

# Installation and Operation Manual for the SPV



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## 1.0 Introduction

### 1.1 Manual Organization

This Installation Manual describes the safe installation, and operation of the Eaton® SPV Series Surge Protective Device (SPD).

This manual is organized into eight sections, as follows:

- 1.0 Introduction
- 2.0 Preparation
- 3.0 Installation Procedures
- 4.0 Ordering Guidelines
- 5.0 Specifications
- 6.0 Diagnostics and Safety Features
- 7.0 Warranty and Liability Information
- 8.0 Technical Assistance

### 1.2 Product Overview

The Eaton SPV Series protects critical electrical and electronic equipment from damage by power surges. This is done by shunting high energy lightning surges (and other transient disturbances) away from the equipment being protected. It does this by providing a low impedance surge path to ground while supporting power, frequency, and voltage.

The Eaton SPV Series is available with a Basic Feature Package. Each model is available in Delta, Wye, and Split Phase wiring configurations. An optional flush mount plate kit is also available, Catalog # SPVFLUSHMTPLTG.

All Eaton SPV Series models have been tested and certified by Underwriter's Laboratory® (UL®), to comply with UL Standard 1449, 3rd Edition and UL1283 5th Edition (Type 2 SPDs only).

### 1.3 Safety Precautions

A licensed/qualified electrician must complete all instructions in this manual in accordance with the National Electric Code (NEC®), state, and local codes, or other applicable country codes. All applicable local electrical codes supersede these instructions.

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#### **⚠ WARNING**

**IMPROPER INSTALLATION COULD CAUSE DEATH, INJURY AND EQUIPMENT DAMAGE. FOLLOW ALL WARNINGS AND CAUTIONS. COMPLETELY READ AND UNDERSTAND THE INFORMATION IN THIS INSTRUCTION MANUAL BEFORE ATTEMPTING TO INSTALL OR OPERATE THIS EQUIPMENT.**

**IMPROPER WIRING COULD CAUSE DEATH, INJURY AND/OR EQUIPMENT DAMAGE. ONLY LICENSED/QUALIFIED ELECTRICIANS WHO ARE TRAINED IN THE INSTALLATION AND SERVICE OF ELECTRICAL SERVICES ARE TO INSTALL AND SERVICE THIS EQUIPMENT.**

**HAZARDOUS VOLTAGES ARE PRESENT INSIDE THE SPD DURING NORMAL OPERATION. FOLLOW ALL SAFE WORK PRACTICES TO AVOID ELECTRICAL SHOCK.**

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#### **⚠ WARNING**

**ARC FLASH DURING INSTALLATION COULD CAUSE INJURY. USE APPROPRIATE SAFETY PRECAUTIONS AND EQUIPMENT FOR ARC FLASH PROTECTION.**

## 1.4 Equipment Testing

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#### **⚠ WARNING**

**CONDUCTING DIELECTRIC, MEGGER, OR HI-POTENTIAL TESTING WITH THE SPD INSTALLED WILL CAUSE INTERNAL DAMAGE TO THE SPD. THE SPD WILL ALSO CAUSE THE TEST TO FAIL.**

Every Eaton SPV Series unit is tested at the factory for dielectric breakdown. No further SPD testing is required for installation.

If you desire to test distribution equipment by performing dielectric, megger, or hi-potential tests, any installed SPD must be disconnected from the power distribution system to prevent damage to the unit.

Follow this procedure to safely disconnect the SPD:

1. Isolate SPDs connected via conductors as follows:
  - a. 3-wire delta SPDs: Turn off the circuit breaker to isolate the SPD, if connected through a circuit breaker.
  - b. Wye connected SPDs: Turn off the circuit breaker and remove the Neutral connection.

## 2.0 Preparation

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#### **⚠ WARNING**

**INSTALLING A SPD THAT IS IMPROPERLY RATED FOR THE ELECTRICAL SYSTEM VOLTAGE COULD CREATE A POTENTIALLY HAZARDOUS CONDITION, RESULTING IN INJURY OR EQUIPMENT DAMAGE.**

### 2.1 Preparation for Installation

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#### **⚠ CAUTION**

**EATON SPV SERIES PRODUCTS MUST BE INSTALLED OR REPLACED BY A LICENSED/QUALIFIED ELECTRICIAN TO AVOID INJURY OR EQUIPMENT DAMAGE.**

Before installing an Eaton SPV Series unit, do the following:

- Verify that the area is clear of any dirt, debris or clutter that may hamper the installation process.
- Verify that there is enough space to install the SPD.
- Confirm that all tools and equipment needed for the installation are available.
- Confirm that the system voltage and wiring configuration is the same as the SPD you are installing.

