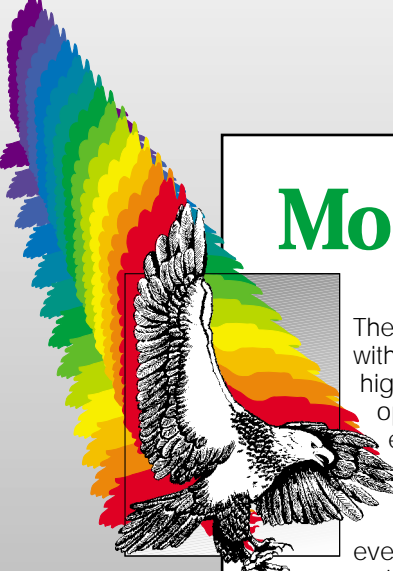


Model PDX *Parallel Design for Extra Protection*



The service entrance is the first location within your facility where you must prevent high-voltage transients from entering your operation. It is also that point in your electrical system where the most severe transients usually occur. Events such as lightning, utility grid switching, and other high-energy random transient events can cause severe damage to the equipment within your facility and interrupt the critical processes of your business.

With Model PDX, you can now be assured of having the highest quality parallel design transient suppression system available to protect the service entrance or any critical distribution point within your facility. With the lowest (best) clamping voltage performance, Model PDX is UL 1449 Second Edition listed and is rated for the service entrance (IEEE-defined Category C3) environment. In addition, Model PDX provides something *extra*:

Extra Surge Capacity. With up to 480,000 surge amps of protection per each mode of suppression, Model PDX is the strongest, most durable parallel transient suppression system on the market.

Extra Filtering. Extended noise filters provide superior noise suppression capability versus other standard TVSS products to protect you against harmful RFI/EMI interference.

Extra Monitoring. True "on-line" monitoring for *each individual protection module* is provided without the need for external diagnostic test kits. Standard S3 includes visual indication lights, horn, and surge counter. Optional Focus Level 3 monitoring provides power quality measurements plus the ability to link several units via modem.

Extra Value. All Model PDX systems feature United Power's field-replaceable "Clear Choice" protection modules. This platform provides high-quality TVSS protection with easier maintenance and a far lower cost of ownership.

Model PDX features our custom NEMA 12 metal enclosures, field replaceable Clear Choice protection modules, filters for superior noise suppression, and advanced on-line monitoring.

Features

Benefits

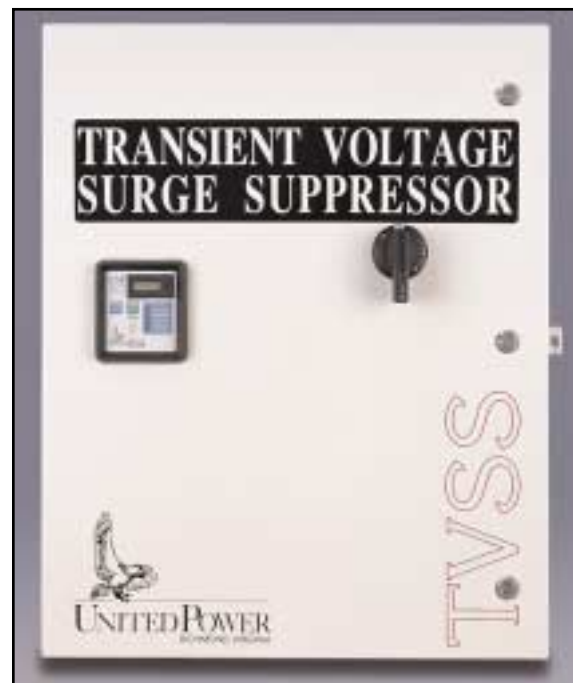
- Protects Loads from High-Energy Transients
- Clamps Voltage Close to Nominal Waveform
- Safely Diverts Excess Surge Current
- Filters Line Noise, +/- 20% Sinewave Tracking
- UL 1449 Listed — Second Edition
- UL 1283 Listed (Noise Suppressor)
- 5-Year Warranty

Electrical

- Excellent UL-assigned Clamping Voltage Ratings
- 80-480 kA Rated per Each Protection Mode
- Available in all Popular Voltage Configurations
- Integral Fused Disconnect Switch Available
- All Copper Power Pathways

Environmental

- NEMA 12 or NEMA 3R Enclosures
- Form C Contact for Remote Monitoring
- On-line Monitor: LEDs, Horn, and Surge Counter
- Optional Focus Level 3 Monitoring



