

# *Panelmount (Facility-Wide) Surge Protection*

*AC Power Protection*



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## *Our Comprehensive Surge Protection Plan—For Your Facility*



## *Why Should I Install Facility-Wide Surge Protection?*

### **Damage Due to Transients and Surges**

In today's world, almost every business depends on fragile micro-electronics to run everything from computer networks to manufacturing lines. **Power disturbances can disrupt or cripple equipment, causing loss of data, and an increase in downtime.** In fact, downtime and damage caused by power disturbances or transients cost companies billions of dollars each year.

The terms used to describe these power disturbances are varied — surges, transients, spikes, swells, or noise. What these terms describe are high-energy events that are microseconds in duration. The magnitude of these events can vary dramatically based on how they are generated and where they occur relative to the facility.

Transient impulses like those caused by lightning or utility grid switching can produce high-energy events that adversely affect your facility's incoming power. These disturbances will then propagate throughout your facility and ultimately place each panel and the panel's downstream equipment at risk. Numerous standards exist which address these concerns by recommending coordinated protection throughout your facility.

### **Develop a Plan**

The benefits of installing surge protective devices (SPDs) throughout a facility are clear:

- **Reduction in downtime**
- **Improved system and data reliability**
- **Elimination of damaged equipment due to transients and surges**

Taking the extra steps to ensure the operation of your facility requires a coordinated surge protection plan that identifies susceptible "SURGEHOTSpots" within that facility.

