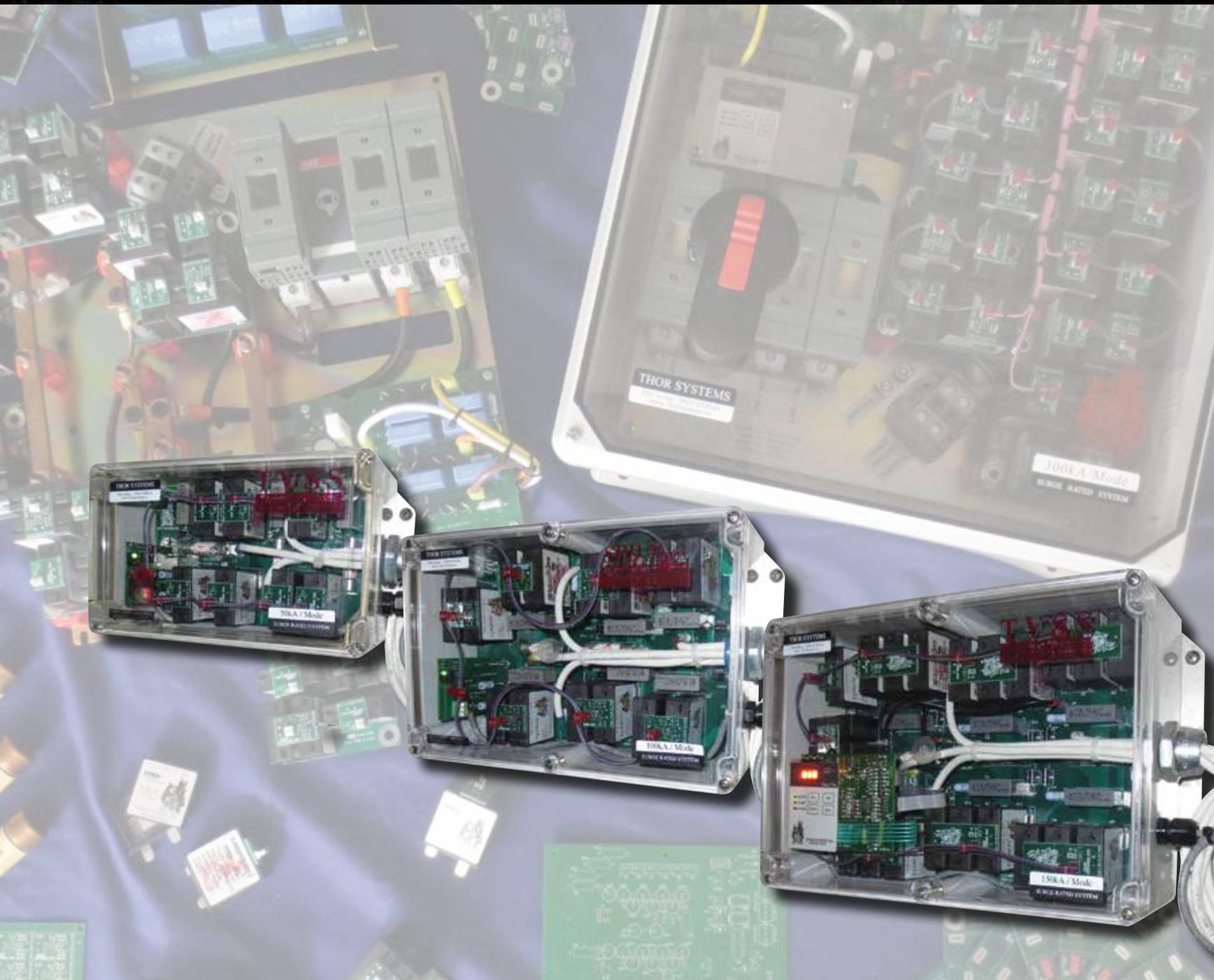




# THOR SYSTEMS SURGE PROTECTION

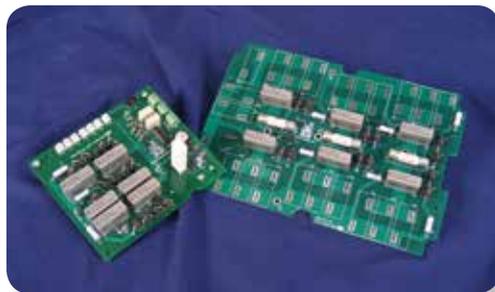


## Hybrid Surge Protection



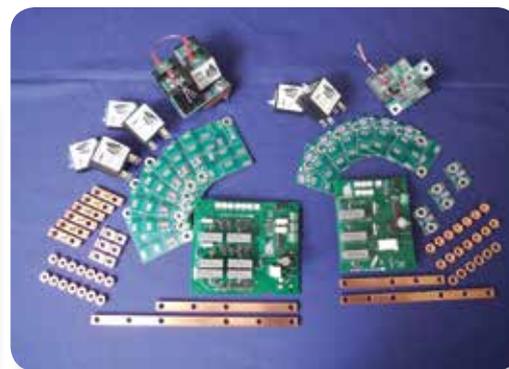
### Thermally Protected Metal Oxide Varistors (TpmOV)

TpmOVs (34mm sq/ rated 50kA) provide the ability to deliver full rated surge current while providing a "Fail Safe Device" containing integrated thermal and dielectric (arc shield) protection. The TpmOV provides physical as well as status indication.



