Surge Protection Solutions

Surge-Trap®
UL/CSA Surge Protective Devices
POWER RELATED FLUCTUATIONS COST U.S. COMPANIES MORE THAN $80 BILLION A YEAR

You have expensive equipment you rely on every day to meet your customers’ needs. Down machines cost you time, money, and resources to get back on line. With a minimal investment, you can protect your sensitive control equipment or your entire facility from surge events. Mersen’s Surge-Trap® product line offers a world-class suite of surge protection products designed to protect your facility from harmful and preventable surge damage.

Most surge spikes originate from within a customer’s own facility. In fact, nearly 80% of all surge problems are directly attributed to power disturbances from within the facilities own equipment.

Any facility with motors stopping and starting, light load panels being turned on and off frequently, and other potential power disturbances is at risk for damage caused by a surge spike.

Of course, surges in electrical power can also originate outside of a facility, accounting for roughly 20% of facility transient problems. These surges may be caused by utility grid switching, lightning strikes, switching of capacitor banks, and electrical accidents.

Although many transients are not predictable, damage to a facility is preventable with a proven and tested surge protective device.

WHAT TYPES OF DAMAGE CAN A SURGE CAUSE TO A FACILITY?

- **Disruptive**: A surge enters an electronic component which interprets the valid logic command. The result: system lock-up, machine malfunction leading to faulty output, or corrupted files.

- **Dissipative**: A repetitive pulsing of short duration energy. The result: Long-term machine or system degradation leading to system replacement at earlier intervals.

- **Destructive**: A high-level energy surge that immediately results in equipment failure or destruction.

WHAT DOES A VOLTAGE SURGE LOOK LIKE?

A voltage surge is a voltage level that is short in duration and can be several times greater than the system’s normal operating AC RMS or DC voltage level.
WHY Mersen? THERMALLY PROTECTED MOV (TPMOV®)

FOR SURGE PROTECTION THAT COVERS EVERY VOLTAGE NEED WITHIN YOUR FACILITY

Metal Oxide Varistors (MOVs) are the most common and efficient technology used to protect equipment against damaging voltage spikes. However, while MOVs are efficient, they also degrade over time and possibly fail catastrophically when they reach end of life. In response, UL wrote standards to prevent fire risk while using MOVs. In 2009, UL 1449 3rd Edition was published*, and it transformed the way SPD manufacturers designed and manufactured their devices.

This is when Mersen’s TPMOV became essential. This Mersen-patented invention was the first fail-safe Thermally Protected MOV (TPMOV) able to pass all UL 1449 3rd Edition tests as well as even more stringent tests applied by our customers. A few years later, Mersen TPMOVs are often imitated, but there is still no match to Mersen’s technology.

Almost all Mersen SPDs feature our Thermally Protected MOV (TPMOV) technology, a fail-safe surge protection solution without the need for additional upstream protection. As a result, the Surge-Trap® product line offers the lowest cost, safest, and most reliable surge protection products on the market.

<table>
<thead>
<tr>
<th>Surge Protective Device</th>
<th>MERSEN SURGE-TRAP</th>
<th>TYPICAL COMPETITOR</th>
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<td>Fuse</td>
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<tr>
<td>Fuseholder</td>
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<td>Additional Wiring</td>
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<td>Total Product Cost</td>
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</tbody>
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- **Thermal MOV protection (TPMOV).** Thermal protection eliminates an MOV’s hazardous and destructive failure modes (thermal runaway).
- **Overvoltage is solely managed by TPMOV technology.** This technology eliminates the need for additional wiring, fuse components, and costly installation time.
- **Prevention protection method.** Save MOV disconnection prior to MOV thermal runaway (as opposed to the containment method). No emission of fire, smoke, soot, or ionized gas.
- **Industry Innovation.** Mersen developed the first SPD product to pass UL1449 3rd edition safety testing, utilizing our patented TPMOV technology.
- **Highest Short-Circuit Current Rating (SCCR).** Surge-Trap products feature the highest SCCR rating available for any surge protective device, allowing for higher safety ratings and protection.
- **Isolated MOV.** Surge-Trap products provide fail-safe protection by isolating the MOV at the end of life.

Mersen offers surge protection products ranging from point-of-use protection to complete facility protection. The Surge-Trap product line represents the broadest suite of products for all your application requirements.
Per the National Electrical Code® (NEC) and ANSI/UL 1449, SPDs are designated as follows:

**Type 1:** Permanently connected, intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device (service equipment). Their main purpose is to protect insulation levels of the electrical system against external surges caused by lightning or utility capacitor bank switching.

**Type 2:** Permanently connected, intended for installation on the load side of the service disconnect overcurrent device (service equipment), including branch panel locations. Their main purpose is to protect the sensitive electronics and microprocessor-based loads against residual lightning energy, motor generated surges, and other internally generated surge events.

**Type 3:** Point-of-utilization SPDs installed at a minimum conductor length of 10 meters (30 feet) from the electrical service panel to the point-of-utilization. Examples include cord connected, direct plug-in, and receptacle type SPDs.

The Institute of Electrical and Electronics Engineers (IEEE) has developed three categories that every facility can be divided into, location Category A, B, and C. See IEEE Standard C62.41.1 and C62.41.2 for further reference.

**Category C:** Outside overhead lines and service entrance (outdoor)
- Service drops from pole to building
- Runs between meter and panel
- Overhead lines to detached building
- Underground lines to well pump

**Category B:** Feeders, short branch circuits and service panels (indoor)
- Distribution panel devices
- Bus and feeder distribution
- Heavy appliance outlets with “short” connections to service entrance
- Lighting systems in large buildings

**Category A:** Outlets/receptacles and long branch circuits (indoor) (least severe)
- All outlets at more than 10m (30 ft) from Category B
- All outlets at more than 20m (60 ft) from Category C
UL SAFETY REQUIREMENTS FOR SURGE PROTECTION

MAKE SURE YOUR INSTALLATION COMPLIES WITH UL 1449 4TH EDITION STANDARDS

UL can mark SPDs with two different classifications. A product that fully complies with the UL 1449 4th Edition type categories 1, 2, or 3 is marked with a small holograph label bearing the letters SPD. It also has the UL Listing Symbol.

When a product is compliant as a component assembly of UL 1449 4th Edition, UL labels it as a Recognized Component.

- Recognized components require additional safety evaluation for the application of the product and normally this type is installed at an OEM or an electrical panel manufacturer location.
- If it is integrated into a listed panel, a UL representative will review the application to confirm it meets safety requirements.
- The UL Recognition symbol is shown as a mirror image UR.

A UL Recognized product receives a detailed list of how it is different than a listed product. The UL test report provides the “Conditions of Acceptability.” An OEM and UL field engineer requires this information to assure the SPD is applied safely.

Non-UL listed products can be misleading. Some SPD manufacturers self-test their units using their own opinion of what is important. They can state on the packaging that the SPD is UL 1449 compliant, but it’s just their opinion. The use of these products is not in compliance with NEC regulations because they are not listed. Some independent third party testing labs will test to only portions of UL 1449 at the manufacturer’s request. Look for the UL Listed logo or UL hologram logo to avoid this situation.

