICAL HAZARD

The electrical hazard icon indicates the presence of an electrical hazard which could result in electrical shock or death.

WARNING

The warning icon indicates a potentially hazardous situation which could result in death or serious bodily injury if not avoided.

CAUTION

The caution icon indicates a potentially hazardous situation which may result in minor or moderate injury if not avoided.

INFORMATION

The information icon indicates a situation that may result in equipment or property damage. The information provided alerts the reader to relevant facts and/or conditions.

These instructions, local codes and ordinances and applicable standards that apply to piping, electrical wiring, ventilation, etc. must be thoroughly understood before proceeding with the installation.

Personal Protective Equipment (PPE) is to be worn during installation, operation and service in accordance to the Occupational Safety and Hazard Administration (OSHA). PPE must be in accordance to NFPA 70E, latest revision when working with electrical components. Thin sheet metal parts have sharp edges. To prevent injury, the use of work gloves is recommended.

This equipment must be applied and operated under the general concepts of reasonable use and installed using best building practices.

This equipment is not intended for use by persons with reduced physical, sensory or mental capabilities, lack of experience and knowledge, or children.

Additional copies of the Installation, Operation and Maintenance Manual are available at www.unitedcoolair.com. For detailed information regarding specifications, dimensional drawings, and weight information, contact your local United CoolAir manufacturer's representative.

WARNING

Improper installation, service, or maintenance can result in death, injury, or property damage. Read this installation, operation, and maintenance manual thoroughly before installing or servicing this equipment.

Installation must be done by a registered installer/contractor qualified in the installation and service of HVAC equipment.

Installation

Unit Description

The VertiCool Premium is an indoor packaged vertical air conditioner that is designed to condition recirculated or mixed air and maintain comfort cooling conditions within the space. The unit features a high efficiency variable speed compressor, VFD blowers and microprocessor controls. With the addition of the optional subcooling coil for reheat, the unit can operate over a wide range of ambient air conditions to dehumidify 100% outside air and deliver ventilation air to the space at neutral conditions. The unit can be applied as constant volume, multi-zone VAV, single-zone VAV or constant volume/DOAS.

Be sure to read this entire manual before installation and start-up.

Inspection Of Equipment

All units are leak-checked, pressure-tested, evacuated and charged with R-410A refrigerant prior to shipment.

Immediately upon receipt of the unit, inspect for visible or concealed interior / exterior damage. **Report any damage to the freight carrier, and file a damage claim.**

Inspect the unit data plate to verify the model unit that was ordered is what has been received. Check the electrical rating and characteristics of the unit and verify that they match the electrical supply available.

Some options / accessory items may have been shipped loose in one or more boxes. These may have been delivered to another location, or possibly within the unit. If shipped with the unit there will be a sticker that identifies where the shipped loose items are located inside. Confirm that all of the options / accessory items are also available and that no damage has occurred.

If the unit must be temporarily stored (i.e. job site is not ready for installation of the unit), the unit should be set on 4" x 4" (10 cm x 10 cm) pieces of timber on level ground in a protected area. The unit should be covered to be protected from the environment. **This indoor unit cannot be stored outside. Keep the length of storage time to a minimum. Be aware that the warranty start date begins at time of installation or no later than 6 months from date of shipment.**

WARNING

This unit contains HFC-(R410A), an azeotropic mixture of R-32 (Difluoromethane) and R-125 (Pentafluoroethane). DO NOT VENT HFC-(R410A) to the atmosphere. The U.S. Clean Air Act requires the recovery of any residual refrigerant. Do not use R-22 service equipment or components on R410A systems.

Handling

To facilitate handling, the unit is set on a wooden skid so that it may be picked up with a pallet jack or fork lift. Under no circumstances should the unit or the skid be "walked" on the corners. Use dolly trucks, pipe rollers or suitable means to move the unit to its proper location.

When moving by crane, use appropriate speader bars with cables/slings to protect each unit's cabinet structure.

Application Data

Voltage	208 / 230	460
Variation	187 / 253	414 / 506

Cooling (Air Entering Evaporator)	DB (min./max.)	60 / 110
	WB (min./max.)	56 / 82

Installation Overview

The VertiCool Premium unit is shipped as a packaged vertical unit. It is possible to twin two units together to operate as one system utilizing common supply and return ductwork and ducting the condenser air to common intake and discharge louvers.

WARNING

Improper installation, service, or maintenance can result in death, injury, or property damage. Read this installation, operation, and maintenance manual thoroughly before installing or servicing this equipment.

Installation must be done by a registered installer/contractor qualified in the installation and service of HVAC equipment.

Single Unit

1. Determine installation location with proper mounting provisions and clearances required.
2. Move the unit to the desired installation location.
3. Unit contains a full charge of R-410A refrigerant.
4. Install the unit so that controls and access panels are accessible to the operator and maintenance personnel. NOTE: See additional side clearance required with FRONT SUPPLY air path.
5. Install the condenser ductwork following the guidelines and industry accepted practices for the condenser air intake and discharge.
6. Install the evaporator supply ductwork following the guidelines and industry accepted practices.
7. Connect the condensate drain line.
8. Connect power wire to the unit.
9. Install Marvel Premium Wall Display and connect factory provided connecting cable from microprocessor to Wall Display.
10. Install factory provided, field-installable sensor(s) with field supplied low voltage wiring.
11. Start the unit following the Start-up Procedures.

Twinned Units (Qty. 2)

1. Locate the Twinning Kit provided by UCA. The kit includes:
   - Microprocessor (ethernet) cable
   - Gasketing for areas between filter racks
2. Move the units to the desired installation location.
3. Units contain a full charge of R-410A refrigerant.
4. Install the units, side by side, so that controls and access panels are accessible to the operator and maintenance personnel.
5. Install the condenser ductwork following the guidelines and industry accepted practices for the condenser air intake and discharge. The separate intake ducts for each unit and the separate discharge ducts for each unit can utilize a common louver, as long as the louver is sized properly for the total CFM between the two units and the guidelines and industry accepted practices are followed.
6. Install the evaporator supply ductwork following the guidelines and industry accepted practices. A common duct should be used for both units with field supplied back-draft dampers in each supply outlet.
7. Connect the evaporator condensate drain line to each unit.
8. Connect the main power wire to each individual unit. For replacement applications, it may be possible to utilize the existing disconnect to power both units separately. Contact the electrical contractor for assistance and follow all local and industry codes.
9. Install one Marvel Premium Wall Display. Both units will utilize a single common display. Connect factory provided connecting cable from the first microprocessor to the Wall Display. Connect the short factory provided ethernet cable from one unit's Marvel Premium controller to the other unit's Marvel Premium controller. Use either ethernet port when there are two ports on each controller.
10. Install factory provided, field installable sensor(s) with field supplied low voltage wiring. Each microprocessor requires its own sensors. Install all factory provided sensors.
11. If the twinned application includes a factory provided Duct Static Pressure Transducer, only one transducer is required and connected to the lead unit.
12. Start the units following the Start-up Procedures.

Mounting And Setting In Place

CAUTION

Unit should not be located in a space subject to freezing temperatures.

The VertiCool Premium has been designed to be installed as an indoor air-cooled packaged floor mounted unit.

The VertiCool Premium unit is to be mounted on a solid floor or supported on a full 100% perimeter frame with cross bracing. Attention must be given to building floor loading limitations. Floor should be level in both horizontal planes.

Before the unit is installed, a thorough study should be made of the structure and proposed installation location. Careful consideration must be given to location of wiring, condensate disposal, ductwork and accessibility for maintenance or service.

Clearance

Clearance of 42” is required on the front of the cabinet and 24” on the left and right sides of the cabinet for service and maintenance access.

Sufficient space must be provided for removal and replacement of all filters. This can be from one side only or from both sides for single units. For twinned units, filter access is required on both the right and left sides of the twinned assembly.

Unit Vibration Isolation

Install some type of unit vibration isolation under the entire base of the cabinet.

CAUTION

The unit frame has not been designed for corner point loading. The entire base must be continuously supported.

1. If spring mounts are to be used, fabricate a frame to provide support around the entire perimeter of the unit. Allow sufficient clearance for any door or panel access that is required to provide field service or maintenance on the unit. The frame will also need to be designed with suitable cross bracing. (Figure 2)
2. If waffle pad or other similar sound vibration materials are going to be used, the material needs to be placed under the entirety of the unit base.

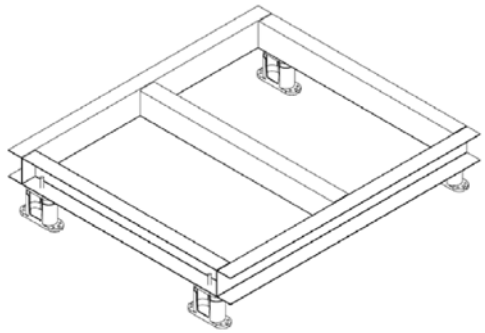


Figure 2

Condenser Intake and Discharge Louver Location

Strategically located condenser intake and discharge louvers help to prevent recirculation of discharge and contaminated air into the intake air stream. Airflow around a building and prevailing wind direction can adversely affect the potential for recirculation and should be factored into louver placement.

In some areas, local codes dictate louver location. Maximize the distance of intake louvers from any exhaust outlet and other contaminants, people, property lines, etc. Avoid placing intakes near areas of high CO2 emissions such as idling vehicles.

The bottom of the intake louver should be raised a minimum of 12” from a horizontal surface (roof, sidewalk, etc.) to prevent blockage from debris. If snow accumulations are expected to be greater than 12”, raise the bottom of the louver above the average snowfall depth.

If more than one VertiCool Premium unit will be installed in the same area, then the minimum separation of one unit adjacent to another should be 6 feet (when not twinned). A 10 foot separation distance should be maintained where two units are installed one above the other. It is best to direct discharge air up and away from pedestrian walkways.

We do not recommend multiple installations between closely situated buildings where discharge air could collect and be directed back to the intake. Recirculation will cause the unit to trip on high head pressure.

General Louver Recommendations

Carefully choosing the right condenser intake/exhaust louver(s) and determining the best location for them are critical components to a successful VertiCool Premium installation. Consult with a louver manufacturer for the proper louver size, material construction, and treatment of material (if located in a corrosive environment).

