

SECTION 264300 – SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes field-mounted SPDs for low-voltage (<1000 V) power distribution and control equipment.
- B. The specified unit(s) shall provide effective high energy transient voltage surge suppression, surge current diversion and high frequency noise attenuation in all electrical modes for equipment connected downstream from the facility's meter or load side of the main overcurrent device. The unit(s) shall be connected in parallel with the facility's wiring system.
- C. The unit(s) shall be designed and manufactured in North America by a qualified manufacturer of suppression filter system equipment. The qualified manufacturer shall have been engaged in the commercial design and manufacture of such products for minimum of ten (10) years.
- D. All products that are submitted according to these specification will be required to meet this specification in it's entirety for both service and distribution TVSS systems. Any product that is submitted and does not comply with all parts of this specification will be subject to rejection.

1.3 DEFINITIONS

- A. VPR: Voltage Protection Rating.
- B. SPD: Surge Protective Device(s)
- C. $I_{(n)}$: Nominal Discharge Current

1.4 SUBMITTALS

- A. See specification section 260500.
- B. Product Data: For each type of product indicated. Include:
 - 1. Maximum Single Impulse Surge Current Rating.
 - 2. Surge Life (Repetitive Surge) Rating.
 - 3. UL1449 (Latest Edition) Voltage Protection Ratings (VPR).
 - 4. UL1449 (Latest Edition) Nominal Discharge Current (In).
 - 5. Product dimensions and weights.
 - 6. Furnished specialties and accessories.
- C. Qualification Data:
- D. Safety Agency File Number.
- E. ISO 9001-2008 Certification.
- F. ISO 1401-2001 Certification.
- G. Operation and Maintenance Data: For SPDs to include all submittal data and any applicable operation and maintenance manuals.

- H. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.
- B. The unit shall be UL 1449 Listed and CUL Approved as a Surge Protective Device and UL 1283 Listed as an Electromagnetic Interference Filter
- C. Provide 2nd party certified data demonstrating SPD response to ANSI/IEEE C62.41.2-2002 standard waveforms when tested according to IEEE C62.45.
- D. Comply with NFPA 70.
- E. All SPDs provided within this project at the service entrance, distribution panels, and sub-panels shall be from the same manufacturer.

1.6 PROJECT CONDITIONS

- A. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:
 - 1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
 - 2. Operating Temperature: 30 to 150 deg F.
 - 3. Humidity: 0 to 95 percent, non-condensing.
 - 4. Altitude: Less than 13,000 feet above sea level.

1.7 COORDINATION

- A. Where field-mounted SPD's are specifically shown on plans, coordinate locations of field-mounted SPDs to allow adequate clearances for maintenance.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Replaceable Protection Modules: 1 of each size and type installed, where field-replaceable modular SPDs are provided.
 - 2. Fuses: 1 of each size and type installed, where field-replaceable fuses are provided.

PART 2 - PRODUCTS

2.1 SURGE PROTECTIVE DEVICES

- A. Manufacturer:

1. Integral Devices: Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.), or by Surge Suppression Inc. if all of the performance of this specification are met and all UL listing of the equipment manufacturer are met.
2. External Devices (where specifically specified on plans): Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.) or Surge Suppression Inc.