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#### **⚠ WARNING**

**TURN OFF THE POWER SUPPLY BEFORE WORKING IN ANY ELECTRICAL CABINET OR ON ANY CIRCUIT BREAKER PANEL. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH FROM ELECTRICAL SHOCK.**

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#### **NOTICE**

**A POOR GROUND, OR GROUNDING/BONDING VIOLATIONS, COULD PREVENT THE SPD FROM PERFORMING AS SPECIFIED.**

**DO NOT USE THE SPD TO CARRY OR PASS THROUGH GROUND TO OTHER DEVICES OR LEADS. DAMAGE TO THE EQUIPMENT MAY RESULT.**

- Check the facility grounding system. All grounding, bonding, and earthing must meet the NEC and any other national, state and local electrical codes.

### 3.0 Installation Procedures

The SPV uses 10 AWG wire for connecting to the distribution system. The wires require protection from a **15 A circuit breaker**. This ensures protection against fault current and fire. The SPV mounting orientation does not affect the SPV operation. The SPV can also be mounted using the optional flush mount plate. To use the optional flush mount plate remove the six screws on top of the unit. Place the plate on top of the device and re-install the six screws to hold the plate in place. See Figure 2 for optional flush mount plate dimensions. The SPV must be connected in accordance with NEC/CEC and local codes for all safety ratings.

1. Locate an available **15 A breaker** space immediately after the main breaker in the electrical equipment being protected.
2. If there is no space available within the electrical equipment, locate the closest existing 15 A breaker within the electrical equipment.
3. Turn OFF the power to the electrical equipment where the SPD is to be installed.
4. Install a 15 A branch circuit breaker to feed the SPD.
5. The SPV may be installed using a standard knockout. If so, remove lock-nut from nipple, insert nipple and 10 AWG wires through knockout, re-install lock-nut and tighten. If not installed directly into the electrical equipment use a metal conduit (rigid or flexible) between the SPD and the electrical equipment.

6. Run the 10 AWG wires from the SPD to the electrical equipment.
7. To ensure maximum effectiveness and provide the best possible protection for the sensitive electrical equipment as possible, the 10 AWG wire lead length between the SPD and installation breaker should be 35 cm (14") or less.

**Note:** Twist the wires tightly together. Minimize overall lead length to optimize SPD performance.

8. Strip the ends of the wires and terminate at the line side terminals of the identified branch breaker mounted within the electrical equipment. Tighten all connections.
9. If a remote monitoring option is required, connect the Form C Contacts to an alarm or building monitoring system. **Form C conductors are optional and are not required for proper SPV operation.** These relay contacts are rated at:  
ac – 150 V, 0.46 A maximum  
dc – 30 V, 1 A maximum
10. Recheck all connections.
11. Switch the MAIN power to the ON position for the electrical equipment and SPD.
12. Check all status indicator lamps to verify system operation.