1. Select a louver design that will safely separate the discharge from the intake air stream to ensure that air recirculation will not occur.
2. The intake louver should be designed to minimize and virtually eliminate water penetration at a reasonable face area velocity (fpm).
3. In most cases, the cross-sectional “free area” of the louver must be equal to or larger than the cross-sectional areas of the intake and/or discharge unit

openings to allow for optimum velocity and reasonable pressure drop across the louver.

4. Louvers should be inspected and cleaned on a regular basis. A bird screen is required to deter animals and debris from entering the duct system.
5. All louver manufacturer instructions, local codes, and industry accepted guidelines must be followed for all installations.

It is critical that the two air streams be directed in different directions so that no recirculation of discharge air is allowed to enter the inlet air stream. In some cases, it may be necessary to provide a deflector vane or separator between the two air streams. If recirculation of the discharge air does occur, the unit will likely trip on high head pressure and continue to fail until the louver design is corrected.

INFORMATION

Discharge air from the condenser air discharge should be deflected away from the condenser air intake, to prevent recirculation (Figure 3).

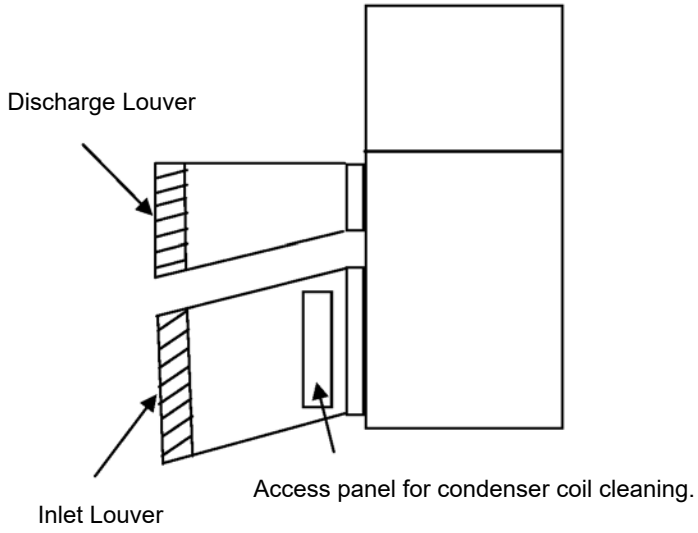


Figure 3

The intake and discharge louver can be in separate frames or combined in one frame. The combination intake/discharge louver design (Figure 4) offers an advantage over separate louvers because it requires only one wall opening which decreases installation costs. However, the blades cannot be of uniform configuration (i.e. the same blade design and angle). The discharge louver blades should be angled to direct the airflow straight out horizontally from the unit and the intake blades should be angled down at approximately 45°.

Combination Intake/Discharge

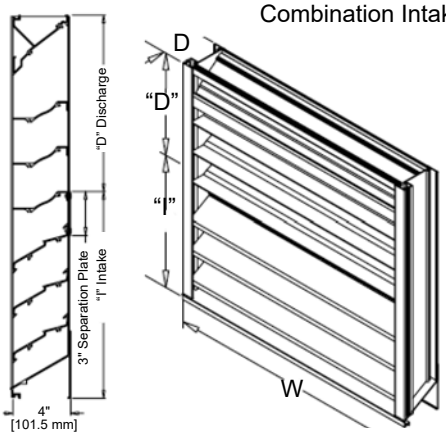


Figure 4

General Ductwork Recommendations

All ductwork must be designed in accordance with industry accepted practices. Consult ASHRAE, AMCA or SMACNA guidelines or other relevant industry standards for details. Use of turning vanes is recommended.

1. Connect all evaporator and condenser duct work to the unit using field supplied flexible duct connectors to minimize or isolate any unit vibration and help ensure that it is not transmitted into the duct work, to the structure and/or out into the space.
2. Support all duct work independently from the equipment.
3. Adequate access to both the evaporator and condenser coils as well as the louver must be available for cleaning purposes.

Ducts should be insulated in accordance with applicable industry standards or per local codes, particularly if the unit will be operated during cold weather. The condenser intake duct should include a provision to access the inlet side of the coil for periodic cleaning. It is also best to design for sufficient clearances for servicing the blower motors, expansion valves, filters, and any additional accessories installed.

The VertiCool Premium units are supplied with a motor and drive package which provides the specified CFM and ESP capability at time of order. Normal start-up procedures should be followed including air balancing the system

following the completed unit installation. Refer to the Marvel Premium IOM Addendum on VertiCool Premium for air flow adjustment recommendations.

Length of Ductwork for Discharge Air

Fan performance is impacted greatly by the placement and distancing of ductwork, as well as the location of ductwork elbows, condenser louvers, and dampers. “System Effect” is a term used by the industry to describe these potentially adverse conditions.

The effective length of ductwork at a fan’s outlet is one of the most important factors in fan and system efficiency. In most cases, the profile of the air coming out of a fan is asymmetrical, causing turbulence and a lack of static pressure regain. For symmetrical and uniform flow to be achieved, outlet ducting on the evaporator supply and condenser discharge must be long enough to allow airflow to diffuse and fully develop. This is called 100% Effective Duct Length (EDL). Figure 5 shows the air velocity profile at various distances from the centrifugal blower’s outlet.

In addition to effective duct length, the placement and direction of elbows is significant at a fan’s outlet. An elbow installed too close to the outlet will result in a significant loss of airflow. If the elbow turns in the opposite direction of the fan’s rotation, the loss will be even greater.

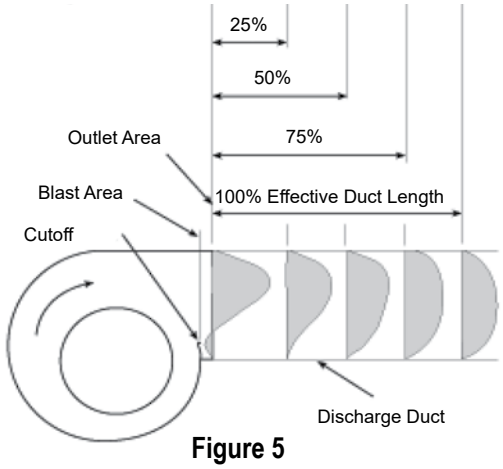


Figure 5

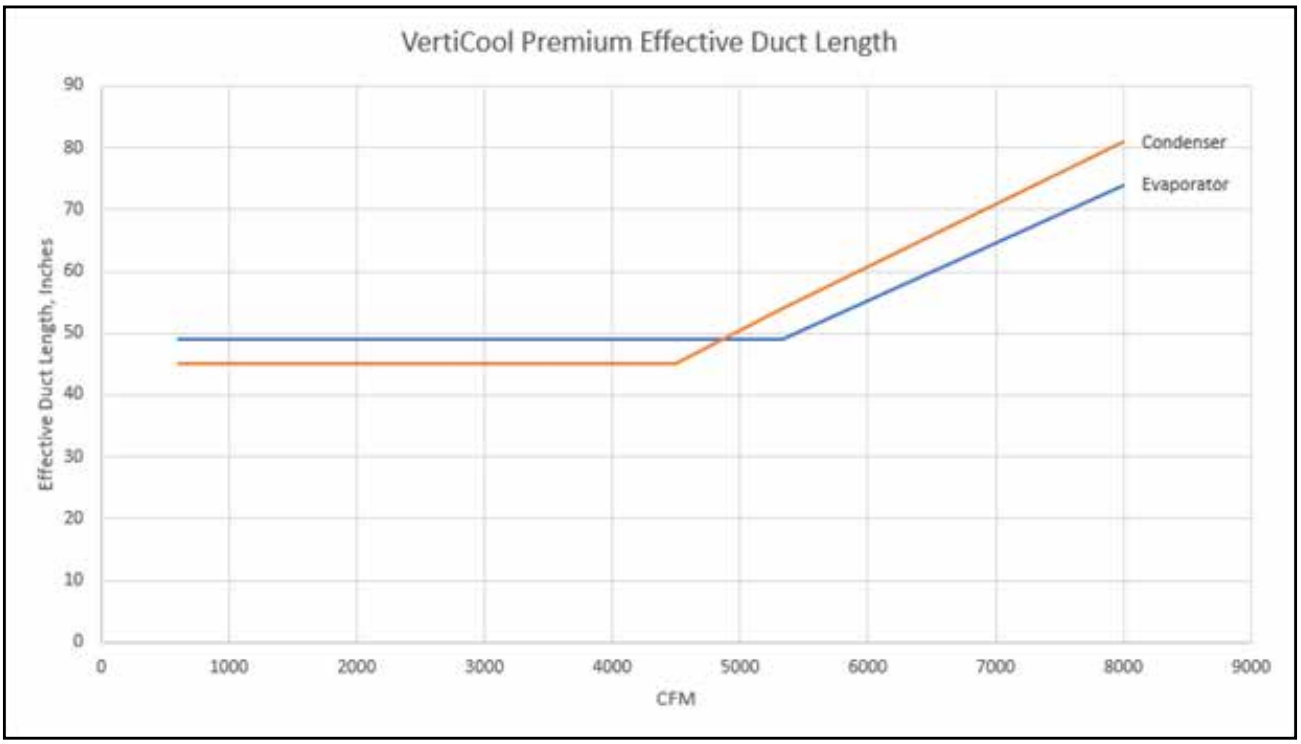
It is best to design the ductwork to provide minimum sufficient straight length of duct to reduce system effect but of sufficient length to guarantee uniform airflow distribution through the duct and/or louver for maximum velocity.

To determine the Effective Duct Length, see Chart A.

Condensate Drain Connection

The unit is shipped with an internal evaporator condensate trap factory installed and does NOT require an external trap.

Units are equipped with one 3/4” FPT drain connection.



Electrical

ELECTRICAL HAZARD

Only a qualified licensed electrician or individual that is properly trained in handling live electrical components should perform the wiring installation. Failure to follow all electrical safety precautions and industry accepted practices when exposed to live electrical components could result in death or serious injury.

INFORMATION

Use Copper Conductors Only. Failure to use copper conductors may result in equipment damage.

INFORMATION

All electrical wiring must be in accordance with NEC (National Electrical Code), NFPA (National Fire Protection Agency) most current versions as well as any applicable state or local codes.

