

# Enhance System Protection and Reduce Equipment Damage

SurgeLogic™

Surge Protective Devices



by Schneider Electric

# The High Cost of Surge Damage



Utility industry experts estimate that power quality problems including those **resulting from transient voltage surges cost U.S. companies a stunning \$80 billion annually**. That figure not only includes the high price of direct damage to electrical distribution systems, electronic equipment, software and tools, but also the crippling cost of lost productivity. Facility downtime, lost data, lost orders and the disruption of critical processes can seriously reduce productivity. This means that minimizing the risk of damage from electrical surges is an absolute priority for companies of all types, all across the globe.

## Power Disturbances

Lightning and fluctuations in utility power (caused by grid switching, for example) are often assumed to be the main sources of power disturbances. However, the overwhelming cause is actually equipment, such as motors and appliances, turning on and off. Even simply switching lights on and off will cause electrical surges. In many cases, 80% of all transient voltage surges are generated from inside sources, while only 20% come from outside a facility.

## Key Causes of Internal Transients

- Motor switching
- Robotics
- Capacitor bank switching
- X-ray generators
- Welders
- Pumps
- AC chillers
- Laser printers
- Production machinery
- Copiers

## Location Variables that Increase the Risk of External Transients

- Regions of high lightning activity
- At the end of a utility line
- On a transmission line downstream of industrial facilities
- At a higher elevation than surrounding structures
- In an open, rural location

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- ✓ Internally and externally mounted surge protective devices
  - ✓ Retrofit or new construction
  - ✓ Low let-through levels
  - ✓ High surge ratings

# Square D™ Brand Surgelologic Surge Protective Devices

Unmatched Surge Suppression. Unequaled Experience.

With the Surgelologic line of Surge Protective Devices (SPDs), Square D by Schneider Electric offers world class solutions for electrical distribution systems. From simple applications to mission-critical implementations in commercial and industrial environments, the Surgelologic line provides a surge protective device for every need.

Each Surgelologic SPD is designed, tested and manufactured in-house, confirming that your solution is:

- Built to the highest standards
- Features the most advanced technologies
- Meets the industry's most rigorous testing criteria
- Backed by the expertise that only 100 years of experience in electrical distribution can bring
- Made in the USA

We have the knowledge and resources to help you select the system that's right for your specific needs. This is critical when considering that choosing devices with a higher level of suppression than you need can be unnecessarily costly, while too little suppression can result in serious equipment damage and power outages.

## Product Safety: Industry-leading Testing and Design

Schneider Electric has an industry recognized laboratory in the U.S. dedicated to testing and evaluating SPD technologies. We test all of our surge protective devices by installing them into environments that take into account system components and processes to increase product reliability.

Our lightning laboratory is one of the few places in the world where high energy tests can be performed up to 150,000 A. As a result, we can simulate worst-case scenarios and use the data to improve product performance and safety.

Schneider Electric commits tremendous resources to improving containment and end-of-life events to reduce the additional hazards that could result in catastrophic facility problems. Additionally, our product design and development teams constantly evaluate new suppression technologies and regulatory changes to provide products and systems that meet your needs, and the needs of your customers, anywhere in the world.

- ✔ Internal fusing coordinated with distribution system
- ✔ Modular construction for ease of maintenance
- ✔ Thermal fusing
- ✔ 200 kA short circuit current rating

## Expertise that Drives Design for Maximum Safety

The Surgelologic family of SPDs incorporates a wealth of electrical distribution and surge suppression expertise that allows you to design with confidence and know that your customers will receive superior surge suppression. We've dedicated extensive resources to advance the power quality industry, including:

- Understanding the effects of transients and lightning on power systems
- Investigating SPD technologies and their coordination with the entire power system
- Defining appropriate product installation practices
- Driving improvements in the NEC, UL and ANSI codes and standards for the benefit of the industry and its customers
- Designing products for improved performance
- Qualifying all Surgelologic SPDs under severe power conditions to improve performance and end-of-life conditions



▲ Schneider Electric's lightning generator tests Surgelologic SPDs in real-world systems and situations.

# A Full Line: Flexibility Across the Board

With Square D brand Surgelologic SPDs, you can **choose a surge solution that satisfies the level of suppression you require**. Our systems cover all categories of transient severity as described by the ANSI/IEEE C62.41 standards. These range from transients of the highest level of severity at service entrance switchgear and switchboards (Category C) to distribution panelboards or switchboards (Category B).