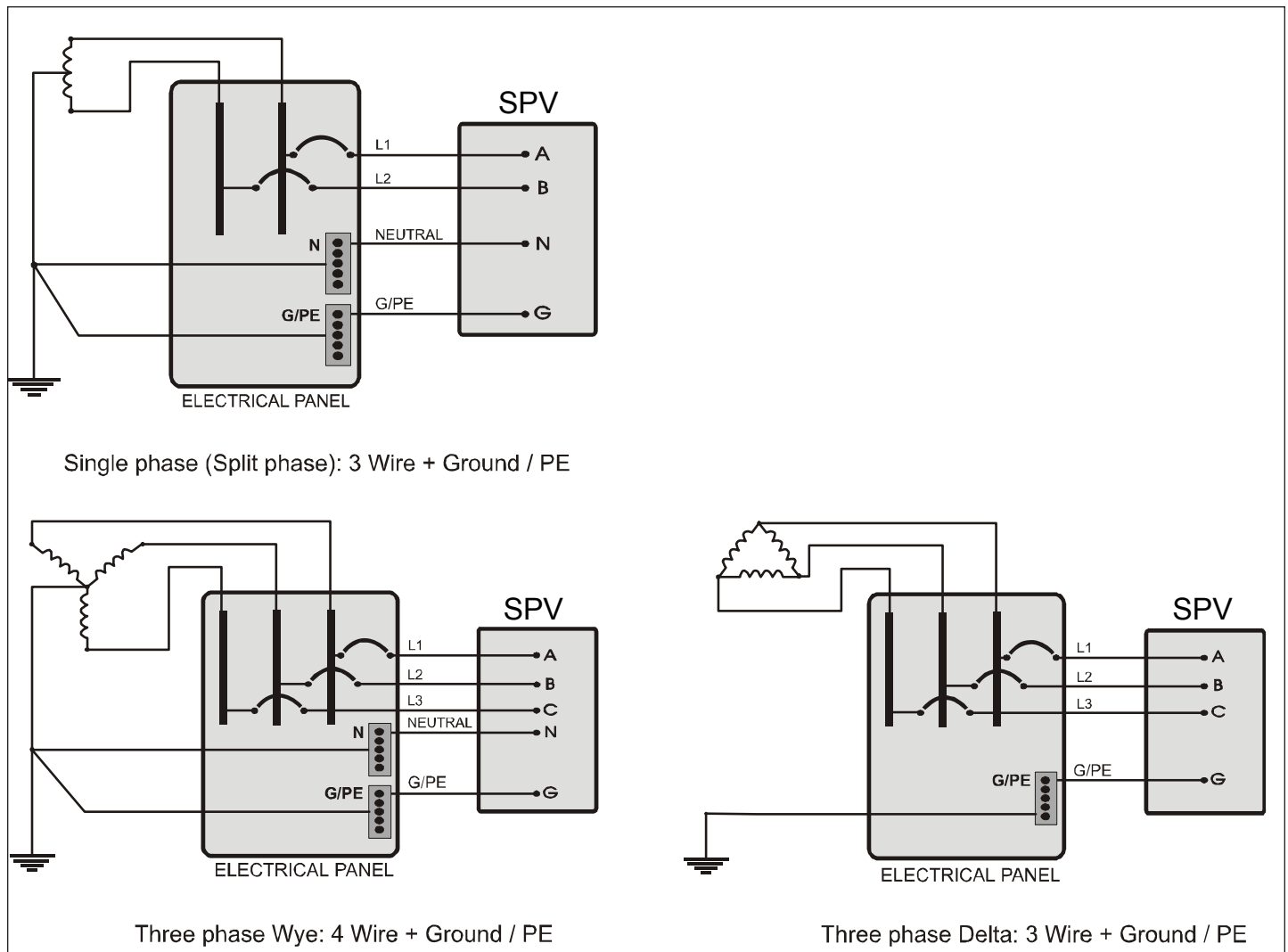
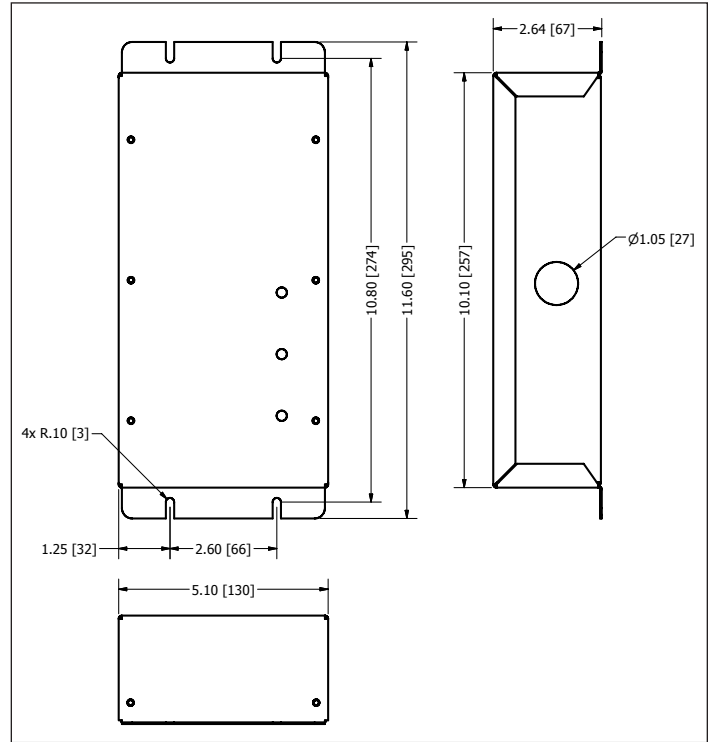