AN EXAMPLE OF A PRODUCT COMPLYING WITH UL 1449 4TH EDITION AND THE NEC:

If a maintenance person wanted to protect an existing machine panel against voltage surges, they might select a Mersen STXR480Y05. This is rated 480/277 volts supplied by a three-phase wye solidly grounded neutral source with not over 200kA short-circuit current. This is UL listed for a fully compliant field installation.

An OEM could select either the Mersen STXR480Y05 as above, or the Mersen STP4803PYGM DIN-Rail SPD, which is UL Recognized. If the UL Recognized product is chosen, the application must meet the UL “Conditions of Acceptability.” In this example, mounting the SPD inside of the machine panel fully complies.

If there is any question about the veracity of a UL SPD status, UL has an easy verification procedure on their website at www.ul.com. At the bottom of the home page, click on the online Certifications Directory. Then enter the name of the manufacturer to verify the appropriate UL listing.
MEETING THE WORLD’S TOUGHEST STANDARDS

SURGE PROTECTION TERMS TO KNOW

There are many unique surge protection terms that are helpful to know. Below is a glossary of frequently used terms:

- **8/20 current impulse current**: Impulse with a virtual front time¹ of 8μs and a time to half-value² of 20μs.

- **Clamp Voltage**: The peak MOV terminal voltage measured with an applied 8/20 μs pulse of rated impulse current.

- **Metal Oxide Varistor (MOV)**: An electronic component that is commonly used to divert excessive current to the ground and/or neutral lines.

- **Maximum Continuous Operating Voltage (MCOV)**: The maximum rms voltage that may be continuously applied to the SPD for each connected mode.

- **Nominal Discharge Current Rating (Iₙ)**: Peak value of the current through the SPD, selected by the manufacturer from a list of predetermined values, having a short-circuit current wave shape of 8/20 μs where the SPD remains functional after 15 surges.

- **Voltage Protection Rating (VPR)**: A rating per UL 1449 4th Edition, signifying the rounded-up average measured limiting voltage of an SPD when the SPD is subjected to the surge produced by a 6kV, 3kA 8/20 μs combination waveform generator.

- **Short-Circuit Current Rating (SCCR)**: The suitability of an SPD for use on an AC power circuit that is capable of delivering not more than a declared rms symmetrical current at a declared voltage during a short circuit condition.

- **Surge Protective Device (SPD)**: A device that contains at least one nonlinear component and is listed to limit surge voltages and divert surge current.

- **Voltage Protection Level (Uₚ)**: Maximum voltage to be expected at the SPD terminal when subjected to the SPD’s nominal discharge current (Iₙ).

¹ The front time is defined according to IEC 60060-1 to be 1.25 x (t90 - t10).
² The time to half-value is defined as the time between the virtual origin and the 50% point on the tail.

NEW TO SURGE PROTECTION?

Mersen offers educational and collaborative product training annually with opportunity for hands-on experience to learn more about our products. For information on when the next training will be offered, please contact Mersen USA at 978.462.6662.
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The Mersen flagship for facility-wide protection, The Surge-Trap® Type 1 STZ Series features surge capacities up to 450kA designed with Mersen’s industry leading TPMOV® technology inside making it the safest and most reliable product on the market. Options include surge counter, through-the-door disconnect switch, audible alarm, dry contact, and EMI/RFI filtering. This external SPD can be installed on the line or load side of the service entrance.

**Features and Benefits:**

- Type 1 SPD for service entrance and facility-wide protection
- Ideal for new construction bid projects and specification as well as existing facility retrofit
- Designed with the industry leading Mersen TPMOV® Technology (internally fused)
- Available with accessory **Option A** for basic features (LED status indicators) and **Option B** for standard features (EMI/RFI filter, surge counter with reset, audible alarm and dry contacts with silence)
- Replaceable SPD module
- SPD module can be rotated 90 degrees depending on desired cable entry location
- Available with or without disconnect switch
- For use in ANSI/UL Type 1 or 2 SPD installations
- Up to 10 Modes of Protection (L-N, L-L, L-G, N-G)
- 15-year warranty

**Ratings:**

- Volts ($U_n$): 120-480VAC
- Nominal Discharge Current Rating ($I_n$): 20kA
- Surge Capacity (per phase): 100, 150, 200, 300, 450kA
- Short-Circuit Current Rating (SCCR): 200kA
- Optional EMI/RFI Filter: Up to -50dB from 10kHz to 100MHz

**Approvals:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
## General Product Specifications

### Catalog Number (Includes Suffixes*)

<table>
<thead>
<tr>
<th>Catalog Number</th>
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<th>Maximum Continuous Operating Voltage (MCOV, uₑ)</th>
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<td>L-G</td>
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<td>STZ480D...</td>
<td>480V DELTA &amp; HRG WYE</td>
<td>20kA</td>
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</tbody>
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*Part Number Selector (Don't see what you need? Please contact the factory)

### STZ Model Series

- **STZ**
  - **480Y** Voltage and System Configuration
    - 240S: 240/120V Split
    - 120D: 120V DELTA
    - 208Y: 208/120V WYE
    - 480Y: 480/277V WYE
    - 240D: 240V DELTA
    - 480D: 480V DELTA & HRG WYE

### 30 Surge Capacity

- 10: 100kA
- 15: 150kA
- 20: 200kA
- 30: 300kA
- 45: 450kA

### B Package

- **Standard**
  - LED Status Indicators
  - Phase Loss Indication
  - Audible Alarm
  - Form C Dry Contacts
  - EMI/RFI Filter
  - Surge Counter

### 1 Enclosure

- 1: NEMA 1/12/3R/4X: NEMA 4X

### T Disconnect

- T: UL98 Switch thru the door handle
  - BLANK: None

### Human-Machine Interface (HMI)

- **Option A: Basic**
  - LED Status Indicators
  - Phase Loss Indication

- **Option B: Standard**
  - LED Status Indicators
  - Phase Loss Indication
  - Audible Alarm
  - Form C Dry Contacts
  - EMI/RFI Filter
  - Surge Counter

Note: Images above show HMI mounted on Internal SPD (STZ-R Series).
For the STZ External SPD, HMI will be mounted on the enclosure door.
Optional Form C Dry Contact and Audible Alarm
[Included with Option B]

Form C Dry Contact
125VAC, 1A Resistive
30VDC, 2A General Purpose

NC = Normally Closed
COM = Common
NO = Normally Open

Audible Alarm
Alarm sounds when any protection is lost.

Dimensions and Mounting Configurations

Without Disconnect Switch
12x12 Enclosure

With Disconnect Switch
16x12 Enclosure
For facility-wide surge protection internal to existing equipment such as switchgear, panelboards, or motor control centers, the Surge-Trap® Type 1 STZ-R Series is the obvious choice. The STZ-R series features surge capacities up to 450kA designed with Mersen’s industry-leading TPMOV® technology inside making it the safest and most reliable product on the market. Ideal for OEMs and panel builders, this internal SPD can be installed on the line or load side of the service entrance.