UNITED POWER

PDX3-S3

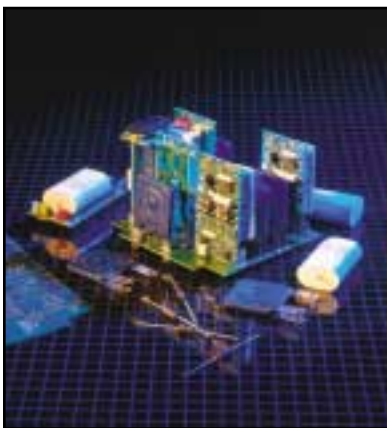
PDX Features Advanced Hybrid Technology

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 technologically 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 80,000 surge current amperes.

Capacitors are integral to our PDX 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 clamping level of the MOV and along the entire waveform.



Family Number of Stages

United Power PDX systems are available in two-stage and three-stage platforms. The desired number of protection stages is predicated on several factors including the voltage configuration of the circuit being protected, the location of the system, the criticality of the connected load, and the budget profile of the project.

PDX2 Two-stage systems are ideal for service entrance delta-configured applications where only L-G and L-L surge current diversion is applicable. On three-phase WYE configured or split-phase circuits, PDX2 is a value engineered means of diverting unwanted surge current in both L-N and N-G pathways.

PDX3 Three-stage systems are only available on those circuits featuring a neutral conductor such as split-phase and three-phase WYE circuits and are ideal for service entrance or distribution panel applications. Three-phase PDX3 systems provide our popular seven modes of protection: A-N, B-N, C-N, A-G, B-G, C-G & N-G.

Monitoring

All standard Model PDX units feature our Standard Level 3 on-line monitoring system. The "S3" panel provides five color-coded LEDs that indicate the overall status of the PDX surge suppression system. The S3 panel includes an audible alarm with re-set switch and battery back-up. PDX systems also include:

Three LEDs per each protection mode (except N-G):

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



Eight-Digit Surge Counter

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

Form C Contact

Because TVSS systems are often installed in switchgear rooms or electrical closets, monitoring can be difficult. We provide a Form C contact in every PDX so you can remotely monitor the unit at the building central monitoring system.

Focus Level 3 Monitoring (option)

Focus is the industry's most comprehensive monitor and has been available on our power conditioning systems for years. United Power now offers Focus micro-processor based monitoring on PDX systems. True RMS voltage and current is monitored on the circuit the TVSS is protecting. With this data, kVA, kW, kWh, frequency, percent load, and other information is presented on the system's 80-character LCD display. Our optional "SSTT" provides accurate magnitude and duration data of all sag/surge/transient events. In addition, total harmonic distortion (THD) is provided for harmonic management purposes.

An optional RS-232 port is available to assist multi-location customers transmit critical power data back to the manufacturer and also becomes your source for power quality information.



-320K-31-FS-12

Surge Current Rating

The surge current naming protocol of a Model PDX system is simple: the part number is equal to the surge current capacity of the system *in each mode/pathway of protection*. For example, 320K means the system is equipped to provide 320 kA of surge current capacity in each of the L-N, L-G, and N-G protection modes, in this three stage example. Systems are available in surge current ratings of 80 kA, 160 kA, 240 kA, 320 kA, 400 kA, or 480 kA per each pathway of protection.

Voltage Code

United Power offers Model PDX suppression systems in virtually every domestic and international voltage configuration. We assign a two-digit reference code to 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 economical to integrate a 300 kAIC fused disconnect switch internal to the TVSS system. This is ideal for service entrance applications where a switchboard branch circuit device being used as the TVSS disconnect is prohibitively expensive.

C: Cable-Bus Bar Termination

PDX is also available in our "C" termination format where the TVSS system is installed with an external circuit breaker serving as the system's disconnect device. The system is provided with copper bus bars complete with lugs to receive the leads from the circuit the system is protecting. Method "C" is ideal for systems used to protect a main distribution panel or lighting panel where a customer-supplied branch circuit breaker is readily available. Always remember that short lead lengths provide optimum TVSS performance.



Enclosure Type

NEMA 12

All systems pictured are mounted in NEMA 12 enclosures for classic indoor applications. A



NEMA 12 rating requires the enclosure to be fabricated to guard against dust, dirt, dripping water and non-corrosive liquids.

