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Subject to change without notice.
Important Notice

This manual is the property of the owner.
Please be sure to leave it with the owner when you leave the job.

Use of Symbols

This publication includes warnings, cautions and information icons that point out safety related issues or conditions as well as other pertinent information relative to a safe installation, service or maintenance situation. The following icons should be interpreted as follows:

- **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.
General Information

Inspection of Equipment
Upon receiving of the variable frequency drive (VFD), carefully inspect for visible or concealed interior/exterior damage. If damage occurred during transit, contact the freight carrier immediately and file a damage claim report.

Inspect the unit data plate to verify the VFD is the appropriate one for the application. (Voltage, VFD and Evaporator Motor HP are compatible)

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 in the unit the shipped loose items are located. Confirm that all of these options/accessory items are also available and that no damage has occurred.

Handling
Handle the VFD as prescribed by the VFD manufacturer.

Location
Before VFD can be installed, a thorough study should be made. Attention must be given to:
A. Wall, panel or structure load limitations are appropriate
B. Required service clearances are present
C. Location of wiring and safety devices is acceptable
D. Temperature and humidity levels will be within manufacturer tolerances
E. Mounting location is as recommended by the VFD manufacturer
F. Confirm that the mounting location will not subject the VFD to any moisture
G. Make sure that adequate ventilation is provided as recommended by the VFD manufacturer
H. Device will not be located near heat radiating elements
I. Make sure all power wiring and control wiring can be separated per industry accepted practices

Programming
Refer to the manual with the VFD for programming and troubleshooting instructions.

INFORMATION
Confirm that the incoming power supply matches the unit and VFD data tags.

ELECTRICAL HAZARD
Only a qualified licensed electrician or other individual that is properly trained in handling live electrical components should perform any installation, adjustment, repair or maintenance. 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
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

Disconnect all power before servicing the drive controller. WAIT ONE MINUTE until DC bus capacitors discharge, then measure DC bus capacitor voltage to verify that DC voltage is less than 45 volts.

ELECTRICAL HAZARD

DO NOT short across any internal components or touch unshielded components. Use of electrically insulated tools is required.

ELECTRICAL HAZARD

Equipment must be properly grounded per all applicable national and local codes. Refer to the VFD manufacturers manual for specific grounding details.

ELECTRICAL HAZARD

Make sure all covers and doors are closed before applying power or starting the VFD.

Voltage Unbalance

Voltage unbalance occurs when the RMS line voltages on a 3-phase power supply are unequal. Voltages are never 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 desirable voltage unbalance is 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:

\[
\text{Percent Voltage Unbalance} = 100 \times \left( \frac{\text{Maximum Voltage Deviation}}{\text{Average Voltage}} \right)
\]

Example:

- Phase-Phase voltages
  - A-8 = 479V
  - 8-C = 472V
  - C-A = 450V

  Average Voltage = \( \frac{479 + 472 + 450}{3} = 467 \)
  
  Maximum Voltage Deviation from Average = \( 467 - 450 = 17 \) (Must always be positive)
  
  Voltage Unbalance = \( 100 \times \left( \frac{17}{467} \right) = 3.6\% \)

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.
Field Provided VFD / Field Installed

1. Turn off all power to the unit.
2. Locate and remove the access panel for the evaporator.
3. Locate the evaporator blower motor.
4. Locate the wiring to the motor and follow back to the two (2) sets of power blocks (Refer to Figure 1A or 1B)
   **NOTE:** Refer to Electrical Schematic provided with the unit for specific power block ID.
5. Remove the jumpers from between the power blocks. Make note of the motor side power block to prevent wiring the VFD backwards. (Refer to Figure 1A or 1B)

**WARNING**
Severe damage and personal injury may result if jumpers are not removed.

**INFORMATION**
All field supplied wiring is to be sized per NEC or applicable local codes.

6. Attach the appropriate size wire to the power block (motor side) and connect them to the terminals on the VFD marked for the Motor (U, V & W) (Refer to Figure 2A or 2B).

**INFORMATION**
Damage to VFD may occur if not correctly wired.

7. Install a circuit breaker for VFD protection between the VFD and the entering power block (Refer to Figure 2A or 2B). Size the circuit breaker according to VFD manufacturer recommendation.
Field Provided VFD / Field Installed (Continued)

8. Attach the appropriate size wire to the circuit breaker and connect them to the terminals on the VFD marked for Mains (L1, L2, & L3) (Refer to Figure 2A or 2B).