Internal Surge Protective Devices		
<b>Switchboards</b> QED-2 and QED-S 	<b>Switchgear</b> Power-Zone™ 4 	
<b>Panelboards</b> NQ 	NF 	I-Line 
<b>Busway</b> I-Line II 	<b>OEM Internal Kit</b> IMA SPD 	
<b>Motor Control Centers</b> Model 6 		

## Surgelologic Internal SPDs: Built-in Performance

No question, the best way to ensure cost-effective power quality (especially important for critical power facilities) is to use surge protective devices that are built directly into end-use equipment. That's why Surgelologic internal surge protective devices are the perfect choice. They are specifically designed for integration with Square D equipment, built-in at the factory for maximum reliability, and fully tested and certified as specified by UL 1449 Third Edition, UL 1283 and UL 67, UL 891, UL 1558, UL 845 and UL 857 as applicable. Surgelologic internal surge protective device systems use leading-edge technologies to address specific equipment powered by switchgear and switchboards, distribution panelboards, motor control centers and Busway, as well as a variety of other applications.

## Surgelologic Retrofit: Internal and External SPDs

Retrofitting SPD units into I-Line,™ QMB, MCC and Busway applications is simple. The QMB fusible switch, 6" MCC Bucket, I-Line and Busway plug-on units come with the SPD already installed. These units can be easily added to existing equipment to provide the performance of a fully integrated SPD.

Schneider Electric also offers a full range of externally mountable SPDs. These units are typically used to address a single piece of equipment or for retrofit applications and can include an internal disconnect and remote monitor as available options. Surgelologic external SPDs are designed to be used alone or in conjunction with internal devices to provide superior surge suppression. Surgelologic external SPDs are also fully tested and certified as specified by UL 1449 Third Edition and UL 1283.

## Diagnostics at a Glance

All Square D brand Surgelologic SPD systems feature LED-based diagnostics as standard equipment. These monitor the surge protective device, so you always know its status. You can verify the operational integrity of MOVs, overcurrent and thermal protection at a glance. Loss of suppression indication and power loss detection are also standard. Switchable audible alarm with test functions, dry contacts and surge counter come standard on all internal, EMA and EBA products. A remote monitor is an available option as well.



## Modular Makes It Easy

All internal and EMA external Surgelogic systems feature a modular design for a flexible, cost-effective way to achieve superior surge suppression at every level of the electrical distribution system. Modularity means lower life cycle costs and fast, easy field service or replacement.

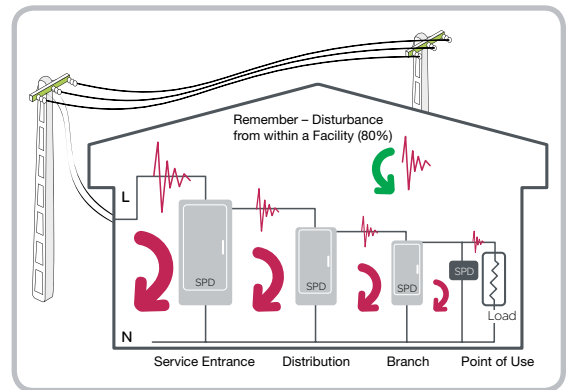
All Surgelogic modular devices share a common architecture, so the same type of module fits NQ or NF panels, I-Line or QMB installations, Busway, MCC or EMA surge suppressors. Each module includes its own internal diagnostics for a redundant system. If there's ever a problem, any module can be quickly replaced to restore the device.

## Maximizing the Effectiveness of Your SPDs

### Multi-point Suppression

Protecting all your equipment within a facility typically requires more than a single SPD located at the service entrance. Strategically locating SPDs throughout your electrical distribution system, commonly referred to as cascading, will provide maximum surge suppression. A cascaded approach to your surge suppression provides suppression of not only the surge events coming in from the utility, but also those surges generated inside the facility.

External SPD		
<b>EMA</b> 	<b>EBA</b> 	<b>HWA</b> 
Retrofit SPD		
<b>I-Line</b> 	<b>MCC</b> 	<b>QMB</b> 



### Lead Lengths

Internal/integral SPDs don't require the extra several feet of conductor used by externally mounted devices. That's key because every foot of conductor can increase potentially damaging let-through voltage by more than 100 volts per foot.

