

SECTION 23 09 13  
VARIABLE FREQUENCY DRIVES  
Design Standard

PART 1 GENERAL

1.1 PURPOSE:

The variable frequency drive is an essential element of variable flow mechanical systems. This design standard has the purpose of creating a consistent application of variable frequency drives throughout the San Mateo County Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

PART 2 PRODUCTS

2.1 VARIABLE FREQUENCY DRIVES

Shall be provided on all fan systems with variable air volume controls and on secondary and tertiary hydronic systems with variable flow requirements.

Design and specify work to include materials and installation for a complete adjustable frequency motor drive consisting of a pulse width modulated (PWM) inverter for use on a standard NEMA Design B induction motor. Design drive specifically for variable torque applications.

- A. Drives to be UL Listed.
- B. Solid state, with a Pulse Width Modulated (PWM) output waveform enclosed in a NEMA 1 enclosure (provide other NEMA enclosures as required for application), completely assembled and tested by manufacturer. Employ a full wave rectifier (to prevent input line notching), DC Line Reactor, capacitors, and Insulated Gate Bipolar Transistors (IGBTs) as the output switching.
- C. Device drive efficiency: 97 percent or better at full speed and full load.
- D. Fundamental power factor: 0.98 at all speeds and loads.
- E. Door interlocked thermal magnetic circuit breaker disconnect handle, through-the-door type, and pad-lockable in the "Off" position.
- F. Provide all VFDs with the same customer interface, including digital display, keypad and customer connections; regardless of horsepower rating. The keypad is to be used for local control (start/stop, forward/reverse, and speed adjust), for setting all parameters, and for stepping through the displays and menus
- G. VFD's shall be interfaced with the BMS to monitor and adjust speed control, start/stop and to alarm on failure or low flow situation.

2.2 APPROVED MANUFACTURERS:

- A. ABB
- B. Danfoss
- C. Schneider Electric

PART 3 EXECUTION

3.1 SUBSTITUTES ALLOWED?

Yes, if performance and quality equivalency can be evidenced.

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS:

23 05 13 - Common Motor Requirements for HVAC Equipment Design Standards

25 55 00 – Building Management and Control System (BMS)

END OF SECTION