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 invertor 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.
  - Invertor 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 invertor, 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.

- 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.