



# Eaton's SPD Series

For mounting external to electrical distribution equipment

### Introduction

#### Eaton SPD Series sidemount surge protective devices

Eaton sidemount versions of the SPD Series surge protective devices are the latest and most advanced UL® 1449 5th Edition certified surge protectors. Application of SPD Series units throughout a facility will ensure that equipment is protected with the safest and most reliable surge protective devices available. SPD Series units are available in all common voltages and configurations, and also in a variety of surge current capacity ratings from 50 kA to 400 kA. Four feature package options are also available to choose from.

### Applications

#### Facility-wide surge protection is needed more than ever

The ever-increasing use of microprocessors and other sensitive electronic equipment has increased the necessity for facility-wide surge protection. These sensitive electronic components are used within many pieces of equipment, including computers, programmable logic controllers and other commonly used electrical and electronic equipment. Surges can wreak havoc on equipment, causing catastrophic failures, process interruptions and premature aging leading to failure. The application of surge protective devices (SPDs) can mitigate problems with sensitive electronic equipment, keeping the equipment and its related processes up and running reliably without disruption or damage due to surge-related events.

In addition to externally generated surge events, such as lightning and grid switching, equipment is also susceptible to damage by internally generated surges. In fact, the majority of surges are generated internally by commonly used items, such as fluorescent lighting ballasts, light dimmers, photocopiers, fax machines and variable frequency drives. This further reinforces the need for facility-wide surge protection applied at all stages of the electrical distribution system, from the electrical service entrance down to the single-phase loads.

### Standards and certifications

- UL 1449 5th Edition and UL 1283 7th Edition



### Features

- Thermally protected metal oxide varistor (MOV) technology is used
- 20 kA nominal discharge current ( $I_n$ ) rating (maximum rating assigned by UL)
- 50 kA to 400 kA surge current capacity ratings
- Four feature package options
- Factory-sealed assembly prevents arc flash and shock hazards
- Contains no replaceable parts or items that require periodic maintenance
- Optional internal disconnect available
- 200 kA short-circuit current rating (SCCR)
- Can be used for UL 96A compliance
- Can be used for NFPA® 780 compliance
- Can be used for RoHS compliance
- 10-year warranty (15 years with registration)

The breadth of the SPD Series' features, options and configurations ensures that the correct unit is available for all electrical applications, including service entrances, distribution switchboards, panelboards and point-of-use applications.

# EATON

Powering Business Worldwide

### The SPD Series makes surge suppression safer than ever

The SPD Series employs safety and design features that make surge protection safer than ever. Unlike many surge protective devices, the SPD Series contains no user-serviceable parts or items that require periodic maintenance, such as replaceable surge modules, replaceable fuses, surge counter memory backup batteries or wire lugs that require periodic retightening. Sidemount versions of the unit are factory-sealed, meaning potential contact with harmful voltages inside the unit is not possible.

The SPD Series sidemount units also take safety to the next level by using thermally protected MOVs as their core surge suppression component. These thermally protected MOVs operate in a safe manner, even when subjected to abnormal conditions, such as temporary overvoltages or high fault current conditions. When one of these conditions exists, the thermally protected MOVs are removed from the circuit quickly and safely before a potentially unsafe condition can occur, with absolutely no discharge of smoke or ionized gases. Using the latest in technology and surge protective device design, the SPD Series provides safe, reliable, worry-free surge protection.

### Prewired

All SPD Series sidemount units are prewired at the factory and contain a factory-installed conduit interface, making installation very easy. Simply mount the unit, perform any required conduit runs, and land all required wires to the electrical assembly that the unit is being interfaced with. No internal wiring connections or access to the inside of the unit is required.

### Factory-sealed

All SPD Series sidemount units are factory-sealed. This preventive safety measure eliminates potential arc flash and shock hazards, as the user/installer has no chance of coming into contact with energized electrical components within the unit. In addition, the unit contains no user-replaceable or serviceable items. Factory-sealing all units, coupled with the lack of replaceable items, further increases user safety, as contact with live electrical parts is neither possible nor necessary.