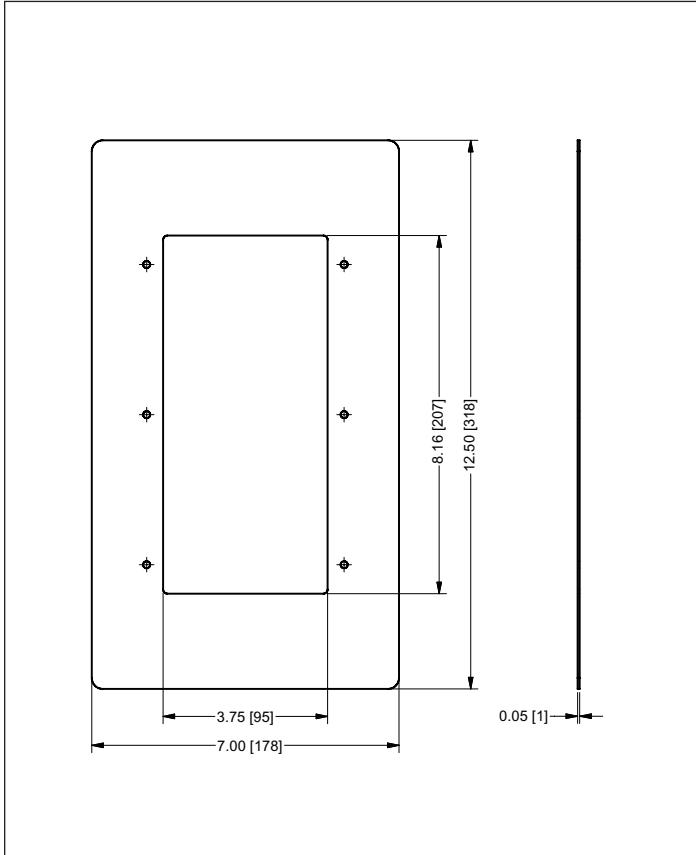
Figure 1. Wiring Diagrams

**Table 1. Power Wire Color Code**

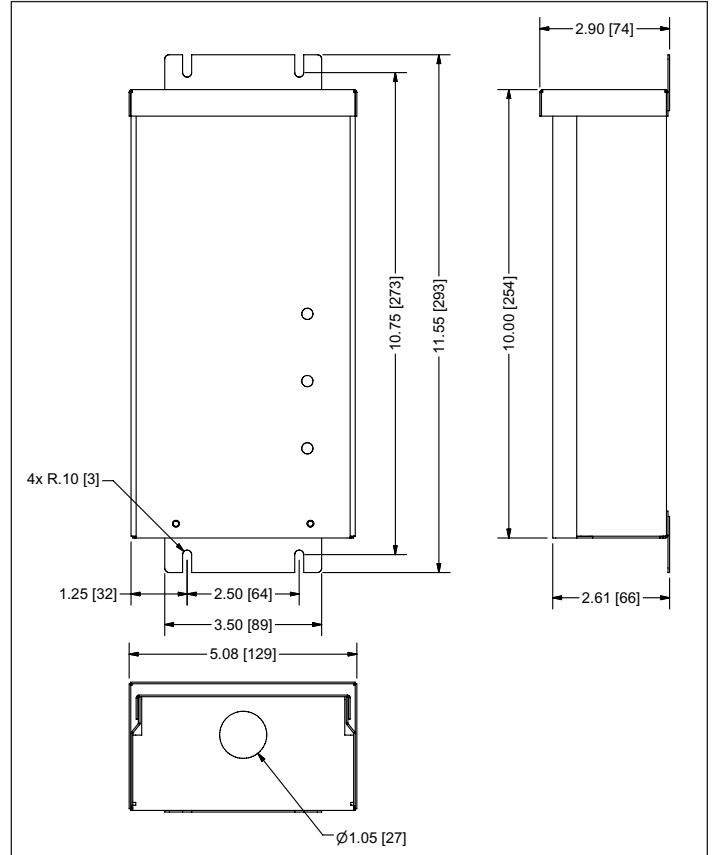
Power Wire Color Code		Form C Wire Color Code	
Mode	SPV	Mode	Color
L1 (A)	Black	Common	Blue/White
L2 (B)	Black	Normally open	Red/White
L3 (C)	Black	Normally closed	Orange/White
Neutral	White		
Ground/PE	Green/Yellow		



