

**SECTION 264300
SURGE PROTECTIVE DEVICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surge protective devices for service entrance locations.
- B. Surge protective devices for distribution locations.
- C. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 262300 - Low-Voltage Switchgear.
- C. Section 262413 - Switchboards.
- D. Section 262416 - Panelboards.
- E. Section 262419 - Motor-Control Centers.
- F. Section 262513 - Low-Voltage Busways.

1.03 ABBREVIATIONS AND ACRONYMS

- A. EMI/RFI: Electromagnetic Interference/Radio Frequency Interference.
- B. SPD: Surge Protective Device.

1.04 REFERENCE STANDARDS

- A. MIL-STD-220 - Method of Insertion Loss Measurement 2009c (Validated 2019).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- D. UL 1283 - Standard for Electromagnetic Interference Filters Current Edition, Including All Revisions.
- E. UL 1449 - Standard for Surge Protective Devices Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to ordering equipment.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.
 - 1. SPDs with EMI/RFI filter: Include noise attenuation performance.
- C. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.
- D. Certificates: Manufacturer's documentation of listing for compliance with the following standards:
 - 1. UL 1449.
 - 2. UL 1283 (for Type 2 SPDs).

1.07 QUALITY ASSURANCE

- A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.09 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Warranty: Provide minimum 15 year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Field-Installed, Externally Mounted Surge Protective Devices:
 - 1. Intermatic, Inc: www.intermatic.com/#sle.

2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mounted SPDs.
- C. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.
- D. Protected Modes:
 - 1. Wye Systems: L-N, L-G, N-G, L-L.
 - 2. Delta Systems: L-G, L-L.
 - 3. Single Split Phase Systems: L-N, L-G, N-G, L-L.
 - 4. High Leg Delta Systems: L-N, L-G, N-G, L-L.
- E. UL 1449 Voltage Protection Ratings (VPRs):
 - 1. 208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
 - 2. 240/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
 - 3. 480V Delta System Voltage: Not more than 1,800 V for L-G mode and 3,000 V for L-L mode.
 - 4. 480Y/277V System Voltage: Not more than 1,500 V for L-N, L-G, and N-G modes and 2,500 V for L-L mode..
- F. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- G. Enclosure Environment Type per NEMA 4X.
- H. Mounting for Field-installed, Externally Mounted SPDs: As indicated on the drawings.
 - 1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.
 - 2. Provide flush-mounted SPD where mounted in public areas or adjacent to flush-mounted equipment.

2.03 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

- A. Surge Protective Device - Basis of Design: Intermatic Inc; PanelGuard M Series; www.intermatic.com/#sle.
1. Voltage: As indicated on drawings.
 2. Features: Seven modes of protection (for 3-phase wye circuits); component-level thermal fusing; internal circuit board-mounted overcurrent fusing; 200 kAIC SCCR;
 3. Surge Current Rating: Not less than 240 kA/Phase.
 4. Warranty: 15 Year.
 5. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 6. UL 1449 Short Circuit Current Rating (SCCR): Not less than 200 kA.
 7. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 8. Include the following options:
 - a. DIAGNOSTICS (One of the following must be selected)
 - 1) DG1 - Green LEDs, one per phase, normally on.
 - 2) DG2 - Green LEDs, one per phase, normally on with internal audible alarm and dry relay contacts.
 - 3) DG3 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button.
 - 4) DG4 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button. Audible alarm with panel mount alarm mute and test switches.n.
 - b. DISCONNECT SWITCH OPTIONS (Only one of the following may be selected)
 - 1) Integral non-fused disconnect switch, with external handle.
 - 2) Integral non-fused disconnect switch, without external handle.
 - c. REMOTE LED OPTION (May be selected)
 - 1) LP - Remote LEDs in 4X enclosure.
 - d. OTHER OPTIONS (May be selected)
 - 1) P - Flush mount plate.

2.04 SURGE PROTECTIVE DEVICES FOR DISTRIBUTION LOCATIONS

- A. Surge Protective Device - Basis of Design: Intermatic Inc; PanelGuard M Series; www.intermatic.com/#sle.
1. Voltage: As indicated on drawings.
 2. Features: Seven modes of protection (for 3-phase wye circuits); component-level thermal fusing; internal circuit board-mounted overcurrent fusing.
 3. Surge Current Rating: Not less than 160 kA/Phase.
 4. Warranty: 15 year.
 5. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 6. UL 1449 Short Circuit Current Rating (SCCR): Not less than 200 kA.
 7. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 8. Include the following options:
 - a. DIAGNOSTIC (One of the following must be selected)
 - 1) DG1 - Green LEDs, one per phase, normally on.
 - 2) DG2 - Green LEDs, one per phase, normally on with internal audible alarm and dry relay contacts.
 - 3) DG3 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button.
 - 4) DG4 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button. Audible alarm with panel mount alarm mute and test switches.
 - b. DISCONNECT SWITCH OPTIONS (Only one of the following may be selected)
 - 1) Integral non-fused disconnect switch, with external handle.
 - 2) Integral non-fused disconnect switch, without external handle.

- c. REMOTE LED OPTION (May be selected)
 - 1) LP - Remote LEDs in 4X enclosure.
- d. OTHER OPTIONS (May be selected)
 - 1) P - Flush mount plate.

2.05 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

- A. Surge Protective Device - Basis of Design: Intermatic Inc; PanelGuard M Series; www.intermatic.com/#sle.
 - 1. Voltage: As indicated on drawings.
 - 2. Features: Seven modes of protection (for 3-phase wye circuits); component-level thermal fusing; internal circuit board-mounted overcurrent fusing.
 - 3. Surge Current Rating: Not less than 80 kA/Phase.
 - 4. Warranty: 15 Year.
 - 5. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 - 6. UL 1449 Short Circuit Current Rating (SCCR): Not less than 200 kA.
 - 7. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 - 8. Include the following options:
 - a. DIAGNOSTIC OPTIONS (One of the following must be selected)
 - 1) DG1 - Green LEDs, one per phase, normally on.
 - 2) DG2 - Green LEDs, one per phase, normally on with internal audible alarm and dry relay contacts.
 - 3) DG3 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button.
 - 4) DG4 - Green LEDs, one per phase, normally on with internal audible alarm, dry relay contacts, and surge counter with reset button. Audible alarm with panel mount alarm mute and test switches.
 - b. DISCONNECT SWITCH OPTIONS (Only one of the following may be selected)
 - 1) Integral non-fused disconnect switch, with external handle.
 - 2) Integral non-fused disconnect switch, without external handle.
 - c. REMOTE LED OPTION (May be selected)
 - 1) LP - Remote LEDs in 4X enclosure.
 - d. OTHER OPTIONS (May be selected)
 - 1) P - Flush mount plate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.
- C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.
- D. Verify system grounding and bonding is in accordance with Section 260526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless indicated otherwise, connect service entrance surge protective device on load side of service disconnect main overcurrent device.

- E. Provide conductors with minimum ampacity as indicated on the drawings, as required by NFPA 70, and not less than manufacturer's recommended minimum conductor size.
- F. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.
- G. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 260526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.
- H. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

END OF SECTION