### TVS Diodes (SAD)/Filter Capacitors

Silicon Avalanche Diodes (SAD) provide the fastest response to transient events while diverting the leading edge of the transient waveform. **Filter Capacitors** specifically added to attenuate high frequency interference (EMI/RFI "electrical noise") which can cause data errors, system lock-ups and restarts.



### StakTraks™ (Multiple Low Impedance Surge Paths)

A unique, inventive design concept uses combinations of double-sided PCBs having multiple parallel surge paths and solid copper buss structure. Heavy copper parallel PCB traces interconnect the individual suppression elements providing a concise, low impedance conduit capable of handling transient event frequencies. This hybrid design is used throughout THOR SYSTEMS' TSr (field replaceable) and TSn (non-field replaceable) product offerings.

## Applications

Applications should match Surge Protective Devices (SPDs) to the installation parameters, requiring evaluation of the surge protection and the electrical environment of the facility. The Site Risk Assessment Spreadsheet is a useful tool to perform this coordination.

## Susceptibility

Susceptibility encompasses the factors which define the ability of a facility to be affected by surge events. These factors include:

- Electrical system ampacity at point of installation
- Geographical location (Isokeraunic Map and Mean Ground Flash Density Map)
- System voltage
- Distribution system configuration
- Available short circuit at point of installation
- SPD location (within the electrical system): SPD should always be installed as close as physically possible to the equipment to be protected.
- Specific application criticality: Only the end user can determine the true cost of damaged and/or nonfunctioning equipment. Based on the importance of the protected equipment, the susceptibility may increase.

Another important factor is the grounding system, as the majority of transient events occur in the common mode. Most grounding installations of critical equipment call for the grounding system impedance to be 5 ohms or less.

THOR SYSTEMS' Site Risk Assessment provides the means to identify existing and potential PQ problems and coordinate multiple SPDs and locations. Download a Site Risk Assessment Spreadsheet [TSI 0119/R0] from our website or contact THOR SYSTEMS to perform an on-site evaluation to determine the best solution for your environment.

### SITE RISK ASSESSMENT

## Why Cascade Surge Protection

**Cascaded** Surge Protective Devices (SPDs) at the Service Entrance and downstream at the protected equipment Distribution and Branch Circuit panelboards are required for effective surge protection. This coordination using multiple SPDs, provides a protective barrier at the Service Entrance to protect from **externally generated transients**, i.e. lightning, utility grid switching, high winds causing power line arcing, and electrical accidents (less than 20% of all transient activity).

**Internally generated transients** are created by changes in electrical demand, involving inductive and capacitive loads (starting and stopping of electrical motors, machine processes, pumping equipment, HVAC systems, etc.). Internal transients are normally smaller in magnitude, but a far greater number of such transient events accounts for 80% of all voltage transient problems (hardware failures for no apparent reasons, time and material losses caused by unnecessary restarts and rebooting of equipment).



# Features & Benefits



**Series TSr300 Modular SPD**  
Mounted on Top of Service Entrance Switchgear; Bottom Feed Configured



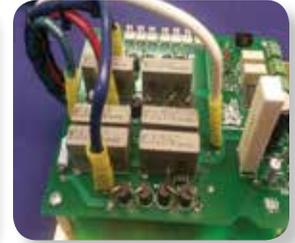
**Series TSni100 – Non-Modular SPD**  
Mounted with Direct Feed from Panel Breaker



**TSr/TSn Option**  
TSm270a Monitor (Status Indication, Surge Counter)



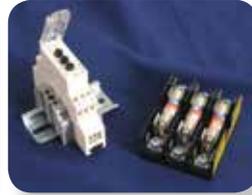
**TSr Input Options**  
#6 Terminal Block (Std.); #2 Distribution Block or 60A Fused Disconnect (Opt.)