**Features and Benefits:**

- SPD intended to be installed internal to existing switchgear, panelboards, motor control centers, etc.
- Designed with the industry leading Mersen TPMOV® Technology (internally fused)
- Available with accessory **Option A** for basic features (LED status indicators) and **Option B** for standard features (EMI/RFI filter, surge counter with reset, audible alarm and dry contacts with silence)
- Local or remote human-machine interface (HMI) mounting options
- HMI can be rotated 90 degrees depending on desired cable entry location
- Available with or without disconnect switch
- For use in ANSI/UL Type 1 or 2 SPD installations
- Up to 10 Modes of Protection (L-N, L-L, L-G, N-G)
- 15-year warranty

**Ratings:**

- Volts ($U_n$): 120-480VAC
- Nominal Discharge Current Rating ($I_n$): 20kA
- Surge Capacity (per phase): 100, 150, 200, 300, 450kA
- Short-Circuit Current Rating (SCCR): 200kA
- Optional EMI/RFI Filter: Up to -50dB from 10kHz to 100MHz

**Approvals:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
## General Product Specifications

### Mounting:
- Mounting feet

### Wiring:
- Wire Lugs for 6-10 AWG copper

### Flammability:
- UL94-5VA

### Operating & Storage Temperature:
- -40°C to +85°C

### Relative Humidity Range:
- 0 to 95% non-condensing

### Visual LED End-of-Life Indicator:
- Green = 67% to 100% Life
- Yellow = 34% to 66% Life
- Red = 0 to 33% Life

### Frequency:
- 50-60Hz

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### Human-Machine Interface (HMI)

**Option A: Basic**
- LED Status Indicators
- Phase Loss Indication

**Option B: Standard**
- LED Status Indicators
- Phase Loss Indication
- Audible Alarm
- Form C Dry Contacts
- EMI/RFI Filter
- Surge Counter

**STZ Model Series**
- 240S: 240/120V Split
- 120D: 120V DELTA
- 208Y: 208/120V WYE
- 480Y: 480/277V WYE
- 240D: 240V DELTA
- 480D: 480V DELTA & HRG WYE

**480Y Voltage and System Configuration**
- 10: 100kA
- 15: 150kA
- 20: 200kA
- 30: 300kA
- 45: 450kA

**30 Surge Capacity**
- A: Basic
- B: Standard

**Package**
- Q: Internal SPD without HMI
- R: Internal SPD with HMI
- U: UL98 Switch BLANK: None
Optional Form C Dry Contact and Audible Alarm
(Included with Option B)

Form C Dry Contact
125VAC, 1A Resistive
30VDC, 2A General Purpose

NC = Normally Closed
COM = Common
NO = Normally Open

Audible Alarm
Alarm sounds when any protection is lost.

Dimensions and Mounting Configurations
The most compact of the STX series offering, the Surge-Trap® Type 1 STXH meets requirements for UL1449 4th Edition and is suitable for any 120/240VAC split phase application. The STXH Series SPD features TPMOV® technology inside making it the safest product available in its category. Its compact size, performance, and reliability are especially ideal for HVAC applications and direct mounting to air condition disconnect switches.

**Features and Benefits:**

- Designed with the industry leading Mersen TPMOV® Technology
- Compact footprint designed to mate with AC Disconnect Switches
- LED status indicator (ON = Good, OFF = Replace)
- NEMA 4X enclosure for outdoor or indoor use
- Fits 1/2" knockouts with 18" leads for easy installation
- For use in ANSI/UL Type 1 or 2 SPD installations
- 3 Modes of Protection (L-N, L-L)
- 3-year warranty

**Ratings:**

- Volts ($U_n$): 120/240VAC Split Phase
- Nominal Discharge Current Rating ($I_{n}$): 20kA
- Surge Capacity (per phase and per mode): 50kA
- Short-Circuit Current Rating (SCCR): 200kA

**Approvals:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
**GENERAL PRODUCT SPECIFICATIONS**

Mounting: 1/2” – 14 threaded hub  
Includes sealing locking washer  

Wiring: Pre-wired 18” 10AWG  

Enclosure: NEMA 4X Non-metallic  

Flammability: UL94-V0  

Operating & Storage Temperature: -40°C to +85°C  
Relative Humidity Range: 0 to 95% non-condensing  

Visual End-of-Life Indicator: GREEN = OK,  
OUT = REPLACE  

Frequency: 50-60Hz  

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**CATALOG NUMBER (INCLUDES SUFFIXES*)** | **SYSTEM VOLTAGE AND CONFIGURATION** | **Iₕ** | **MAXIMUM CONTINUOUS OPERATING VOLTAGE (MCOV, Uₑ)** | **VOLTAGE PROTECTION RATING (VPR) (UL 1449, 6kA, 3kV)** | **L-N** | **L-L** |
--- | --- | --- | --- | --- | --- | --- |
STXH120P05 | 120V Single Phase | 20kA | 150 | - | 600 | - |
STXH240505 | 240/120V Split Phase | 20kA | 150 | 300 | 600 | 1000 |

**LED Status Indicator**

Visible from side profile through light tube in cover  

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**Dimensions and Mounting Configurations**

Ideal for Air Conditioning Disconnect Applications  

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The most popular range in the STX series offering, the Surge-Trap® Type 1 STXR meets requirements for UL1449 4th Edition and is ideal for the replacement of obsolete surge arrestors. The STXR Series SPDs feature TPMOV® technology inside, making them the safest product available. With a small, compact design and line or load installation flexibility, the STXR series is the perfect fit for branch panel and/or individual equipment protection.

**FEATURES AND BENEFITS:**

- Designed with the industry leading Mersen TPMOV® Technology
- LED status indicator (ON = Good, OFF = Replace)
- NEMA 4X enclosure for outdoor or indoor use
- Fits 3/4” knockouts with 3’ leads for easy installation
- Optional mounting bracket for surface mount applications
- Optional audible alarm and remote dry contacts
- For use in ANSI/UL Type 1 or 2 SPD installations
- Up to 10 modes of Protection (L-N, L-L, L-G optional, N-G optional)
- 5-year warranty

**RATINGS:**

- Volts ($U_n$): 120-600VAC
- Nominal Discharge Current Rating ($I_d$): 20kA
- Surge Capacity (per phase and per mode): 50kA
- Short-Circuit Current Rating (SCCR): 200kA

**APPROVALS:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
### Surge-Trap® STXR Series

#### General Product Specifications

- **Mounting:** 3/4” – 14 threaded hub, includes locking washer
- **Wiring:** Pre-wired 3’ (1m) 10AWG
- **Enclosure:** NEMA 4X Non-metallic
- **Flammability:** UL94-V0
- **Operating & Storage Temperature:** 
  -40°C to +85°C
- **Relative Humidity Range:** 0 to 95% non-condensing
- **Visual End-of-Life Indicator:** GREEN = OK, OUT = REPLACE
- **Frequency:** 50-60Hz