INFORMATION

The correct phase sequence of the incoming power supply is a requirement. If the phase sequence is not correct it could cause damage or failure to electrical components. Reverse the incoming wiring to resolve the issue. Do not switch any internal unit wiring.

INFORMATION

Confirm that the incoming power supply matches the unit data tag.

INFORMATION

Unit wiring and components have been designed for the specific unit application and factory assigned controls. Do not use the unit transformers or alter the unit wiring to interface any field supplied accessories or controls.

ELECTRICAL HAZARD

Conduit is not an acceptable grounding source. A separate ground conductor must be connected from Earth Ground to the factory supplied grounding lug internal to the unit.

Transformer

Factory provided transformer for 280/230 volt units is wired from the factory for the 208 volt power supply. If the power supply will be consistently above 220 volts, please refer to the electrical diagram to re-wire to the 240 volt tap.

Wiring

1. Refer to the electrical diagram.
2. Units are completely internally wired at the factory.
3. All units are provided with terminal blocks.
4. Check the unit data tag for the required voltage, minimum circuit ampacity and maximum overcurrent protection.
5. Route the power wiring through one of the holes provided in the front corner posts. A factory provided power block is installed behind the unit's electrical control panel. Route the main power wires in accordance with all codes from the disconnect to the unit power block. A proper ground termination lug has been provided in the unit's power block connection box.
6. Power wiring must comply with all applicable national and local codes. The power supply must be suitably protected per the unit MOP value designated on the unit data tag.
7. Use copper conductors only. The unit must be earth grounded using the ground lug provided in the electrical box.

8. Select a location to install the appropriate duct mount and/or wall mount sensor(s) to avoid drafts, sun exposure or internal heat sources. Please refer to the Marvel Premium IOM and provided electrical diagram for sensor installation instructions.

Blower Rotation

Check for proper blower rotation. If they are running backwards, interchange any two of the incoming power leads.

Do not rewire any components inside the unit.

Voltage Unbalance

Voltage unbalance occurs when the RMS line voltages on a 3-phase power supply are unequal. Voltages should be balanced between phases, but if the level of the unbalance becomes excessive it will create problems for not only motors but also controls.

The maximum voltage unbalance should never exceed 2.0%.

When testing for voltage unbalance, the phase-to-phase voltages should be measured rather than the phase-to-neutral voltages since 3-phase motors are connected across phases.

Use the following formula to determine the percent of voltage unbalance.

Percent Voltage Unbalance = 100 x (Maximum Voltage Deviation from Average / Average Voltage)

Example:

Phase-Phase Voltages
A-B = 479 V
B-C = 472 V
C-A = 450 V

Average Voltage = (479 + 472 + 450) / 3 = 467

Voltage Deviation from Average
A-B = 479 – 467 = 12
B-C = 472 – 467 = 5
C-A = 467 – 450 = 17 (maximum voltage deviation)

Percent Voltage Unbalance = 100 x (17 / 467) = 3.6 %

In this example the percent of voltage unbalance exceeds the desired maximum of 2%. Additional checks should be made at the unit disconnect to confirm the values. Use accepted industry practices to check or test the quality of the power supply. Often, it is just a matter of repairing malfunctioning equipment or redistributing loads to improve the unbalance.

If no cause can be located and resolved for the unit power supply, the building manager or owner should be notified of the issue to get the proper power supplied to the unit.

It should be noted that the inclusion of a variable frequency drive (VFD) with an unbalanced power supply may result in nuisance tripping and 3rd harmonic currents.

Controls – Marvel Premium

Refer to the Marvel Premium IOM for specific instructions on installation and operation. https://www.unitedcoolair.com/wp-content/uploads/securepdfs/Marvel-Premium_IOM.pdf

Pressure Switches

High Pressure

This switch shuts the unit down in the event of excessive high pressure in the discharge line. A manual reset is required at the high pressure switch. The switch trips at 625 psig ± 15%. Refer to the Marvel Premium IOM for full reset instructions.

Low Pressure

This switch shuts the unit down in the event of low pressure in the suction line. This switch is auto-reset but requires a manual reset on the Marvel Premium.

System Options

Hot Water Coil

A hot water coil, when used as heat or reheat, will be located inside the unit and installed at the factory.

Install the factory provided, modulating hot water valve external to the unit. Install the low voltage control wiring (field provided) from the hot water valve back to the terminal blocks located in the unit control panel. Follow all applicable national and local electrical codes.

Subcooling Coil for Dehumidification

A subcooling coil is available to provide modulating reheat capability for all applications including high percentage outdoor air or 100% outdoor air applications. The subcooling coil is located downstream of the evaporator coil and includes a modulating reheat valve. The modulating valve varies the liquid refrigerant flow through the coil to maintain the neutral supply air temperature set point during dehumidification mode.

Air Side Economizer

The factory provides the Air Side Economizer controls and sensors. The enthalpy sensors for the return air and the outside air are shipped loose for field mounting.

The mixing box, dampers and actuators are field supplied. The damper actuators are to be spring return type.

Field supplied low voltage wiring must be installed between the two sensors and the terminal blocks located in the unit control panel. Make sure to use the correct type and wire gauge size. Refer to the Marvel Premium IOM and provided electrical diagram for sensor installation instructions.

Condensate Pump

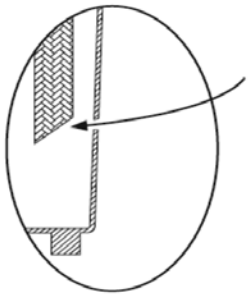
Mount the condensate pump external to the unit. Follow pump manufacturer instructions.

A 115 volt power supply must be field supplied for the pump.

INFORMATION

The unit is shipped with an internal evaporator condensate trap factory installed and does NOT require an external trap.

Refer to Figure 8 for the termination of the condensate tubing inside the pump.



Cut tubing at an angle so that bottom of reservoir doesn't close it. Be sure tubing does not interfere with float.

Figure 8

Refer to Figure 9 for the inverted "U" trap that is to be installed for the condensate line.

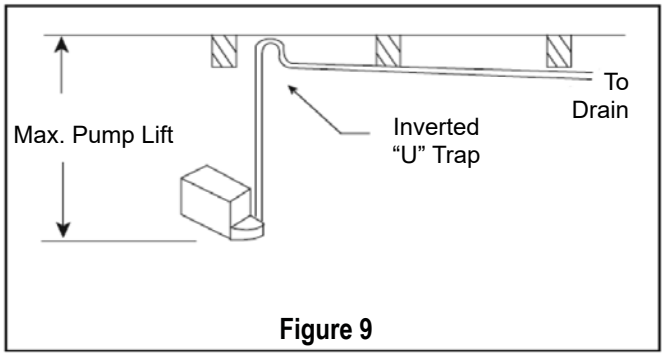


Figure 9

Route the condensate disposal tubing to a suitable location.

Continued on next page

Maintenance Procedures

ELECTRICAL HAZARD

Turn OFF power and lockout service before conducting any maintenance. Keep hands, clothing and tools clear of electrical terminals.

WARNING

Make sure to keep hands and clothing clear of any moving belts, blowers and motors while performing any maintenance. Failure to do so could result in death or serious bodily injury.

CAUTION

Any maintenance should be conducted by qualified HVAC service personnel only. Potentially hazardous situations which may result in personal injury, equipment or property damage.

Filters

Do NOT run unit without filters.

Throwaway filters are supplied which are pleated extended surface type. Filters should be checked monthly for dirt accumulation and replaced when necessary.

INFORMATION

Unit must be shut off at the disconnect switch before the filters are serviced. Be sure to check that the air flow direction arrows on the filters point in the correct direction of air flow.

Blowers

Disconnect power and lockout the service before doing any service or maintenance.

Air-cooled units are provided with belt drive blower packages for both the evaporator and condensing sections. Check that the blower wheel is tight on the shaft and does not contact the housing. Bearings are permanently sealed, but should be checked periodically for signs of wear. Check for restrictions or foreign material in the air circuit. The drive may be adjusted for different CFMs and/or static pressures. If such an adjustment is made, check that the motor current draw does not exceed the motor nameplate current by more than 10%.

Blower Motors

All blower motors are equipped with overcurrent protection by the VFD. The VFDs are protected by a circuit breaker.

WARNING

Open disconnects to unit before doing any service or maintenance. A motor that is off on thermal overload can start any time when the automatic thermal overload resets.

Blower Speed Adjustment

Blower speed may be changed by adjusting the blower speed setpoint in the Marvel Premium. Consult factory and/or sales representative for assistance.

Typically, the motor and drive packages have been sized and designed for the specific CFM and external static pressure (ESP) of the application. Before making any changes confirm what the performance was designed for and what the actual performance is.

INFORMATION

Reduction of airflow through excessive external air friction losses, lowered blower speed operation with dirty filters, or obstructed air flow may result in excessive condensation at air outlets, short cycling, or total unit shut- down due to evaporator coil icing.

Blower Bearing Lubrication

INFORMATION

Unit must be shut off at the disconnect switch before the blowers are serviced.

VertiCool Premium units have pillow block bearings. These bearings will need to be lubricated based on the use of the equipment.

Duty	Grease Interval
Low Usage	12 Months
Periodic	6 Months
Continuous	1 – 2 Months

Use a high quality lithium grease for blower pillow block bearings. Wipe off the “Zerk” fitting with a rag before adding grease so as not to introduce dirt into the bearing.

Slowly rotate the shaft while pumping it in. Pump the grease in slowly so as not to blow out the bearing seal. When the grease starts to “seep” out of the bearing you have put in enough new lubricant.

Over lubricating can cause a bearing to fail from overheating or it can blow out the seal.

Both excessive or inadequate grease may cause premature failure. Provided there is some grease in the bearings for lubrication, under lubrication is better than over lubrication as grease can easily be added but not removed. Always allow a slight bead around the circumference of the seals to protect the bearing from foreign matter and helps flush out the bearing as well.

Wipe off the “Zerk” fitting with a rag after adding grease.

Belts

Excessive belt tension is the number one cause for blower bearing failure. Over-tightening can flat-spot the bearings. Proper belt tension and pulley alignment are essential for trouble free operation.

Deflection is the amount the belt gives when force is applied, usually by finger, to the belt at the approximate center point to the belt span.