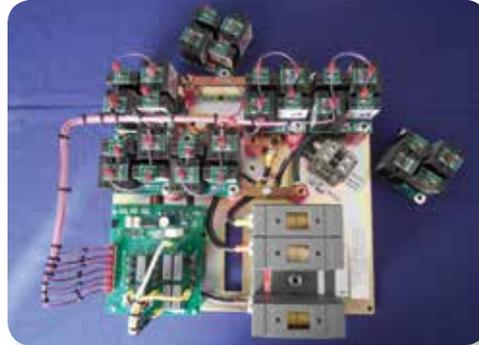
**TSr Power Supply**  
Includes 1.5 or 15kW SADs, EMI Filter Caps and Dry Contacts



**TSr Options**  
Phase Loss, (2) Form "C" Contacts



**TSr Optional Multifunction Relay**  
Over/Under Voltage; Phase Loss and Phase Balance Detection



**TSri Backpan Assembly**  
(2) Modules Removed Showing all Copper Buss Structure

## AC/Data/Telcom Surge Protection



**DIN Rail SPD Assembly**  
Chiller, Wastewater, Generator, Control Cabinet Applications



**19" Patch Panel SPD**  
Multiple RJ45 to 110 PDB Ports; 5V, 24V or 150V Models Available; 12, 24 or 48 Ports Available



**Phone, DSL and Coax SPD**  
Protects (3) Phone, (1) DSL and (1) Type "F" Coax Cable Line



**1-Port Coax SPD**  
Protects (1) Type "F" Coax Cable Line



**4-Port Coax SPD**  
Protects (4) Type "F" Coax Cable Lines



**Mac Victor Power Network (MVPN)**  
2.0 to 3.0kVA

### Mac Victor Power Network (MVPN)

Centralized, isolated power system provides clean and continuous power (battery backup) for critical electronics

#### APPLICATIONS:

- Convenience Stores, Fast Food Restaurants
- Gas Stations, Points of Sale (POS) Equipment, Back Office Electronics
- Telephone/Security Panels
- Customer Kiosks, Printers, Monitors, Wastewater Treatment Controls, Location Servers/Communication Racks



**Small Business/Residential AC SPD**  
120/240Vac Models; 50kA Per Mode; Pre-Wired with #10AWG



**Data/Telcom DIN Rail SPD**  
5V, 12V, 24V or 150V Models Available; Terminal Screw Connection; DIN Rail Mount



**AC DIN Rail SPD**  
40kA Per Mode; 120V, 277V and 480V Models Available



**4-20mA SPD**  
Discrete Wire Connection; 24V Models; 1/2" NPT or Bracket Mount



**DIN Rail RJ45 SPD**  
5V or 48V; 1-Port RJ45 Connection



## Quality Assurance Thru Six Sigma

Our ability to improve company performance is enabled by ongoing dedication to the Six Sigma principles of business development, which are an integral part of our work processes.

The methodology of Six Sigma provides the tools to continuously improve the business processes and is a rigorous and systematic utilization of information (management by facts) and statistical analysis to measure and improve a company's operational performance, practices and systems by identifying and preventing "defects" in manufacturing and service-related processes.

## Industry Standards

THOR SYSTEMS' products are designed, manufactured, and tested in compliance with the following codes and standards:

- American National Standards (ANSI/IEEE C62.41.1, C62.41.2, C62.45, C62.62 and C62.72)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA 70 NEC)
- Underwriters Laboratories (UL1449 and UL1283)

## Service

Engineering and Customer Service - THOR SYSTEMS Engineering and Customer Service staff has extensive surge protection and critical power industry knowledge. We are available to assist our customers with application, installation and site evaluation requirements, as well as answer any questions that may arise.

Site Evaluations – THOR SYSTEMS can provide Site Risk Assessments and make SPD equipment recommendations.

## Surge Protection... Why THOR SYSTEMS

THOR SYSTEMS, manufacturer of Surge Protective Devices (SPDs), was founded on the dedication of exceeding the expectations of our customers and all of our business partners. Our five senior staff members have 117 years' cumulative experience in the power quality/surge protection industry and are pleased to support technical questions and specific applications, including site visits for power quality system evaluation. THOR SYSTEMS' commitment is evident in all facets of our business from delivering product value, high performance/full surge rated designs to providing the correct power quality solution for specific applications.

### SERVICE

service@ThorSystems.us

Phone: 804.355.1100

Fax: 804.355.8900

### SALES

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Phone: 804.355.1100

Fax: 804.355.8900

### TECHNICAL SUPPORT

support@ThorSystems.us

Phone: 804.355.1100

Fax: 804.355.8900

## Design Philosophy

- Applying a small number of large block TpMOVs with "Fail Safe Design"
- Hybrid design utilizing SADs, TpMOVs, and FILTER CAPACITORS for optimum surge protection
- Modular Designs – Series TSr Products (100 through 300kA per mode; all modes protected)
- Non-modular Designs – Series TSn Products (50 through 150kA per mode; all modes protected)

## Providing Solutions

Coordinated surge protection provides the means to dissipate transient/surge energy from **external** (20%) and **internal** (80%) sources.

THOR SYSTEMS would like to become an information resource for your surge protection applications. THOR SYSTEMS offers products and services that provide protection from the more *obvious external* to the more frequent internal transient voltage sources. Our consistent focus on improved product performance and increased value to the customer is conveyed by our products' transparent cover enclosures, showcasing the TILE Architecture, Innovative Design Configurations, and per Mode Status Indication.



**TSr Product Series**  
(Modular)



**TSn Product Series**  
(Non-Modular)