9. Attach the appropriate size wire to the circuit breaker and connect them to the terminals on the entering power block marked for power entering (L1, L2, & L3) (Refer to Figure 2A or 2B).

10. Secure all wiring.

11. Replace access panel back on the evaporator section.

12. Turn on power to unit.

13. Program VFD per the manufacturers instructions.

Static Pressure Transducer
Field or Factory Provided/Field Installed

**ELECTRICAL HAZARD**

Only a qualified licensed electrician or other individual that is properly trained in handling live electrical components should perform any installation, adjustment, repair or maintenance. 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**

Damage to the Static Pressure Transducer may occur if not wired correctly.

1. Mount the transducer in a vertical position, making sure that the pneumatic tube connections are at the bottom. This helps to prevent moisture from reaching the transducer.

2. Attach field supplied pneumatic tubing to the “HIGH” connection of the transducer. (Refer to Figure 3)

3. Route the pneumatic tubing to a point approximately 2/3rds of the distance down the straightest length of supply air ducting. Make certain that there are no kinks in the tubing. Use clamps to hold the tubing into place.

4. Drill a clearance hole into the center face of one side of the duct work.

5. The end of the pneumatic tubing must be cut square to the tube side wall for the tube to pick up the correct air pressure reading.

6. Insert approximately 1/8” of the tubing into the duct. Make sure the tubing is positioned in the duct at a right angle so that the air flow goes across the square end of the tube.

**INFORMATION**

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

The Static Pressure Transducer (SPT) is field installed external to the main electrical panel and wired back to the VFD.

7. Terminals are type sensitive. Power input to the “+” terminal must be 10 VDC. Output from the “-” terminal is 4 - 20 mA to the VFD analog input.

8. Use 18 AWG wire size to connect from the (-) and (+) terminals of the pressure transducer back to the VFD. (Refer to Figure 3)

9. The terminal markings on the VFD can vary from one manufacturer to another. Refer to the VFD manufacturer instructions for the proper terminal connections.

10. Static Pressure Transducers are typically preset to read from 0” to 2.5” W.C. The VFD controller will read the preset configuration and will accelerate or decelerate the motor to maintain the programmed configuration.

**Figure 3 - Static Pressure Transducer**
Field Provided VFD/Field Installed (Continued)

Figure 2A - After VFD Installed Motor w/ Overload

Figure 2B - After VFD Installed Motor w/o Overload
Factory Provided VFD/Field Installed

1. Turn off all power to the unit.
2. Locate and remove the access panel for the evaporator.
3. Locate the evaporator blower motor.
4. Locate the wiring to the motor and follow back to the two (2) sets of power blocks (Refer to Figure 3A or 3B).
   **NOTE:** Refer to Electrical Schematic provided with the unit for specific power block ID.
5. Remove the jumpers from between the power blocks. Make note of the motor side power block to prevent wiring the VFD backwards. (Refer to Figure 3)

**WARNING**

Severe damage and personal injury may result if jumpers are not removed.

6. Attach the appropriate size wire to the power block (motor side) and connect them to the terminals on the VFD marked for the motor (U, V & W) (Refer to Figure 4).

**INFORMATION**

Damage to VFD may occur if not correctly wired.

7. Attach the appropriate size wire to the line side power block and connect them to the terminals on the VFD marked for Line Voltage (L1, L2, & L3) (Refer to Figure 4A or 4B).

8. Secure all wiring per industry accepted practices.
9. Replace access panel back on the evaporator section.
10. Turn on power to the unit.
Field Provided VFD/Field Installed (Continued)

Figure 4A - After VFD Installed Motor w/ Overload

Figure 4B - After VFD Installed Motor w/o Overload
Unique Solutions for All-Indoor HVAC Projects

VertiCool Classic
Vertical, 3 - 30 Ton

VertiCool Aurora
Vertical, 3 - 35 Tons

VariCool®
VAV, 9 - 70 Tons

VariCool® EZ-Fit
VAV, 12 - 90 Tons

OmegaAir Vertical
100% Outside Air, 1 - 15 Tons

Portable Cooling and Heating Units
3-30 Tons

C13-Series Horizontal
2 - 10 Tons

C-Series Horizontal
1 - 15 Tons

Special Configuration
Engineered to Order

OmegaAir Horizontal,
100% Outside Air, 1 - 15 Tons

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.

Scan to learn more about all of our products!

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