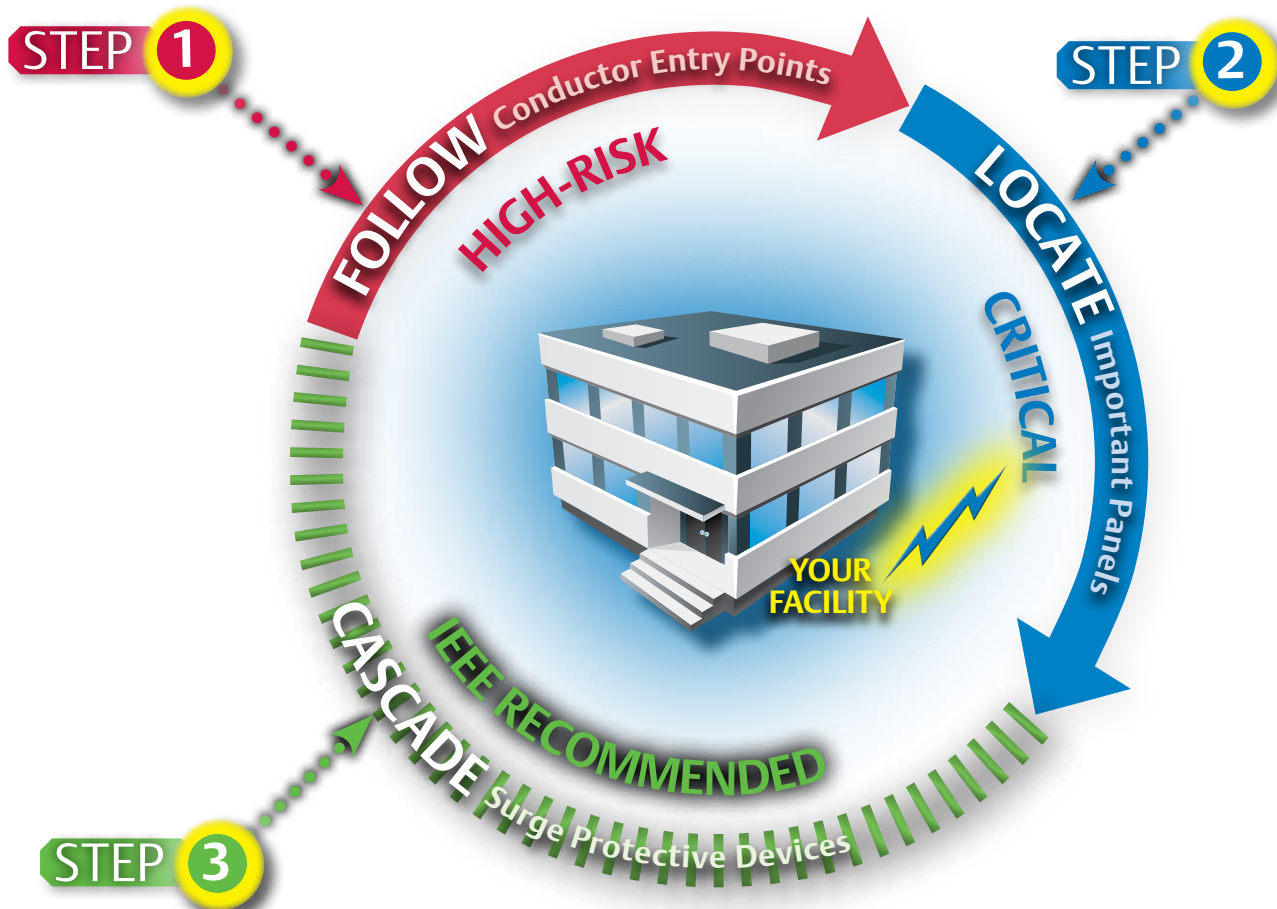


## Emerson Network Power's 3-Step Approach to Facility-Wide Surge Protection



Lightning generated transients are diverse, varying in magnitude, duration, and frequency. Most lightning strikes are actually multi-stroke in nature, with a typical single flash containing four or more strokes. These transients can enter your electrical system at significant levels, working through your facility on any exposed conductor or path. They can directly enter your building via a flash or near a flash to your structure and indirectly through power lines or your building's wiring.

Emerson Network Power has developed a series of products to specifically address these potential **SURGEHOTSpots**. With over 40 years of experience designing and manufacturing world-class surge protection products, we've established a **3-Step Approach** for you to follow to ensure a properly protected facility.



For optimum protection, IEEE recommends cascading surge protection throughout your facility. This approach suggests placing high capacity surge protective devices (SPDs), at the service entrance (or conductor entry points), followed by SPDs at downstream distribution and branch panels.



## FOLLOW...

Follow conductor entry points that penetrate your facility. These lead to electrical panels susceptible to the highest surge impulse levels – we refer to these entry points as **“HIGH-RISK”** surge paths.



## LOCATE...

Locate all electrical panels and install surge protection on equipment connected to or involved in:

- Alternate power
- Essential systems
- Emergency operations

These **“CRITICAL”** panels need to provide power to equipment in the most extreme conditions.



## CASCADE...

Cascade surge protective devices (SPDs) throughout your facility on all panels downstream from the panels identified in STEPS 1 and 2. For optimum protection, **IEEE (Institute of Electrical and Electronics Engineers)** recommends cascading surge protection throughout your facility. This approach suggests placing high capacity surge protective devices (SPDs) at the service entrance (or conductor entry points), followed by SPDs at downstream distribution and branch panels.





## Facility-Wide Surge Protection

### Step 1 — Follow Conductor Entry Points

*It is recommended practice to individually provide surge protection on both the equipment and the panel board feeding the equipment.*

#### Rooftop HVAC

*All exterior mechanical systems located in an area not effectively protected by a lightning protection system should be considered targets.*

Rooftop HVAC

#### Exterior Lighting

*Lightning transients put the electronics within the fixture at risk. Additionally, it provides a direct path for the transient to enter the facility's electrical system.*

Exterior/Parking  
Lot Lighting



## HIGH-RISK Locations

Surge protection is required to protect the sensitive components within the switch and the loads supplied by the output distribution panel.



### Detached Structure

Small buildings that do not contain their own utility feed and are electrically connected to the main facility may experience problems due to ground potential differences.

### Transfer Switch

The transfer switch controls and monitors the power from the generator and distributes it to the most critical equipment within the facility.

A strike close to either building will cause a voltage differential, which in turn will cause high currents to flow.

Detached Structure

Transfer Switch

Service Entrance Panel

### Service Entrance

The power from the utility feeding your facility is a primary transient target because of induced events on high-mast overhead lines and a direct connection to possible grid switching.



## Facility-Wide Surge Protection

### Step 2 — Locate Important Panels

Apply protection at the line side and the load side of the UPS, as well as the manual bypass switch.

#### UPS

Generally feeds critical IT equipment and key systems within a facility. Transient voltage can damage sensitive components within the UPS and electrically connected equipment downstream.

Facility UPS

Rackmount Equipment

#### Network/IT Equipment

Your facility's data center or server room is the central point for all network activity. Any anomaly such as a transient or surge can cripple your business. Apply surge protection at all electrical panels feeding power to the room and at the rack equipment level.



**NEC® article 700.8 requires surge protection at these locations in all “mission-critical facilities”.**



Life Safety  
Panels



Critical  
Panels

### ‘Essential’ Panels

Electrical panels feeding power to both life safety and critical power applications need to be properly protected.