Insufficient deflection indicates that the belt tension is entirely too tight, and if not loosened somewhat, noise due to excessive vibration, premature bearing failure, shortened belt life, and a reduction in supply air blower performance may result. Tight belts may also overload the motor and cause the efficiency to drop considerably or even premature motor failure as well.

Excessive deflection is an indication that the belt is not tight enough. If not corrected, slippage may occur causing loss of blower speed and belt failure. The belts will glaze then crack or even break due to increased temperatures caused by slippage. Belts may slip during start-up, but slipping should stop as soon as the fan reaches full speed.

If the midpoint (midway between the blower and motor shaft) of the belt is pressed inward, there should be about 1/2” to a 1” of deflection when the belt is properly tensioned.

Refer to Figure 10 – Belt Tensioning below.

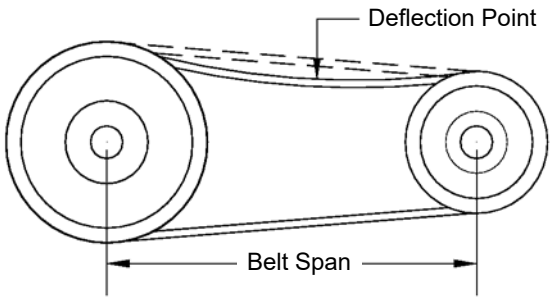


Figure 10 – Belt Tensioning

For proper tensioning, use the following equation:

$$\text{Deflection} = \frac{\text{Belt Span}}{64}$$

Belt span is in inches from pulley center to pulley center (see Figure 10).

Belt tension is adjusted by using the adjusting bolt on the end of the motor mounting frame.

Check the alignment of the sheaves to make sure that the sheave faces are in the same plane. Check this by placing a straight edge across the face of the sheaves. Any gap between the edge and sheave faces indicates misalignment.

Note: This alignment method is only valid when the width of the surfaces between the belt edges is the same for both sheaves. Both shafts should be at right angles to the belt. Check the setscrew and/or bushing bolt tightness.

Belts tend to stretch somewhat after installation. Recheck belt tension after several hours of operation.

Refrigerant Systems

All refrigerant circuits contain a liquid line sight glass. If bubbles appear in the sight glass, the system is either undercharged with refrigerant or there may be a restriction in the liquid line upstream of the sight glass. However, bubbles will appear every now and then upon compressor start up, but normally clear to pure liquid after a few minutes of operation.

The sight glass contains a moisture indicator which changes color when moisture is present in the refrigerant circuit. This indicator is the circular dot in the center of the sight glass. If the color of this indicator is blue, the refrigerant is okay. When the indicator is pink or purple, an abnormal condition exists, servicing is required.

INFORMATION

After installation and during equipment start-up, the sight glass may appear pink or purple. This occurs during prolonged periods of non-operation and should turn blue after several hours (up to 24) of operation.

Evaporator And Condenser Coils

The finned coils in a unit should be checked at least every six (6) months or more frequently based on experience of the specific application.

Evaporator finned coils can become “fouled” due to a build up of contaminants in the air path that are not caught or captured in the air filters. Over time this build up on the fin surface can reduce heat transfer and increase resistance to air flow. The end result might be higher operating costs or occupant discomfort

A dirty condenser coil will cause high condensing pressures, resulting in higher power consumption and possibly system shut-down by high pressure safety control. A dirty evaporator coil will reduce unit capacity and eventually will cause system shut-down by the low pressure safety control.

Finned Coil Cleaning

Before cleaning any finned coils, remove the filters. Remove any large debris or visible dirt accumulation.

WARNING

Make sure to keep hands and clothing clear of any moving belts, blowers and motors while performing any maintenance. Failure to do so could result in death or serious bodily injury.

CAUTION

Clean coils only with cold water and a suitable detergent or a commercially available coil cleaner. DO NOT use hot water or steam to clean a coil containing refrigerant as this may cause a high pressure situation that could damage the coil and associated safety devices or refrigerant components.

CAUTION

Confirm that any coil cleaning agents, detergents or solutions are suitable for use on a copper tube/aluminum fin coil. If the cleaning agent is too acidic or alkaline, damage to the coil fins may result.

Rinse all coils thoroughly after any coil cleaning.

Use a suitable fin comb after the coil cleaning to straighten any bent fins.

Sequence Of Operation

Refer to the Marvel Premium IOM for specific instructions on installation, operation and sequence of operation https://www.unitedcoolair.com/wp-content/uploads/securepdfs/Marvel-Premium_IOM.pdf

The standard sequence of operation documents for constant volume, multi-zone VAV, single-zone VAV and 100% outside air (DOAS) applications are available at https://www.unitedcoolair.com/literature/control-sequences-soo/

Troubleshooting Guide

ELECTRICAL HAZARD

Turn OFF power to unit before conducting any troubleshooting, unless the tests you are performing require system operation. Keep hands, clothing and tools clear of electrical terminals.

WARNING

Make sure to keep hands and clothing clear of any moving belts, blowers and motors while performing any tests. Failure to do so could result in death or serious bodily injury.

CAUTION

Any troubleshooting or test procedures are to be conducted by qualified HVAC service personnel or electricians only. Potentially hazardous situations which may result in personal injury, equipment or property damage.

INFORMATION

For operating and troubleshooting instructions for microprocessor controller, refer to specific controller instructions that accompany the unit.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Control is erratic	**1.** Control wiring not installed correctly **2.** Loose electrical connections **3.** Broken wiring	**1.** Check wiring connections against schematic. **2.** Check all connections for tightness. **3.** Check wire continuity.
Blower fails to start	**1.** Controller not set properly **2.** Motor failure **3.** Circuit breaker tripped **4.** Controller alarm **5.** VFD not functioning properly	**1.** Turn on and set controller for desired operation **2.** Replace motor **3.** Check cause and resolve then reset circuit breaker **4.** Resolve alarm condition **5.** Confirm VFD programming and operation
Compressor fails to start	**1.** Controller not set properly **2.** Loss of refrigerant charge or low pressure **3.** High pressure alarm **4.** Low line voltage **5.** Controller alarm **6.** Setpoint issue **7.** Compressor disables	**1.** Turn on and set controller for desired operation **2.** Repair leak, evacuate and recharge refrigerant system **3.** Confirm proper fluid flow quantity through condenser. Confirm acceptable fluid temperatures entering the condenser **4.** Resolve incoming voltage issue **5.** Resolve alarm condition. **[Note: Compressor internal overload may require an extended period of time (1 hour or more) to reset]** **6.** Review setpoints and alter. **7.** Check Compressor enabled.
Compressor short cycles	**1.** Reduced air flow **2.** Loss of refrigerant charge **3.** Short cycling of conditioned air **4.** Drain pan switch open **5.** Check controller alarms	**1.** Check filters and coil for any blockages. Replace filters if dirty **2.** Repair leak, evacuate and recharge refrigerant system **3.** Make sure that supply air is not short cycling back into return air stream **4.** Confirm that unit condensate is draining properly. **5.** Refer to Alarm in Marvel Premium IOM

NOTE: Refer to Marvel Premium IOM for resetting alarms.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Evaporator coil ices	**1.** Lack of air flow **2.** Low return air temperature **3.** Loss of refrigerant charge **4.** VFD not functioning properly	**1.** Check filters and coil for any blockages. Verify that blower is rotating in the proper direction. Replace filters. **2.** Make sure that the supply air is not short cycling back into return air stream. **3.** Repair leak, evacuate and recharge refrigerant system. **4.** Check VFD settings.
Noisy compressor	**1.** Expansion valve stuck open **2.** Worn or scarred compressor bearings **3.** Liquid slugging **4.** Broken compressor valve (compressor knocking) **5.** Excessive head pressure	**1.** Ensure thermal expansion valve bulb is tight on suction line **2.** Confirm thermal expansion valve bulb is located properly on suction line **3.** Check superheat **4.** Replace compressor **5.** Reduce head pressure **6.** System overcharged. Reclaim excess refrigerant from the high side of the system.
System short of capacity	**1.** Flash gas in liquid line **2.** Expansion valve stuck open or possibly obstructed **3.** Clogged filter drier **4.** Iced or clogged evaporator coil **5.** Condenser needs cleaned	**1.** Check for refrigerant leaks. Repair leak, evacuate and recharge refrigerant system. Check sub-cooling. **2.** Ensure thermal expansion valve bulb is tight on suction line and correctly located. Replace thermal expansion valve **3.** Replace filter drier **4.** Check filters and coil for any blockages. Replace filters if dirty. Verify that blower is rotating in the proper direction **5.** Clean condenser
Head pressure too high	**1.** Possible non-condensible in system **2.** Overcharge of refrigerant **3.** Condenser air intake, duct or coil blocked. **4.** Condenser blower not operating or running backwards.	**1.** Recover and recharge refrigerant system. Install new filter drier. **2.** Recover excess refrigerant from high side of system. Reset high pressure safety switch if tripped **3.** Clean away debris from condenser air circuit. **4.** Check phase of incoming power to unit (3 ph units only). Reverse any two incoming power supply wires (except ground).
Head pressure too low	**1.** Excessive air flow across condenser coil.	**1.** Confirm proper air flow amount. Adjust blower drive package as necessary.

NOTE: Refer to Marvel Premium IOM for resetting alarms.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Suction pressure too low	**1.** Flash gas in liquid line **2.** Obstructed expansion valve **3.** Loss of fluid in expansion valve bulb **4.** Clogged filter drier **5.** Lack of air flow **6.** Entering WB too low **7.** Evaporator blower running backwards	**1.** Check for refrigerant leak. Repair leak, evacuate and recharge refrigerant system. **2.** Replace thermal expansion valve **3.** Replace thermal expansion valve **4.** Replace filter drier **5.** Check filters and coil for any blockage. Verify that blower is rotating in the proper direction **6.** Confirm that entering return air conditions fall within acceptable range. Reset low pressure safety switch if necessary **7.** Check phase of incoming power to unit (3 ph units only). Reverse any two incoming power supply wires (except ground).
No cooling	**1.** Controller setpoint not set properly **2.** Control wiring issue **3.** Controls in an alarm condition **4.** High or low pressure switch open **5.** Compressor thermal overload open **6.** Compressor VFD alarm	**1.** Turn on and set controller for desired operation **2.** Check wiring connections against schematic. Check all connections for tightness. Check wire continuity. **3.** Refer to controller troubleshooting **4.** Reset high or low pressure switch, re-enable compressor **5.** Compressor internal overload may require an extended period of time (1 hour or more) to reset **6.** Check and reset VFD
Condensate carry over	**1.** Air flow too high	**1.** Reduce air flow
Condensate pump does not run	**1.** Check to see that power to the pump is present **2.** Confirm that float is moves freely **3.** Confirm that dirt or algae is not interfering with float action	**1.** Locate and repair electrical issue. **2.** Clean float and sump **3.** Clean float and sump
Condensate pump runs with no discharge	**1.** Tubing blocked or kinked **2.** Check valve blocked **3.** Impeller blocked **4.** Tubing elevation or run exceeds head capability.	**1.** Inspect, clean or straighten as necessary. **2.** Clean check valve **3.** Remove debris from pump impeller **4.** Verify tubing run is within pump head limitations.