### Compact size

Sidemount versions of the SPD Series are compact in size, taking up less space in the electrical room. Units housed in NEMA® 1 rated enclosures in the 50 kA through 200 kA surge current capacity range are housed in a 74-square-inch enclosure that is only 3.50 inches deep. Units housed in NEMA 1 rated enclosures in the 250 kA through 400 kA surge current capacity range are housed in a 74-square-inch enclosure that is only 6.00 inches deep.

### Enhanced protection status indicators

The Eaton SPD Series takes the features normally found in surge protective devices to the next level. Unlike many surge protectors that may have only single-colored indicators that simply indicate whether power is applied to the surge protective device, each SPD Series unit includes dual- or tri-colored light emitting diodes (LEDs) that indicate the true status of the protection. On three-phase units, if power is removed from a phase, the unit's LEDs continue to indicate the status of protection on that phase, not the status of power applied to the phase. This feature ensures that the user has the most accurate information about the protection supplied by the SPD—not the power applied to the phase.

All units that require a neutral wire connection also contain an additional set of dual- or tri-colored LEDs that report the status of the protection in the neutral-ground (N-G) protection mode. Like the phase protection status LEDs, the N-G protection status LEDs also report the true status of the protection in the N-G mode.

Although most SPDs on the market contain N-G mode protection, they do not monitor and indicate the status of the protection in that mode. The SPD Series' N-G protection mode status indication feature will ensure that users are supplied with complete and accurate information concerning the surge protective device's protection status.

### 20 kA nominal discharge current rating ( $I_n$ )

The entire SPD Series product offering has a nominal discharge current ( $I_n$ ) of 20 kA, the highest achievable rating for this important parameter. This is a new rating for SPDs that is included as part of UL 1449 5th Edition testing and certification. This rating provides an indication of the SPD's design robustness and ability to handle a number of large-magnitude surges over a short period of time and remain operational within tested parameters.

During  $I_n$  testing, the SPD is subjected to 15 surges of a current magnitude chosen by the SPD's manufacturer. Valid current magnitude choices for the test are 20 kA and 10 kA for Type 1 SPDs. Valid choices for Type 2 SPDs are 20 kA, 10 kA, 5 kA and 3 kA. The 15 surges are then applied at the value chosen by the manufacturer.

Prior to the start of  $I_n$  testing, a preliminary voltage protection rating (VPR) is measured. The VPR is the measured let-through voltage of the unit when a 6 kV, 3 kA surge is applied. This value is documented and saved as a reference. After all surges have been applied, the VPR is measured once again and compared to the value that was recorded prior to the 15-surge sequence. In order to pass the  $I_n$  test, the SPD must survive all 15 surges and the measured pre- and post-VPR values must be within  $\pm 10\%$  of each other.

Choosing an SPD with an  $I_n$  of 20 kA ensures that your equipment is being protected by a unit that will continue to maintain a high level of surge protection performance, even after being subjected to multiple high-magnitude surges.

Industry standards for lightning protection systems require the installed SPDs to have a nominal discharge current of 20 kA. The 2008 Edition of National Fire Protection Agency (NFPA) Standard 780, titled "Standard for the Installation of Lightning Protection Systems," states the requirement in Section 4.18.3.1.2. UL 2007 Edition Standard 96A, titled "Installation Requirements for Lightning Protection Systems," states the requirement in Section 13.1. Choosing an SPD with an  $I_n$  of 20 kA will ensure that compliance with these standards can be achieved.

## SPD Series unit



Eaton SPD Series sidemount unit mounted externally to an Eaton panelboard.



All SPD Series sidemount units come prewired and include a factory-installed conduit interface, making installation very easy.



All SPD Series units are factory-sealed, ensuring that the user/installer has no potential of coming into contact with harmful voltages present inside the unit.

## Feature package options

The SPD Series provides users with the option of selecting between four feature packages—basic, standard, standard with surge counter, and Power Xpert® SPD. The proper feature package can be selected based on the requirements of the application or the specification.