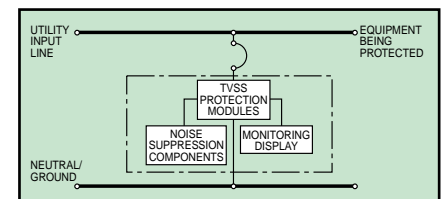
NEMA 3R

NEMA 3R enclosures are required for outdoor applications and protect the contents against falling rain or sleet, and shall be undamaged by the formation of ice on the enclosure.

Connection Method

PDX systems are manufactured as Standard ("S") in a parallel connection method.

S The parallel method of connection is by far the most popular means of installing a PDX system. Care should be taken to ensure the lead length of the interconnection wire is as short as possible to improve suppression performance.



Advanced Laboratory Environment

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

UL 1449—Second Edition is *the* standard for those developing, evaluating and comparing the performance of various TVSS systems. Our test lab features surge generation equipment that is similar to that used by UL in its Second Edition 1449 listing process. Our financial commitment to having the industry's most complete testing facility is extensive and our performance testing is on-going. Our UL 1449—Second Edition listing process has been timely and our documentation is always thoroughly maintained and available to our customers upon request.

PDX is Category C3 Tested

Our KeyTek ECAT Model E504 surge simulator is similar to the test equipment used throughout the UL 1449—Second Edition listing process. This system can repetitively generate the 6000V/500A combination waveform as specified in the UL 1449—Second Edition standard.



Our lab also features a KeyTek ECAT Model E522 which is one of the few surge generators available on the market today that duplicates the IEEE-defined Category C3 20 kV/10 kA, 8 x 20 μ s waveform required for service entrance locations. Our fully equipped test facility enables United Power to provide accurate clamping voltage performance information in both visual and hard copy formats. Our engineers have identified long-term repetitive tests that facilitate accurate forecasting of the longevity characteristics of various models when installed in each different IEEE Category B or C location.

KeyTek ECAT Model 522 is the industry's state of the art 20 kV/10 kA Category C3 surge simulator.

High-Energy Surge Generator

There are only a few certified high current (over 10 kA) test labs in the country that enable TVSS manufacturers to expose their systems to surge currents beyond the waveforms as defined by the IEEE. Due to the supply being so limited, it is challenging for TVSS manufacturers to provide independent laboratory testing on all of its products.

United Power has developed a high-energy surge generator that is capable of producing an 8 x 20 μ s waveform in excess of 150,000 amps. This generator gives United Power the ability to report and document the performance of surge protection devices when exposed to catastrophic events such as lightning and other high-energy transients. When coupled with our KeyTek lab, the high-energy surge generator is an invaluable tool for product development and evaluation.

PDX Meets Industry Standards

UL 1449—Second Edition

This standard replaces the original 1985 UL 1449 standard. UL 1449—Second Edition requires manufacturers to subject their systems to several safety tests in order to retain its UL listing. The new tests are more stringent and are designed to verify product safety and performance. United Power has completed the testing process and has all PDX models UL 1449—Second Edition listed.

UL 1283

This standard is applied to noise suppression systems versus TVSS systems. United Power includes a filter-network in every PDX system and has UL listed the product accordingly.