NOTE: Refer to Marvel Premium IOM for resetting alarms.

Limited Warranty

The following is the Limited Warranty provided by United CoolAir (a trade name of United CoolAir LLC, herein “Seller”) to any customer (herein “Buyer”) for any goods and services (a “deliverable”):

1. Limited Warranty. Seller provides such warranty as set forth in any instruction manual provided with the deliverable, or if there is no such warranty or instruction manual, Seller warrants to Buyer that such deliverable will be free from defects in material and workmanship (in either case the "Limited Warranty"). Except as expressly set forth in this section or specifically authorized by an executive officer of Seller in writing, the Limited Warranty is not transferable or assignable and any such transfer or assignment is void. If Buyer is authorized by Seller to be a reseller of deliverables that are goods or an installing contractor, the Limited Warranty may be passed through to Buyer's customer, but Buyer shall not alter the Limited Warranty in any way. Notwithstanding the foregoing, if Buyer re-brands Seller's deliverable or Seller, at Buyer's request, brands the deliverable with a mark not owned by Seller, the Limited Warranty may not be transferred or assigned, and all claims under the Limited Warranty shall be made directly by Buyer to Seller and not by any customer of Buyer. The Limited Warranty applies only to products installed in the continental United States, Alaska, Hawaii, Puerto Rico and Canada.

EXCLUSIONS

The Limited Warranty does not cover service trips, service calls, costs of removing and reinstalling components and other labor charges or the cost of shipment of replacement parts.

The Limited Warranty excludes damages due to:

(i) failure to install, operate or maintain deliverables as directed in any instruction manual provided or under applicable law or regulation,

(ii) misuse, abuse, neglect or modification of a deliverable or any controls, in any way,

(iii) improper service, use of replacement parts or accessories that are not specified by Seller,

(iv) improper installation, or any relocation of a deliverable after initial installation,

(v) incorrect supply, accident, fire, flood, acts of God or another casualty,

(vi) use of a deliverable other than its intended purpose and normal usage,

(vii) use of a deliverable in a corrosive atmosphere or any atmosphere containing contaminants,

(viii) shipment of a deliverable (all claims must be filed with carrier),

(ix) use of a deliverable in the vicinity of combustible or explosive materials,

(x) any defect in a deliverable arising from a drawing, design, or specification supplied by or on behalf of Buyer,

(xi) failure of parts, components, services, accessories or hook-ups not supplied or approved by Seller,

(xii) incompatibility with items not supplied by Seller,

(xiii) a deliverable not properly installed by a qualified (licensed Commercial HVAC Contractor) contractor experienced in installing the deliverable,

(xiv) inadequacy or interruption of electrical service, improper voltage conditions, blown fuses, or other like circumstances

(xv) failure to properly and routinely clean air and/or water side of condenser and evaporator,

(xvi) improper sizing, application or lack of load in space,

(xvii) deliverable being allowed to exceed its proper temperature limits due to improper operation or maintenance of inadequate air over it,

(xviii) (I) freezing of the condenser water or condensate (II) use of corrosive water (III) fouling or restriction of the air/water circuit by foreign material or like causes,

(xix) improper or rapid cycling of the compressor.

This warranty does not apply to the installation, plumbing, wiring, ducting not integral to the product.

Limited Warranty

Wear items or consumables such as belts, filters, coolant, refrigerant, etc. are not included under the Limited Warranty. The Limited Warranty does not cover the equipment and materials not manufactured by Seller; the warranty for those items shall belimited to only such warranty as that furnished by the manufacturer thereof as may properly be assigned to Buyer.

No warranty coverage is applicable if Buyer cannot prove original purchase date and required annual maintenance history, provide factory start up report, air and/or water balance, the data plate and/or serial number on any deliverable is removed, defaced, modified, or altered in any way, or Seller is not permitted to inspect the damaged deliverable.

No person other than an executive officer of Seller has authority to change or extend the terms of the Limited Warranty, and Buyer confirms that no other warranty terms have been extended by Seller or are applicable to the deliverables. Change or extensions to the terms of the Limited Warranty are binding only if confirmed in writing by Seller's duly authorized executive officer.

2. Limitation on Warranties/Damages. Any claim under the Limited Warranty set forth in section 1 must be made within the following time periods or such claim is waived:

(a) for compressors, the claim must be made within sixty (60) months from the date of purchase by Buyer;

(b) for replacement parts, the claim must be made within the latter of twelve (12) months from the date of shipment of deliverable by Seller or any Limited Warranty period remaining on the deliverable with which the replacement part is used or is intended to be used;

(c) for all other deliverables, the claim must be made within twelve (12) months from the date of start-up or eighteen (18) months from the date of shipment of deliverable by Seller, whichever occurs first.

Except as set forth in these terms, Seller makes no representation or warranty of any type, express or implied, including any warranty of merchantability, warranty of fitness for a particular purpose or warranty of non-infringement or warranty arising from any course of dealing, course of performance or usage of trade.

Seller will not under any circumstances, be liable for any special, indirect, punitive, or consequential damages (even if Seller has been notified of the possibility of such damages) resulting from or related to a product including, without limitation, any loss of profits, or loss of opportunity. Some jurisdictions do not allow limitations on warranties or damages, so this limitation or exclusion may not apply to Buyer.

3. Remedy. Seller's sole obligation and Buyer's exclusive remedy with respect to any deliverable, whether arising in contract, tort (including negligence), strict liability, breach of warranty or otherwise, is limited to Seller, at its discretion, replacing or repairing the defective deliverable, providing replacement parts or issuing Buyer a credit equal to the price paid to Seller for such defective deliverable, and in no event will Seller's liability exceed the amounts actually received by Seller for any deliverable.

This exclusive remedy shall not be deemed to have failed its essential purpose so long as Seller is willing and able to repair or replace a defective deliverable or parts thereof or, also at Seller's option, to refund the price received by Seller for the defective deliverable, within a reasonable time after Buyer demonstrates that a defect exists in accordance with the terms and limitations of the Limited Warranty.

VertiCool Premium

Pre Startup Checklist

Installing contractor should verify the following items.		
1. Is there any visible shipping damage?	☐ Yes	☐ No
2. Is the unit level?	☐ Yes	☐ No
3. Is proper vibration isolation provided in accordance with IOM?	☐ Yes	☐ No
4. Are the unit clearances adequate for service and operation?	☐ Yes	☐ No
5. Do all access doors (including filter access) open freely and are the handles operational?	☐ Yes	☐ No
6. Have all shipping braces been removed?	☐ Yes	☐ No
7. Have all electrical connections been tested for tightness?	☐ Yes	☐ No
8. Does the electrical service correspond to the unit nameplate?	☐ Yes	☐ No
9. On 208/230V units, has transformer tap been checked?	☐ Yes	☐ No
10. Has overcurrent protection been installed to match the unit nameplate requirement?	☐ Yes	☐ No
11. Do all fans rotate freely?	☐ Yes	☐ No
12. Does the field water piping to the optional hot water coil appear to be correct per design parameters?	☐ Yes	☐ No
13. Are air filters installed with proper orientation?	☐ Yes	☐ No
14. Has the condensate drain been connected?	☐ Yes	☐ No
15. Confirm ship loose items required for proper installation.	☐ Yes	☐ No

Start-Up Procedures (R-410A Systems)

Some of the numbered items below are referenced on the Start Up Form that needs to be completed..

1. Start up must be performed by a qualified HVAC Technician.
2. Make certain that power is disconnected at the main power circuit breaker or service disconnect before starting any of this procedure.
3. Check all electrical screw terminals and wiring lugs for tightness internal to the equipment. Components may have loosened due to vibration during transit or handling. Verify that the main power block lug connections made in the field are tight and secure.
4. Confirm that the voltage rating of the equipment data tag coincides with the power that will be delivered to the unit.
5. Verify that the circuit protection for the unit satisfies Local and National Codes according to the unit data tag Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protection (MOP).
6. Leak check the refrigerant system. While the unit was leak checked at the factory, leaks can develop during transit and / or handling.
7. Confirm that the unit condensate has been taken to a suitable point for disposal.
8. Verify that the filters are in place, clean and usable.
9. Apply power to the unit. Switch the circuit breaker or field supplied electrical service disconnect switch to the on position.

Note: If the outdoor air temperature is less than 70°F, apply power to the unit for 24 hours prior to starting the compressors.

10. Set the Unit's wall controller to the OFF position.
11. Record the voltage at the unit terminals.
12. Set the unit to the ON position as per the operating instructions in the Marvel Premium IOM.
13. Verify that the evaporator blower is rotating in the correct direction.

Note: If the evaporator blower motor runs backwards, shut off all power to the unit. Switch any two of the incoming power leads at the unit terminal block. The unit has been wired and phased properly at the factory. DO NOT change any factory wiring to correct for a phase problem.

Note: Before conducting the following start up sections connect a suitable refrigerant gauge set to the unit Schrader connections. Install temperature sensors to record the appropriate refrigerant line temperatures. Service gauge access ports have been provided in the cabinet corner posts so that the gauge line hoses can be run outside the cabinet with the access panels installed.

14. Set the supply cooling setpoint to 55°F

Note: There may be a delay for the compressor operation.

15. Verify that the condenser blower rotation is correct.
16. While waiting for the compressor to stabilize, record the External Static Pressure (ESP) for both the evaporator and condenser blowers.

Note: Make sure all the unit access panels are in place when taking these readings.

