

SECTION 26 43 13 – TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

- A. The Surge Protection Devices (SPD) covered under this section includes all service entrance type surge protection devices suitable for use as Type 1 or Type 2 devices per UL1449 4rd Edition, applied to the line or load side of the utility feed inside the facility.
- B. This section includes SPD's located at Service Entrance.
- C. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to finish and install surge protection devices.
- D. The unit installed at the electrical service entrance shall be designed for parallel connection to the facility's wiring system and be multi-listed as a TVSS device, a noise filter, and as a Secondary Surge Arrester. The suppression filter system shall be designed and manufactured in the USA by a qualified manufacturer of suppression filter system equipment.
- E. Provide product startup as listed in part 3.

1.2 STANDARDS

- A. The specified unit shall be designed, manufactured, tested by an approved National Testing Lab (i.e. UL, ETL, Metalab, etc.) and installed in compliance with the following standards:
 - 1. Underwriters Laboratories UL 1449 4th Edition 2014 Revision
 - 2. Underwriters Laboratories UL 1283
 - 3. Underwriters Laboratories UL 96A
 - 4. IEEE C62.41
 - 5. IEEE C62.45
 - 6. IEEE 1100 Emerald Book
 - 7. National Fire Protection Association (NFPA 70 [NEC])

1.3 SUBMITTALS

- A. Package must include shop drawings complete with all technical information, unit dimensions, detailed installation instructions, maintenance manual, recommended replacement parts list and wiring configuration.
- B. Copies of Manufacturer's catalog data, technical information and specifications on equipment proposed for use.
- C. Copies of documentation stating that the Surge Protection Device is listed by UL to UL1449 4th Edition, category code VZCA.
- D. Copies of actual let through voltage data in the form of oscillograph results for both ANSI/IEEE C62.41 Category C3 (combination wave) and B3 (Ring wave) tested in accordance with ANSI/IEEE C6245.

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- E. Copies of Noise Rejection testing as outlined in NEMA LS1-1992 (R2000) Section 3.11. Noise rejection is to be measured between 50kHz and 100MHz verifying the devices noise attenuation. Must show multiple attenuation levels over a range of frequencies.
- F. Copies of test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor components can survive published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable.
- G. Copy of warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.

1.4 WARRANTY

- A. The manufacturer of the TVSS shall provide a Warranty against failure for the following durations from the date of shipment.
 - 1. Service Entrance Unit: Fifteen (15) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Current Technology
 - 1. Service Entrance Model TG3-200- (See Chart below, provide voltage as shown on drawings).
- B. Thor equivalents.
- C. Asco by Schneider equivalents.

2.2 GENERAL

- A. Refer to drawing for operating voltage, configuration and surge current capacity per mode for each location, or you may list locations and information here.
- B. Declared Maximum Continuous Operating Voltage (MCOV) shall be greater than 115 percent of the nominal system operating voltage and in compliance with test and evaluation procedures outlined in the nominal discharge surge current test of UL1449, section 37.7.3. MCOV values claimed based on the component's value or on the 30-minute 115% operational voltage test, section 38 in UL1449 will not be accepted.
- C. Unit shall have no more than 10% deterioration or degradation of the UL1449 4th Edition Voltage Protection Rating (VPR) when exposed to a minimum of 14,000 repeated category C3 (20kV/10kA) surges. The SPD manufacturer must provide a test report validating the repetitive surge test was performed.
- D. Protection Modes UL1449 4th Edition VPR(6kV, 3kA) for grounded WYE/delta and High Leg Delta circuits with voltages of (480Y/277), (208Y/120), 3-Phase, 4 wire circuits, (120/240) split phase shall be as follows and comply with test procedures outlined in UL1449 3rd Edition section 37.6:

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TG3-200			B3 Ringwave	C3 Comb. Wave	UL 1449 4th Ed
Voltage	Mode	MCOV	6kV, 500A	20kV, 10kA	VPR Rating
120/208,	L-N	150	490	980	700
120/240	L-G	150	570	980	700
	N-G	150	640	1170	700
	L-L	300	500	1600	1200
277/480	L-N	320	450	1420	1200
	L-G	320	540	1540	1200
	N-G	320	570	1600	1000
	L-L	552	530	2600	2000

- E. High Frequency Extended Range Power Filter. The unit shall include a high frequency filter and shall be listed to UL 1283 as an Electromagnetic Interference Filter. The unit's EMI-RFI noise rejection or attenuation values shall be in compliance with test and evaluation procedures outlined in MIL-STD-220B.

Attenuation Freq.	10KHz	100KHz	1MHz	10MHz	Max at 142KHz
SL-200	18.1dB	44dB	22.8dB	15.3dB	54.6dB

NOTE: Standardized insertion loss data obtained utilizing MIL-STD-220B 50-ohm insertion loss methodology. Noise source path = 100' to model maximum average circuit distance, filter connection distance = 6".

2.3 ENCLOSURE AND MOUNTING

- A. The unit shall be supplied in a NEMA 4 metallic enclosure for mounting external to switchgear. Products required to be mounted integral to switchgear will not be accepted.

2.4 FEATURES/OPTIONS

- A. On-Line Diagnostic Monitoring:
1. Provide the following monitoring on Service Entrance Units:
 - a. LED/phase and audible alarms.
 - b. Surge Counter.
 - c. 2 Form 'C' contacts to provide alarm indication to remote system.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The specified service entrance unit shall be installed on the wall adjacent to the switchboard and connected to the designated breaker in the switchboard utilizing a cable similar to Current Technology HPI-6Y series cable. Cable leads shall be kept to a minimum. Terminals shall be provided for all necessary power and ground connections.
- B. System shall not require removal and replacement for warranty or other repairs. All internal component replacements shall be capable of being completed by a licensed electrician.
- C. Other materials and equipment shall comply with applicable Sections of this Division.

3.2 QUALITY ASSURANCE

- A. Diagnostic Signature Card. Each unit shall be factory tested before shipment. A copy of the start-up test results and the factory benchmark testing results shall be supplied to the engineer and the owner for confirmation of proper system function. These results shall also clarify that the integrity of all neutral-to-ground bonds were verified through testing and visual inspection, and that all grounding bonds were observed to be in place.

3.3 STARTUP

- A. Startup: A manufacturer's representative shall visit the site verify installation and submit to Contracting Officer a letter stating equipment and installation meets intent of Contract Documents, and manufacturer's warranties and guarantees are in effect.

END OF SECTION 26 43 13