The elimination of cables and their impedance in the SPD connection results in the lowest possible let-through voltage, thereby providing maximum suppression to your systems.



◀ The Surgelogic SPD diagnostic panel provides quick and clear status indication for the surge protective device.

# Square D Surgelologic Surge Protective Devices

All the Right Reasons...

- Specifically designed for distribution systems and the transient environment
- A comprehensive selection of internal and external devices
- Internal surge suppression systems expressly engineered for Square D electrical distribution systems
- Modular systems for flexibility and long-term value
- Duty cycle tested – IMA/EMA/EBA: 20,000 impulses, HWA: 10,000 impulses, ANSI C62.41, 10 kA, 20 kV
- UL-listed designs (in accordance with UL 1449, UL 1283 and UL 67, UL 891, UL 1558, UL 845, UL 857 as applicable)
- Low UL 1449 voltage protection rating (VPR)
- 200 kA short circuit current ratings
- 10-year warranty
- Unmatched level of safety testing
- Highest UL-defined nominal discharge (In) rating
- Made in the USA



## Application Guidelines

Exposure Level	Surge Rating	Environment	Internal Mount	External Mount
Extreme	480 kA 320 kA	<ul style="list-style-type: none"> <li>• Larger ampacity service entrance</li> <li>• Extreme lightning area</li> <li>• Other large industries in area</li> <li>• Large facility in rural locations</li> </ul>	<ul style="list-style-type: none"> <li>• Switchboard</li> <li>• Switchgear</li> </ul>	<ul style="list-style-type: none"> <li>• Modular (EMA)</li> </ul>
High to medium	240 kA 160 kA	<ul style="list-style-type: none"> <li>• High lightning areas</li> <li>• High to medium ampacity service entrance</li> <li>• Service entrance switchboards</li> <li>• Service entrance panelboards</li> </ul>	<ul style="list-style-type: none"> <li>• Switchboard</li> <li>• Switchgear</li> <li>• MCC</li> <li>• I-Line/QMB Panel</li> </ul>	<ul style="list-style-type: none"> <li>• Modular (EMA)</li> <li>• Brick (EBA)</li> </ul>
Medium	160 kA	<ul style="list-style-type: none"> <li>• Distribution switchboards</li> <li>• Branch circuits not protected by a SPD at service entrance</li> <li>• Panels feeding heavy industrial motors</li> <li>• Branch circuits feeding loads outside the facility</li> </ul>	<ul style="list-style-type: none"> <li>• Switchboard</li> <li>• MCC</li> <li>• I-Line/QMB Panel</li> <li>• NQ/NF Panel</li> <li>• Busway</li> </ul>	<ul style="list-style-type: none"> <li>• Modular (EMA)</li> <li>• Brick (EBA)</li> </ul>
Medium to low	160 kA 120 kA	<ul style="list-style-type: none"> <li>• Computer equipment loads</li> <li>• Branch circuits with no upstream surge suppression</li> </ul>	<ul style="list-style-type: none"> <li>• Switchboard</li> <li>• MCC</li> <li>• I-Line/QMB Panel</li> <li>• NQ/NF Panel</li> <li>• Busway</li> </ul>	<ul style="list-style-type: none"> <li>• Modular (EMA)</li> <li>• Brick (EBA)</li> </ul>
Low	120 kA 100 kA 80 kA 50 kA	<ul style="list-style-type: none"> <li>• Branch circuits well inside the facility</li> <li>• Branch circuits with very sensitive loads and upstream surge suppression</li> </ul>	<ul style="list-style-type: none"> <li>• NQ/NF Panel</li> </ul>	<ul style="list-style-type: none"> <li>• Modular (EMA)</li> <li>• Brick (EBA)</li> <li>• Nipple Mount (HWA)</li> </ul>