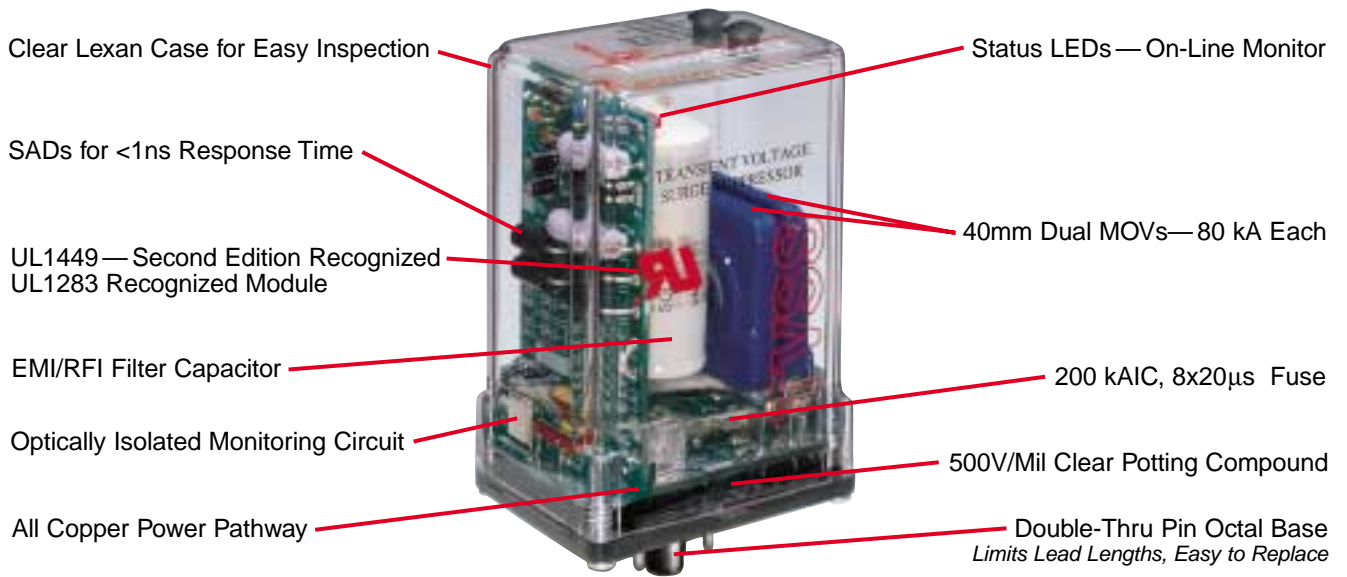
ANSI/IEEE C62.41

This was the first standard to define the location for TVSS placement and the magnitude of a transient at each location. IEEE created "categories" as follows: Category C-service entrance, Category B-distribution panel, and Category A-point of use. There are sub-categories within each location with Category C3 being the most demanding (20 kV/10 kA). All PDX systems are Category C3 compliant.

ANSI/IEEE C62.45

TVSS system longevity was not addressed in C62.41 and has been subsequently addressed in C62.45. This standard requires the TVSS system to protect the load against at least 1000 events of the Category claimed for compliance. All PDX systems fulfill this requirement at Category C3 levels.

PDX Features “Clear Choice” Protection Modules



Field Replaceable Protection Modules

Many people see the high surge current ratings and immediately discount them because they feel they will never see a transient of such high magnitude. Higher surge current-rated systems are purchased for *longevity purposes*, not only for single impulse protection. All TVSS systems have a life expectancy based on the number of transient events, the magnitude of each event, and the overall surge current rating of the TVSS system itself. For this reason, at some future time, you will be required to replace the suppression components within your system.

United Power designed its Clear Choice protection modules to allow easy replacement in the field. All modules are UL 1449— Second Edition recognized for safety and feature octal pins complete with orientation key to ensure proper installation. Our boards are world voltage-rated (through 600V) and retaining clips are used for each voltage rated module to secure the modules in place. It is by far the most user-friendly means of replacing surge suppression components in the industry today.

Other service entrance TVSS systems require the user to return the entire TVSS enclosure to the manufacturer for system-wide suppression component replacement. The inconvenience is significant, the packaging and freight costs are your responsibility, and the critical load is unprotected throughout the entire repair process. In selecting United Power, simply field replace the failed protection module with a new module. There is no need to remove the entire system and expose your critical load to high-energy transient conditions.

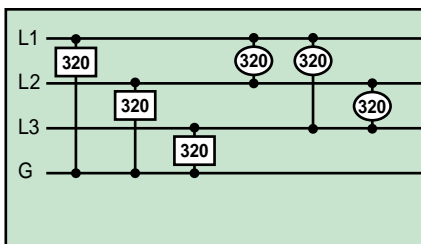
Building Block Approach

PDX systems are available in three basic “platforms” based on the voltage configuration of the circuit being protected and the desired number of suppression pathways. Systems are

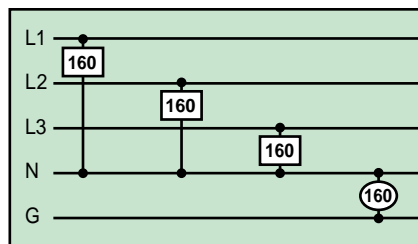
available in all popular domestic and international voltage configurations. The illustrations below detail the various pathways available in popular three phase WYE and Delta configurations.

The numbers within the symbols indicate the surge current rating per pathway. PDX systems are available in 80 kA, 160 kA, 240 kA, 320 kA, 400 kA, and 480 kA ratings.

