

UNDERWRITERS LABORATORIES INC. CERTIFICATION REQUIREMENT DECISION

This Certification Requirement Decision is prepared by UL LLC. It is normative for the applicable UL Product Certification Program(s); however, it is currently not part of the UL Standard(s) referenced below.

Product Category (CCN): QYZS

Standard Number: UL 218

Standard Title: Standard for Fire Pump Controllers

Edition Date: September 16, 2015

Edition Number: 3

Section / Paragraph Reference: Section 14.3.4

Subject: Line Reactors Used with Variable Frequency Drives

DECISION:

14.3.4 A line reactor rated for continuous duty shall be provided. It shall be installed ahead of the VFD and shall have a 5 percent impedance rating as a minimum. A reactor provided as an integral part of a VFD may satisfy all or part of the 5 percent impedance if the reactor is connected on the line side of the converter (rectifier) section of the VFD.

Note 1: This is to reduce the likelihood of capacitor and rectifier damage and to avoid capacitor overvoltage shutdown of the VFD and to reduce the input current harmonics to near sinusoidal to avoid overheating the VFD input circuit components and wiring. This reactor is required whether or not the controller or its VFD also contain a DC link reactor, choke (inductor), or swinging choke. By being ahead of the VFD, it protects both the input rectifiers or SCRs, as well as reducing capacitor current (ripple current) and capacitor over-voltage (and over-voltage trip) in the energy storage capacitors. The line reactor enhances line quality by suppressing line transients and disturbances.

Note 2: A DC link reactor or choke does not protect the input rectifiers or SCRs from line voltage transients.

RATIONALE FOR DECISION:

Variable frequency drives (VFD) are often provided with line reactors as part of the factory assembled product. The requirement in paragraph 13.3.4 to install a line reactor ahead of the VFD having a 5 percent impedance rating as a minimum will result in additional impedance for a VFD provided with a reactor as part of the factory assembled product. Most VFDs are designed to operate with a maximum line reactor impedance. Excessive line reactor impedance may cause improper operation of a VFD such as overheating. The revised requirement will permit a reactor provided as an integral part of a VFD to satisfy all or part of the 5 percent impedance requirement in 13.3.4 if the reactor is connected on the line side of the converter (rectifier) section of the VFD.

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