**Figure 3. NEMA 1 Steel Enclosure Dimensions**



**Figure 2. Optional Flush Mount Steel Plate Catalog Number = SPVFLUSHMTPLTG.**



**Figure 4. NEMA 3R Steel Enclosure Dimensions**

### 4.0 Ordering Guidelines

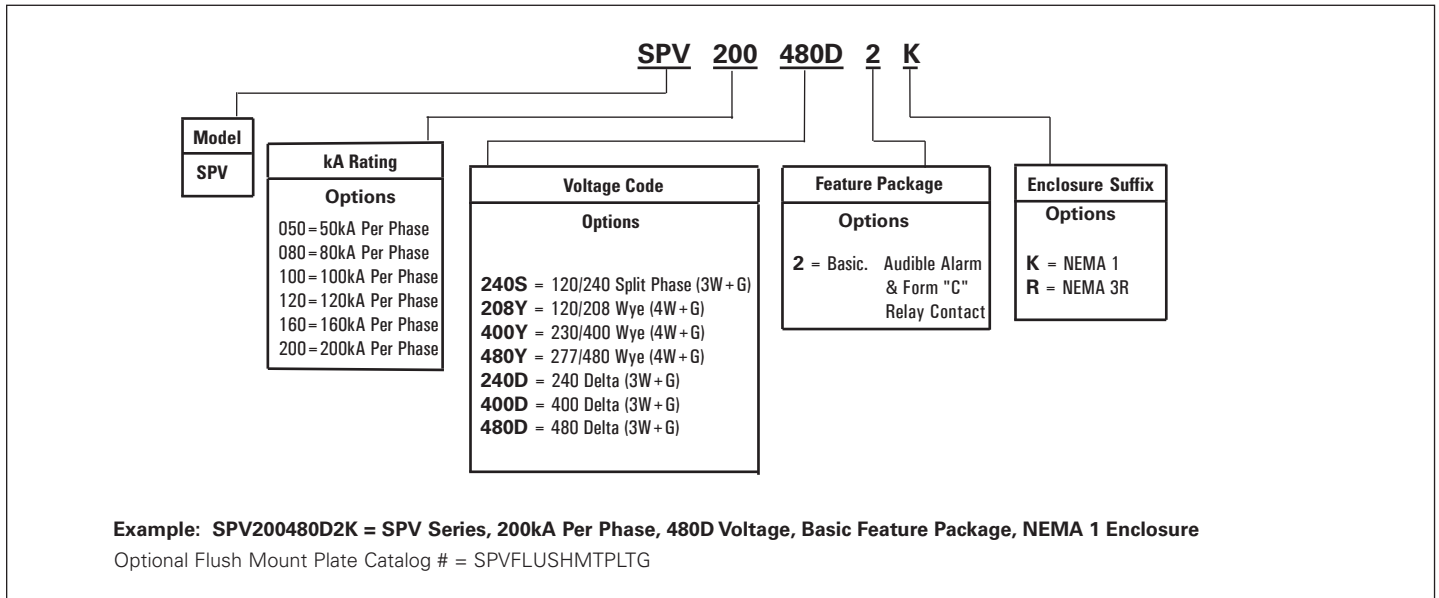


Figure 5. Eaton SPV Series

## 5.0 Specifications

Table 2. Specifications

Description	Specification
Surge current capacity per phase	50, 80, 100, 120, 160, 200 kA ratings available
Nominal discharge current (In) 208Y, 240S, 240D, 400Y & 480Y 400D & 480D	10kA 20kA
Short circuit current rating (SCCR) 208Y, 240S, 240D, 400Y & 480Y 400D & 480D	42kA 5kA
SPD Type	Type 2
Standard split phase voltages available	240
Three phase wye system voltages available	120/208, 230/400, 277/480
Three phase delta system voltages	240, 400, 480
Input Power Frequency	50/60 Hz
Protection modes	Single split phase .....L-N, L-G, N-G, L-L Three phase Wye..... L-N, L-G, N-G, L-L Three phase delta.....L-G, L-L
Maximum continuous operating voltage (MCOV)	
208Y and 240S voltage codes	150 L-N, 150 L-G, 150 N-G, 150 L-L
400Y and 480Y voltage codes	320 L-N, 320 L-G, 320 N-G, 640 L-L
240D voltage code	320 L-G, 300 L-L
400D and 480D voltage codes	550 L-G, 640 L-L
Ports	1
Operating temperature	-40 through 50° C (-40 through 122° F)
Operating humidity	5% through 95%, non-condensing
Operating altitude	Up to 16,000 ft (5000 m)
Weight	Approximately 1.6 kg (3.5 lbs)
Conductor Lead Length	24 inches
Form C relay contact ratings	150 Vac, 0.46A maximum or 30 Vdc, 1A maximum
Form C relay contact logic	Power on, normal state - NO contact = OPEN, NC contact = CLOSED Power off, fault state, - NO contact = CLOSED, NC contact = OPEN
EMI/RFI filtering attenuation	Up to 40 dB from 10 kHz to 100 MHz
Agency certifications and approvals	UL1449 3rd Edition listed device for the US and Canada, UL1283 5th Edition (Type 2 SPDs only)
Warranty	10 Years

## 6.0 Diagnostics and Safety Features

### 6.1 Indicator Lights

The SPV provides the user with three Phase Indicator Lights, to keep you informed of the SPD's operating status.

Depending on your voltage you may have 2 or 3 green Phase Indicator Lights. These lights will illuminate when the system is operating properly. If any of these lights are OFF the power may not be applied or a problem may exist within the SPD. Check incoming power, or breaker for power; if the Phase Indicator Lights remain OFF the unit may be damaged, contact the Power Quality Technical Support team.

The SPV also provides an Audible Alarm and Form C contacts for additional remote indication of power loss to the SPD. Connection of the Form C contacts are optional. For additional information on Form C connection please contact the Power Quality Technical Support team.

