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The Description of the Project
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SPECIFICATION DIVISION 26

NUMBER SECTION DESCRIPTION

DIVISION 26 ELECTRICAL
SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

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DIVISION 26 ELECTRICAL

SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

INCLUDE PARAGRAPH 1.1.A AND B IN EVERY SPECIFICATION SECTION. EDIT RELATED SECTIONS 1.1.B TO MAKE IT PROJECT SPECIFIC.

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 01 Specification Sections, and other applicable Specification Sections, in particular the Related Sections listed below, apply to this Section.

VERIFY ALL RATINGS, DIMENSIONS AND REQUIREMENTS SPECIFIED TO BE AS SHOWN ON THE DRAWINGS ARE CLEARLY SHOWN ON THE DRAWINGS.

IN 1 BELOW, SELECT PROPER COMMISSIONING SPEC SECTION NUMBER APPLICABLE TO THE PROJECT.

B. Related Sections:

1. Section 019100/019110 - Commissioning
2. Section 017823 - Operation and Maintenance Manual
3. Section 260513 - Medium, Low & Control Voltage Cables
4. Section 260526 - Grounding and Bonding for Electrical
5. Section 260533 - Electrical Materials and Methods
6. Section 260800 - Electrical Acceptance Tests
7. Section 262000 - Low Voltage Electrical Distribution

1.2 SUMMARY

A. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment. Unless shown otherwise on the drawings, SPDs shall be side-mounted. Integrally mounted SPDs are not generally acceptable unless approved by the Owner.

1.3 SUBMITTALS

A. Product Data: The submittals shall include data on rated capacities, operating characteristics, electrical characteristics, dimensions, and furnished specialties and accessories.

B. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.

C. Installation, Operation, and Maintenance Manuals.

1.4 QUALITY ASSURANCE

A. Listed or labeled by Underwriters Laboratories (UL) or an approved Nationally Recognized Testing Laboratory (NRTL).

B. Surge Protective Devices shall comply with UL 1449, Standard for Surge Protective Devices 3rd Edition or later.

1.5 WARRANTY

A. Provide a complete warranty for parts and labor for a minimum of five years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide external side-mount SPDs as shown on the drawings or as required to satisfy relevant code requirements and to provide a complete installation.

B. SPDs with Accessories shall be listed and labeled as defined in NFPA 70 and marked for intended location and application.

C. SPDs shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.

D. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.

E. SPDs shall be non-modular. SPDs containing items such as single-mode replaceable modules, replaceable fuses, or replaceable batteries shall not be accepted. SPDs requiring user intervention to test the unit via a diagnostic test kit or similar device shall not be accepted.

F. Service Conditions: The Surge Protective Devices shall be rated 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. Short-circuit Current Rating: Equal or exceed 100 kA
3. Operating Temperature: 30 to 120 deg F.
4. Humidity: 0 to 85 percent, noncondensing.

G. SPDs shall have the following features and accessories:

1. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
2. Indicator light display for power and protection status.

RETAIN THE FOLLOWING PARAGRAPH FOR SPECIAL APPLICATIONS WHERE INTEGRATION WITH BUILDING AUTOMATION IS REQUIRED.

3. 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.

RETAIN THE FOLLOWING PARAGRAPH FOR SPECIAL APPLICATIONS WHERE ELECTROMAGNETIC AND RADIO-FREQUENCY INTERFERENCE FILTERS IS REQUIRED TO IMPROVE POWER QUALITY TO SENSITIVE EQUIPMENT.

4. Comply with UL 1283.

AUDIBLE ALARMS ARE NOT GENERALLY DESIRABLE FOR UNIVERSITY APPLICATIONS. THE FOLLOWING PARAGRAPH MAY BE EDITED FOR SPECIAL INSTANCES WHERE AN ALARM MAY BE DESIRABLE TO PROVIDE IMMEDIATE INDICATION OF PROTECTIVE DEVICE FAILURE.

