

**SURGE PROTECTIVE DEVICE  
(SPD)**

**PART 1 -- GENERAL**

**1.01 SUMMARY**

- A. Section includes the Surge Protective Device(s) (SPD) to provide protection of electrical equipment rated 600 volts and less from the harmful effects of surges, transients and electrical line noise and excessive voltages due to lightning strikes or switching transients.

**1.02 SUBMITTALS**

- A. Submit manufacturer's data demonstrating compliance with this Specification and the Drawings. Information shall include, but not be limited to:
1. Catalog data showing features and accessories in accordance with this specification.
  2. An equipment manual with installation, operation, and maintenance instructions for the specified unit.
  3. Electrical and mechanical drawings that show unit dimensions, weights, mounting provisions, connection details and layout diagram of the unit.
  4. UL 1449 **Third Edition** compliance document showing the Voltage Protection Rating (VPR) for the specific catalog number(s) submitted.
  5. Short Circuit Current Rating (SCCR) that meets or exceeds the available fault current.

**1.03 OPERATING AND MAINTENANCE MANUALS**

1. Identify the size, model and features for each item.
2. Complete instructions regarding the operation and maintenance of equipment involved. Instructions and documentation not related to the equipment furnished must be removed or crossed out. *O&M manuals must be individually tailored to the project and equipment as furnished.*
3. Complete nomenclature of replaceable parts, part numbers, current cost, name and address of nearest vendor of replacement parts. Information on equipment or components not related to equipment furnished must be removed or crossed out. *O&M manuals must be individually tailored to the project and equipment as furnished.*
4. Copy of warranties issued on the installation, showing dates of expiration.
5. Refer to Specification Section 16010 for additional requirements.

**1.04 QUALITY ASSURANCE**

- A. The SPD system shall be designed and manufactured to the following standards:
1. Underwriters Laboratory (UL) 1449-**Third Edition**

2. Underwriters Laboratory (UL) 1283-Fifth Edition
  3. National Electric Code, 2011 (NEC)
  4. American National Standard Institute (ANSI)
  5. Institute of Electrical and Electronic Engineers (IEEE)
  6. National Electrical Manufacturers Association (NEMA)
  7. National Fire Protection Association (NFPA)
  8. Occupational Safety and Health Act (including Pub. 81-123)
  9. Federal Information Processing Standards (FIPS)
- B. In addition, the system shall be tested in accordance with the following standards:
1. ANSI/IEEE C62.41, Categories A, B and C3 (10kA)
  2. ANSI/IEEE C62.45
- C. The SPD system shall be coordinated and engineered by the manufacturer. The system shall be manufactured in the USA by an ISO 9001 certified manufacturer engaged in the design and manufacture of SPD systems as specified for a minimum of five (5) years.

## 1.05 RELATED WORK


- A. Specification Section 16400, Service Entrance Section
- B. Specification Section 16482, Motor Control Centers

## 1.06 WARRANTY

- A. The SPD system manufacturer shall warranty the entire system against defective materials and workmanship for a period of **ten years** following delivery from the manufacturer. This warranty is in effect as long as the unit is installed in compliance with the manufacturer's owner's/operator's manual, UL listing requirements, and any applicable national or local electrical codes.
- B. The manufacturer is required to have a nationwide network of factory-trained technicians dedicated to repair and service of this product. The manufacturer shall have a dedicated **1-800 telephone number** for service problems and questions. This number must be manned 24 hours a day, 365 days a year by a knowledgeable factory employee to ensure prompt response to any emergency situation, which may arise. The manufacturer is required to be able to service the equipment on a local basis without the requirement to return the product to the manufacturer for proper repair.

## PART 2 -- PRODUCTS

### 2.01 ACCEPTABLE PRODUCTS

- A. External SPD's
  1. Emerson 510 Series
  2. Current Technology TG Series
  3. Surge Suppression Inc.  E Series

- 4. Or equal
- B. Small Service, Control Panel and Electrical Service Pedestal SPD's (SPD Cubes)
  - 1. Emerson 420 Series
  - 2. Advanced Protection Technologies S50 Series
  - 3. Current Technology CGC Series
  - 4. Or equal 

**2.02 ENVIRONMENTAL REQUIREMENTS**

- A. The SPD system shall be designed for operation in the following conditions:
  - 1. Operating Temperature -40° F to 140° F
  - 2. Relative Humidity 0 - 95%
  - 3. Operating Altitude 0 - 12,000 Feet