17. Record the return air temperature to the evaporator coil along with the supply air temperature. (The unit should have operated for at least 15 minutes before taking these readings).
18. Record the outdoor ambient entering the condenser coil along with the discharge air temperature of the condensing section.
19. Record the suction line pressure and the suction line temperature for each circuit near the compressor.
20. Using an appropriate pressure / temperature chart for R-410A refrigerant, look up and record the saturation temperature corresponding to the suction pressure.
21. Calculate and record the suction superheat for each circuit by taking the difference between the suction line temperature and the saturation temperature corresponding to the suction pressure.
22. Record the liquid line pressure and the liquid line temperature for each circuit near the condenser coil outlet.
23. Using an appropriate pressure / temperature chart for R-410A refrigerant, look up and record the saturation temperature corresponding to the liquid line pressure.
24. Calculate and record the liquid sub-cooling for each circuit by taking the difference between the liquid line temperature and the saturation temperature corresponding to the liquid line pressure.

Start-Up Procedures (R-410A Systems) continued:

25. Record the Amps for the evaporator blower motor, each compressor and the condenser blower motor.

- **a.** Make sure the pressures on each compressor circuit are within the proper limits:
  - **i.** 290 – 550 psig Discharge
  - **ii.** 100 – 140 psig Suction
- **b.** Compressor Amperage is below the RLA Amps listed on the unit data tag.
  - **i.** The maximum compressor operating current (amps) at start up depends a lot on the system loading. The lower the load, the less the current. The higher the load, the higher the current.
- **c.** The blower motor MOC values should never be exceeded as listed on the data tag.
  - **i.** If the MOC value is exceeded, shut the unit off and check the duct design, or make sure there is no blockage / obstruction in the duct or filters. Reduce the Supply Blower speed setpoint.

26. Document any additional information deemed appropriate for the specific application or installation.

27. Shut the system down and remove all test instruments and test sensors.

28. Leave the system in the operating mode as appropriate for the customer and the application.

Optional Heating Start Up with Optional Hot Water Coil:

29. Make sure the hot water boiler is on.

30. Set the supply heating set point to 90°F. Set the return heat set point to 80°F.

31. The heating valve should be activated.

32. After several minutes of operation, record the return air temperature and the supply air temperature.

Start-Up Procedures

Complete the form by listing your name, company name, phone and fax number. Sign and date the form and provide a copy as required to all interested parties.

Job Name: _____ **Date:**_____

Address: _____

City:_____ **State:** _____**ZIP**_____

Country: _____

Unit Model No.: _____

Unit Serial No.:_____

Screw Lugs & Terminals OK?.....Yes _____ No _____
Describe any loose connections and action(s) taken:

_____

_____

Power Supply Correct Voltage and Phase? .....Yes _____ No _____
If not in agreement with unit data tag contact the Distributor.

_____

Is the Circuit Protection the correct type and does it meet
the unit data tag requirements?.....Yes _____ No _____
If not correct describe what action(s) have been taken to correct:

_____

_____

Unit controller wiring verified? .....Yes _____ No _____

_____

Unit leak checked OK?.....Yes _____ No _____
If leak was located describe where and how repaired:

_____

_____

Condensate trapped & run to a suitable disposal point?.....Yes _____ No _____

_____

Filters are in place, clean & usable?.....Yes _____ No _____

_____

Three Phase
Measured Voltage.....L1-L2 _____ L2-L3_____ L1-L3 _____

_____

Evaporator Blower Motor Rotation OK? .....Yes _____ No _____
If rotation is not correct describe action(s) taken to correct:

_____

_____

Condenser Blower Motor Rotation OK? .....Yes _____ No _____
If rotation is not correct describe action(s) taken to correct:

_____

_____

Continued on Next Page

Evaporator External Static Pressure .....(ESP): _____ In. WG _____

Condenser External Static Pressure .....(ESP): _____ In. WG _____

Cooling Mode

System Air Temperatures .....Return: °F _____ Supply: °F_____

Condenser Coil.....Outdoor Ambient: °F _____ Condenser Discharge: °F _____

	Compressor 1	Compressor 2
Suction Pressure: Suction Line Temperature:	psi _____ °F_____	psi _____ °F_____
Saturation Temperature:	°F_____	°F_____
Suction Superheat:	° _____	° _____
Liquid Line Pressure:	psi _____	psi _____
Saturation Temperature: Liquid Line Temperature:	°F_____ °F_____	°F_____ °F_____
Sub-cooling:	° _____	° _____

Electrical

Evap. Motor Amps ..... L1 _____ L2 _____ L3 _____

Compressor 1 Amps..... L1 _____ L2 _____ L3 _____

Cond. Motor Amps..... L1 _____ L2 _____ L3 _____

Heating Mode (Optional)

System Air Temperatures .....Return: °F _____ Supply: °F_____

Entering Water Temperature:.....Return: °F _____Fluid Type:_____

Leaving Water Temperature: .....Return: °F _____

Misc. _____

Technician (print name): _____

Company: _____

Phone:_____ Fax:_____

Signature: _____ Date:_____

VertiCool Premium Basic Model Designation

EXAMPLE:	VP	G	3	T	9	3	3	M	–	A	2	N	S	N	R
	1,2	3	4	5	6	7	8	9		11	12	13	14	15	16

Digit	Description	Feature
1, 2	**Family**	VP = VertiCool Premium
3	**Common to All**	G
4	**Voltage**	3 = 208/230-3-60
		4 = 460-3-60
5	**Air Path**	T = Top Supply / Rear Return
		F = Front Supply / Rear Return
6	**Compressor VFD Setting**	Any #: 1 - 9
7	**Evap Motor VFD Setting**	Any #: 1 - 9
8	**Cond Motor VFD Setting**	Any #: 1 - 9
9	**Sequence of Operation**	C = Constant Volume
		D = Constant Volume, Optional ASE Controls
		M = Multi-Zone VAV
		N = Multi-Zone VAV, Optional ASE Controls
		S = Single-Zone VAV
		T = Single-Zone VAV, Optional ASE Controls
		Z = 100% Outside Air, Constant Volume
10	**Options Section**	-
11	**Internal Coils**	A = Evap & Cond, Both Uncoated
		B = Evap & Cond, Both E-Coated
		C = Evap & Cond & HWC, All Uncoated
		D = Evap & Cond & HWC, All E-Coated
		E = Evap & Cond & SCC, All Uncoated
		F = Evap & Cond & SCC, All E-Coated
12	**Filters**	2 = 2” MERV 8/Evap
		4 = 2” MERV 8/Evap, 2” MERV 8/Cond (w/filter rack)
		6 = 2” MERV 8 + 4” MERV 13/Evap
		8 = 2” MERV 8 + 4” MERV 13/Evap, 2” MERV 8/Cond (w/ filter rack)
13	**Cabinet Finish**	N = Non-Painted, Galvanized
		P = Painted, Wet-Paint
14	**Twinned Unit**	S = Single Unit
		T = Twinned Unit
15	**Sensor for Field Supplied**	N = None
	Duct Heater (Electric or Gas),	M = Duct Mount Temp Sensor, Modulating 0-10 vdc Control Signal
	Used for Heating Only	T = Duct Mount Temp Sensor, Two Stage Control Signal
16	**For Future Expansion**	R = Reserved
17	**Place Holder**	- = Only included if there is a “Special”
18	**Special**	X = Special Modification that does not affect electrical ratings or other items that may affect safety.

Maintenance Log

This log must be printed by installer and kept with the unit. It is the responsibility of the owner and/or maintenance/service contractor to document any service, repair or adjustments. United CoolAir Service and Warranty Departments are available to advise and provide phone help for proper operation and replacement parts. The responsibility for proper startup, maintenance and servicing of the equipment falls to the owner and qualified licensed HVAC technician.

Entry Date	Action Taken	Name/Tel.

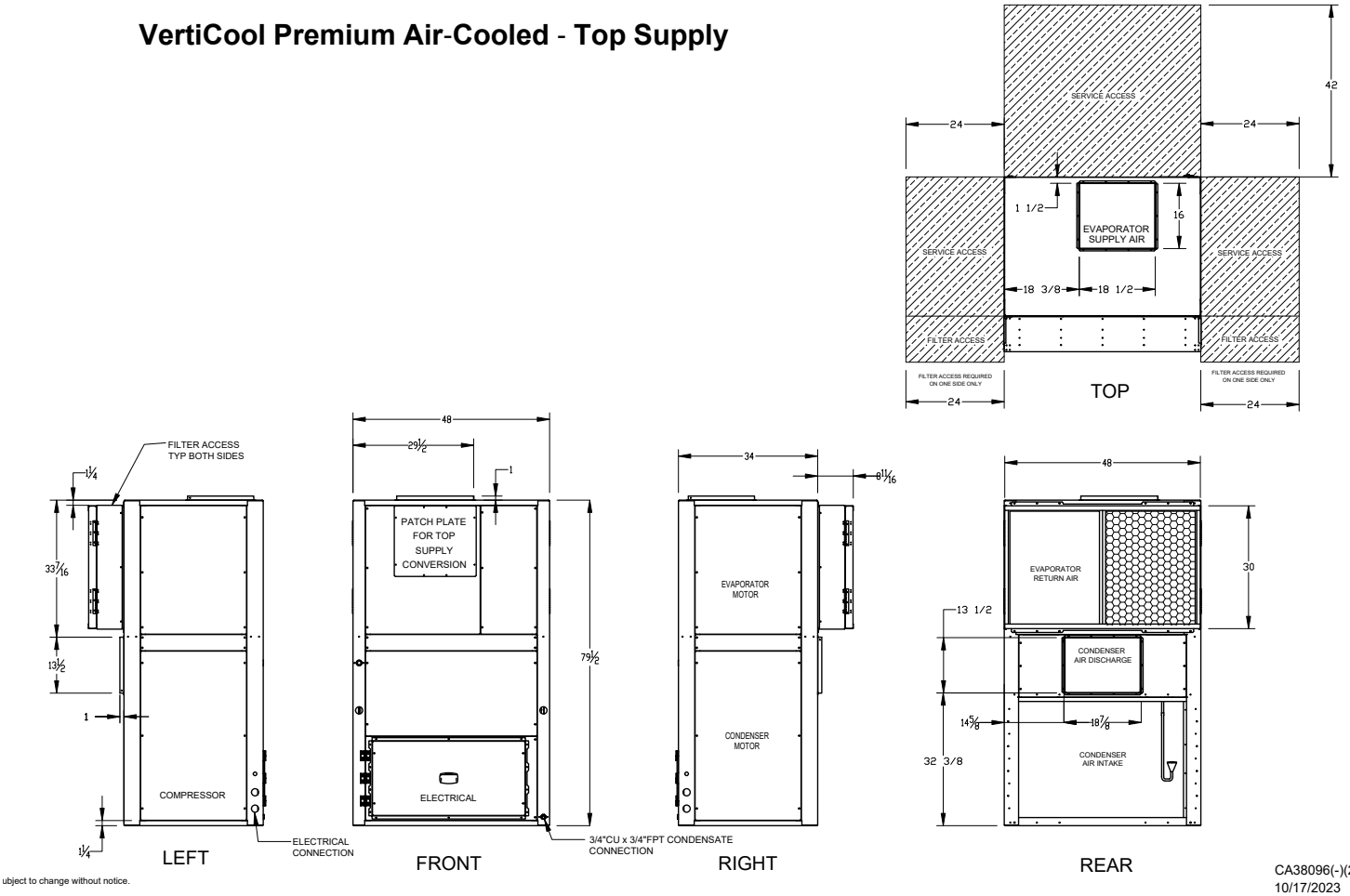
Note: United CoolAir Service: Phone (717) 843-4311
Please have the serial number of the unit. Service team members are available Monday through Friday from 7:00 AM to 5:00 PM Eastern Standard Time.

