



Model SPD *Surge Protective Device*

The transient voltage surge suppression (TVSS) industry has grown from a "niche" market consisting of a few small manufacturers, to one of the fastest-growing segments among all power protection products. Today, United Power is raising the technological bar with its advanced hybrid transient suppression technology. Model SPD has been specifically designed for hardwired

Service Entrance and Distribution Panelboard applications.

Model SPD systems are small, lightweight and feature from 80 kA to 320 kA of surge current suppression per each mode of protection. Model SPD has the surge handling capability necessary to protect your facility's sensitive electronic loads from the catastrophic effects of high-energy transients, either internally or externally generated. Since SPD is a parallel-connected device, it is perfect for either new construction or retrofit applications.

Features

Benefits

- Protects Loads from High-Energy Transients
- Clamps Voltage Close to Nominal Waveform
- Diverts Surges Safely to Neutral and/or Ground
- Filters Line Noise, +/- 20% Sinewave Tracking
- UL 1449 Listed — Second Edition
- UL 1283 Listed (Noise Suppressor)
- 5-Year Warranty

Electrical

- Available in all Popular Voltage Configurations
- Models Available from 80 kA - 320 kA **Per Each Protection Mode**
- Integral Fused Disconnect Switch Available

Environmental

- Small Size for Universal Applications
- Lightweight, Easy to Install
- NEMA 4X Enclosure
- Watertight and Corrosion Resistant
- On-board Monitoring: LEDs, Surge Counter
- Form C Contact for Remote Monitoring

The professional engineering community has identified transients as the most paralyzing problem within many facilities. Engineers have accepted TVSS as an integral part of any overall power protection strategy.

United Power invests heavily in its research and product development efforts to ensure we continue to be the technological leader in the TVSS industry. The result of that commitment of resources is evidenced in Model SPD.

Model SPD systems are available in a wide variety of voltage, surge current, and disconnect configurations to meet your specific Surge Protective Device application.



UNITED POWER

SPD3 - S2 - 2

SPD Features Advanced Hybrid Technology

United Power is the technological leader in the development of transient voltage surge suppression systems. Our hybrid technology features three different surge suppression components, working in conjunction, to provide you with the most advanced Surge Protective Device platform available in the industry:

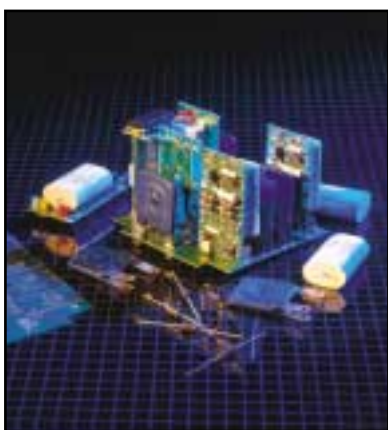
Silicon Avalanche Diodes (SADs)

offer the most rapid transient response time available in the industry. SADs respond in <1 nanosecond, ensuring that we capture the leading edge of the high-energy transient, which often has the most severe impact on your critical electronic loads.

Metal Oxide Varistors (MOVs)

are the industry's most popular surge suppression component due to their <5 nanosecond response time and ability to divert high amounts of surge current. United Power uses dual 40mm MOVs, each rated to divert 40,000 surge current amperes.

Capacitors are integral to our SPD filter circuit. In addition to the SAD/MOV suppression devices, they filter electrical line noise that is often detrimental to the life of sensitive electronic loads. Sinewave tracking is provided to address voltage aberrations below the rating of the MOV and along the entire waveform.



Family Number of Protection Modes

United Power SPD systems are available in either two-stage or three-stage configurations. The number of stages is predicated on the voltage configuration, physical location, and budget aspects of a given project.

Two-stage (SPD2) systems are ideal for service entrance three phase delta-configured applications where only line-to-ground and line-to-line surge current diversion is applicable. On three phase wye-configured or split-phase circuits, SPD2 systems are an economical means of diverting unwanted surge current in both line-to-neutral and neutral-to-ground pathways.



Three-stage (SPD3) systems are only available on circuits featuring a neutral conductor. Three-phase SPD3 systems provide the industry-popular seven diversion pathways: A-Neutral, B-Neutral, C-Neutral, A-Ground, B-Ground, C-Ground, and Neutral-Ground.

