3621 Saunders Avenue
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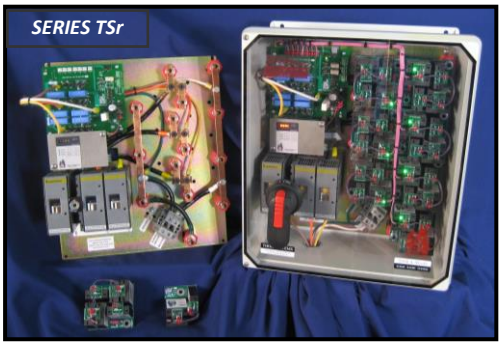
THOR SYSTEMS
3rd GENERATION SURGE PROTECTIVE DEVICES (SPD/TVSS)

THOR SYSTEMS being the first permanently-connected surge protection manufacturer in the industry to successfully obtain a UL 1449 3rd Edition listing, offers our 3rd Generation Products that provide a unique solution and offer a wide array of world-class product platforms that brings a new level of performance to the surge protection market. These products offer advanced technology, innovative designs, and outstanding value and are currently listed to UL 1449 4th Edition.



Modular TSr Product Series
(50, 100,150, 200, 250 & 300kA/Mode)

Our 3rd Generation Products are a strong response to the unique challenges presented by UL 1449 2.5 revision and UL 1449 3rd Edition Standards. These products fully comply with the highest, most severe test levels and deliver **full-rated** surge protection capacity to the customer. During the last 11-1/2 months of the product development, we strengthened and expanded our portfolio providing the maximum performance and reliability for applications of the most demanding environments.

Optimizing surge protection performance, quality, durability, and end user value were key design parameters for the development of our 3rd Generation Product platforms. Our totally new product development ***sets*** **the pace** of change rather than ***reacting*** **to change**.

THOR SYSTEMS outpaces its peers across every metric of design, performance, packaging, quality, and value. Our 3rd Generation Product development was an ambitious, exciting undertaking made more challenging by the fact that we did not compromise the ability to deliver full surge protection rating. Its development took shape ever more **clearly** as we completed the design platforms, system configurations, and product testing.

We are totally committed to providing our customers with the highest performance, quality, and value in our products. This commitment is **clear**ly visible in our enclosures utilizing transparent covers allowing the customer to see firsthand the features, workmanship, and development put into our system. Our customers' interests continue to come first. Experience has shown that if we serve them well, success will follow.

Non-Modular TSn Product Series
(50, 100, & 150kA/Mode)

HEADWINDS OF CHANGE IN SURGE PROTECTION

NEW PLAYERS IN SURGE PROTECTION

For the past several years, manufacturers of electrical switchgear have been promoting the integration of their own brand of surge protective devices (SPD/TVSS) into their distribution equipment while seeking to seize market opportunities and expand their product scope. In order to expedite this market penetration, small independent businesses were acquired. As is often the case after acquisition, products were "Value Engineered" typically providing the customer with a less than optimum product due to the lack of creativity and poor performance, which are the trademarks of many Value Engineered products.

Claims were made to **simplify specifications** for surge protection that direct buss-mounted products provided shorter lead lengths, thus improving performance. In **reality**, the simplified specifications **eliminated competition** providing the customer with a **no-choice**, often **inferior lower-end product**. In addition, the direct buss-mounted units required shutdown of the entire panel or switchboard with all of the associated loads in the event of SPD/TVSS failure or service needs.

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CATASTROPHIC FAILURES

A serious issue, catastrophic "End of Life" SPD/TVSS system failure, can result in the **spraying of ionized gas** and the creation of an **arc flash** contaminating the customer's electrical distribution equipment and ultimate **critical systems shutdown**.

There is no central reporting requirement for this type of event. Understandably, those who suffer these types of failures are not seeking publicity about the incident. When a catastrophic failure occurs, full recovery often requires that surge protection and associated distribution equipment be replaced. This replacement can take weeks, requiring site remediation which can be quite costly.

