

**SECTION 16443-5 (26 24 19.70)**  
**Integrated Transient Voltage Surge Suppressors (TVSS / SPDs)**  
**For Low Voltage Motor Control Centers**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

This section describes the materials and installation requirements for an integrated Transient Voltage Surge Suppressor (TVSS), also referred to as Surge Protective Device (SPD), in a Low Voltage Motor Control Center (MCC). These devices are used to protect AC electrical circuits from the effect of lightning induced currents, substation switching transients and internally generated transients resulting from inductive and or capacitive load switching.

**1.02 REFERENCES**

- A. UL 1449 Second Edition 2005 - Transient Voltage Surge Suppressors
- B. UL 1283 - Electromagnetic Interference Filters
- C. ANSI/IEEE C62.41.1-2002 - IEEE Guide on the Surge Environment in Low Voltage (1000 V and Less) AC Power Circuits; C62.41.2-2002 - IEEE Recommended Practice on Characterization of Surge Voltages in Low Voltage AC Power Circuits; and C62.45-2002 - IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits.
- D. NEC 2005, Article 285

**PART 2 PRODUCT**

**2.01 SURGE PROTECTIVE DEVICE**

- A. Internal TVSS
  - 1. TVSS shall be Listed in accordance with UL 1449 Second Edition 2005 and UL 1283, Electromagnetic Interference Filters.
  - 2. Integrated surge protective devices (SPD) shall be Component Recognized in accordance with UL 1449 Second Edition, Revision 2/9/2005 Section 37.3 and 37.4 at the standard's highest short-circuit current rating (SCCR) of 200 kA, including intermediate level of fault current testing that will be effective 2/9/2007.
  - 3. TVSS shall be tested with the ANSI/IEEE Category C High exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).
  - 4. TVSS shall provide suppression for all modes of protection: L-N, L-G, and N-G in WYE systems.
  - 5. The manufacturer of the TVSS shall be the same as the manufacturer of the service entrance and distribution equipment in which the devices are installed and shipped. Also, this distribution equipment shall be fully tested and certified to the following UL standards:

UL 67 = Panelboards,  
UL 845 = Motor Control Centers,  
UL 857 = Busway,  
UL 891 = Switchboards,  
UL 1558 = Low Voltage Switchgear.

- 6. Recommended TVSS ratings:
  - a. Minimum surge current rating shall be 160 kA per phase (80 kA per mode) for service entrance and 80 kA per phase (40 kA per mode) for distribution applications.
  - b. UL 1449 clamping voltage must not exceed the following:

| <u>VOLTAGE</u> | <u>L-N</u> | <u>L-G</u> | <u>N-G</u> |
|----------------|------------|------------|------------|
| 240/120        | 800/400V   | 800/400V   | 400V       |
| 208Y/120       | 400V       | 400V       | 400V       |
| 480Y/277       | 800V       | 800V       | 800V       |
| 600Y/347       | 1200V      | 1200V      | 1200V      |

- c. Pulse life test: Capable of protecting against and surviving 5000 ANSI/IEEE Category C High transients without failure or degradation of clamping voltage by more than 10%.
- 7. TVSS shall be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.
- 8. TVSS shall be constructed of one self-contained suppression module per phase.
- 9. Visible indication of proper TVSS connection and operation shall be provided. The indicator lights shall indicate which phase as well as which module is fully operable. The status of each TVSS module shall be monitored on the front cover of the enclosure as well as on the module. A push-to-test button shall be provided to test each phase indicator. Push-to-test button shall activate a state change of dry contacts for testing purposes.
- 10. TVSS shall be equipped with an audible alarm which shall activate when any one of the surge current modules has reached an end-of-life condition. An alarm on/off switch shall be provided to silence the alarm. The switches and alarm shall be located on the front cover of the enclosure.
- 11. A connector shall be provided along with dry contacts (normally open or normally closed) to allow connection to a remote monitor or other system. The output of the dry contacts shall indicate an end-of-life condition for the complete TVSS or module.
- 12. Terminals shall be provided for necessary power and ground connections.

NOTE TO ENGINEER: EACH OF THE FOLLOWING OPTIONS SHOULD BE CHOSEN WITH CARE AS THEY ADD TO THE COST OF THE EQUIPMENT

- 13. The TVSS shall be equipped the following optional items:
  - a. A transient voltage surge counter shall be located on the diagnostic panel on the front cover of the enclosure. The counter shall be equipped with a manual reset and battery backup to retain memory upon loss of AC power.
  - b. A remote monitoring device shall be provided to directly connect to the TVSS with a dry contact connector for simple installation. The device will have indicator lights and an audible alarm to monitor for normal and fault conditions.
- B. TVSS shall have a warranty for a period of ten (10) years from date of invoice. Warranty shall be the responsibility of the electrical distribution equipment manufacturer and shall be supported by their respective field service division.
- C. Approved Vendor: Square D/Schneider Electric, Surgelogic IMA Series

END OF SECTION