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<td>150</td>
<td>300</td>
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<tr>
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<td>480/240V Split Phase</td>
<td>20kA</td>
<td>320</td>
<td>640</td>
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<tr>
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<td>208/120V 3-Phase WYE</td>
<td>20kA</td>
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<td>20kA</td>
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<td>640</td>
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<td>STXR480Y05</td>
<td>480/277V 3-Phase WYE</td>
<td>20kA</td>
<td>320</td>
<td>470</td>
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<tr>
<td>STXR600Y05</td>
<td>600/347V 3-Phase WYE</td>
<td>20kA</td>
<td>420</td>
<td>695</td>
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</table>

*Suffixes:*

- Add Suffix “N” for N-G protection. Example: STXR208Y05N
- Add Suffix “A” for Audible Alarm and Dry Contact. Example: STXR208Y05A
- For both options, Example: STXR208Y05AN

#### Accessory Description

- **STXRMBK:** STXR Mounting Bracket Kit. Includes (1) 90 degree bracket and (2) mounting screws
- **Optional Form C Dry Contact and Audible Alarm (Suffix “A”):**
  - 125VAC, 1A Resistive
  - 30VDC, 2A General Purpose
- **Audible Alarm:**
  - Alarm sounds when any protection is lost

#### Dimensions and Mounting Configurations

- **3/4”-14 Mounting Hub**
- **Bracket Mount Option**
The Surge-Trap® Type 1 STXP Series offers advanced performance and features over the STXR series including higher surge capacity and phase LED status indicators. The STXP meets requirements for UL1449 4th Edition and has been designed for additional mounting flexibility including mounting feet and flush-mount capability. The STXP features TPMOV® technology inside making it the safest product available. Installation can be done on the line or load side of a panel. The STXP is the perfect fit from service entrance all the way down to an important machine specific control panel.

**Features and Benefits:**

- Designed with the industry leading Mersen TPMOV® Technology (internally fused)
- Enhanced 100kA surge capacity for longer life and higher single impulse withstand
- LED status indicator (ON = Good, OFF = Replace)
- LED phase loss indicators (ON = Operational, OFF = Maintenance Required)
- NEMA 4X enclosure for outdoor or indoor use
- Mounting hub and mounting feet for installation flexibility
- Pre-wired with 3’ leads for easy installation
- Optional flush-mount kit for in-wall installation
- Optional audible alarm and remote dry contacts
- For use in ANSI/UL Type 1 or 2 SPD installations
- Up to 10 Modes of Protection (L-N, L-L, L-G, N-G)
- 10-year warranty

**Ratings:**

- Volts ($U_n$): 120-600VAC
- Nominal Discharge Current Rating ($I_{\text{in}}$): 20kA
- Surge Capacity (per phase): 100kA
- Short-Circuit Current Rating (SCCR): 200kA

**Approvals:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
### GENERAL PRODUCT SPECIFICATIONS

- **Mounting:** Female 3/4” – 14 threaded hub
- **Wiring:** Mounting feet with 0.125” diameter holes
- **Enclosure:** NEMA 4X Non-metallic
- **Flammability:** UL94-SWA
- **System Voltage and Configuration:**
  - Operating & Storage Temperature: -40°C to +85°C
  - Relative Humidity Range: 0 to 95% non-condensing
  - Visual End-of-Life Indicator: GREEN = OK, OUT = REPLACE
  - Frequency: 50-60Hz

### CATALOG NUMBER (INCLUDES SUFFIXES*)

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>System Voltage and Configuration</th>
<th>( I_n )</th>
<th>Maximum Continuous Operating Voltage (MCOV, ( U_{c} ))</th>
<th>Voltage Protection Rating (VPR) (UL 1449, 6kA, 3kV)</th>
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<td>( L-G )</td>
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<td>480/240V Split Phase</td>
<td>20kA</td>
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<td>380/220V 3-Phase WYE</td>
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<td>STXP480Y10</td>
<td>480/277V 3-Phase WYE</td>
<td>20kA</td>
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<td>320</td>
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<tr>
<td>STXP600Y10</td>
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<td>20kA</td>
<td>-</td>
<td>550</td>
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<td>20kA</td>
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</table>

### CATALOG NUMBER (INCLUDES SUFFIXES*)

- **STXPFMK:** STXP Flush Mount Kit. Includes (1) mounting plate and (3) mounting screws

### ACCESSORY DESCRIPTION

- **Optional Form C Dry Contact and Audible Alarm (Suffix "A")**
  - **Form C Dry Contact (Pre-wired 3’ 18AWG)**
    - 125VAC, 1A Resistive
    - 30VDC, 2A General Purpose
    - Gray = Normally Closed
    - Blue = Common
    - Red = Normally Open
  - **Audible Alarm**
    - Alarm sounds when any protection is lost

### Dimensions and Mounting Configurations

- **Flush Mount Option**
The most advanced of the STX series, the Surge-Trap® Type 1 STXT Series comes standard with EMI/RFI Filtering and surge capacities up to 200kA. The STXT features TPMOV® technology inside, making it the safest product available. With line or load side installation flexibility, this unit is a great fit from the service entrance all the way down to each distribution and/or branch panel.

**FEATURES AND BENEFITS:**

- Designed with the industry leading Mersen TPMOV® Technology (internally fused)
- Premium 200kA surge capacity for longer life and higher single impulse withstand
- Includes EMI/RFI filter for cleaner attenuation
- LED status indicator (ON = Good, OFF = Replace)
- LED phase loss indicators (ON = Operational, OFF = Maintenance Required)
- NEMA 4X enclosure for outdoor or indoor use
- Mounting hub and mounting feet for installation flexibility
- Optional audible alarm and remote dry contacts
- For use in ANSI/UL Type 1 or 2 SPD installations
- Up to 10 Modes of Protection (L-N, L-L, L-G, N-G)
- 10-year warranty

**RATINGS:**

- Volts ($U_n$): 120-600VAC
- Nominal Discharge Current Rating ($I_d$): 20kA
- Surge Capacity (per phase): 100kA or 200kA
- Short-Circuit Current Rating (SCCR): 200kA
- EMI/RFI Filter: Up to -50dB from 10kHz to 100MHz

**APPROVALS:**

- ANSI/UL 1449 4th Edition, Type 1 SPD, File E210793
- CSA C22.2, Type 1 SPD
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- UL96A Lightning Protection
- RoHS Compliant
**General Product Specifications**