EXTERNAL HEADWINDS

Catastrophic failures and "**litigation avoidance**" carried a strong focus of attention, prompting the request for additional safety testing to ensure controlled system failure and 100% containment of the failed system. A **properly designed** product applied with system installation **coordination** would not have failed with these results. However, a successful lobbying effort resulted in additional testing as required by the UL 1449 2.5 revision and 3rd Edition Standards.

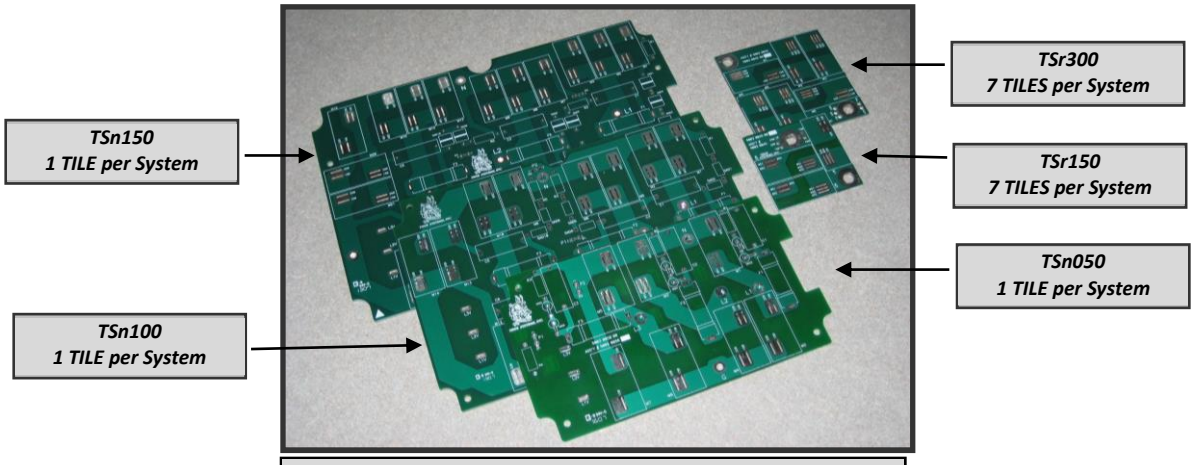
A fundamental question facing the surge protection industry is: How to address "End-of-Life" catastrophic SPD/TVSS failures – a fuse sizing/performance limiting exercise or new product development? After a thorough review of the new UL 1449 revision 2.5 and 3rd Edition Standards test requirements, THOR SYSTEMS concluded new product development was the only acceptable solution which would be in the long-term best interest of our customers, our sales representatives and the company.

In business the one constant is change, which can be a most compelling opportunity when coupled with a constant need for improved power quality and a growing expectation for a better operating environment to provide a competitive edge in an expanding world economy. The launch of THOR SYSTEMS' 3rd Generation Products is a very **positive response** to a change initiated by a very **negative series of events**.

WITHOUT BOUNDARIES:
FEATURES & COMPETITIVE ADVANTAGE

TILE ARCHITECTURE

Our new **"TILE Architecture"** is the primary building block for our expanded 3rd Generation Product platforms. These product platforms are segregated into two fundamental classes: TSn "Single-**TILE**" and TSr "Multi-**TILE**" **Architecture**.



SINGLE & MULTI-TILE (MODULAR) ARCHITECTURE

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The modular TSr replaceable **TILES** facilitate timely replacement of sacrificial component assemblies, returning total surge protection without the necessity of replacing the entire system. Another advantage of the Multi-**TILE Architecture** is the ability to upgrade surge protection capacity ***in the field*** without having to purchase and incur the installation cost of a new, larger suppression system to meet an additional level of protection requirements. For example, a TSr050 can be increased to 100 or 150kA and a TSr200 can be increased to 250 or 300kA.

The Single-**TILE** TSn Series is a compact, high performance non-field replaceable surge protection system which is a full three-tier hybrid design offering 50, 100, and 150kA surge protection capacity.

