

**SECTION 26 43 13**  
**TRANSIENT VOLTAGE SURGE SUPPRESSORS**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all labor, materials, necessary equipment and services to complete the system surge protection work as indicated on the drawings, as specified herein or both, except as for items specifically indicated as “NIC ITEMS”.

**1.2 RELATED WORK**

- A. Section on Grounding.
- B. Section on Wire and Cables.
- C. Section on Wiring Devices.
- D. Section on Circuit Breakers.
- E. Section on Safety Switches.
- F. Section on Low Voltage Switchgear.
- G. Section on Switchboards and Panel Boards.
- H. Section on Fuses.

**1.3 SUBMITTALS**

- A. Submit shop drawings and product data under provisions of Section 013300, “Submittal Procedures”

**1.4 APPLICABILITY**

- A. Surge suppressor requirements outlined: provide fully applicable for protection of building electrical and electronic systems from the effects of line induced transient voltage surge and lightning discharge.

**1.5 REFERENCE STANDARDS**

- A. The following standard and publications are referenced in various parts of this specification and apply.
  - 1. UL 1449 Second Edition –Transient Voltage Surge Suppressors. – 1998.
  - 2. ANSI/IEEE C62.41-1991 (IEE 587) Guide for Surge Voltages in Low-Voltage AC Power Circuits.
  - 3. ANSI/IEEE C62.33-1982 Standard Test Specifications for Varister Surge Protection Devices.
  - 4. ANSI/IEEE C62-45-1992 IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits.
- B. ANSI/IEEE standards may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47<sup>th</sup> Street, New York, NY 10017.

- C. UL Standards may be obtained from Underwriters Laboratories, Inc., 12 Laboratory Drive, P.O. Box 13995, Research Triangle Park, NC 27709.
- D. Most recent edition of above listed standards.
- E. NFPA 70, National Electrical Code.

## 1.6 MANUFACTURER'S QUALIFICATIONS

- A. All surge suppression devices: manufactured by a company normally engaged in the design, development, and manufacture of such devices for electrical and electronics systems equipment.
- B. The surge suppressor manufacturer: offer factory repair service for all non-encapsulated assemblies and replacement for all encapsulated units.
- C. The surge suppressor manufacturer: offer technical assistance through support by a factory representative or local distributor.

## 1.7 WARRANTY

- A. All surge suppression devices: warranted to be free from defects in materials and workmanship under normal use under provisions of the instructions provided for a period of five (5) year.
- B. Any suppressor, which shows evidence of failure or incorrect operation during the warranty period: repaired or replaced by the manufacturer at no cost to the Owner.

## 1.8 SUBSTITUTIONS

- A. Substitutions may be considered when a product becomes unavailable through no fault of the contractor.
- B. Submit under provisions of Section on "Product Substitution Procedures".

## 2.0 PRODUCTS

### 2.1 MAIN SERVICE PANEL TVSS GENERAL REQUIREMENTS (IEEE CAT/ 'C-3')

- A. Surge Suppressors: Install at the main switchboard(s), panel board(s), transfer switch(s), etc., the service encounters as it enters the building.
- B. Suppressors: Close nipped to the device being protected in a position which will minimize lead length between suppressor and the buses or control breaker to which the suppressor connects. Suppressor leads: Do not extend beyond the suppressor manufacturer's recommended maximum length without specific approval of the engineer.
- C. Suppressors: designed for the specific type and voltage of electrical service and provide clamping for line to line, line to neutral, and neutral to ground.
- D. Suppressors: of shunt design.
- E. Suppressors: design to withstand a maximum continuous operating voltage of not less than 115 percent of nominal RMS line voltage.
- F. Suppressors: contain internal safety fusing. On the load side provide circuit

breaker or fused disconnect which is designed to disconnect the suppressor from the electrical source if the suppressor fails. Where required, provide an integral fused disconnect.

- G. Suppressors: fail-safe, have no holdover current, have repeated surge capability, solid-state, self-restoring and fully automatic
- H. Suppressors: contain a visual indication at the suppressor to verify that either the suppressor has failed or that the suppressor is operational and functional.
- I. Suppressors: UL 1449 listed and approved for the location in which they are installed.
- J. Suppressors: provide an operating temperature range of -40 degrees C to + 85 degrees C.
- K. Suppressors: provide an operating humidity of 0 to 95 percent (non-condensing).
  - 1. Voltage Configuration: as shown on plans.
  - 2. Maximum surge capacity 240KA / Phase.
  - 3. Maximum clamping voltage as per UL.