## Advanced SPD Product Specifications

Feature	IMA					EMA/EBA	HWA
	Switchgear	Switchboard	Panelboards	MCC	Busway	External Modular/ External Brick	Nipple Mount
Regulatory standards	UL 1558	UL 891	UL 67	UL 845	UL 857	UL 1449	UL 1449
UL 1449 3rd Edition listed	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL 1283	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surge current rating per phase	480 kA 320 kA 240 kA 160 kA 120 kA	480 kA 320 kA 240 kA 160 kA 120 kA	240 kA 160 kA 120 kA	240 kA 160 kA 120 kA	240 kA 160 kA 120 kA	480 kA 320 kA 240 kA 160 kA 120 kA	100 kA (HWA only) 80 kA (HWA only) 50 kA (HWA only)
UL 1449 3rd Ed. SPD Type	Type 1 and 2	Type 1 and 2	Type 1 and 2	Type 1 and 2	Type 1 and 2	Type 1 and 2	Type 1 and 2
Nominal discharge current (I <sub>n</sub> )	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Voltage Protection Rating (VPR)							
120/240 V, 1Ø, 3W	700V L-N, L-G, N-G, 1200V L-L						900V L-N, 1200V L-G, 1500V L-L, 700V N-G
240/120 V, 3Ø, 4W high leg delta	700V L-N, L-G, N-G, 1000V H-N, H-G, 1200V L-L, 1500V H-L						1000V L-N, 1200 V H-N and L-G, 1500V H-G and L-L, 1800V H-L, 700V N-G
208Y/120 V, 3Ø, 4W	700V L-N, L-G, N-G, 1200V L-L						900V L-N, 1200V L-G, 1500V L-L, 700V N-G
480Y/277 V, 3Ø, 4W	1200V L-N, L-G, N-G, 2000V L-L						1200V L-N, 2000V L-G, 2500V L-L, 1000V N-G
600Y/347 V, 3Ø, 4W	1500V L-N, L-G, N-G, 2500V L-L						1500V L-N and N-G, 2500V L-G, 3000V L-L
240 V Delta (HWA only)	—	—	—	—	—	—	1500V L-L
480 V Delta (HWA only)	—	—	—	—	—	—	3000V L-L
600 V Delta (HWA only)	—	—	—	—	—	—	3000V L-L
Duty cycle tested ANSI C62.41, 10 kA, 20 kV	20,000 impulses						10,000 impulses
Short Circuit Current Rating (SCCR) (NEC™ Article 285)	200,000 A						
Component level fusing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LED per phase	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Full-time online diagnostics	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Loss of suppression indication	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Audible alarm	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Dry contacts	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Surge counter	Standard	Standard	Standard	Standard	Standard	Standard	No
Remote monitor	Optional	Optional	Optional	Optional	Optional	Optional	Optional
Internal SPD switch	Yes	Yes	Yes (I-Line & QMB) Optional (all others)	Yes	Yes	Optional	No
Mounting location	Internal	Internal Plug-in (QMB) Plug-in (I-Line)	Internal Direct Bus Plug-in (QMB) Plug-in (I-Line)	Internal Plug-in	Internal Plug-in	External	External
Modes of suppression	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L	L-N, L-G, N-G, L-L
Replaceable modules	Yes	Yes	Yes	Yes	Yes	Yes	No
SPD warranty	10 years	10 years	10 years	10 years	10 years	10 years	10 years

# Meeting the World's Needs for Quality Power

With the rapid growth of the internet and web-hosting facilities, and an explosion in the use of sensitive electronic equipment and controls in manufacturing plants, offices, hospitals and homes, there is universal demand for reliable power. Schneider Electric is the world's leader in power protection. From circuit breakers to surge suppressors, Square D brand Surgellogic products are **dedicated to advancing technology to safely deliver and control electrical power for all of our customers around the world.**

In addition to the featured products, the following products are also instrumental in monitoring your electrical system and creating a cascaded surge suppression network.



## Surgellogic XR Surge Protective Devices

Surge suppression in a compact, hardwired package for 50,000 A and 80,000 A, configurations on single-phase power systems.



## SDSA1175 and SDSA3650 Series Surge Protective Devices

Designed for use against lightning and large surge events in high exposure areas, such as antennas and parking lot lighting systems. These devices may also be used for surge suppression of irrigation pumps, oil pumps and motors operating below 600 V.

## Powerlogic™ Series 4000T Circuit Monitor


A multifunctional monitor designed to provide detailed electrical and energy system information, including impulse transient detection and capture. Series 4000 circuit monitors help you measure and control energy costs, reduce downtime and extend the life of your equipment.



★ Visit Schneider Electric's Surgellogic web site at [www.surgellogic.com](http://www.surgellogic.com)

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