CITY OF FORT WAYNE MASTER CREATED: 11/16/18

SECTION 26 43 13

SUrge Protection Devices

1. - GENERAL
	1. DESCRIPTION
		1. Scope:
			1. The Surge Protection Device (SPD) covered under this section includes all service entrance type SPD suitable for use as Type 1 or Type 2 devices that are applied to the line or load side of the utility feed.
			2. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install surge protection devices with size and trip rating as shown or specified.
		2. Coordination:
			1. Review installation procedures under other Sections and coordinate installation of items to be installed with or before surge protection devices.
		3. Related Sections:

NTS: List below only sections covering products, construction, and equipment specifically identified in this section and specified in another section and directly referenced in this specification. Do not list administrative and procedural division 01 sections.

* + - 1. Section 26 05 05, General Provisions for Electrical Systems.
			2. Section 26 05 53, Identification for Electrical Systems.
			3. Section 26 13 00, Medium-Voltage Switchgear.
			4. Section 26 23 00, Low-Voltage Switchgear.
			5. Section 26 24 13, Switchboards.
			6. Section 26 24 16, Panelboards.
			7. Section 26 24 19, Motor Control Centers.
	1. REFERENCES

NTS: Retain applicable standards and add others as required.

* + 1. Standards referenced in this Section are:
			1. UL 1449, 4th Edition – Standard for Surge Protection Devices.
			2. UL 1283, 7th Edition – Standard for Electromagnetic Interference Filters.
			3. UL 96A, 13th Edition – Standard for Installation Requirements for Lightning Protection Systems.
			4. ANSI/IEEE C62.41 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
			5. ANSI/IEEE C62.45 – Guide for Surge Testing for equipment connected to Low-Voltage AC Power Circuits.
			6. IEEE C62.62 – Standard Test Specification for Surge Protection Devices for Low-Voltage AC Power Circuits.
			7. IEEE 1100 Emerald Book
			8. NFPA 70 Article 285, National Electrical Code.
			9. NFPA 70E, Electrical Safety in the Workplace
	1. Definitions
		1. Definitions referenced in this section are:
			1. Inominal: Nominal discharge current.
			2. MCOV: Maximum continuous operating voltage.
			3. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
			4. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
			5. OCPD: Overcurrent protective device.
			6. SCCR: Short-circuit current rating.
			7. SPD: Surge protective device.
			8. VPR: Voltage protection rating.

NTS: Edit article “1.4” below to suit the Project. DO NOT DELETE (NOT USED) ITEMS.

* 1. SUBMITTALS
		1. Action Submittals: Submit the following:
			1. Product Data: For each type of Product
				1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
				2. Include maximum conductor length for all external SPDs.
				3. Include manufacturer’s suggested OCPD size and rating.
			2. Shop Drawings (NOT USED)
			3. Samples (NOT USED)
		2. Informational Submittals: Submit the following:
			1. Certificates (NOT USED)
			2. Delegated Design Submittal (NOT USED)
			3. Test and Evaluation Reports
				1. 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.
			4. Manufacturers’ Instructions
				1. Submit instructions for each type.
			5. Source Quality Control Submittals (NOT USED)
			6. Field Quality Control Submittals
				1. Results of Field Quality Control Reports.
			7. Manufacturer Reports (NOT USED)
			8. Sustainable Design Submittals (NOT USED)
			9. Special Procedure Submittals (NOT USED)
			10. Qualifications Statements (NOT USED)
		3. Closeout Submittals.
			1. Maintenance Contracts (NOT USED)
			2. Operation and Maintenance Data
				1. Submit complete installation, operation and maintenance manuals including test reports, maintenance data and schedules, and description of operation.
			3. Bonds (NOT USED)
			4. Warranty Documentation
				1. Submit manufacturer’s warranty per the requirements of this Section.
			5. Record Documentation (NOT USED)
			6. Sustainable Design Closeout (NOT USED)
			7. Software (NOT USED)
		4. Maintenance Material Submittals. (NOT USED)
			1. Spare Parts (NOT USED)
			2. Extra Stock Materials (NOT USED)
			3. Tools (NOT USED)
	2. QUALITY ASSURANCE
		1. SPDs shall bear the UL label.
		2. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.
		3. Testing Agency Qualifications: In addition to requirements specified in Section 26 01 26 independent testing agency shall meet OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907, or shall be full member company in InterNational Electrical Testing Association (NETA).
		4. Manufacturer:
			1. Manufacturer shall have not less than five years of experience producing substantially similar equipment to that required and, upon request, shall submit documentation of not less than five installations in satisfactory operation for not less than five years in the United States.
	3. Delivery, Storage, and Handling
		1. Equipment shall be handled and stored in accordance with manufacturer’s instructions.
1. - PRODUCTS
	1. MANUFACTURERS
		1. Subject to compliance with requirements, provide products by the following:
			1. External SPDs:
				1. ASCO Power Technologies
				2. Current Technologies
			2. Internal SPDs:
				1. Eaton.
				2. Siemens
				3. Square D.
	2. general spd requirements
		1. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
		2. Comply with NFPA 70.
		3. Comply with UL 1449.
		4. MCOV of the SPD shall be the nominal system voltage.
	3. service entrance and transfer switch suppressor
		1. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 1.
		2. SPDs with the following features and accessories:
			1. Integral disconnect switch.
			2. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
			3. Indicator light display for power and protection status.
			4. 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.
			5. Surge counter.
		3. Comply with UL 1283.

