Installation Instructions

Variable Frequency Drive (VFD)

7 ½ - 25 Ton Units with ClearControl™



⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Modifying or changing parameters whose function is not described in this manual will affect drive controller operation. Some register changes will take effect as soon as they are entered.
- Do not modify or change parameters whose function is not described in this instruction bulletin.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Hazard Categories and Special Symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of a lightning bolt or ANSI man symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

The exclamation point symbol is used to alert you to potential personal injury hazards.

Obey all safety messages that follow this symbol to avoid possible injury or death.

Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

Before You Begin

Read and understand these instructions before performing any procedure on this drive controller.

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this manual before installing or operating the VFD controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive controller, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- Before servicing the drive controller:
    - Disconnect all power.
    - Place a “DO NOT TURN ON” label on all power disconnects.
    - Lock all power disconnects in the open/off position.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Install and close all covers before applying power or starting and stopping the drive controller.
- Disconnect all power, including external control power that may be present, before servicing the drive controller. WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 6 to verify that the DC voltage is less than 45 V. The drive LEDs are not accurate indicators of the absence of
- DC bus voltage.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

IMPROPER DRIVE CONTROLLER OPERATION

- If the drive controller is de-energized for a prolonged period, the performance of the **electrolytic capacitors** will be reduced.
- Once a year, apply power to the drive controller for at least 5 hours to restore the performance of the capacitors, then check its operation.
- If the drive has not been powered for more than a year, do not connect the drive controller to the line voltage. Gradually increase the voltage using an adjustable AC source.

Failure to follow these instructions can result in injury and equipment damage.

⚠ DANGER

AUTOMATIC RESTART ENABLED

- This drive controller can restart under fault conditions.
- Equipment must be shut down, locked out and tagged out to perform servicing or maintenance.

Failure to follow these instructions will result in death or serious injury.

Bus Voltage Measurement Procedure

Before working on the drive controller, turn it off and wait 15 minutes to allow the DC bus to discharge and then measure the DC bus voltage. Note: An LED charging indicator shown in Figure 1 is lit when capacitors are charging.

⚠ DANGER

HAZARDOUS VOLTAGE

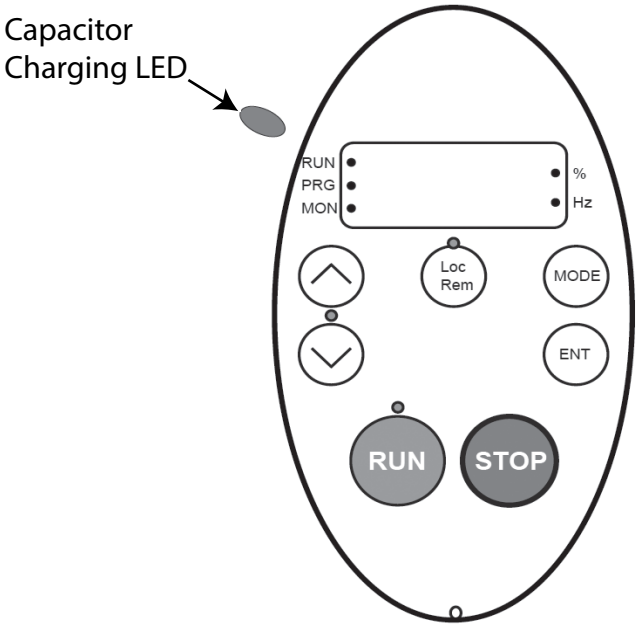
Read and understand the precautions in “Before You Begin” on page 4 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

The DC bus voltage can exceed 1000 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect all power and wait 15 minutes to allow the DC bus to discharge.
2. Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 45 Vdc.
3. If the DC bus capacitors do not discharge completely, contact your local Factory representative. Do not repair or operate the drive controller.

Figure 1 Capacitor Charging LED



General VFD Information

Model

The parameters of this Schneider Altivar 212 VFD have been modified (programmed) specifically to operate in conjunction with the ClearControl™ system. **No adjustments of the VFD are required for installation or operation of this unit.** Any change to the factory set parameters may cause unintended operation.

Replacement

The VFD is horsepower and voltage specific therefore; replacement must be the same model as the existing. A preprogrammed VFD is recommended and available from ProStock. A non-programmed Schneider Altivar 212 may be used but must be programmed exactly per Table 4 for safe and proper function.

