SES160 B Series
Surge Protective Device

WARNINGS

- Safety First – Hazardous Voltage & Shock Hazard
- Only qualified licensed electricians should install or service SPDs
- Hazardous voltages exist within SPDs
- SPDs should never be installed or serviced when energized
- Use appropriate safety precautions including Personal Protection Equipment
- Failure to follow these instructions can result in death, serious injury, and/or equipment damage
- This manual shall be read in its entirety prior to installing

Bonding and Grounding Hazard

Verify that the neutral conductor in the service entrance equipment is bonded to ground in accordance with the National Electric Code (NEC®) and all applicable codes. During installation into an electrical system the panel must not be energized; or the Circuit Breaker de-energized, until the SPD is completely installed, inspected and tested. All conductors must be connected and functional including the neutral (if required).

The voltage rating of the SPD and system must be verified before energizing the SPD. Failure to follow these guidelines can lead to abnormally high voltages at the SPD. This may cause the SPD to fail. The warranty is voided if the SPD is incorrectly installed and/or if the neutral conductor in the service entrance equipment or downstream of separately derived systems is not bonded to ground in accordance with the NEC®

Do Not Hi-Pot Test SPDs

Any factory or on-site testing of power distribution equipment that exceeds normal operating voltage such as high-potential insulation testing, or any other tests where the suppression components will be subjected to higher voltage than their rated Maximum Continuous Operating Voltage (MCOV) must be conducted with the SPD disconnected from the power source. For 4-wire systems, the neutral connection at the SPD must also be disconnected prior to performing high-potential testing. Failure to disconnect SPD and associated components during elevated voltage testing will damage the SPD and will void the warranty.

SPDs on Ungrounded Systems

Caution – Ungrounded systems are inherently unstable and can produce excessively high line-to ground voltages during certain fault conditions. During these fault conditions, any electrical equipment including an SPD may be subjected to voltages which exceed their designed ratings. An SPD designed specifically for Ungrounded systems should be used.

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2. nVent products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow nVent's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void your warranty.

SAFETY INSTRUCTIONS:
All governing codes and regulations and those required by the job site must be observed.
Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

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Unpacking & Preliminary Inspection
Inspect the entire shipping container for damage or signs of mishandling. Remove the packing materials and further inspect the unit for any obvious shipping damages. If any damage was found and is a result of shipping or handling, immediately file a claim with the shipping company and forward a copy to nVent.

Storage Environment
This SPD should be stored in a clean, dry environment. Storage temperature range is -40°C (-40°F) to +60°C (+140°F). Avoid exposure to high condensation.

PRE-INSTALLATION & INSTALLATION PLANNING

Operating Environment
The standard unit uses a NEMA 4X enclosure. Flush-mount kits are available as option. Before installing, ensure that your enclosure type and application are appropriate with regard to moisture, dirt, excessive dust, flammable materials or atmospheres, corrosive vapors, etc. This SPD is designed in an ambient temperature range of -25°C (-13°F) to +85°C (+185°F) with a relative humidity of 0% to 95% (noncondensing). Excessive temperature may inadvertently operate internal thermal over temperature protectors.

Line Side versus Load Side Installation
The SES160 B Series is tested and Listed as a Type 1 SPD per UL 1449 4th Ed. This SPD can be installed on the Line Side of the service overcurrent device. Type 1 SPDs may also be installed in UL Type 2 Applications. In general, it is more practical to install as Type 2 on the load side of the main overcurrent Device for maintenance reasons.

Audible Noise
SPD background noise is negligible or non-existent, and does not restrict the location of installation.

Lead Lengths & Maximizing SPD Performance
SPDs must be located as close to the circuit as possible to minimize let-through voltage. Use the shortest & straightest possible leads. Pre-Plan installations and ensure that nearest breaker positions are used. If new construction, adjust breaker locations as appropriate. When longer leads are unavoidable, gently twist leads together (one to two twists per foot), or tie-wrap leads together.

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Voltage Rating

Before installing SPD, verify that it has the same voltage rating as the power distribution system. Compare the SPDs nameplate voltage or model number and ensure that SPD configuration matches the intended power source.

Circuit Breaker Connected

When connected on load side of main disconnect, we suggest connecting via a 20A circuit breaker. The circuit breaker is the intended disconnect switch and provides short circuit protection to the connecting conductors. These SPDs have internal overload protection elements within the product. These SPDs have demonstrated 200kA Short Circuit Current Ratings (SCCRs).