After hours tech support available Monday — Friday until 7:00 PM Eastern Standard Time.
Saturday 8:00 AM — 1:00 PM
Call: (717) 676-6765

NOTES:

Addendum A - Dimensional Drawings

VertiCool Premium Air-Cooled - Top Supply

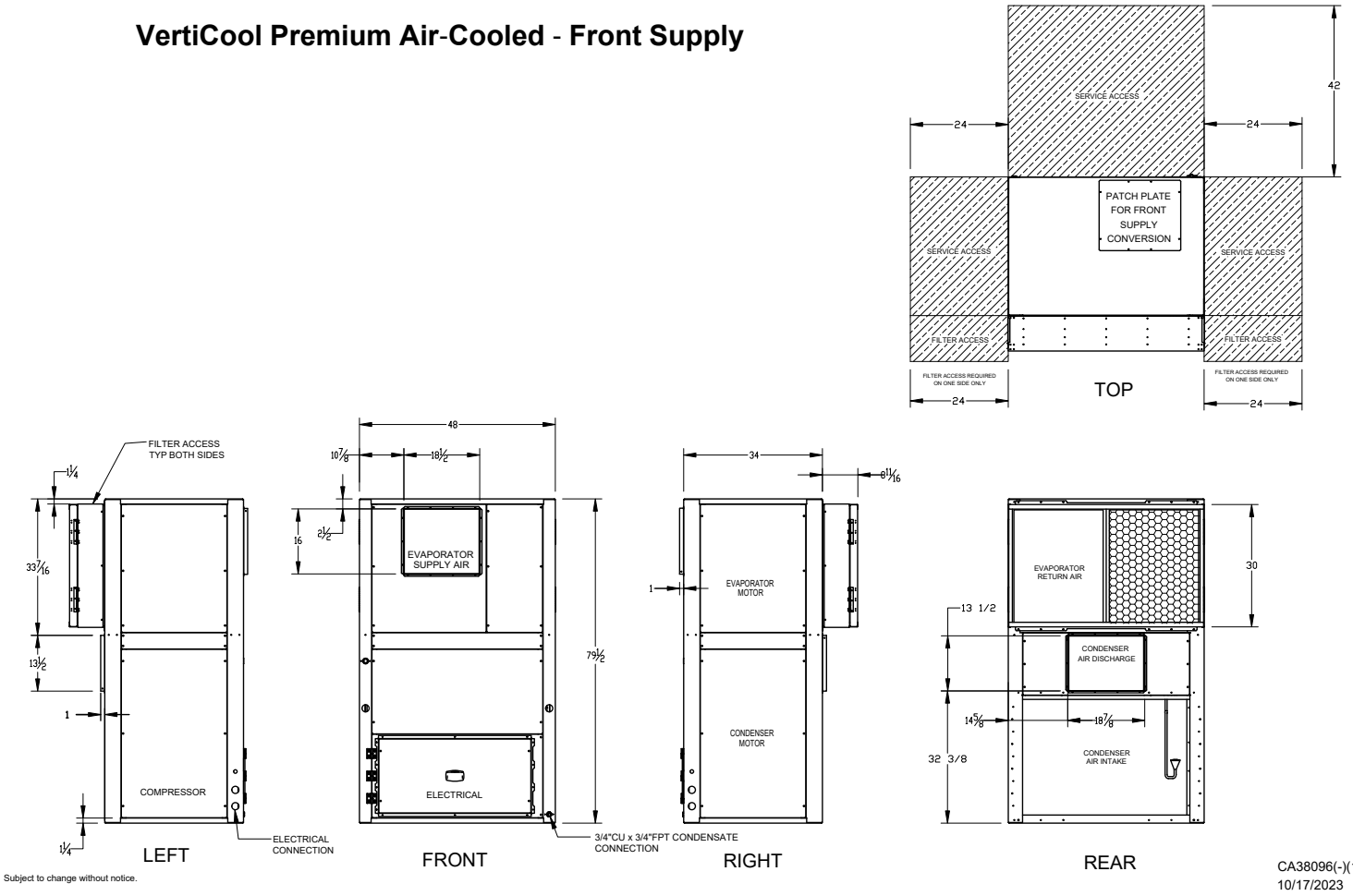


ubject to change without notice.

CA38096(-)(2)
10/17/2023

Addendum A - Dimensional Drawings

VertiCool Premium Air-Cooled - Front Supply

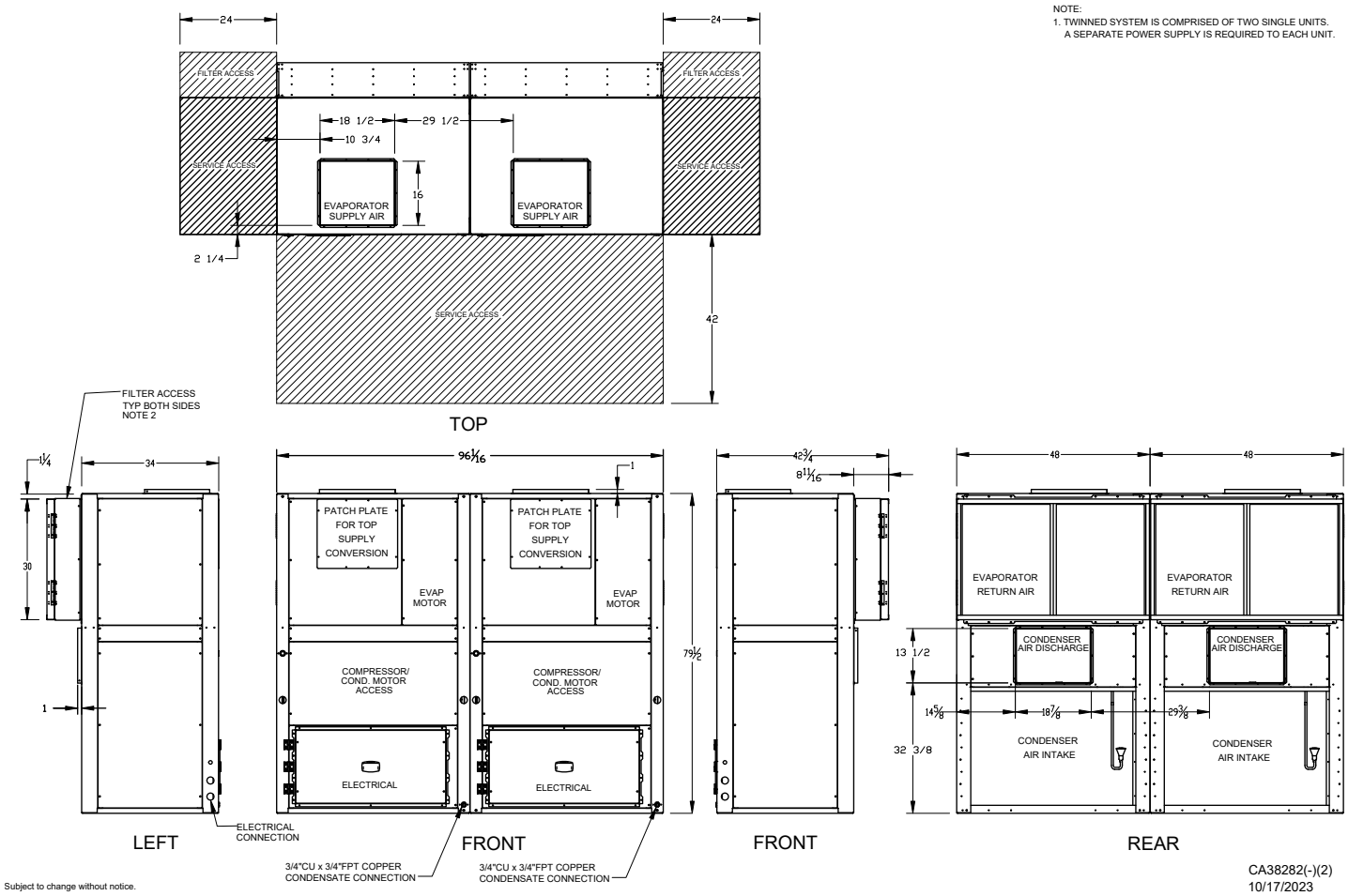


Subject to change without notice.