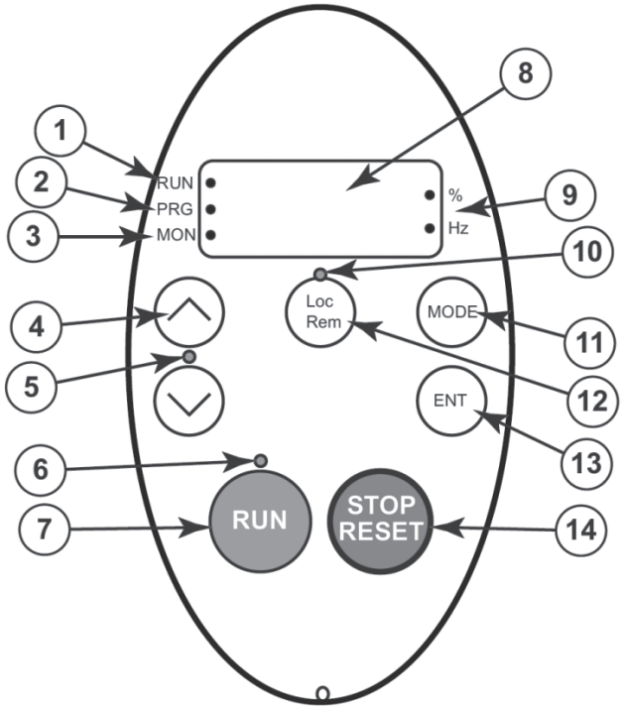
Operation

The purpose of the VFD is to allow low airflow in Fan Only (G) and First Stage Cooling (Y1) operation of a two stage unit. Unit air balancing should be performed at 100% airflow (60Hz at VFD) during a W1, W2, or Y2 call by adjusting the blower motor sheave. First Stage Cool and Fan Only speeds are factory set at 50% airflow (30 Hz at VFD) to meet ASHRAE 90.1-2010 and for best performance. Both of these speeds are independently adjustable at the RTU-C in section 6.15 (VARIABLE FREQ DR). The VFD display will indicate an equivalent value in Hz (i.e. Low Cool adjusted to 60% will display as 36Hz at the VFD). A 20 second (adjustable at the VFD) ramp-up or ramp-down is used whenever the blower speed is increased or decreased. Since the VFD operates on 24VDC control voltage, a blower relay (with 24VAC across the coil) is used to turn the VFD on. Blower speeds are changed via Modbus communication from the RTU-C.

Integrated Display Terminal

The LEDs and keys on the integrated display terminal are illustrated in Figure 2 and described in Table 1.

Figure 2 Description of Display Terminal



VFD		1
Wire harness VFD input	45-42522-146	1
Wire harness VFD output	45-42522-145	1
Mounting Bracket	AE-101106-01	1
Mounting Plate	Ae-101106-02	1
Parts Bag		
Screws	63-42109-03	10
Relay	42-21517-08	1
Screws 8-18 x 1/2	63-22153-01	2
Wires	45-50204-76-AE-065	2
Communication harness	45-42522-137	1
Instructions	92-106916-02	1

Communicating VFD installation.

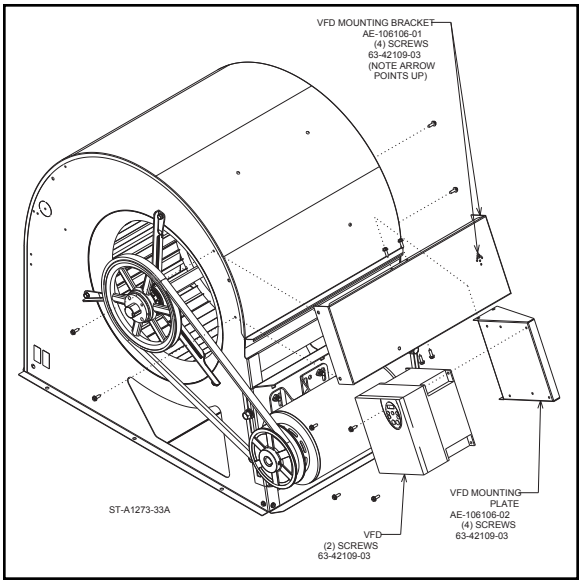
• Remove Power from unit.