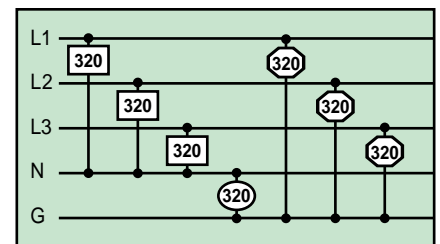
PDX2 — Two Stage Delta



PDX2 — Two Stage WYE



PDX3 — Three Stage WYE



Model PDX: Parallel Design for Extra Protection *Technical Specifications*

FEATURES—GENERAL	Model PDX2	Model PDX3
Connection Method	Parallel	Parallel
UL/CUL 1449—Second Edition, UL1283	Yes	Yes
Surge Suppression Technology	Hybrid: SAD/MOV/Capacitors	Hybrid: SAD/MOV/Capacitors
System Response Time	<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 AIC Rating	300,000 AIC	300,000 AIC
Fused Disconnect Amp Rating	60 Amps	60 Amps
Indicating LEDs, Audible Alarm	Yes	Yes
8-Digit Surge Counter	Yes	Yes
Focus Level 3 Monitoring	Yes—Optional	Yes—Optional
Form C Contact	Yes	Yes
Remote Monitoring Available	Yes	Yes
Enclosure Type	NEMA 12 Standard, NEMA 3R Optional	NEMA 12 Standard, NEMA 3R Optional

SURGE CURRENT RATINGS	Model PDX2 (L-G, L-L)*			Model PDX2 (L-N, N-G)*			Model PDX3 (L-N, L-G, N-G)*		
	Nameplate	Per Mode	Per Phase	Per System	Per Mode	Per Phase	Per System	Per Mode	Per Phase
080K	80 kA	160 kA	160 kA	80 kA	80 kA	160 kA	80 kA	160 kA	240 kA
160K	160 kA	320 kA	320 kA	160 kA	160 kA	320 kA	160 kA	320 kA	480 kA
240K	240 kA	480 kA	480 kA	N/A	N/A	N/A	240 kA	480 kA	720 kA
320K	320 kA	640 kA	640 kA	N/A	N/A	N/A	320 kA	640 kA	960 kA
400K	400 kA	800 kA	800 kA	N/A	N/A	N/A	400 kA	800 kA	1200 kA
480K	480 kA	960 kA	960 kA	N/A	N/A	N/A	480 kA	960 kA	1440 kA

* All PDX2 surge current values are presented for Delta or WYE configured systems. PDX3 surge current ratings are for voltages that include a neutral.

UL-ASSIGNED CLAMPING VOLTAGE RATINGS	Model PDX2-Delta (L-G, L-L)		Model PDX2-WYE (L-N, N-G)		Model PDX3-WYE (L-N, L-G, N-G)		
	L-G	L-L	L-N	N-G	L-N	L-G	N-G
Voltage Configuration**							
120/240 Split Phase: 2W+N+G	N/A	N/A	330	330	330	330	330
120/208 Three Phase WYE: 3W+N+G	N/A	N/A	330	330	330	330	330
277/480 Three Phase WYE: 3W+N+G	N/A	N/A	500	330	500	700	330
480 Three Phase Delta: 3W+G	1200	1200	N/A	N/A	N/A	N/A	N/A

** Contact United Power for UL 1449 clamping voltage performance ratings for voltage configured systems not listed above. All ratings are for PDX units with "C" installation method (no fused disconnect).
 Contact factory for UL-assigned clamping voltage ratings for all "F" systems that include a fused disconnect.

ENCLOSURE DIMENSIONS***	Model PDX2 (Two Stage)		Model PDX3 (Three Stage)	
	Without Disconnect (C) H x W x D (in.)	With Fused Disconnect (F) H x W x D (in.)	Without Disconnect (C) H x W x D (in.)	With Fused Disconnect (F) H x W x D (in.)
80-160 kA Systems	20 x 16 x 9	24 x 20 x 9	20 x 16 x 9	24 x 20 x 9
240-320 kA Systems	24 x 20 x 9	24 x 20 x 9	24 x 20 x 9	24 x 20 x 9
400-480 kA Systems	30 x 24 x 9	30 x 24 x 9	30 x 24 x 9	30 x 24 x 9

*** All PDX2 dimensions from 80-160 kA are for three phase WYE or Delta configured systems. PDX2 systems from 240-480 kA are all three phase Delta configured. PDX3 dimensions are all for three phase WYE systems. All dimensions are rounded to the nearest inch.



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