AHU Commander SK VSD

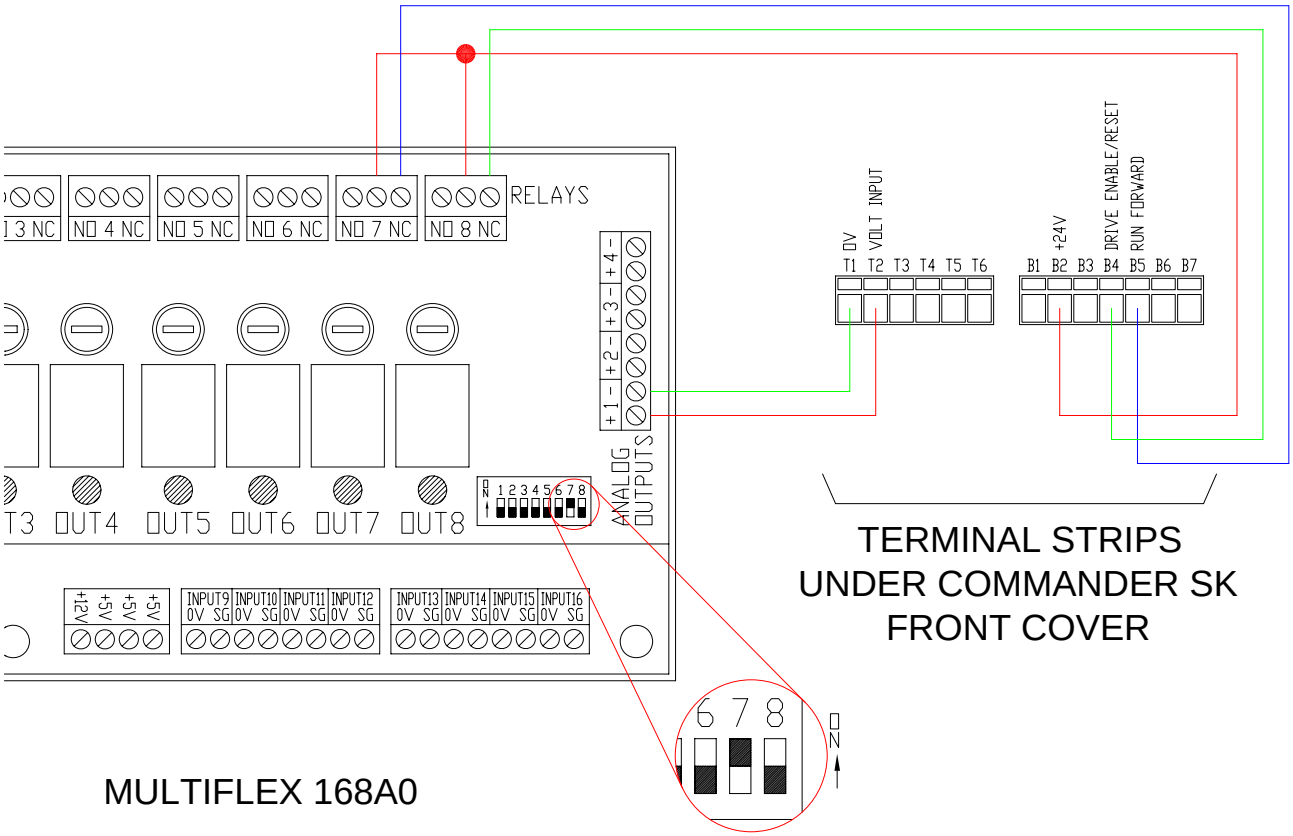
Revision: 1

Overview

The E2 controller can be used for controlling Variable Speed Drives (VSD) in three applications. These applications are Condenser, Suction Group, and AHU. The exact procedure for setting up the drive will vary depending on the application and VSD type. This document is for setting up a Control Techniques Commander SK VSD in an AHU application. The parameters used in the example will vary depending on the actual site configuration. This document is to be used as a guide only. Many of the setup procedures for the AHU application apply to a Condenser or Suction Group application.

Installation

For basic control, a VSD requires at least 1 analog output and 2 relay outputs from an I/O board(s). The analog output is for controlling the speed of the motor(s) attached to the Commander SK. The first relay output is used to enable and reset the Commander SK. The second relay output is used to signal a forward run command. The relays are used as dry contacts. The Commander SK provides the +24V for the relays from terminal B2. The Commander SK should be connected to the I/O board(s) as shown in the Commander SK Wiring Diagram. The failsafe for the B4 terminal must be in the OFF position. The failsafe for the B5 terminal must be in the ON position.



Commander SK Wiring Diagram

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Commander SK Configuration

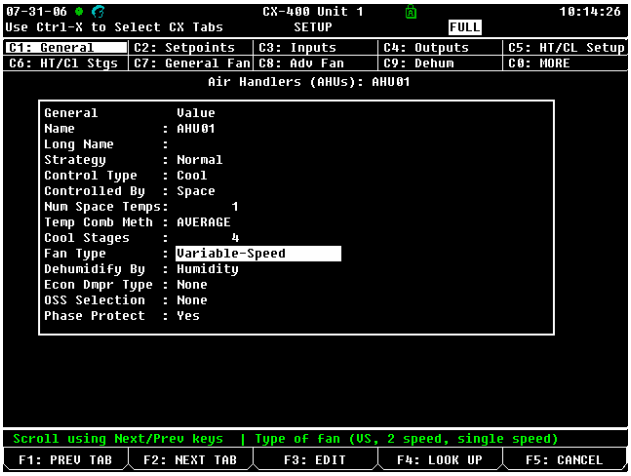
The Commander SK has several configuration parameters. For details on all of the available configuration options, refer to the Commander SK owner's manual. All documentation can be downloaded from http://www.emersonct.com/. For this example, the following parameter values were changed from the initial default values. Other parameters will need to be changed for the VSD to operate properly. The parameters below allow the Commander SK to interface with an Emerson E2 controller. The remaining parameters effect how the drive controls the motor(s) attached to the VSD.