• Open blower access door.

• Remove blower section.

Remove screws from bottom of blower.

Remove 4 pin motor power connector from motor connector.



• Install VFD mounting plate to VFD mounting bracket using 4 screws.

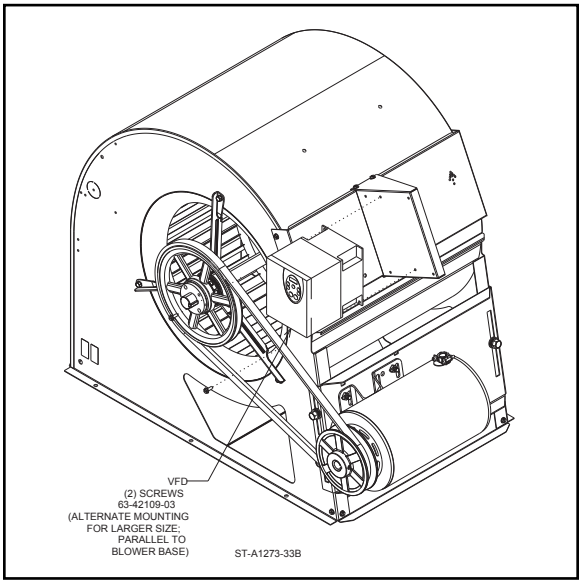
• Install Mounting Bracket on blower using 4 screws.

• Install blower back in unit and install screws at bottom of the blower assembly.

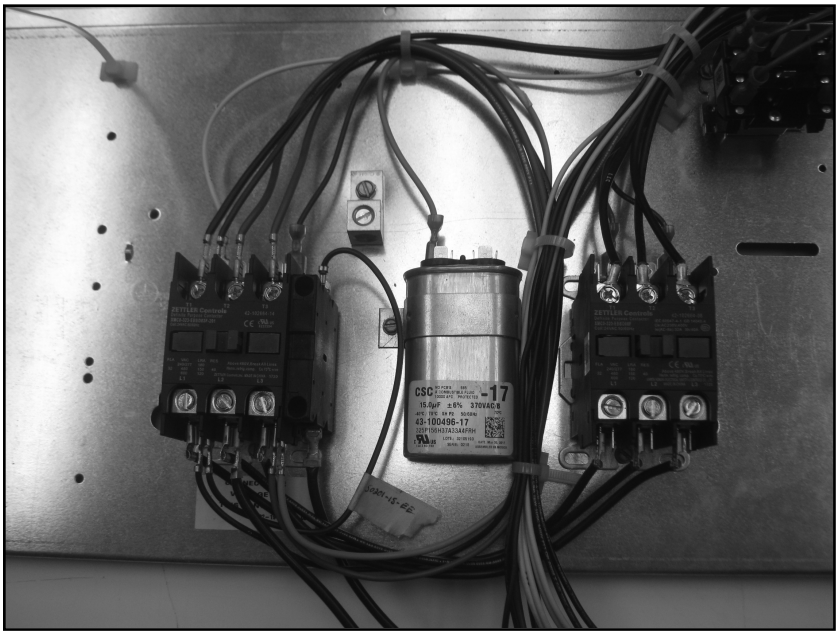
• Install VFD to mounting plate using 2 screws.

• Connect VFD harnesses to existing power harnesses in blower.