UL 1449 Listed Suppression Voltage Ratings shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	MCOV
208Y/120V	400	400	400	150V
480/277	700	700	700	320V

These ratings may be relaxed for additional vendors, but the level of protection will decrease.)

Provide rating as per UL 1449 standard test results.

- L. Mechanical Requirements:
  - 1. Enclosure: Confirm under provisions of NEMA 1 or NEMA 3R as shown on plans.
  - 2. The suppressor: fully tested before shipment.
  - 3. The manufacturer: provide detailed mechanical and electrical drawings showing component locations and electrical connections for installations.
- M. Approved Manufacturers:
  - 1. Square D.
  - 2. MCG Electronics.
  - 3. LEA.
  - 4. Atlantic Scientific.
  - 5. Current Technology.
  - 6. Advanced Protection Technologies (APT).

## 2.2 SUPPRESSORS (IEE CAT.B)

- A. Install surge suppressors at building panels, chillers starters.
- B. Suppressors: close nipped to the device being protected in a position which will minimize lead length between suppressor and the buses or control breaker to which the

- suppressor connects. Suppressor leads: extended beyond the suppressor manufacturer's recommended maximum length without specific approval of the engineer.
- C. Suppressors: designed for the specific type and voltage of electrical service and provide clamping for line to line, line to neutral, line to ground and neutral to ground.
  - D. Suppressors: of shunt design.
  - E. Suppressors: designed to withstand a maximum continuous operating voltage of not less than 115 percent of nominal RMS line voltage.
  - F. Suppressors: contain internal safety fusing.
  - G. Suppressors: fail-safe, have no holdover current, have repeated surge capability, solid-state, self-restoring and fully automatic.
  - H. Suppressors: contain a visual indication at the suppressor to verify that either the suppressor has failed or that the suppressor is operational and functional.
  - I. Suppressors: UL 1449 listed and approved for the location in which they are installed.
  - J. Suppressors: provide an operating temperature range of -40 degrees C to +85 degrees C.
  - K. Suppressors: provide an operating humidity of 0 to 95 percent (non-condensing).
  - L. Suppressors shall be marked with a short circuit rating and shall not be installed at a point on the system where the available fault current exceeds that rating.
  - M. Electrical Requirements:
    - 1. Voltage Configuration: as shown on plans.
    - 2. Maximum surge capacity 50 KA / Phase.
    - 3. Maximum clamping voltage as per UL Test 1449 shall not exceed 400 volts L-N.
    - 4. Must have a replaceable fuse for each phase.
    - 5. Must have a failure mode indicator for each phase.
    - 6. Must protect all common and transverse modes.
    - 7. Must be used with a heavy duty or main panel suppressor.
  - N. Mechanical Requirements:
    - 1. Enclosure: Conform under provisions of NEMA 1.
    - 2. The suppressor: fully tested before shipment.
    - 3. The manufacturer: provide detailed mechanical and electrical drawings showing component locations and electrical connections for installations.
  - O. Approved Manufacturers:
    - 1. MCG Electronics.
    - 2. Joslyn.
    - 3. Libert.
    - 4. LEA.

5. Square D.

3.0 EXECUTION

3.1 SEGREGATION OF WIRING

- A. All system wiring: classified into protected and non-protected categories. Wiring on the exposed side of suppression devices are considered unprotected. Surge suppressor grounding and bonding conductors also fall into these categories.
- B. All wiring between surge suppressors and protected equipment, considered protected.
- C. Provide a minimum of three (3) inches of separation between parallel runs of protected and unprotected wiring in control panels, terminal cabinets, terminal boards and other locations. In no case, protected and unprotected wiring be bundled together or routed through the same conduit. Where bundles of protected and unprotected wiring cross, make such crossings at right angles.

3.2 INSTALLATION OF SUPPRESSORS

- A. Suppressor: installed as close as practical to the electrical panel to be protected, consistent.
- B. Suppressors: installed in a neat, workmanlike manner. Lead dress: as short and as straight as possible and be consistent with recommended industry practices for the system on which these devices are installed.
- C. Supplementary grounding and bonding connections required between the bonding buss or ground plane for each equipment cluster and other locations as indicated: accomplish by using #6 AWG core cooper conductor and approved connections unless otherwise noted.

END OF SECTION 264313

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