<table>
<thead>
<tr>
<th>Mounting:</th>
<th>System Voltage and Configuration</th>
<th>( I_n )</th>
<th>Maximum Continuous Operating Voltage (MCOV, ( U_{\text{c}} ))</th>
<th>Voltage Protection Rating (VPR) (UL 1449, 6kA, 3kV)</th>
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</thead>
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<td>120V Single Phase</td>
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<td>L-N 150 L-G 150 L-L 150 N-G* 150</td>
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<tr>
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<td>480V Split Phase</td>
<td>20kA</td>
<td>L-N 320 L-G 320 L-L 640 L-G 150</td>
<td>L-N 1200 L-G 1200 L-L 2000 N-G* 700</td>
</tr>
<tr>
<td></td>
<td>208/120V 3-Phase WYE</td>
<td>20kA</td>
<td>L-N 320 L-G 320 L-L 640 L-G 150</td>
<td>L-N 1200 L-G 1200 L-L 2000 N-G* 700</td>
</tr>
<tr>
<td></td>
<td>380/220V 3-Phase WYE</td>
<td>20kA</td>
<td>L-N 320 L-G 320 L-L 640 L-G 150</td>
<td>L-N 1200 L-G 1200 L-L 2000 N-G* 700</td>
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<tr>
<td></td>
<td>480/277V 3-Phase WYE</td>
<td>20kA</td>
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<tr>
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<td>600V/347V 3-Phase DELTA</td>
<td>20kA</td>
<td>L-N 695 L-G 840 L-L 840 L-G 840</td>
<td>L-N 2500 L-G 2500 L-L 2500 N-G* 1200</td>
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<tr>
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<td>600V 3-Phase DELTA &amp; HRG WYE</td>
<td>20kA</td>
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<td>L-N 2500 L-G 2500 L-L 2500 N-G* 1200</td>
</tr>
</tbody>
</table>

**Suffixes:** Add Suffix "A" for Audible Alarm and Dry Contact. Example: STXP208Y10A
For 100kA Surge Capacity models, substitute “10” for “20.” Example: STXT208Y10

### Optional Form C Dry Contact and Audible Alarm (Suffix "A")

**Form C Dry Contact**
- 125VAC, 1A Resistive
- 30VDC, 2A General Purpose

<table>
<thead>
<tr>
<th>COM = Common</th>
<th>NO = Normally Open</th>
</tr>
</thead>
</table>

**Audible Alarm**
Alarm sounds when any protection is lost

---

**Dimensions and Mounting Configurations**

3/4"-14 Female Mounting Hub
Surge-Trap® Pluggable Surge Protective Device (SPD) is a no-fuse, fail-safe surge suppressor featuring Mersen’s patented TPMOV® technology inside. UL 1449 4th Edition approved, it is DIN-rail mountable featuring a fail-safe self-protected design, visual indicator, and a small footprint. A remote indicator option provides status to critical control circuitry. The Surge-Trap Pluggable SPD has a high short circuit rating and a thermally protected MOV, which eliminates the need for additional overcurrent protection devices.

**FEATURES AND BENEFITS:**

- Easy installation or retrofit
- DIN-rail mountable
- Fail-safe, self-protected design
- Remote indicator
- Visual indicator
- IP20 finger-safe design
- Small footprint
- No additional overcurrent protection devices required
- Easy to replace modules
- 2-year warranty

**RATINGS:**

- **Volts (Uₚ):** 120-690VAC
- **Nominal Discharge Current Rating (Iₚ):** 10-20kA
- **Surge Capacity:** 50kA
- **Short-Circuit Current Rating (SCCR):** 200kA

**APPROVALS:**

- ANSI/UL 1449 4th Edition, Type 1 Component Assembly SPD, File E210793
- ANSI/IEEE C62.41.1, C62.41.2, C62.45
- RoHS Compliant
### GENERAL PRODUCT SPECIFICATIONS

- **Mounting:** 35mm DIN-Rail
- **Wire Range:** 6-14AWG Solid / Stranded CU
- **Terminal Torque:** 14.75 lbs-in
- **Degree of Protection:** IP 20
- **Flammability:** UL94 V0
- **Operating & Storage Temperature:** -40ºC to + 85ºC
- **Visual End of Life Indicator:** RED = End of Life
- **Remote End of Life Indicator:** NO/NC Dry Contact
- **Frequency:** 50-60 Hz

### 1-POLE, SINGLE-PHASE, 2-WIRE

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Nominal Voltage (VAC)</th>
<th>Maximum Continuous Operating Voltage (MCOV, VAC)</th>
<th>Voltage Protection Rating (VPR, VAC)</th>
<th>Replacement Plug</th>
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*SCCR = 42kA

### 2-POLE, SPLIT-PHASE, 3-WIRE

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<th>Maximum Continuous Operating Voltage (MCOV, VAC)</th>
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<th>Voltage Protection Rating (VPR, VAC)</th>
<th>Replacement Plug</th>
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### 3-POLE, 3-PHASE WYE, 4-WIRE

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<th>Maximum Continuous Operating Voltage (MCOV, VAC)</th>
<th>Voltage Protection Rating (VPR, VAC)</th>
<th>Replacement Plug</th>
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<td>STP4803PYGM</td>
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<td>STP6803PYGM</td>
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### 4-POLE, 3-PHASE WYE, 5-WIRE, INCLUDING N-G MODE

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<th>Nominal Voltage (VAC)</th>
<th>Maximum Continuous Operating Voltage (MCOV, VAC)</th>
<th>Voltage Protection Rating (VPR, VAC)</th>
<th>Replacement Plug</th>
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<th>Voltage Protection Rating (VPR, VAC)</th>
<th>Replacement Plug</th>
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<td>825/730</td>
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Surge-Trap® Modular Surge Protective Device (SPD) is a no-fuse, fail-safe surge suppressor featuring Mersen’s patented TPMOV® technology inside. UL 1449 4th Edition approved, it is DIN-rail mountable featuring a fail-safe self-protected design, visual indicator, and a small footprint. A remote indicator option provides status to critical control circuitry. The Surge-Trap Modular SPD has a high short circuit rating and a thermally protected MOV, which eliminates the need for additional overcurrent protection devices.

**FEATURES AND BENEFITS:**
- Easy installation or retrofit
- DIN-rail mountable
- Fail-safe, self-protected design
- Remote indicator (optional)
- Visual indicator
- IP20 finger-safe design
- Small footprint
- No additional overcurrent protection devices required
- 2-year warranty

**RATINGS:**
- Volts ($U_n$): 120-690VAC
- Nominal Discharge Current Rating ($I_n$): 20kA
- Surge Capacity (per phase and per mode): 50kA
- Short-Circuit Current Rating (SCCR): 200kA

**APPROVALS:**
- ANSI/UL 1449 4th Edition, Type 1 Component Assembly SPD, File E210793
- ANSI/IEEE C62.411, C62.412, C62.45
- RoHS Compliant
# SURGE-TRAP® ST SERIES

## GENERAL PRODUCT SPECIFICATIONS

- **Mounting**: 35mm DIN-Rail
- **Wire Range**: 6-1/4 AWG Solid / Stranded CU
- **Terminal Torque**: 14.75 lbs-in
- **Degree of Protection**: IP 20
- **Flammability**: UL94 V0
- **Operating & Storage Temperature**: -40ºC to + 85ºC
- **Visual End of Life Indicator**: Visual Tab
- **Remote End of Life Indicator**: NO/NC Dry Contact
- **Frequency**: 50-60 Hz
- **Response Time**: < 25 ns

### 1-POLE, SINGLE-PHASE, 2-WIRE

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### 2-POLE, SPLIT-PHASE, 3-WIRE

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### 3-POLE, 3-PHASE DELTA, 3-WIRE

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### 3-POLE, 3-PHASE DELTA, 4-WIRE

