

Variable Frequency Drive (VFD) Requirements **26.29.23**

Description:

The purpose of the section is to highlight the current applicable UMCP Design Standards for the design and performance of VFDs at the campus.

Related Sections:

- TBD

Effective Date:

July 10, 2009

Applicable Standards:

- 1990 NEC
- UL – Underwriters Laboratories
- IEEE 587

General Requirements:

- Control Frequency Drives shall be manufactured by a single contractor utilizing a sine coded pulse width modulated inverter control. The variable speed drive units applied to various HVAC systems shall be provided with designs utilizing the following basic criteria/specifications:
 - Converter shall consist of a modular assembly consisting of a diode rectifier and capacitor assembly which will first convert, then filter and maintain a fixed DC voltage source from the fixed voltage and frequency input.
 - Inverter shall be Insulated Gate Bipolar Transistor (IGBT) with a minimum rating of 1000 VDC on 460 VAC controls to invert the converter fixed DC voltage into a sine-coded pulse with modulated output.
 - Control Logic to consist of a single printed circuit board for all horsepower sizes and incorporates an 8 bit, or larger, microcomputer central processing unit to control all inverter, converter, base drive, and external interface functions.
- The VFD unit shall allow application onto systems which employ any NEMA-B induction squirrel cage motor.
- The selected VFDs shall provide user friendly diagnostics clearly displayed at a front display.
- The following identifies the minimum features to be noted in a design:
 - Standard line input voltage 460 VAC.
 - Shall not induce voltage line notching into the utility line.
 - The VFD units shall be controlled automatically a 4-20 mA control signal.
 - The VFD shall be UL approved.
 - The VFD shall be designed to meet power line transient conditions defined within IEEE-587.
 - The VFD shall comply with 1990 NEC.
 - The VFD shall contain the following general features:
 - Automatic restart after power outage and fault occurrences of over current or over voltage.
 - Control follower circuit board to utilize 4-20 mA control signal.
 - Electronic overload protection.
 - Hand/Off/Auto operator switch.
 - Instantaneous electronic trip when 180% FLA sensed, phase to phase output short or phase to ground output short circuit occurs.
 - Interface for time clock control.
 - Line circuit breaker.
 - Manual bypass (door interlocked) for fixed 60 Hz operation in emergency.
 - Manual speed potentiometer.
 - Minimum/Maximum adjustable speeds.
 - Over-temperature protection.

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- Panel mounted display of status, frequency, and service diagnostics.
- Run/Stop command switch.
- Shall provide for 100% current limit.
- Thermal overload relay.
- Timed acceleration and deceleration for soft starting and stopping.