System Grounding

An equipment grounding conductor must be used on all electrical circuits connected to the SPD. For the best performance, use a single point ground system where the service entrance grounding electrode system is connected to and bonded to all other available electrodes, building steel, metal water pipes, driven rods, etc. (for reference see: IEEE Std 142-2007). For sensitive electronics and computer systems, we recommend that the ground impedance measurement be as low as possible.
When metallic raceway is used as an additional grounding conductor, an insulated grounding conductor should be run inside the raceway and sized per the NEC®. Adequate electrical continuity must be maintained at all raceway connections. Do not use isolating bushings to interrupt a metallic raceway run. A separate isolated ground for the SPD is NOT recommended. Proper equipment connections to grounding system and ground grid continuity should be verified via inspections and testing on a regular basis as part of a comprehensive electrical maintenance program. On 4-Wire Power System Service Entrance Panels, neutral to ground bonding (Main Bonding Jumper) must be installed per the NEC®. Failure to do so WILL damage SPDs.

CAUTION: This unit must be installed in conformance with all governing codes and instructions, and must be installed on the load side of the main over-current protection.

Retro-fit Into Existing Panel with No Available Breaker Positions

Follow all applicable Codes:
Consider consolidating loads in a manner that might free breaker positions.
A ten foot tap rule in NEC® 240.21(B)(1) allows you to tap the bus as long as the tap conductors are rated at least 10% of the ampacity of the panel. In the case where the ampacity of the panel is larger than the wires of the SPD, consider tapping the bus per NEC® 240.21(B)(1) and running appropriate size conductors to a safety switch fused to 20A. Mount the SPD immediately adjacent to the safety switch.

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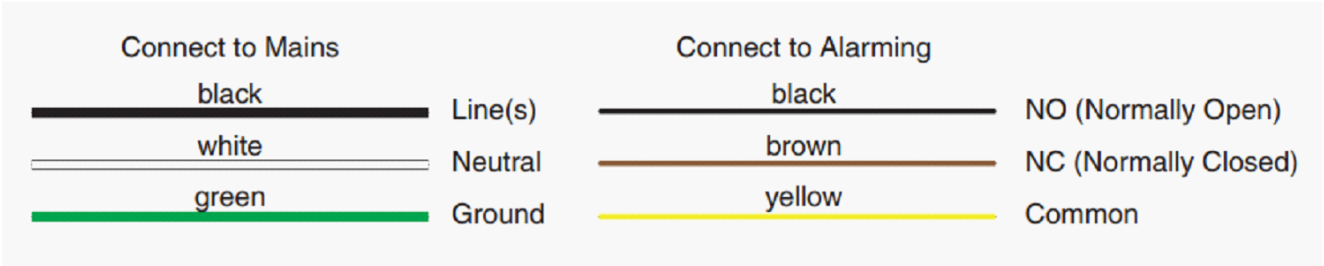
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INSTALLATION

Pre-Plan your installation

- Meet all National and Local codes. (NEC® Article 285 addresses SPDs)
- Mount SPD as close to panel or equipment as possible to keep leads short
- Ensure leads are as short and straight as possible, including neutral and ground.
- Consider a breaker position that is closest to the SPD and the panel's neutral & ground
- Suggested breaker size is 20A.
- Make sure system is grounded per NEC® and clear of faults before energizing SPD.



1. Use a voltmeter to check all voltages to ensure correct SPD.
2. If utilizing Dry Contacts, pre-plan their installation.
3. Remove power for panel. Confirm panel is deenergized.
4. Identify connection/breaker location and SPD location.
5. Make sure leads are short.
6. Remove an appropriately sized knockout from panel.
7. Mount SPD. Connect to equipment using an approved wiring method, including seals appropriate for the enclosure rating.
8. Connect conductors as appropriate – short and straight as possible.
9. Label or mark conductors as appropriate
   Energized: black
   Neutral: white
   Ground: green
10. Make sure system is bonded per NEC® and is clear of hazards or faults before energizing (N-G bonding not per NEC® will fail SPDs (only at Service Entrance).
11. Energize and confirm proper operation of indicators and/or options. If Audible Alarm cycles, de-energize immediately and contact nVent for help.

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OPERATION

LED Operation

Each SPD contains 1 green LED per line shown in the appropriate voltage configuration. When the LEDs are green complete protection is present. Upon MOV failure the LED corresponding to the failed mode will extinguish.

Audible Alarm

Similar to the LEDs the Audible Alarm will sound upon suppression element failure. The Audible Alarm may be silenced by removing power to the SPD.

Dry Contact

Three 18", 22 AWG wires are included through the nipple as the Form C Dry Contacts. The Contacts change state during inoperative conditions, including loss of power. Any status change can be monitored elsewhere via the Relay Contacts.

- Please note: Dry Contacts are designed for low voltage or control signals only
- Maximum switching current is 2A
- Maximum switching voltage is 240Vac
- Higher energy applications require additional relay implementation outside the SPD
- Yellow is Common, Black is Normally Open and Brown is Normally Closed. If the Dry Contacts are not utilized, insulate lead ends, coil and secure.

MAINTENANCE

SPDs require minimal maintenance. We recommend periodic inspection of diagnostic indicators to ensure proper operation. We also recommend keeping the SPD clean as appropriate.

Troubleshooting & Service

Please contact us for any service related issues.

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