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<td>240</td>
<td>270 270 - - 540 800 800 - - 1500 20</td>
<td></td>
</tr>
<tr>
<td>ST4803PDG (M)</td>
<td>480</td>
<td>550 550 - - 1100 1500 1500 - - 3000 20</td>
<td></td>
</tr>
</tbody>
</table>

### 3-POLE, 3-PHASE WYE, 4-WIRE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST2083PYG (M)</td>
<td>120/208</td>
<td>180 180 - - 360 500 500 - - 900 20</td>
<td></td>
</tr>
<tr>
<td>ST4803PYG (M)</td>
<td>277/470</td>
<td>320 320 - - 640 900 900 - - 1800 20</td>
<td></td>
</tr>
<tr>
<td>ST6003PYG (M)</td>
<td>347/600</td>
<td>420 420 - - 840 1200 1200 - - 2000 20</td>
<td></td>
</tr>
<tr>
<td>ST6903PYG (M)</td>
<td>400/690</td>
<td>510 510 - - 1020 1500 1500 - - 3000 20</td>
<td></td>
</tr>
</tbody>
</table>

### 4-POLE, 3-PHASE WYE, 5-WIRE, INCLUDING N-G MODE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST2083PY (M)</td>
<td>120/208</td>
<td>180 180 - - 360 500 500 - - 900 20</td>
<td></td>
</tr>
<tr>
<td>ST4803PY (M)</td>
<td>277/470</td>
<td>320 470 150 640 1000 1500 500 800 2000 20</td>
<td></td>
</tr>
<tr>
<td>ST6003PY (M)</td>
<td>347/600</td>
<td>420 690 270 840 1500 2500 800 2500 20</td>
<td></td>
</tr>
<tr>
<td>ST6903PY (M)</td>
<td>400/690</td>
<td>1020 510 510 1020 3000 1500 1500 3000 20</td>
<td></td>
</tr>
</tbody>
</table>

For remote indication, add "M" to the end of the part number. Example, ST4803PYM.

Omit "M" to order without remote indication. Example, ST4803PY.
SURGE-TRAP® STP AND ST SERIES

**DIMENSIONS - STP SERIES**

<table>
<thead>
<tr>
<th>POLES</th>
<th>A (IN)</th>
<th>A (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pole</td>
<td>0.71</td>
<td>18.03</td>
</tr>
<tr>
<td>2 Pole</td>
<td>1.42</td>
<td>36.06</td>
</tr>
<tr>
<td>3 Pole</td>
<td>2.13</td>
<td>54.1</td>
</tr>
<tr>
<td>4 Pole</td>
<td>2.84</td>
<td>72.13</td>
</tr>
</tbody>
</table>

**DIMENSIONS - ST SERIES**

<table>
<thead>
<tr>
<th>POLES</th>
<th>A (IN)</th>
<th>A (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pole</td>
<td>0.7</td>
<td>17.8</td>
</tr>
<tr>
<td>2 Pole</td>
<td>1.39</td>
<td>35.5</td>
</tr>
<tr>
<td>3 Pole</td>
<td>2.1</td>
<td>53.3</td>
</tr>
<tr>
<td>4 Pole</td>
<td>2.8</td>
<td>71</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS**

1-POLE, SINGLE-PHASE, 2-WIRE

2-POLE, SPLIT-PHASE, 3-WIRE

3-POLE, 3-PHASE DELTA, 3-WIRE

3-POLE, 3-PHASE DELTA, 3-PHASE WYE, 4-WIRE

4-POLE, 3-PHASE WYE, 5-WIRE

4-POLE, 3-PHASE DELTA HIGH-LEG, 5-WIRE

**REMOTE STATUS INDICATOR**

- **Signal Wire Range**: #16 to #30 AWG
- **Terminal Torque**: 2.2 lb-in
- **Cont. between Comm + NO**: Product Offline, Not Protected
- **Cont. between Comm + NC**: Product Online, Protected

**ST AND STP SERIES**: FOR REMOTE INDICATION, ADD “M” TO THE END OF THE CATALOG NUMBER. FOR EXAMPLE, ST4803PYGM.
**Surge-Trap® STPT2-PV Series for Photovoltaic**

STPT2 40 PV is the series of devices that provide advanced overvoltage protection to photovoltaic systems by utilizing Mersen’s optimized dynamic thermal disconnection system, which does not require additional overcurrent protection (back-up fuse) due to its high short-circuit withstand rating.

These surge protective devices are suitable for all PV applications: large-scale, rooftop, and self-consumption (off-grid) DC installations.

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Catalog Number</th>
<th>$U_{\text{cpv}}$ [VDC]</th>
<th>$U_{\text{max}}$ (8/20) [kV]</th>
<th>$I_{\text{n}}$ (8/20) [kA]</th>
<th>SCCR [kA]</th>
<th>Cartridge ID (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>83020138</td>
<td>STPT2-40K600V-YPV</td>
<td>660</td>
<td>≤2.6</td>
<td>20</td>
<td>100</td>
<td>C40</td>
</tr>
<tr>
<td>83020139</td>
<td>STPT2-40K600V-YPVM</td>
<td>660</td>
<td>≤2.6</td>
<td>20</td>
<td>100</td>
<td>C40</td>
</tr>
<tr>
<td>83020140</td>
<td>STPT2-40K1000V-YPV</td>
<td>1060</td>
<td>≤4</td>
<td>20</td>
<td>50</td>
<td>C41</td>
</tr>
<tr>
<td>83020141</td>
<td>STPT2-40K1000V-YPVM</td>
<td>1060</td>
<td>≤4</td>
<td>20</td>
<td>50</td>
<td>C41</td>
</tr>
<tr>
<td>83020158</td>
<td>STPT2-40K1500V-YPV</td>
<td>1500</td>
<td>≤5</td>
<td>10</td>
<td>65</td>
<td>C42</td>
</tr>
<tr>
<td>83020159</td>
<td>STPT2-40K1500V-YPVM</td>
<td>1500</td>
<td>≤5</td>
<td>10</td>
<td>65</td>
<td>C42</td>
</tr>
</tbody>
</table>

**Approvals:**

- ANSI/UL 1449 4th Edition, Type 2 Component Assembly, File E468946
- EN 50539-11
- UTE C 61740-51

**DIN-Rail Pluggable SPD for Photovoltaic Applications**

**Ratings:**

- Volts ($U_{\text{cpv}}$): 600-1500VDC
- Nominal Discharge Current Rating ($I_{\text{n}}$): 10-20kA
- Surge Capacity (per phase and per mode): 40kA
- Short-Circuit Current Rating (SCCR): 50-100kA

**Dimensions**

![Dimensions Diagram]

**Electrical Diagram**

![Electrical Diagram]

**Microswitch Diagram**

![Microswitch Diagram]

**Replacement Cartridges**

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Catalog Number</th>
<th>Network</th>
<th>$U_{\text{cpv}}$ [VDC]</th>
<th>$I_{\text{n}}$ (8/20) [kA]</th>
<th>$U_{\text{max}}$ (8/20) [kV]</th>
<th>Cartridge ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>83020005</td>
<td>SP2-40K600V-PV</td>
<td>PV</td>
<td>330</td>
<td>40</td>
<td>20</td>
<td>≤1.3</td>
</tr>
<tr>
<td>83020006</td>
<td>SP2-40K1000V-PV</td>
<td>PV</td>
<td>530</td>
<td>40</td>
<td>20</td>
<td>≤2</td>
</tr>
<tr>
<td>83020010</td>
<td>SP2-40K1500V-PV</td>
<td>PV</td>
<td>750</td>
<td>40</td>
<td>10</td>
<td>≤2.5</td>
</tr>
</tbody>
</table>
STMT23 20 S is the series of combined Type 2+3/Class II+III devices for discharging voltage surges while providing a very fine voltage protection level, in accordance with IEC/EN 61643-11.