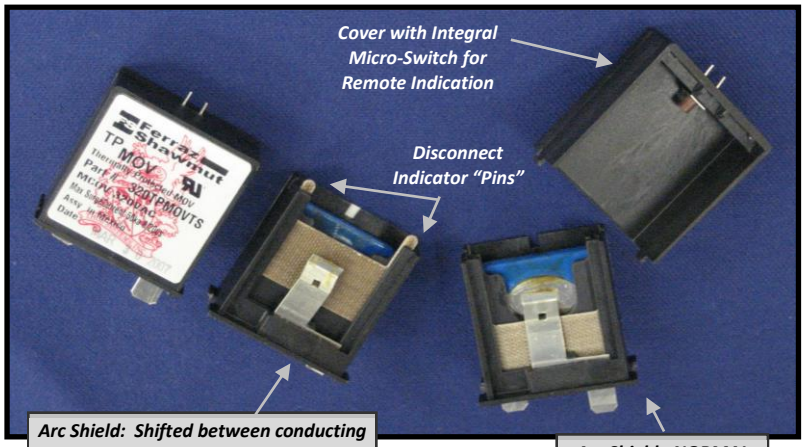
BENEFITS OF TILE ARCHITECTURE and TpMOV

- Reduced costs through higher utilization of standardized Single- and Multi-**TILE** platform designs;
- Improved quality through increased common **TILE** throughput;
- The configurable **TILE Architecture** provides increased breadth of applications for commercial and industrial markets;
- Field upgradeable modular designs: TSr **TILE** 50 →100 →150kA and TSr **TILE** 200 →250 →300kA;
- The Single-and Multi-**TILE** configurations use parallel, full surge rated low impedance surge path **StakTraks™** design which increases suppression performance and system longevity.

A key component of the **TILE Architecture** is the Thermally Protected Metal Oxide Varistor (**TpMOV**), a "fail-safe device" with integrated thermal and dielectric protection. The TpMOV is composed of a voltage clamping device and a disconnecting apparatus that monitors the status of the metal oxide disk. The disconnection also provides a physical indicator (two protruding pins through the top of the cover, as shown in the picture above) and remote indication provided by an integral N.O. micro-switch.

The integration of the **TpMOV** reflects a continuous evaluation of improved technologies with our supplier, including sharing component and system test data, test facilities, product evolution, and market insight for more than 20 years.

TpMOV "FAIL-SAFE" TECHNOLOGY



TSr SERIES (Multi-TILE) MODULAR DESIGN with Replaceable TILES

The Multi-**TILE** design is the building block for the modular TSr (replaceable **TILE** design) product platforms. There are two Multi-**TILE** designs: TSr 50/100/150kA/mode and TSr 200/250/300kA/mode levels of surge protection. Each **TILE** is voltage keyed by color, by numerical identification, and coordinating pin and sleeve to assure correct assembly field replacement.

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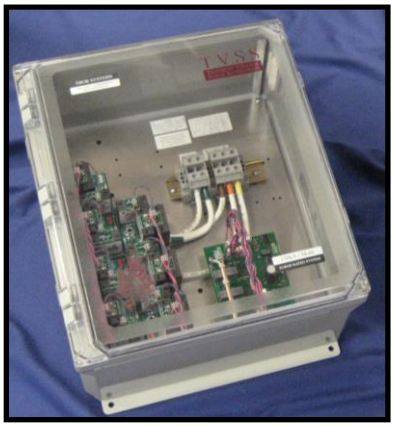
The TSr Series is available in two configurations TSri (industrial[1]) and TSrc (commercial[2]) for the complete range of surge ratings (50 through 300). Both feature a full complement surge rating on each of seven modes for WYE and six modes for Delta applications. The industrial TSri Series is a full three-tier hybrid design featuring **TpMOVs**, TVS Diodes (**SADs**), and Sinewave Tracking **Filter Capacitors**. The commercial TSrc Series product is a two-tier hybrid design (**TpMOVs**, **Filter Capacitors**) ideal for critical load applications from service entrance distribution panels to branch panels, as well as motor control centers. Both the TSri and TSrc have the ability to be upgraded in the field.