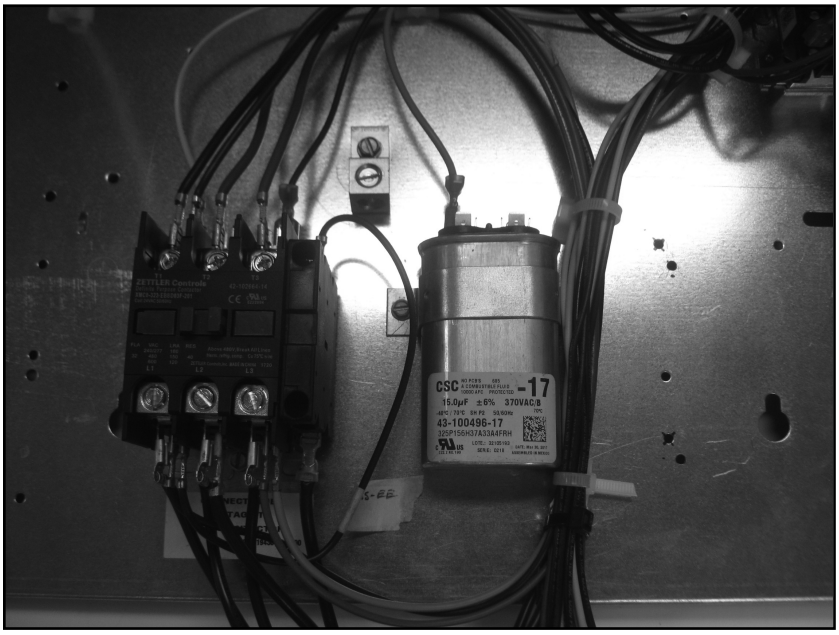


• Remove Blower contactor.

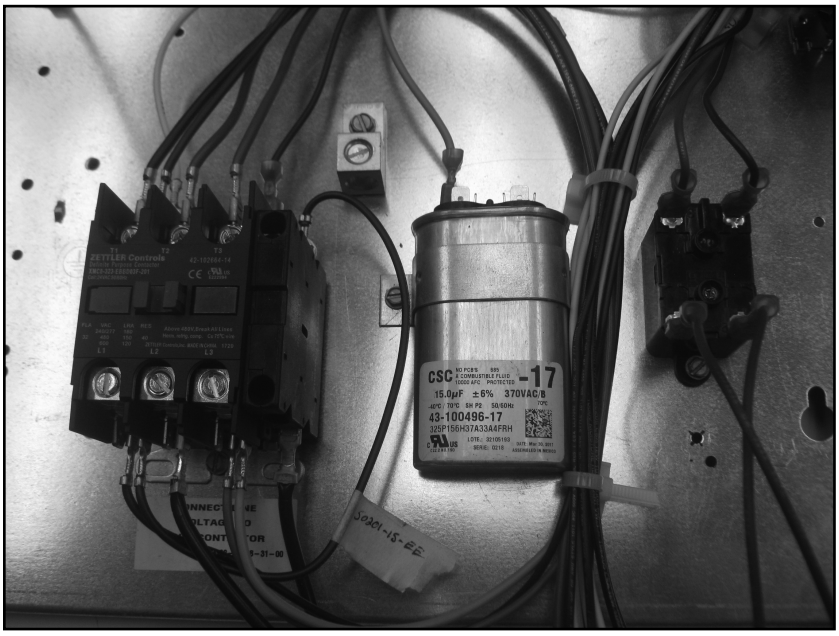


• Remove wires between compressor contactor and blower contactor.

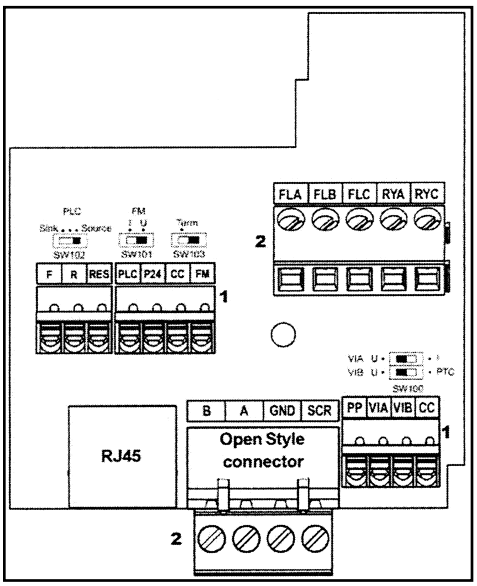
• Place Blower power wires on bottom of compressor contactor.



• Install new blower relay. Use existing blower contactor wires for coil of new relay.



• Install two blue wires from normally open contact of blower relay and connect to F and P24 on VFD.



• Install communication harness between VFD and control terminal P13.

Connect brown wire to GND on VFD terminal.

Connect purple wire to B on VFD terminal.

Connect white wire to A on VFD terminal.

• Replace all blower doors.

• Power system and test operation.

• Go to the VFD menu and ensure the drive is available.

• Ensure indoor blower is running in the correct direction. With a VFD the rotation is determined by the drive so if changes are necessary to correct rotation change wires between the drive and motor.