Suitable as the final stage of protection in panels with Type 2 protection devices installed upstream. These SPDs should be installed as close as possible to the equipment being protected. Ideal for limited spaces. Wide range of voltage ratings.

RATINGS:

- **Volts (U<sub>n</sub>):** 12-230VAC
- **Nominal Discharge Current Rating (I<sub>n</sub>):** 3-10kA
- **Surge Capacity (per phase and per mode):** 6-20kA
- **Short-Circuit Current Rating (SCCR):** 10kA

APPROVALS:

- **IEC/EN 61643-11**

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STET23 20 is the series of combined Type 2+3/Class II+III devices for discharging voltage surges while providing a very fine voltage protection level, in accordance with IEC/EN 61643-11. Complete with a built-in powerful EMI filter.

Suitable as the final stage of protection in installations with electromagnetic disturbances which might interrupt, degrade, or limit system performance.

Series connection for applications up to 20A rated current.

<table>
<thead>
<tr>
<th>REFERENCE NUMBER</th>
<th>CATALOG NUMBER</th>
<th>U_{(VAC)} [V]</th>
<th>U [V]</th>
<th>U_{(8/20)} [kA]</th>
<th>I_{(A)}</th>
<th>REMOTE (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>83230401</td>
<td>STET23-20K150V-SPM</td>
<td>120</td>
<td>150</td>
<td>≤0.8</td>
<td>10</td>
<td>√</td>
</tr>
<tr>
<td>83230403</td>
<td>STET23-20K275V-SPM</td>
<td>230</td>
<td>275</td>
<td>≤1.2</td>
<td>10</td>
<td>√</td>
</tr>
</tbody>
</table>

RATINGS:

- **Volts (U_{n})**: 120-230VAC
- **Nominal Discharge Current Rating (I_{(8/20)})**: 10kA
- **Surge Capacity (per phase and per mode)**: 20kA
- **Load Current Rating (I_{(A)})**: 20A
- **EMI Filter**: Up to 82dB

APPROVALS:

- **IEC/EN 61643-11**
Mersen’s SPD for LED lighting applications, the STLB series is a universal solution with enhanced safety delivering peace-of-mind to users and installers. A single device is suitable for single, split, or three-phase applications; can be installed in series or parallel with the luminaire; features leakage current free technology and visual end-of-life indication. It is also UL Recognized (cURus) and IEC certified.

**FEATURES AND BENEFITS:**

- Universal, certified SPDs which can be safely used in any luminaire and any installation
- Common applications: Roadway Lighting, Parking Lot/Garage Lighting, indoor/outdoor LED signage, industrial manufacturing facilities, all critical 24/7 applications
- Parallel or series connected device
- End-of-life indication via LED or series disconnection
- Leakage Current Free
- Global Compliance to ANSI/UL/CSA and IEC
- Versatile mounting design accommodates for vertical or horizontal mounting
- 2-year warranty

**RATINGS:**

- Volts ($U_n$): 100-277VAC
- Nominal Discharge Current Rating ($I_n$): 3kA
- Surge Capacity (per phase and per mode): 10kA
- Short-Circuit Current Rating (SCCR): 10kA
- Load Current Rating ($I_L$): 2.5A
- IEEE C62.41.2 Location Category: C-High 10kV/10kA

**APPROVALS:**

- ANSI/UL1449 4th Edition, Type 4 SPD, File E468946
- EN 61643-11 Type 2+3 SPD
- RoHS Compliant
## GENERAL PRODUCT SPECIFICATIONS

| Mounting: | 5.5mm Diameter Mounting Hole |
| Wiring: | Screw Terminals [0.7 Nm] |
| Wire Range: | 14-18 AWG Solid/Stranded Cu |
| Connection: | Series or Parallel |
| Enclosure: | IP20 |
| Flammability: | UL94-V0 |
| Operating & Storage Temperature: | -40°C to +85°C |
| Relative Humidity Range: | 5 to 95% |
| Visual End-of-Life Indicator: | GREEN = OK, OUT = REPLACE |
| Frequency: | 50-60Hz |
| Maximum Back-up Fuse: | Mersen AJT25 |
| Response Time (L-L, L-G): | 25ns, 100ns |

## SYSTEM VOLTAGE AND CONFIGURATION

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Catalog Number</th>
<th>Voltage and Configuration</th>
<th>( I_h )</th>
<th>Maximum Continuous Operating Voltage (MCOV, ( U_c ))</th>
<th>Measured Limiting Voltages (MLV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>83230320</td>
<td>STLBT23-10K320V-C3U-DD</td>
<td>120V Single Phase 240V Single Phase 240/120V Split Phase 208Y/120V 3-Ph WYE 480Y/277V 3-Ph WYE 240V 3-Ph DELTA</td>
<td>3kA</td>
<td>L-G</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L-L</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L-G</td>
<td>1020</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L-L</td>
<td>1340</td>
</tr>
</tbody>
</table>

### Dimensions

![Dimensions Diagram](image)

### Wiring Diagram: Series

![Wiring Diagram: Series](image)

### Electrical Diagram

![Electrical Diagram](image)

### Wiring Diagram: Parallel

![Wiring Diagram: Parallel](image)
Mersen’s patented TPMOV® technology eliminates common failure modes that occur in the field with standard metal oxide varistors. Internally the TPMOV is comprised of a voltage clamping device and a disconnecting apparatus that monitors the status of the metal oxide disk, making the TPMOV a fail-safe device. In the event of an overvoltage breakdown, the metal oxide disk is securely disconnected from the system power by an arc shield. Upon failure, the TPMOV is also equipped with a visual pin indicator as well as a normally open micro-switch, providing remote indication if applicable.