### Basic feature package

The basic feature package is perfect for applications where basic, cost-effective, safe and reliable surge protection is required but budgets don't allow for extra, additional features. Rather than sacrifice performance or safety due to cost, SPD Series units with the basic feature package offer high-performing surge protection without sacrificing safety or reliability. The basic feature package has the same level of surge protection and safety provided by the standard package and the standard with surge counter feature package minus some of the features found in them. The package contains dual-colored LEDs that report the true status of the protection in each phase/mode. All four-wire plus ground units also contain an additional set of dual-colored protection status LEDs that report the status of protection in the N-G mode.

### Standard feature package

The standard feature package includes all of the features found in the basic feature package, plus an audible alarm with silence button, EMI/RFI filtering and a Form C relay contact that can be used for remote annunciation of the SPD's status. The audible alarm activates and the Form C relay contact changes state when any loss of protection is detected or a fault condition exists with the unit. Should such a condition occur, the audible alarm can be silenced by pressing the silence button. The EMI/RFI filter provides up to 50 dB of noise attenuation over the range of 10 kHz through 100 MHz.

### Standard with surge counter feature package

The standard with surge counter feature package includes all of the features found in the standard feature package plus a six-digit surge counter with a reset button. The surge counter indicates the ongoing count of the number of surges the unit has been exposed to and stores them in nonvolatile memory. Should power to the SPD Series unit be completely interrupted, the surge counter will recall and display the surge count prior to the interruption when power is restored. Unlike many surge protectors, the SPD Series' surge counter memory feature does not require a backup battery that would need periodic replacement in order to achieve its memory functionality.

### Power Xpert SPD feature package

All features of the standard with surge counter feature package including advanced monitoring and communication. Power Xpert SPD tracks and records surge events and protection status on your facility's power system. Power Xpert SPD categorizes surge events on each phase as low, medium and high according to IEEE® standard C62.41.2 and stores them in an event log with time and date stamps. Power Xpert SPD uses Eaton's Power Xpert architecture for secure Ethernet communications to a webpage, or over Modbus® TCP/IP or BACnet/IP for remote monitoring capabilities. Power Xpert SPD is plug and play compatible with Eaton's PXG900 Gateway and Power Xpert Dashboard.

For more details on Power Xpert SPD, refer to product aid PA158017EN.



## Side-by-side comparison of the SPD Series' available feature packages

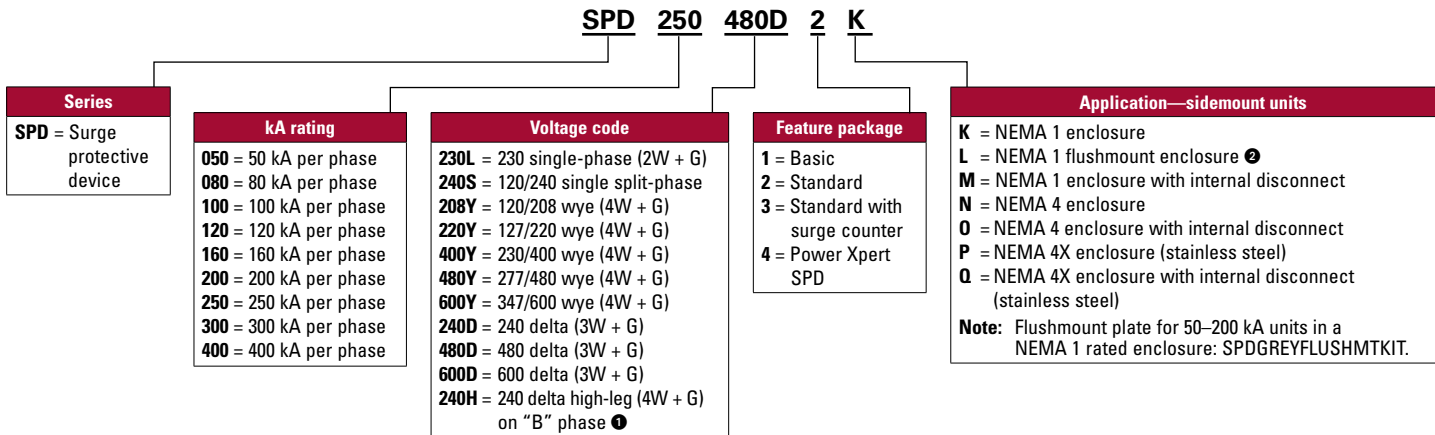
| Feature package comparison   | Basic | Standard | Standard with surge counter | Power Xpert SPD |
|--|-------|----------|-----------------------------|-----------------|
| Surge protection using thermally protected MOV technology  | ■     | ■        | ■                           | ■               |
| Dual-colored protection status indicators for each phase   | ■     | ■        | ■                           |                 |
| Dual-colored protection status indicators for the N-G protection mode ①                          | ■     | ■        | ■                           |                 |
| Tri-colored protection status indicators for each phase and the neutral-ground protection mode ① |       |          |                             | ■               |
| Audible alarm with silence button  |       | ■        | ■                           | ■               |
| Form C relay contact   |       | ■        | ■                           | ■               |
| EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz             |       | ■        | ■                           | ■               |
| Surge counter with reset button  |       |          | ■                           | ■               |
| Percentage protection remaining status   |       |          |                             | ■               |
| RJ45 Ethernet port for LAN connection, Modbus TCP/IP or BACnet/IP                                |       |          |                             | ■               |
| UI webpage and programmable settings   |       |          |                             | ■               |
| Time-and-date stamped surge log and surge categorization   |       |          |                             | ■               |