Life safety includes:

- Fire alarms
- Egress lighting

Critical power includes:

- Medical prep areas
- Operating rooms

## Facility-Wide Surge Protection

### Step 3 — Cascade Surge Protective Devices

#### Cascaded Protection

Apply surge protection to all panels that are electrically tied to panels deemed high-risk or important. Cascaded protection ensures that residual transient voltage is mitigated to safe levels as it moves through the electrical system.

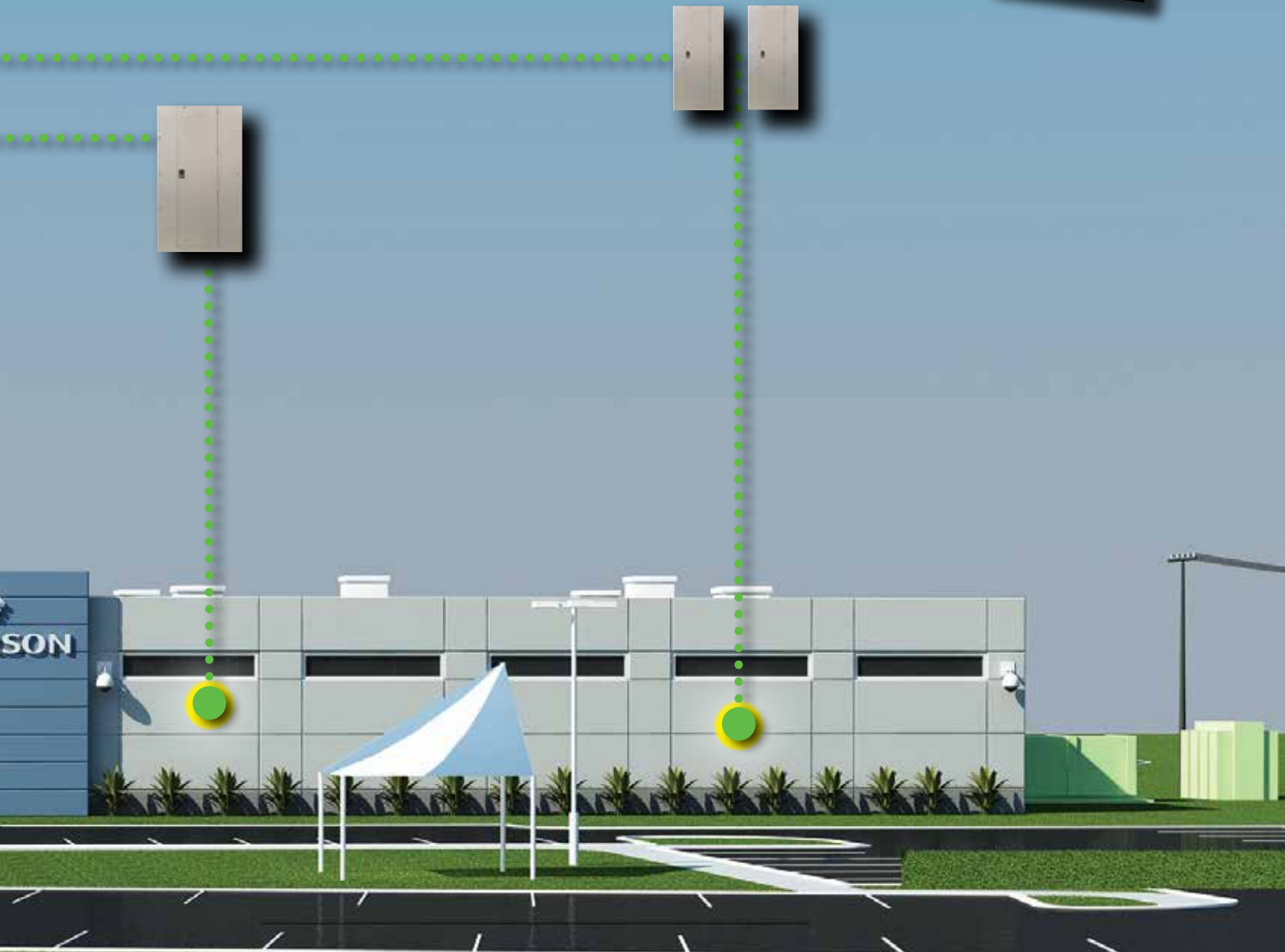
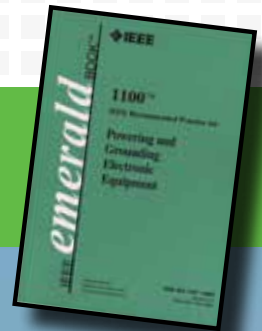
#### Residual Voltage

Residual voltage is the amount of transient voltage remaining on the AC line after a surge protective device (SPD) has performed its function. Many high energy events can still be extreme enough to cause significant damage after only passing by a single level of surge protection. A second and often a third level of protection is necessary to provide clean voltage to sensitive equipment.

