

## **Design Standard**

### **Variable-Frequency Motor Controllers**

#### **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 East Side Union High School District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

#### **Design Standard:**

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 the drive specifically for variable torque applications.

- Drives to be UL Listed.
- 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.
- Device drive efficiency: 97 percent or better at full speed and full load.
- Fundamental power factor: 0.98 at all speeds and loads.
- Door interlocked thermal magnetic circuit breaker disconnect handle, through-the-door type, and pad-lockable in the "Off" position.
- 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

#### **Approved Manufacturers:**

- ABB
- Siemens
- General Electric
- Danfoss
- Yaskawa
- Mitsubishi

**Substitutes Allowed:**

Yes, if performance and quality equivalency can be evidenced.

**Associated Design Standards and Construction Specifications**

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

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