5. No audible alarm. If an alarm is provided, provide a means of disabling audible output.

RETAIN THE FOLLOWING PARAGRAPH FOR SPECIAL APPLICATIONS WHERE SURGE COUNTER IS DESIRED TO PROVIDE AN INDICATION OF POWER QUALITY. NOTE THAT SURGE COUNTERS ARE NOT TESTED OR DEFINED BY THE UL STANDARD AND CAN PROVIDE ONLY A QUALITATIVE METRIC OF EXPOSURE TO SURGE.

6. Surge Counter.

H. Nominal Discharge Current (Inominal) Rating: 20 kA.

PEAK SURGE CURRENT LARGELY DETERMINES THE LONGEVITY OF PROTECTIVE DEVICE FUNCTION WHEN SUBJECTED TO REPEATED SURGES. AT DOWNSTREAM PANELBOARDS, 50KA IS APPROPRIATE. AREAS CONSIDERED SUBJECT TO HIGHER SURGE RISK MAY BE RATED FOR UP TO 300KA. IEEE GUIDANCE IS PROVIDE BELOW FOR VARIOUS PROTECTION LOCATIONS FOR LOW RISK LOCATIONS

SURGE CURRENT CAPACITY BASED ON ANSI / IEEE C62.41 LOCATION CATEGORY

CAT	*APPLICATION*	*PER PHASE*	*PER MODE*
C	*SERVICE ENTRY*	*200KA*	*100KA*
B	*DIST. PANEL*	*120KA*	*60KA*
A	*PANELBOARDS*	*50KA*	*25KA*

I. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than **[40 kA, 120 kA, 200kA]**. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

J. Protection Modes – The SPD shall protect all modes of the electrical system being utilized.

K. Protection modes and UL 1449 VPR for grounded wye circuits with three-phase, four-wire circuits shall not exceed the following:

1. Line to Neutral
   a. 1200 V for 480Y/277 V
   b. 700 V for 208Y/120 V
2. Line to Ground:
   a. 1200 V for 480Y/277 V
   b. 1000 V for 208Y/120 V
3. Line to Line:
   a. 2000 V for 480Y/277 V
   b. 1200 V for 208Y/120 V

L. Protection modes and UL 1449 VPR for 240/120 V, single-phase, three-wire circuits shall not exceed the following:

1. Line to Neutral: 700 V.
2. Line to Ground: 1000 V.
3. Line to Line: 1000 V.

2.2 ENCLOSURES

A. Indoor Enclosures: NEMA 250, Type 1.

B. Indoor or Outdoor Enclosures: NEMA 250, Type 1, Type 4, or Type 4X.

2.3 CONDUCTORS AND CABLES

A. Power wiring shall be the same size as the SPD leads and shall comply with Section 260513 "Medium, Low & Control Voltage Cables."

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

RETAIN THE FIRST PARAGRAPH FOR APPLICATIONS WHERE THE SPD IS CLOSE-COUPLED TO A PANELBOARD. RETAIN THE FOLLOWING PARAGRAPH WHERE THE SPD MAY BE ATTACHED AT POINT-OF-USE EQUIPMENT OR SWITCHING EQUIPMENT.

A. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.

B. Provide a circuit breaker of the manufacturer’s recommended size as a dedicated disconnecting means for SPD phase connections unless otherwise indicated.

C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

D. Use compression connectors and splices only. Wire nuts are unacceptable.

E. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests and reconnect them immediately after the testing is over.

F. Energize SPDs after power system has been energized, stabilized, and tested.

3.2 FIELD QUALITY CONTROL

A. Prior to any testing, perform visual inspections to verify the following:

1. The equipment is properly installed and supported.
2. The equipment is free from damage and defects.
3. Shipping blocks and restraints have been removed.
4. The electrical wiring installation complies with manufacturer's written installation requirements.
5. The electrical terminations have been properly tightened.
6. The equipment has been properly aligned.
7. The equipment has been thoroughly cleaned.
8. The equipment is properly labeled and labels are correct.

3.3 COMMISSIONING

A. Perform Commissioning activities per Related Sections above.

3.4 DEMONSTRATION

A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION 264313