Monitoring

All SPD systems feature Standard Level 2 (S2) monitoring, which includes:

Three LED's per each protection mode (except N-G):

Green	Protection Mode Ready
Yellow	Protection Mode Operating
Red	Protection Mode Fault (Form C Activates)



Six-Digit Surge Counter

Many surge counters in the TVSS industry today record a "transient event" even though the TVSS system never suppressed a transient. By only monitoring changes in line voltage, these devices can falsely record a slight rise in voltage as a transient event. We monitor when **current** is diverted by the MOV/SAD array to ensure we accurately detect all events in which a high-energy transient has been suppressed by the system.

Form C Contact

Because TVSS systems are often installed out of sight in switchgear rooms or electrical closets, monitoring can be difficult. United Power provides a Form C contact in every SPD so a customer can connect the unit to a central monitoring device, such as a Building Automation System.

240K-31-F

Surge Current Capacity

The surge current naming protocol of Model SPD systems is simple: The part number is equal to the surge current capacity of the system in **each mode/pathway of protection**. For example, 240K means the system is equipped to provide 240 kA of surge current capacity in each of the line-to-neutral, line-to-ground, and neutral-to-ground protection modes, in a 3-stage system.

Voltage Code

United Power offers Model SPD systems in virtually every domestic and international voltage configuration. We assign a two-digit reference code for each voltage configuration available. Below is a list of a few of our most popular domestic voltage configurations:

Code	Voltage	Phase	Configuration
25	120/240 VAC	Split Phase	2 Line, Neutral, and Ground
31	120/208 VAC	Three Phase WYE	3 Line, Neutral, and Ground
34	277/480 VAC	Three Phase WYE	3 Line, Neutral, and Ground
43	480 VAC	Three Phase DELTA	3 Line and Ground

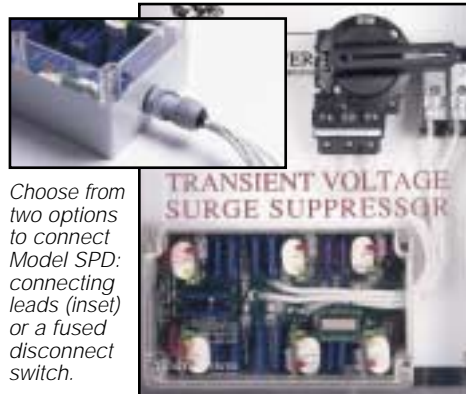
Installation Alternatives

F: Fused Disconnect Switch

Depending on the location of the TVSS system, it may be more economical to integrate a 200 kAIC minimum fused disconnect switch into the TVSS system. This is ideal for service entrance applications where using a switchboard branch circuit device as the TVSS disconnect is prohibitively expensive.

L: Connecting Leads

Model SPD is also available in our 'L' termination method where the user will feed the TVSS system from an external circuit breaker serving as the system's disconnect means. The SPD is equipped with high voltage, multi-stranded conductors to reduce 'skin effect' for improved system operation. Method 'L' is ideal for systems used to protect a lighting panel where a customer-supplied branch circuit breaker is available. This ensures short lead lengths for optimum TVSS performance.



Advanced Laboratory Environment

United Power owns and operates one of the industry's most complete testing laboratories. Our engineering staff understands all applicable industry standards (UL, ANSI/IEEE, NEMA, NEC) and applies that knowledge to the product development and testing of our advanced TVSS systems.

UL 1449—Second Edition is *the* standard when evaluating and comparing the design and performance of various TVSS systems. Our test lab features surge generation equipment as defined by UL in its Second Edition 1449 listing process. Our testing program is extensive and on-going. As a result, our UL testing is timely and our UL documentation is always thoroughly maintained.

Our KeyTek ECAT Model No. E501/E551 generates the IEEE C62.41 Category B3/C1 waveform. Our lab also features our KeyTek ECAT Model No. E522. This is one of the only surge generation instruments available on the market today that duplicates the IEEE-defined Category C3 20,000-volt 10,000-ampere 8 x 20 μ s waveform. Our fully equipped test facility enables United Power to provide accurate clamping voltage rating data on our TVSS systems. Such intensive testing enables United Power to forecast the longevity characteristics of our various models when installed at IEEE C62.41-defined Category C, B, or A locations within a typical facility.