All of the TSr product platforms are available with two input connection methods: Terminals (standard) and optional Fused Disconnect. Each individual Multi-**TILE** features a green LED indicating the individual **TILE** has all surge protection devices active. If any single component is taken off-line, the green LED will turn off and a red LED will illuminate, providing *individual **TILE*** as well as *total system* status indication. The optional disconnect enables the convenient replacement of sacrificial **TILES**, minimizes downtime, and maximizes customer protection and productivity.



TSrc150
With Terminal Block & NEMA 4X
Enclosure with Clear Hinged Cover

TSrc300 BACKPAN
Depicts "StakTraks™ Low Impedance Parallel,
All Copper Buss Structure

TSrc300
With Fused Disconnect & NEMA 4X
Enclosure with Clear Hinged Cover

TSn SERIES (SINGLE-TILE) Non-replaceable TILE Design

The Single-**TILE** design is the base building block for the TSn (non-field replaceable) product platforms offering 50, 100, and 150kA/mode surge protection. The TSn Series is available in two configurations for all three surge ratings.

The TSni (industrial[3]) is a three-tier hybrid design (**TpMOVs**, **SADs**, **Filter Capacitors**) provided with high performance, low impedance Rope Lay wire. The TSnc (commercial[4]) is a two-tier hybrid design (**TpMOVs**, **Filter Capacitors**).

[1] Industrial applications requiring maximum performance, typically operating in extremely severe conditions.
[2] Commercial applications requiring robust and feature-filled products.
[3] Industrial applications requiring maximum performance, typically operating in extremely severe conditions.
[4] Commercial applications requiring robust and feature-filled products.

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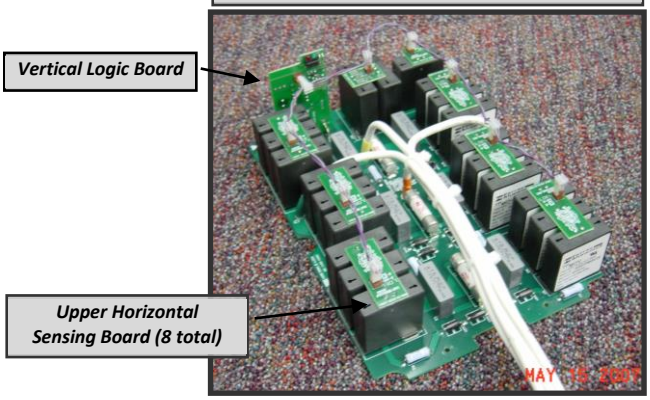
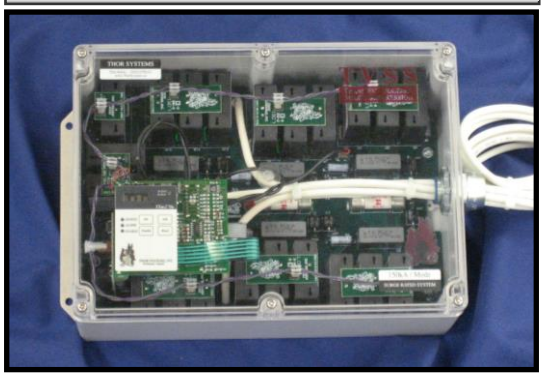
The use of vertical and upper horizontal sensing logic boards provides the ability to optimize parallel redundant, low impedance full surge rated paths resulting in superior performance. The advantage of this innovative board stacking is isolation of necessary status monitoring without compromising surge path integrity and parallel top and bottom layer surge trace routing of the **TILE**.

TSn150 SINGLE TILE DESIGN



TSn150 with DIGITAL SURGE COUNTER



Counter has 8 User Selectable Sensitivity Levels. Unit is prewired, with High Performance, Rope Lay Wire with Direct Solder Connection for Low Impedance Surge Protection.

