

SECTION 264313 - TRANSIENT-VOLTAGE SUPPRESSION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

Latest Update 5-7-2017 See underlined text for Edits.

(Engineer shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Also turn off all “Underlines”.)

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 and all other sections of Division 26.

1.2 SUMMARY

- A. Section includes field-mounted TVSS for low-voltage (120 to 600 V) power distribution and control equipment.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. SVR: Suppressed voltage rating.
- C. TVSS: Transient voltage surge suppressor(s), both singular and plural; also, transient voltage surge suppression.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.
- B. Qualification Data: For qualified testing agency.
- C. Product Certificates: For TVSS devices, from manufacturer.
- D. Field quality-control reports.
- E. Operation and Maintenance Data: For TVSS devices to include in emergency, operation, and maintenance manuals.

- F. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.
- C. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.
- D. Comply with NEMA LS 1.
- E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify UMB in writing no fewer than ten (10) days in advance of proposed electrical service interruptions.
 - 2. Do not proceed with interruption of electrical service without UMB's written permission.
- B. Service Conditions: Rate TVSS devices for continuous operation under the following conditions unless otherwise indicated:
 - 1. Maximum Continuous Operating Voltage: Not less than 115 % of nominal system operating voltage.
 - 2. Operating Temperature: 30°F to 120°F.
 - 3. Humidity: 0% to 85 %, noncondensing.
 - 4. Altitude: Less than twenty thousand (20,000) feet above sea level.

1.7 COORDINATION

- A. Coordinate location of field-mounted TVSS devices to allow adequate clearances for maintenance.

- B. Coordinate TVSS devices with Division 26 Section "Electrical Power Monitoring and Control."

1.8 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: [One (1)] <Insert number> of each size and type installed.

1.9 WARRANTY/GUARANTEE

- A. See Division 26 Specification Section "Basic Electrical Requirements" for warranty and guarantee requirements.
- B. 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: Five years from date of Substantial Completion.
- C. Special Warranty for Cord-Connected, Plug-in Surge Suppressors: Manufacturer's standard form in which manufacturer agrees to repair or replace electronic equipment connected to circuits protected by surge suppressors.

PART 2 - PRODUCTS

2.1 SERVICE ENTRANCE SUPPRESSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. AC Data Solutions.
 - 2. Advanced Protection Technologies Inc. (APT).
 - 3. Current Technology Inc.; Danaher Power Solutions.
 - 4. Liebert Corporation; a division of Emerson Network Power.
 - 5. Square D; a brand of Schneider Electric.
- B. Surge Protection Devices:
 - 1. Comply with the latest edition of UL 1449, 2nd Edition
 - 2. [Modular design (with field-replaceable modules)] [Non-modular design].
<Engineer to Edit for Project Requirements>

3. Fuses, rated at 200-kA interrupting capacity.
4. Fabrication using bolted compression lugs for internal wiring.
5. Integral disconnect switch.
6. Redundant suppression circuits.
7. Redundant replaceable modules.
8. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus.
9. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
10. LED indicator lights for power and protection status.
11. Audible alarm, with silencing switch, to indicate when protection has failed.
12. Form-C contacts rated at 5 A and 250-V ac, 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 building power monitoring and control system.
13. [Four (4)] [Six (6)]-digit transient-event counter set to totalize transient surges. <Engineer to Edit for Project Requirements>

C. Peak Single-Impulse Surge Current Rating: [320 kA per mode/640 kA] [240 kA per mode/480 kA] [160 kA per mode/320 kA] per phase. <Engineer to Edit for Project Requirements>

D. Minimum single impulse current ratings, using 8-by-20-mic.sec waveform described in IEEE C62.41.2

1. Line to Neutral: [70,000] <Insert value> A.
2. Line to Ground: [70,000] <Insert value> A.
3. Neutral to Ground: [50,000] <Insert value> A.