Model SPD: Surge Protective Device *Technical Specifications*

FEATURES—GENERAL	Model SPD2 (Two Stage)	Model SPD3 (Three Stage)
Connection Method	Parallel	Parallel
UL/CUL 1449 Second Edition, UL 1283	Yes	Yes
Surge Suppression Technology	Hybrid: SADs/MOVs/Capacitors	Hybrid: SADs/MOVs/Capacitors
System Response Time to Transient Voltage	<1 Nanosecond	<1 Nanosecond
Extended Noise Filtering	Yes: 10 kHz to 100 MHz	Yes: 10 kHz to 100 MHz
Sine Wave Tracking	Yes ±20%	Yes ±20%
Fused Disconnect Available	Yes — Optional	Yes — Optional
Fused Disconnect Amp Rating	30-60 Amps (Model Dependent)	30-60 Amps (Model Dependent)
Fused Disconnect AIC Rating	200 kAIC (30A)/300 kAIC (60A)	200 kAIC (30A)/300 kAIC (60A)
Indicating LEDs Per Mode	Yes	Yes
6-Digit Surge Counter	Yes	Yes
Form C Contact	Yes	Yes
Remote Monitoring Available	Yes — Optional	Yes — Optional
Audible Alarm	Consult Factory	Consult Factory
Enclosure Type	NEMA 4X	NEMA 4X

SURGE CURRENT RATINGS	Model SPD2 (Two Stage) Circuits Without Neutral			Model SPD2 (Two Stage) Circuits With Neutral			Model SPD3 (Three Stage) Circuits With Neutral		
	Nameplate	Per Mode	Per Phase	Per System	Per Mode	Per Phase	Per System	Per Mode	Per Phase
080 kA	80 kA	160 kA	160 kA	80 kA	80 kA	160 kA	80 kA	160 kA	240 kA
120 kA	120 kA	240 kA	240 kA	120 kA	120 kA	240 kA	120 kA	240 kA	360 kA
160 kA	160 kA	320 kA	320 kA	160 kA	160 kA	320 kA	160 kA	320 kA	480 kA
200 kA	200 kA	400 kA	400 kA	200 kA	200 kA	400 kA	200 kA	400 kA	600 kA
240 kA	240 kA	480 kA	480 kA	240 kA	240 kA	480 kA	240 kA	480 kA	720 kA
320 kA	320 kA	640 kA	640 kA	320 kA	320 kA	640 kA	320 kA	640 kA	960 kA

CLAMPING VOLTAGE RATINGS UL 1449 Second Edition Listed	Model SPD2 (Two Stage)				Model SPD3 (Three Stage)					
	L-N		N-G		L-N		L-G		N-G	
Voltage Configuration*	No Disconnect	W/Disconnect	No Disconnect	W/Disconnect	No Disconnect	W/Disconnect	No Disconnect	W/Disconnect	No Disconnect	W/Disconnect
Circuits With Neutral										
120/240 Split Phase: 2W+N+G	330	400	330	400	330	400	330	400	330	400
120/208 Three Phase: 3W+N+G	330	400	330	400	330	400	330	400	330	400
277/480 Three Phase: 3W+N+G	700	700	330	400	700	700	700	700	330	400

*Please contact United Power for UL 1449 Second Edition clamping voltage performance ratings for voltage configured systems not listed above

ENCLOSURE DIMENSIONS**

Model SPD2 (Two Stage)			Model SPD3 (Three Stage)		
Surge Protection Rating	With Leads (L) H x W x D (in.)	W/Disconnect (F) H x W x D (in.)	Surge Protection Rating	With Leads (L) H x W x D (in.)	W/Disconnect (F) H x W x D (in.)
80 kA Systems	4.7 x 4.8 x 3.4	14.0 x 10.4 x 7.7	80-160 kA Systems	4.7 x 7.9 x 3.5	16.0 x 12.4 x 7.7
120-160 kA Systems	4.7 x 7.9 x 3.5	16.0 x 12.4 x 7.7	200-320 kA Systems	6.3 x 9.5 x 4.7	18.0 x 14.4 x 7.7
200-320 kA Systems	6.3 x 9.5 x 4.7	18.0 x 14.4 x 7.7			

** Above dimensions are for three-phase wye-configured systems. Please contact the factory for dimensional data on other voltage rated systems. All SPD systems are mounted in the above referenced NEMA 4X enclosures. All dimensions are rounded to the nearest 0.1 inch.



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