NTS: Select correct Peak Surge Current Ration from list below.

* + 1. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than **[200 kA 240kA 320 kA 480 kA]**. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

NTS: KEEP ONE OF THE TWO PARAGRAPHS BELOW. Select correct voltage from list below and choose correct protection mode voltage from items listed below.

* + 1. Protection modes and UL 1449 VPR for grounded wye circuits with **[480Y/277 V 208Y/120 V]**, three-phase, four-wire circuits shall not exceed the following:
			1. Line to Neutral: **[1200 V for 480Y/277 V 700 V for 208Y/120 V]**.
			2. Line to Ground: **[1200 V for 480Y/277 V 1200 V for 208Y/120 V]**.
			3. Line to Line: **[2000 V for 480Y/277 V 1000 V for 208Y/120 V]**.
		2. Protection modes and UL 1449 VPR for grounded wye circuits with 240/120 V, single-phase, three-wire circuits shall not exceed the following:
			1. Line to Neutral: 700 V.
			2. Line to Ground: **[700 V 1000 V]**.
			3. Line to Line: 1000 V.

NTS: Select correct SCCR from list below.

* + 1. SCCR: Equal or exceed **[100 kA 200 kA]**.
		2. Inominal Rating: 20 kA.
	1. panel suppressors
		1. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.
		2. SPDs with the following features and accessories:
			1. Integral disconnect switch.
			2. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
			3. Indicator light display for power and protection status.
			4. 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.
			5. Surge counter.
		3. Comply with UL 1283.

NTS: Insert correct Peak Surge Current Rating in lieu of (-1-) below.

* + 1. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than (-1-). The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

NTS: KEEP ONE OF THE TWO PARAGRAPHS BELOW. Select correct voltage from list below and choose correct protection mode voltage from items listed below.

* + 1. Protection modes and UL 1449 VPR for grounded wye circuits with **[480Y/277 V 208Y/120 V]**, three-phase, four-wire circuits shall not exceed the following:
			1. Line to Neutral: **[1200 V for 480Y/277 V 700 V for 208Y/120 V]**.
			2. Line to Ground: **[1200 V for 480Y/277 V 1200 V for 208Y/120 V]**.
			3. Line to Line: **[2000 V for 480Y/277 V 1000 V for 208Y/120 V]**.
		2. Protection modes and UL 1449 VPR for grounded wye circuits with 240/120 V, single-phase, three-wire circuits shall not exceed the following:
			1. Line to Neutral: 700 V.
			2. Line to Ground: 700 V.
			3. Line to Line: 1000 V.

NTS: Insert correct SCCR value in lieu of (-1-) below.

* + 1. SCCR: Equal or exceed (-1-).
		2. Inominal Rating: 20 kA.
	1. Enclosures
		1. Indoor Enclosures: NEMA 250, Type 12.
	2. conductors and cables
		1. Power Wiring: Same size as SPD leads complying with Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
			1. External SPDs:
				1. Contractor shall not exceed manufacturer’s recommended maximum length of cabling.
				2. Contractor shall consult with Engineer for all cable installations longer than manufacturer’s recommended maximum length.
		2. Class 2 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 18 AWG, complying with Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
		3. Class 1 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 14 AWG, complying with Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
1. EXECUTION
	1. Installation
		1. Comply with NECA 1.
		2. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.
		3. 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.
			1. Do not splice and extend SPD leads unless specifically permitted by manufacturer.
			2. Do not exceed manufacturer's recommended lead length.
			3. Do not bond neutral and ground.
		4. Use crimped connectors and splices only. Wire nuts are unacceptable.
		5. Wiring:
			1. Power Wiring: Comply with wiring methods in Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
			2. Controls: Comply with wiring methods in Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
	2. field quality control
		1. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
			1. Compare equipment nameplate data for compliance with Drawings and Specifications.
			2. Inspect anchorage, alignment, grounding, and clearances.
			3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
		2. An SPD will be considered defective if it does not pass tests and inspections.
		3. Prepare test and inspection reports.
	3. startup service
		1. Complete startup checks according to manufacturer's written instructions.
		2. 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.
		3. Energize SPDs after power system has been energized, stabilized, and tested.
	4. demonstration
		1. Train Owner’s maintenance personnel to operate and maintain SPDs.

+ + END OF SECTION + +