E. Protection modes and UL 1449, 2nd Edition SVR for grounded wye circuits with [480Y/277 V] [208Y/120 V], 3-phase, 4-wire circuits shall be as follows: <Engineer to Edit for Project Requirements>

1. Line to Neutral: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>
2. Line to Ground: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>
3. Neutral to Ground: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>

2.2 PANELBOARD SUPPRESSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

1. Advanced Protection Technologies Inc. (APT).
2. Current Technology Inc.; Danaher Power Solutions.

3. Leviton Mfg. Company Inc.
 4. Square D; a brand of Schneider Electric.
- B. Surge Protection Devices:
1. Comply with UL 1449, 2nd Edition
 2. [Modular design (with field-replaceable modules)] [Non-modular design].
<Engineer to Edit for Project Requirements>
 3. Short-circuit current rating complying with UL 1449, and matching or exceeding the panelboard short-circuit rating and redundant suppression circuits; with individually fused metal-oxide varistors.
 4. Fuses, rated at 200-kA interrupting capacity.
 5. Fabrication using bolted compression lugs for internal wiring.
 6. Integral disconnect switch.
 7. Redundant suppression circuits.
 8. Redundant replaceable modules.
 9. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
 10. LED indicator lights for power and protection status.
 11. Audible alarm, with silencing switch, to indicate when protection has failed.
 12. Form-C contacts rated at 5 A and 250-V ac, 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 building power monitoring and control system.
 13. [Four (4)] [Six (6)]-digit transient-event counter set to totalize transient surges.
<Engineer to Edit for Project Requirements>
- C. Peak Single-Impulse Surge Current Rating: [160 kA per mode/320 kA] [120 kA per mode/240 kA] [80 kA per mode/160 kA] per phase. <Engineer to Edit for Project Requirements>
- D. Minimum single impulse current ratings, using 8-by-20-mic.sec waveform described in IEEE C62.41.2:
1. Line to Neutral: [70,000] <Insert value> A.
 2. Line to Ground: [70,000] <Insert value> A.
 3. Neutral to Ground: [50,000] <Insert value> A.
- E. Protection modes and UL 1449 SVR for grounded wye circuits with [480Y/277 V] [208Y/120 V], 3-phase, 4-wire circuits shall be as follows: <Engineer to Edit for Project Requirements>
1. Line to Neutral: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>
 2. Line to Ground: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>

3. Neutral to Ground: [800 V for 480Y/277 V] [400 V for 208Y/120 V]. <Engineer to Edit for Project Requirements>

2.3 ENCLOSURES

- A. Indoor Enclosures: NEMA 250 [Type 1] [Type 12]. <Engineer to Edit for Project Requirements>
- B. Outdoor Enclosures: NEMA 250 [Type 3R] [Type 4] [Type 4X]. <Engineer to Edit for Project Requirements>

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install TVSS devices at service entrance on load side, with ground lead bonded to service entrance ground.
- B. Install TVSS devices for panelboards and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
 1. Provide multiple, [30] [60] [100]-A circuit breaker as a dedicated disconnecting means for TVSS unless otherwise indicated. <Engineer to Edit for Project Requirements>

3.2 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
 2. After installing TVSS devices but before electrical circuitry has been energized, test for compliance with requirements.
 3. Complete startup checks according to manufacturer's written instructions.

- C. TVSS device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.3 STARTUP SERVICE

- A. Do not energize or connect [service entrance equipment] [panelboards] [control terminals] [data terminals] to their sources until TVSS devices are installed and connected. <Engineer to Edit for Project Requirements>
- B. Do not perform insulation resistance tests of the distribution wiring equipment with the TVSS installed. Disconnect before conducting insulation resistance tests, and reconnect immediately after the testing is over.

3.4 DEMONSTRATION

- A. [Engage a factory-authorized service representative to train] Owner's maintenance personnel to maintain TVSS devices. Provide training for a minimum of four (4) hours. <Engineer to Edit for Project Requirements>

END OF SECTION 264313