**FEATURES AND BENEFITS:**

- High energy capacity
- Consistent footprint with 25-40mm MOVs
- Built-in visual/remote indication
- Wave solderable
- No additional overcurrent protection device (fuses) required

**RATINGS:**

- **Volts (U<sub>n</sub>):** 150-550VAC
- **Nominal Discharge Current Rating (I<sub>n</sub>):** 20kA
- **Surge Capacity:** 50kA
- **Short-Circuit Current Rating (SCCR):** 200kA

**APPROVALS:**

- ANSI/UL 1449 4th Edition, Type 1 Component Assembly SPD, File E210793
- RoHS Compliant
# THERMALLY PROTECTED MOV TPMOV® TECHNOLOGY

## Catalog Number (Includes Suffixes*)

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Maximum Continuous Operating Voltage (MCOV, Vac)</th>
<th>Voltage Protection Rating (VPR)</th>
<th>Nominal Discharge Current (ka)</th>
<th>Operating Temperature</th>
<th>Dimension A (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150TPMOV</td>
<td>150</td>
<td>700</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.485</td>
</tr>
<tr>
<td>180TPMOV</td>
<td>180</td>
<td>800</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.485</td>
</tr>
<tr>
<td>270TPMOV</td>
<td>275</td>
<td>800</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.495</td>
</tr>
<tr>
<td>320TPMOV</td>
<td>320</td>
<td>1000</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.51</td>
</tr>
<tr>
<td>420TPMOV</td>
<td>420</td>
<td>1500</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.54</td>
</tr>
<tr>
<td>510TPMOV</td>
<td>510</td>
<td>1500</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.54</td>
</tr>
<tr>
<td>550TPMOV</td>
<td>550</td>
<td>1500</td>
<td>20</td>
<td>-40°C to +85°C</td>
<td>0.545</td>
</tr>
</tbody>
</table>

## Catalog - Ordering System

**TPMOV Model Series**

**SL Mechanical Options**

<table>
<thead>
<tr>
<th>Suffix</th>
<th>PCB Leads</th>
<th>Tact Switch</th>
<th>Visual Tabs</th>
<th>Pkg Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>10</td>
</tr>
<tr>
<td>S</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>10</td>
</tr>
<tr>
<td>SL</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>500</td>
</tr>
<tr>
<td>ST</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>10</td>
</tr>
<tr>
<td>SLT</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>500</td>
</tr>
<tr>
<td>HV</td>
<td>No</td>
<td>Yes-HV</td>
<td>Yes</td>
<td>10</td>
</tr>
<tr>
<td>S-HV</td>
<td>Yes</td>
<td>Yes-HV</td>
<td>Yes</td>
<td>10</td>
</tr>
<tr>
<td>SL-HV</td>
<td>Yes</td>
<td>Yes-HV</td>
<td>Yes</td>
<td>500</td>
</tr>
</tbody>
</table>

* For details regarding HV microswitch please consult factory

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**Dimensional Drawing of TPMOV**

**Board Layout Dimensions**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>A Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>0.545</td>
</tr>
<tr>
<td>420/510</td>
<td>0.54</td>
</tr>
<tr>
<td>320</td>
<td>0.51</td>
</tr>
<tr>
<td>270</td>
<td>0.495</td>
</tr>
<tr>
<td>150/180</td>
<td>0.485</td>
</tr>
</tbody>
</table>
Mersen surge suppression fuses are specially designed to address the protection of SPD systems. Our surge suppression fuses have been specially designed to withstand 8/20 μSec surge pulses without opening, allowing the SPD system to react to the surge. All surge suppression fuses have a 8/20 μSec surge rating, not a continuous current rating. Under AC short circuit conditions these surge suppression fuses are very current limiting.

**FEATURES AND BENEFITS:**
- **VSP fuses rated 600VAC, 200kA I.R.**
- **Surge ratings of 5-100kA 8/20 μSec capacity**
- **Various mounting configurations ferrules, blade, bolt-in, pc board mount**

**RATINGS:**
- **Volts:** 600VAC
- **Surge Rating:** 5-100kA 8/20 μSec
- **Interrupting Rating (IR):** 200kA

**APPROVALS:**
- **ANSI/UL 248 Special Purpose MOV Fuse, File E60314**
MOV PROTECTOR FUSE VSP SERIES

PRODUCT PERFORMANCE DATA

<table>
<thead>
<tr>
<th>CATALOG NO.  (CONNECTION SUFFIX)</th>
<th>VOLTAGE RATING (AC)</th>
<th>8X20 µSEC SURGE RATING</th>
<th>MELTING I^2T (A2S)</th>
<th>CLEARING I^2T (A2S)</th>
<th>I_{peak} @ 100KA 60 Hz (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSP5-2,-R,-H,-S</td>
<td>600V</td>
<td>5,000</td>
<td>341</td>
<td>936</td>
<td>3,652</td>
</tr>
<tr>
<td>VSP10-2,-R,-H,-S</td>
<td>600V</td>
<td>10,000</td>
<td>1,541</td>
<td>3,744</td>
<td>5,794</td>
</tr>
<tr>
<td>VSP15-2,-R,-H,-S</td>
<td>600V</td>
<td>15,000</td>
<td>3,022</td>
<td>8,424</td>
<td>2,591</td>
</tr>
<tr>
<td>VSP20-2,-R,-H,-S</td>
<td>600V</td>
<td>20,000</td>
<td>4,992</td>
<td>14,400</td>
<td>9,194</td>
</tr>
<tr>
<td>VSP30,-2</td>
<td>600V</td>
<td>30,000</td>
<td>12,507</td>
<td>33,696</td>
<td>12,044</td>
</tr>
<tr>
<td>VSP40,-2</td>
<td>600V</td>
<td>40,000</td>
<td>19,543</td>
<td>59,904</td>
<td>14,588</td>
</tr>
<tr>
<td>VSP50,-2</td>
<td>600V</td>
<td>50,000</td>
<td>32,020</td>
<td>93,600</td>
<td>16,925</td>
</tr>
<tr>
<td>VSP60,-2</td>
<td>600V</td>
<td>60,000</td>
<td>42,808</td>
<td>134,784</td>
<td>19,110</td>
</tr>
<tr>
<td>VSP70,-2</td>
<td>600V</td>
<td>70,000</td>
<td>61,152</td>
<td>183,456</td>
<td>21,176</td>
</tr>
<tr>
<td>VSP80,-2</td>
<td>600V</td>
<td>80,000</td>
<td>79,872</td>
<td>239,616</td>
<td>23,146</td>
</tr>
<tr>
<td>VSP90,-2</td>
<td>600V</td>
<td>90,000</td>
<td>99,000</td>
<td>303,264</td>
<td>25,034</td>
</tr>
<tr>
<td>VSP100,-2</td>
<td>480V</td>
<td>100,000</td>
<td>121,500</td>
<td>374,400</td>
<td>26,854</td>
</tr>
<tr>
<td>VSP100-XL</td>
<td>600V</td>
<td>100,000</td>
<td>121,500</td>
<td>374,400</td>
<td>26,854</td>
</tr>
</tbody>
</table>

RECOMMENDED FUSE BLOCKS FOR VSP FUSES

VSP(5-20)-2

<table>
<thead>
<tr>
<th>NUMBER OF POLES</th>
<th>SCREW WITH DOUBLE QUICK CONNECTS</th>
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<th>COPPER BOX CONNECTOR</th>
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VSP(30-100)-2

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MOUNTING OPTIONS

DOUBLE HOLE MOUNT (ROUND HOLES)  -H

PC BOARD MOUNTING  -R

SURFACE SCREW MOUNT  -S