### 7.0 Warranty and Liability Information

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## 7.1 Ten Year Warranty

Eaton warrants the SPV to be free from defects in both workmanship and materials for a period of ten years from the date of delivery to the purchaser.

Eaton assumes no risk or liability for results of the use of the product purchased, including but not limiting the generality of the foregoing:

(1) The use in combination with any electrical or electronic components, circuits, systems, assemblies or any other materials or substances.

(2) Unsuitability of any product for use in any circuit or assembly. Purchaser's rights under the warranty shall consist solely of requiring Eaton to repair, or at Eaton's sole discretion, replace, free of charge, F.O.B. factory, any defective items received at said factory within said term determined by Eaton to be defective. The giving of or failure to give any advice or recommendations by Eaton shall not constitute any warranty by or impose any liability upon Eaton AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESSED, IMPLIED OR STATUTORY AS TO THE MERCHANTABILITY, FITNESS FOR PURPOSE SOLD, PRODUCTIVENESS OR ANY OTHER MATTER. In no event shall Eaton be liable for special or consequential damages or for delay in performance of the warranty.

This warranty does not apply if the unit has been misused, abused, altered, tampered with, or applied in excess of the specifications other than those written on the nameplate. At the end of the warranty period Eaton shall be under no further warranty obligation expressed or implied. The SPV SPD covered by this warranty certificate can only be repaired or replaced by the factory. A RETURN MATERIAL AUTHORIZATION NUMBER (RMA) must be obtained. Please enter a Vista warranty claim or contact CORE (Center of Returns Excellence) at 1-800-410-2910 for help with entering a claim or to obtain an update on your claim status. Repair or replacement will be returned collect. If it is determined that the returned product contains manufacturer's defects then Eaton will replace the defective product at Eaton's expense (including shipping charges).

## 8.0 Technical Assistance

For additional information, technical assistance or referral to a local authorized distributor, contact Power Quality Technical Support at 1-800-809-2772, option 4/ option 2. You can also e-mail us at [surgeprotection@eaton.com](mailto:surgeprotection@eaton.com) or visit us on the web, [www.eaton.com/spd](http://www.eaton.com/spd).

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