**2.03 EXTERNAL SPD ELECTRICAL REQUIREMENTS**

- A. The SPD shall be ANSI/UL 1449 Third Edition, Type 2 listed with a minimum nominal discharge current rating of 20 kA and voltage rating as indicated on the Drawings.
- B. The Surge Current Capacity shall be 125 kA per mode and 250 kA per phase.
- C. The SPD shall provide protection in all modes: L-N, L-G, L-L, and N-G.
- D. The maximum UL 1449-Third Edition VPR ratings shall not exceed the following:

<u>Mode</u>	<u>277/480 VAC</u>
Line-Neutral	<u>1200</u> VAC
Line-Ground	<u>1200</u> VAC
Neutral-Gnd	<u>1200</u> VAC
Line-Line	<u>2000</u> VAC

- E. The unit shall be supplied with compression type terminals for each phase and neutral conductors. Terminals shall be capable of accepting a copper conductor up to No. 8 AWG.

**2.04 SMALL SERVICE, CONTROL PANEL & ELECTRICAL SERVICE PEDESTAL SPD ELECTRICAL REQUIREMENTS**

- A. The SPD shall be ANSI/UL 1449 Third Edition, Type 2 listed with a minimum nominal discharge current rating of 10 kA and voltage rating as indicated on the Drawings.
- B. The Surge Current Capacity shall be 50 kA per mode and 100 kA per phase.
- C. The SPD shall provide protection in all modes: L-N, L-G, L-L, and N-G.
- D. The maximum UL 1449-Third Edition VPR ratings shall not exceed the following:

<u>Mode</u>	<u>120/240</u>	<u>120/208</u>	<u>277/480</u>
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Line-Neutral	700 VAC	700 VAC	N/A
Line-Ground	1000 VAC	1000 VAC	2000 VAC
Neutral-Gnd	700 VAC	700 VAC	N/A
Line-Line	1200 VAC	1200 VAC	3000 VAC

E. The unit shall be pre-wired with 36-inches of No. 10 AWG conductors.

## 2.05 OVERCURRENT PROTECTION

- A. All components of the SPD shall be individually fused and rated for the minimum AIC rating as indicated on the Drawings. Devices utilizing a single fuse to protect multiple suppression paths are not acceptable for use on this project. In addition, devices utilizing replaceable fusing are not acceptable for use on this project.
- B. The overcurrent protection must be integral to the SPD and shall be tested and shipped as a complete system.

## 2.06 ENCLOSURE

- A. The SPD cabinet enclosure shall be rated NEMA 12 for indoor applications and NEMA 4 for outdoor applications. The SPD cabinet enclosure shall be designed for wall mounting.

## 2.07 STANDARD MONITORING FEATURES

- A. Each protection module shall contain status lights to indicate whether the module is operating properly or when the module has failed. The normal operation of the protection module shall provide positive indication utilizing the green light.
- B. An alarm contact shall be provided for remote monitoring of SPD unit failure. The "Form C" dry contact shall be designed to allow connection in either the normally open or normally closed position. Any protection circuit failure condition shall change the state of the alarm contact.
- C. The system's on-board monitoring shall include a six (6) digit Surge Event Counter. The counter shall increment any surge event where the SAD/MOV circuit actually diverts current to its assigned pathway. Systems that increment the counter only when there is a high surge voltage event (and not necessarily actual surge diversion) are not acceptable for use on this project. The counter shall be provided with a (5) year lithium battery for information retention purposes in the event of a complete power failure.

## PART 3 -- EXECUTION

### 3.01 INSTALLATION

- A. The SPD unit shall be mounted in the motor control center/service entrance section/distribution switchboard as indicated on the Drawings. Installation shall be such that the front door of the compartment cannot be opened unless the disconnect switch is on the "off" position. Maximum cable length shall be 48-inches.

### 3.02 INSTALLATION

- A. The SPD unit shall be installed where indicated on the Drawings per the manufacturer's installation instructions.
- B. Each SPD shall be installed as close as practical to the facility's wiring system or equipment bus as indicated on the Drawings. The factory installed conductor shall be terminated to the overcurrent device without splicing additional cable or conductors.

**\*\*END OF SECTION \*\***