220514-H: SUPPLEMENTAL VARIABLE SPEED DRIVES (15960-H)

Related Sections

Basis Guideline: 220514 - “Variable Frequency Drives”
For an explanation of the use of these guidelines, see “Design Guidelines for UMHHC Facilities”

Included as part of this UMHHC guideline section are the details described within the following UM Master Specification sections.
MS220513 - “Motors”
MS220514 - “Variable Frequency Drives”

The UM Master Specifications may be used as a reference and/or basis, but the A/E is completely responsible for contract specifications (meeting the intent of the UMHHC Guidelines and Preferred Manufacturers List) that are used in UMHHC projects.

General

All VFD driven motors less than 100HP shall utilize an AEGIS™ grounding ring assembly, installed per manufacturer’s recommendations, to prevent motor bearing failure due to induced motor currents.

All VFD driven motors 100HP and greater shall utilize an AEGIS™ grounding ring in combination with an insulated/ ceramic bearing assembly installed on the opposite end to prevent motor bearing failure due to induced/ circulating motor currents.

Before adding a VFD, evaluate the possible effects of the VFD on power factor correcting capacitors or harmonic sensitive equipment on the same bus. Avoid installing a VFD on the same bus with capacitors or ‘sensitive’ equipment. Sensitive equipment, as defined here, are loads adversely affected by harmonic voltage distortions. These include high sensitivity laboratory equipment, patient monitoring or treatment equipment, computers, etc.

Total Harmonic Distortion (THD) Considerations

- If ratio of supply transformer’s kVA, to motor HP being served, is equal to or greater than 80, then supply VFD’s with line reactor filters.
- If ratio of supply transformer’s kVA, to motor HP being served, is between 40 and 80, then meter the existing distribution system to determine level of voltage waveform THD. If voltage waveform THD is 2.5% or less, then supply VFD with line reactor filters. If voltage waveform THD is more than 2.5%, then supply 18-pulse type VFD.
- If ratio of supply transformer’s kVA, to motor HP being served is equal to or less than 40, then supply 18-pulse type VFD.
- VFD’S for motors 100HP and greater shall be 18-pulse type regardless of supply transformer’s kVA to motor HP ratio.

If the total load on the transformer, after the additions of the current project, exceeds 75% of its rating and/or if the total harmonic generating load on a substation will exceed 50% the A/E shall prepare an IEEE 519 study for review by the University showing that the transformer can safely carry those loads. If the study shows the transformer inadequate, the project shall either increase the transformer size, or add additional transformers.