B. Each Surge Protective Device shall:

1. Be internal to the associated distribution equipment (without violating any applicable UL listings) unless specifically shown otherwise on plans.
2. Be UL 1449 (Latest Edition) listed.
3. Have short-circuit current rating complying with UL 1449 (Latest Edition), that matches or exceeds the short-circuit rating of the associated distribution equipment.
4. Be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.
5. Have fuses, rated at 200-kA interrupting capacity.
6. Have a minimum UL 1449 Nominal Discharge Current (I_n) Rating of 20kA.
7. Be fabricated using bolted compression lugs.
8. Provide suppression for seven (7) modes of protection.
9. Have LED indicator lights for power and protection status of each phase.
10. Have audible alarm, with silencing switch, to indicate when protection has failed.
11. Have form-C contacts rated at 2 A and 24-V ac minimum, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with facility monitoring and control system if monitoring by that system is required by plans or other specifications.
12. Have six-digit transient-event counter, mounted to front of equipment door, set to totalize transient surges (externally mounted SPD's may have the transient –event counter mounted on the visible face of the SPD).
13. Meet all UL 96A requirements (for Lightning Protection Systems) where the device is installed at a service entrance of the facility. At a minimum, these devices shall:
 - a. Be marked as Type 1 or Type 2 SPDs with product Identity consisting of “Surge Protective Device” or “SPD”, and identifying all ratings so required by UL96A and the 4 digit alpha numeric Control Number.
 - b. Have a minimum UL 1449 Nominal Discharge Current (I_n) Rating of 20kA.
 - c. Be UL listed and labeled with holographic label.

C. Peak Single-Impulse Surge Current Rating shall be meet the following minimums unless specifically shown otherwise on plans:

Application	Per Phase	Per Mode
Service Entrance Devices	240 kA	120 kA
Downstream Devices	160 kA	80 kA

D. The ANSI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	208Y/120V	480Y/277V	600Y/347V
L-N,L-G, N-G	800	1200	1500

L-L	1200	2000	2500
------------	------	------	------

- E. The ANSI /UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	240/120V
L-N,L-G, N-G	1200/800

2.2 ENCLOSURES

- A. Where external units are specifically specified on plans, units not mounted within electrical distribution equipment (such as switchboards, MCC's, etc.) shall be provided in enclosures with NEMA enclosure ratings that match or exceed the NEMA enclosure ratings of the equipment from which the units are fed. For example, a unit fed from a NEMA 4X stainless steel panelboard shall also be mounted within a NEMA 4X stainless steel enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All SPD's shall be integrally-mounted within the associated distribution equipment unless specifically shown otherwise on plans.
- B. Install SPDs at service entrance on load side, with ground lead bonded to service entrance ground.
- C. Install SPDs downstream of the service entrance with conductors or buses between suppressor and points of attachment as short and straight as possible. The lead lengths between the TVSS unit and the equipment being protected shall not exceed fourteen (14) inches without approval from the engineer. Do not bond neutral and ground. Leads shall be as straight as possible with no sharp bends.
- D. Where externally-mounted SPD's are specifically shown on plans, provide circuit breaker as directed by the SPD supplier as a dedicated disconnecting means for SPD unless otherwise indicated.

3.2 FIELD QUALITY CONTROL

- A. Ensure that interiors are free of foreign materials and dirt.
- B. Check and test switches, pushbuttons, meters for proper operation.
- C. Check and test indicating lights for proper operation and color.
- D. Perform manufacturer's on site field test procedures.

3.3 STARTUP SERVICE

- A. Do not perform insulation resistance (MEGGER) tests of the distribution wiring equipment with the SPDs installed. Disconnect all wires, including neutral, before conducting insulation resistance tests, and reconnect immediately after the testing is over.

3.4 SYSTEM WARRANTY

- A. The SPD system manufacturer shall warranty the entire SPD system against defective materials and workmanship for a period of ten (10) years from the date of substantial completion. This warranty is in effect as long as the unit is installed in compliance with the manufacturer's installation, operation, and maintenance manual, UL Listing requirements, and any applicable national or local electrical codes.
- B. Any SPD device which shows evidence of failure or incorrect operation, including damage as the result of lightning strikes, during the warranty period shall be replaced by the manufacturer at no charge to the owner. Warranty will provide for multiple exchanges of any inoperable devices at any time during the warranty period which starts at the date of substantial completion of the system to which the surge suppressor is installed.
- C. The manufacturer is required to have a nationwide network of factory-authorized local service representatives for repair and service of this product. The manufacturer shall have a dedicated 1-800 telephone number for service problems and questions. This number shall be manned by a knowledgeable factory employee to ensure prompt response to any emergency situation that may arise.

END OF SECTION 264300