Parameter	Value
05	AV.PR
11	0
16	VOLT

E2 Programming

In an AHU application, the VSD is used to control the supply van on the AHU. To setup the application, perform the following steps:

1. Log in to the controller with Level 4 access
2. Enter the AHU setup screen
3. From the C1:General tab, set the Fan Type to Variable-Speed



4. Press Ctrl+$ 4 to enter the C4:Outputs tab. From the Commander SK Wiring Diagram, the outputs are assigned as follows:
   FAN STATUS = Relay output to Commander SK B5 Run Forward
   VS INVTR RESET = Relay output to Commander SK B4 Drive Enable / Reset
   VS FAN OUTPUT = Analog output to Commander SK T1/T2

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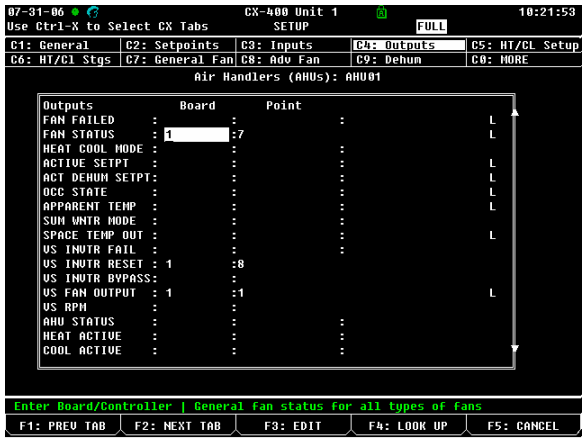
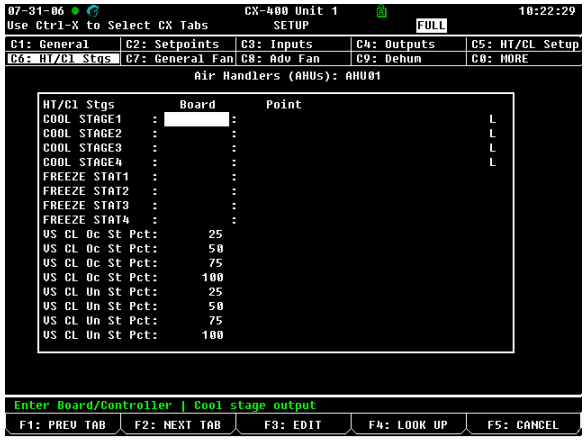
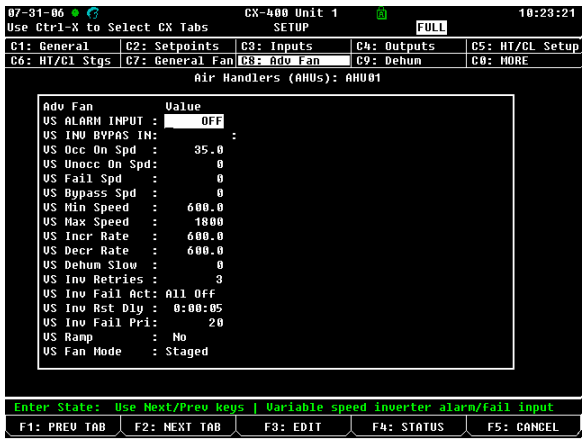


5. Press Ctrl+^6 to enter the C6: HT/Cl Stgs tab. The VS CL Oc St Pct and VS CL Un St Pct value determines the operating speed of the fan. The default value is 50%. The value should be adjusted based on manufacture specifications or system testing.



6. Press Ctrl+*8 to enter the C8: Adv Fan tab. The variables determine the operation of the fan. The value should be adjusted based on manufacture specifications or system testing.



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Variable Speed Drive Control Notes

1. When using Differential mode (C8: Adv Fan – Differential), the fan speed is controlled by measuring the difference between the supply and return temperatures. When using this mode, the fan will not completely shut down. Even when all setpoints are satisfied, and the cooling or heating stages have turned off, the fan will still continue to operate.
2. When controlling a VSD in a Suction Group, only one VSD can be used in an application. In a standard Suction Group, only the first compressor can be a variable speed drive. In an Enhanced Suction Group, any compressor can be a variable speed drive.
3. For a Condenser or AHU application, there can be only one variable speed drive.
4. For a Condenser application, the variable speed drive operates in the following order for a system with 6 fans and 3 stages (2 fans per stage):

    As demand increases on the system:
    1. Stage 1 turns on at minimum fan speed
    2. Stage 2 turns on at minimum fan speed
    3. Stage 3 turns on at minimum fan speed
    4. All stages ramp up and down together as needed to satisfy setpoint

    As demand decreases on the system:
    1. All stages operate at minimum fan speed
    2. Stage 3 turns off.
    3. Stage 2 turns off.
    4. Stage 1 turns off.

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