COMPETITIVE ADVANTAGE

During our 3rd Generation Product development, we executed a disciplined strategy to create a sustainable competitive advantage based on the new development of THOR'S unique **TILE Architecture** utilizing the "fail-safe" **TpMOV**, hybrid suppression technology, and performance enhancing **StakTraks™** multiple full-rated, low impedance surge paths linking all suppression elements. The new, advanced hybrid system design utilizes 1500 Watt or 15,000 Watt **SAD** configurations.

System performance is enhanced by applying hybrid surge protection designs utilizing **SADs** for their fast response speed, "fail-safe" **TpMOVs** for 100% surge capacity, **Filter Capacitors** for electrical noise attenuation, and **StakTraks™** low impedance technology working together to provide added value to our customers.

ENCLOSURE: TSri/TSrc and TSni/TSnc

Our product enclosure transparency provides the ability to observe construction, system status, and quality of workmanship. It is **clear** that our innovative and technologically advanced products provide the customer with performance, quality, and value for their investment.

TSn150 with LEVEL 1 MONITORING
Visible Through Transparent Cover of NEMA 4X Enclosure

3rd Generation Enclosure characteristics:

- Unique, compact NEMA 4X enclosure with **CLEAR** covers enhances both the functionality and the aesthetics of the products;
- TSr products: Fiberglass body with a stainless steel hinged clear Lexana cover;
- TSn products: Polycarbonate body and **clear** polycarbonate cover with neoprene sealing gasket;
- UL 94V-2 (UL File #E41613)/UV rated.

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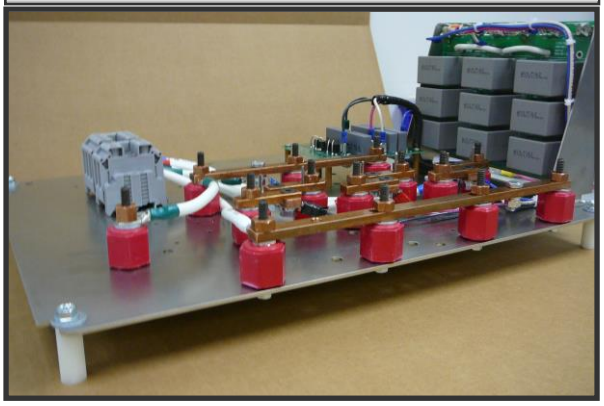
FEATURES

We intend to make a dramatic impact on the surge protection industry with our 3rd Generation Product development in the following areas:

- Improved safety, meeting the most recent UL Standards and listing requirements – UL 1449, 1283;
- The development of **TILE Architecture** which expanded our product platforms;
- The selection and integration of advanced **TpMOV** "fail-safe" technology into the **TILE Architecture**;
- Superior surge protection performance with the ability to deliver **full-rated surge capacity**;
- Utilizing "**Single-** and **Multi-TILE**" designs has increased configuration flexibility and application breadth;
- Innovative, compact product packaging utilizing NEMA 4X enclosures;
- Low impedance **StakTraks™** parallel surge path bus structure;
- Expanded product platforms promoting faster product manufacture, better quality, improved cost, and increased product breadth and application;
- Increased customer profitability by providing improved power quality;
- Superior performance and robust construction qualify for applications that are located in the harshest electrical environments.

TSr 300 BACKPAN
Depicts "StakTraks™ Low Impedance Parallel, All Copper Buss Structure



A consistent focus on improved product performance and increased value to the customer is conveyed by presenting our products in enclosures with **clear** covers. These transparent packages showcase the **TILE Architecture** and unique component configurations, validating our quality of construction.

Thank you for your interest in THOR SYSTEMS, INC. We would like to become your complete power quality partner and source for surge protection. THOR SYSTEMS offers products and services that provide protection from the more ***obvious external*** to the more ***frequent internal*** transient voltage sources. Should you have any questions, please feel free to contact us at 804.355.1100, or visit our Web site, **www.ThorSystems.us**.