CA38096(-)(1)
10/17/2023

Addendum A - Dimensional Drawings

VertiCool Premium Air-Cooled - Twinned - Top Supply



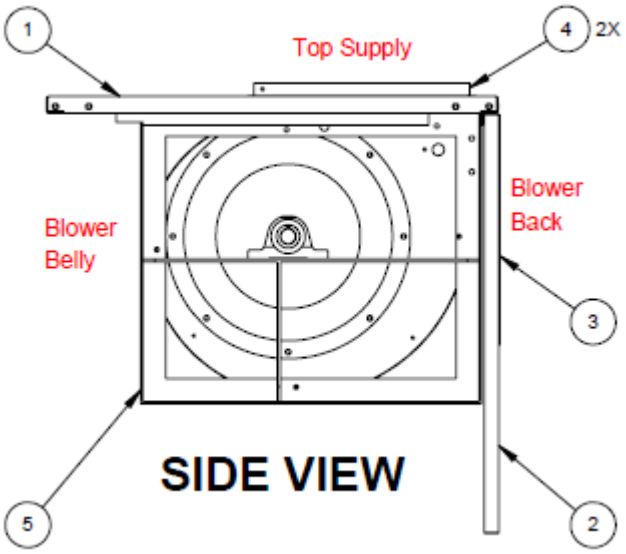
Subject to change without notice.

CA38282(-)(2)
10/17/2023

Addendum B - Field Convert Evaporator Blower

Field Converting the Evaporator Blower from Top Supply to Front Supply.

The unit ships with the blower oriented as top supply. The belly of the blower faces the rear of the cabinet and the back side of the blower faces the front of the unit.



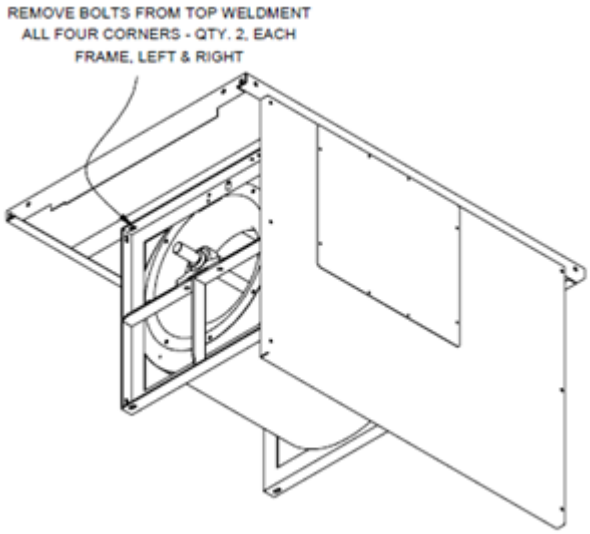
Item #	Qty	Description
1	1	Top Panel
2	1	Front Access Panel
3	1	Supply Block-off Plate
4	2	Supply Duct Flange
5	1	Evap Blower

1. Remove the supply duct flange and set aside.
2. Remove the supply block-off plate on front panel and set aside.
3. Remove the front access panel and set aside. Note that the location of the horizontal supply opening is located toward the top of the cabinet.
4. Remove the blower drive belt and set aside.
5. Remove the blower pulley from the blower shaft. Note that the location of the motor and drive assembly are on the right side of the blower and will remain on the right side once the blower is installed as front supply.
6. Set blower support blocks under the blower frame on both sides of the blower. Support blocks are field provided. Multiple short lengths of 2x4s work well, approximately 3 per each blower frame.

WARNING

The blower weighs 102 lbs. Multiple mechanics (2-3), a chain hoist, and/or block and tackle may be required to lower the blower.

7. Remove the four bolts which secure the blower to the top panel weldment (two bolts on each blower frame, left and right).
8. Carefully lower the blower by removing one support



block at a time on each side to lower the blower until the blower shaft is low enough to clear the VFD electrical box and any other internal support brackets.

INFORMATION

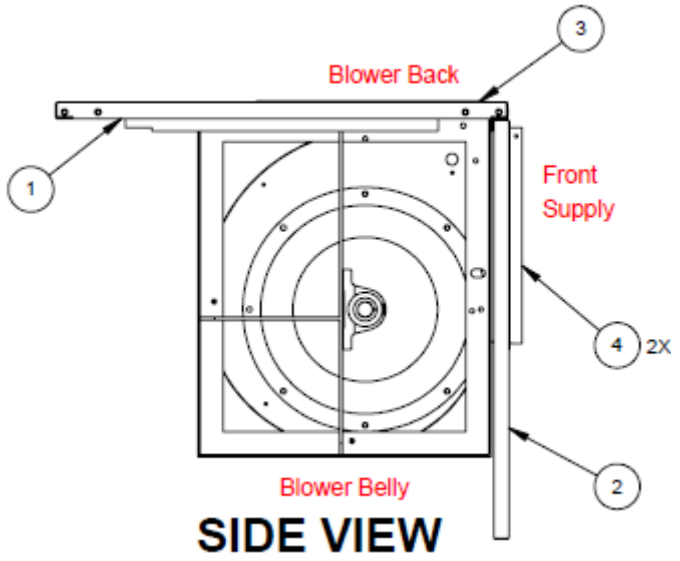
The control wire that feeds the evap blower VFD runs along the bottom front edge of the front cabinet access opening. Protect the wire as the blower is removed from the cabinet.

9. Remove the blower from the cabinet.
10. Rotate and orient the blower so that the supply matches the location of the horizontal supply opening to receive

Addendum B - Field Convert Evaporator Blower

the front access panel. The belly of the blower must be toward the bottom of the cabinet and the back of the blower must be toward the top of the cabinet.

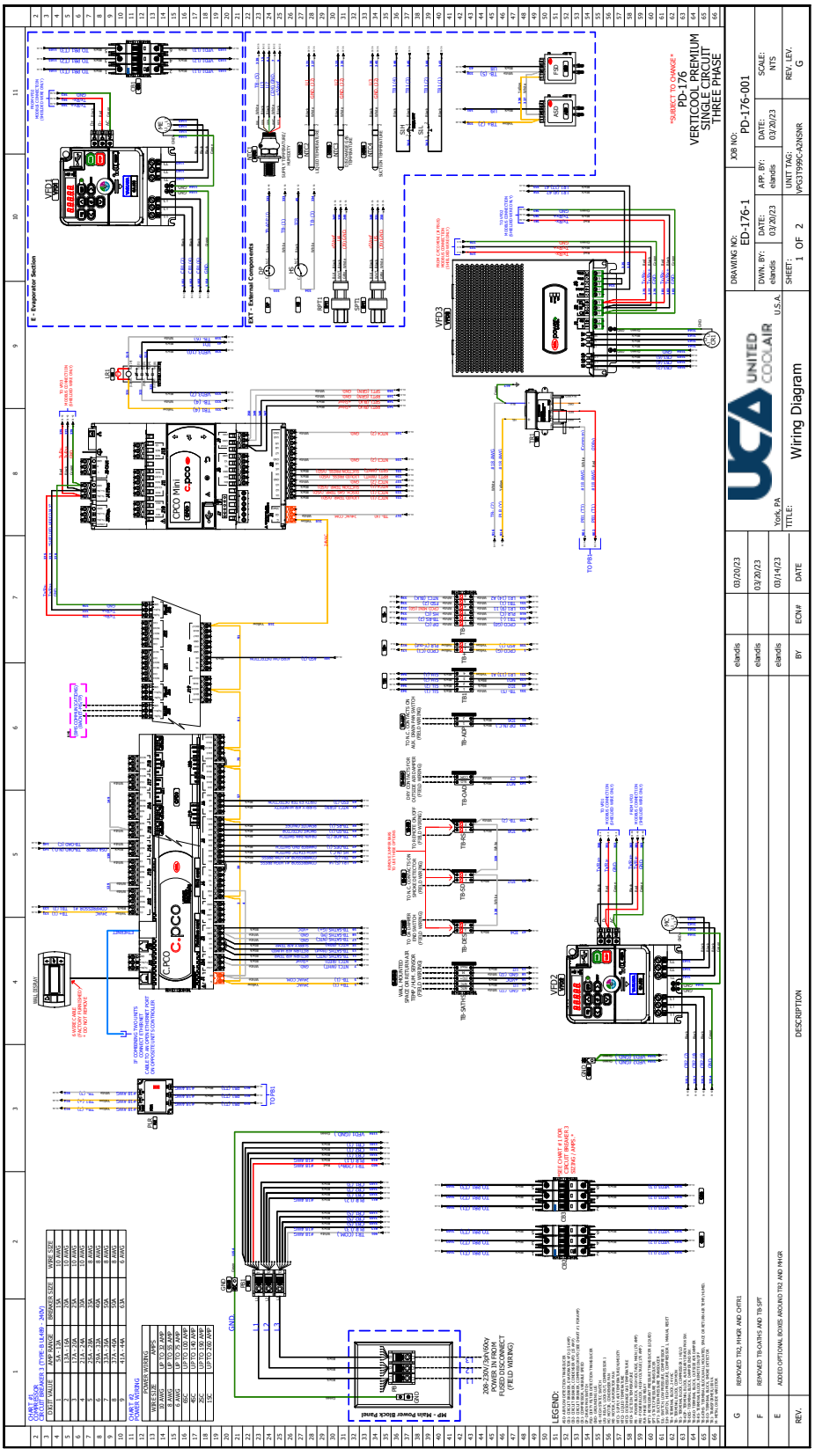
11. Re-install the blower utilizing the support blocks to assist with the blower weight while reattaching the blower.
12. Bolt the blower to the top panel weldment in all four corners of brackets (two on each frame, left and right). Make sure to completely tighten the bolts.
13. Re-install the blower pulley on the blower shaft (right hand side of blower). Pulley alignment must be checked prior installation of the v-belt.
14. Re-install the blower drive v-belt.
15. **Important! Interchange two of the incoming power leads to the evaporator blower VFD for proper blower rotation direction.**
16. Install supply block-off plate on top panel.
17. Attach the duct flange on front access panel.
18. Re-install the front access panel to unit.
19. Upon unit start-up make sure the blower is rotating in the correct direction.



SIDE VIEW

Item #	Qty	Description
1	1	Top Panel Weldment
2	1	Front Access Panel
3	1	Supply Block-off Plate
4	2	Supply Duct Flange

Addendum C - Typical Electrical Diagram



Authorized Distributor:

LIMITED WARRANTY

United CoolAir Units are backed by a 1 year limited warranty on parts and a 5 year limited warranty on the compressor (labor not included). Maintenance items such as filters and belts are excluded under this limited warranty.

FACTORY TESTED

All units are functionally run tested before shipment to ensure a trouble-free start-up and unit commissioning. Industry proven components are used throughout to enhance system reliability and peace of mind.

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