① Neutral-ground protection mode available in applicable voltage configurations only.

## Specifications

| Description  | Ratings   |
|--|---|
| Surge current capacity per phase                   | 50, 80, 100, 120, 160, 200, 250, 300 and 400 kA ratings available   |
| Nominal discharge current ( $I_n$ )                | 20 kA   |
| Short-circuit current rating (SCCR)                | 200 kA  |
| SPD type   | Basic feature package = Type 1 (can also be used in Type 2 applications)<br>Standard, standard with surge counter and Power Xpert SPD feature packages = Type 2   |
| System voltages available (Vac)                    |   |
| Single-phase                                       | 230   |
| Single split-phase (three-wire plus ground)        | 120/240   |
| Three-phase wye (four-wire plus ground)            | 120/208, 127/220, 230/400, 277/480, 347/600   |
| Three-phase delta (three-wire plus ground)         | 240, 480, 600   |
| Three-phase high-leg delta (four-wire plus ground) | 120/240   |
| Input power frequency                              | 50/60 Hz, Power Xpert SPD tested to 60 Hz only  |
| Protection modes                                   |   |
| Single-phase                                       | L-N, L-G, N-G   |
| Single split-phase                                 | L-N, L-G, L-L, N-G  |
| Three-phase wye                                    | L-N, L-G, L-L, N-G  |
| Three-phase delta                                  | L-G, L-L  |
| Three-phase high-leg delta                         | L-N, L-G, L-L, N-G  |
| Operating temperature                              | -40 °C to +50 °C (-40 °F to +122 °F), Power Xpert LCD module (-20 °C to +70 °C)   |
| Operating humidity                                 | 5% through 95%, noncondensing   |
| Agency certifications and approvals                | UL 1449 5th Edition listed device;<br>UL 60950-1+ AMD 1 AMD 2 Information technology equipment—safety. PT. 1, general requirements—Edition 2<br>ICES and FCC part 15 subpart B Conducted & Radiated Emissions Class A Limits<br>Tested to UL 2900-1, Software Cybersecurity for Network-connected Products, in Eaton's Cybersecurity test lab<br>IEC 255-21-1 and IEC 255-21-2<br>IEEE 693-2018, IBC-2015 |
| Warranty   | 10 years (15 years when registered on <a href="http://www.eaton.com/spd">www.eaton.com/spd</a> )  |

## PD Series catalog number configuration for units mounted external to electrical distribution equipment



**Example:** SPD250480D2K = SPD Series, 250 kA per phase, 480D voltage, standard feature package, housed in NEMA 1 enclosure

- ❶ Please consult the factory for 240 delta high leg (4W + G) applications with high leg on "C" phase.
- ❷ NEMA 1 flushmount units are available in 50–200 kA ratings only.



SCAN ME

Side-mounted instruction manual



SCAN ME

Side-mounted technical data

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