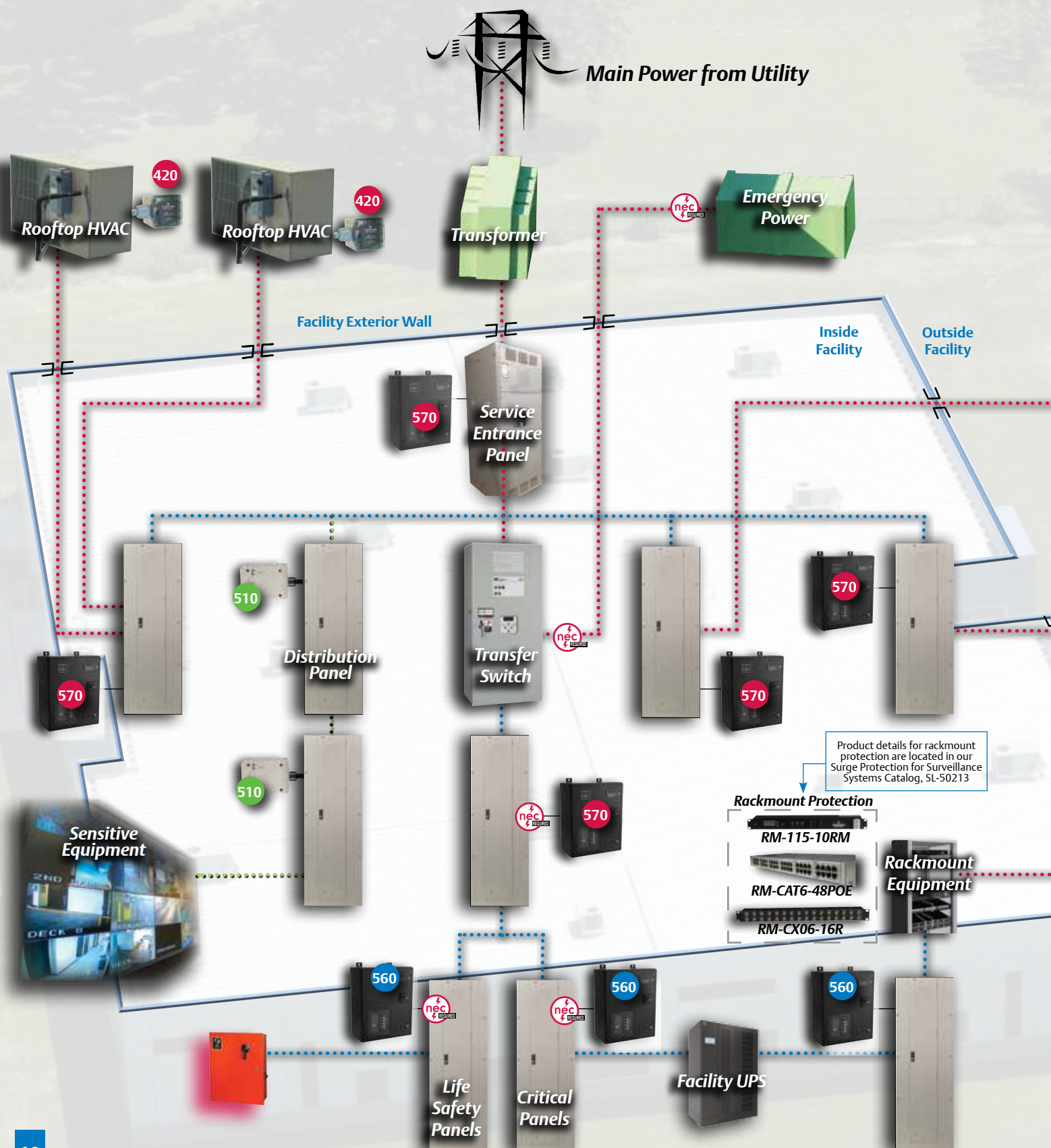




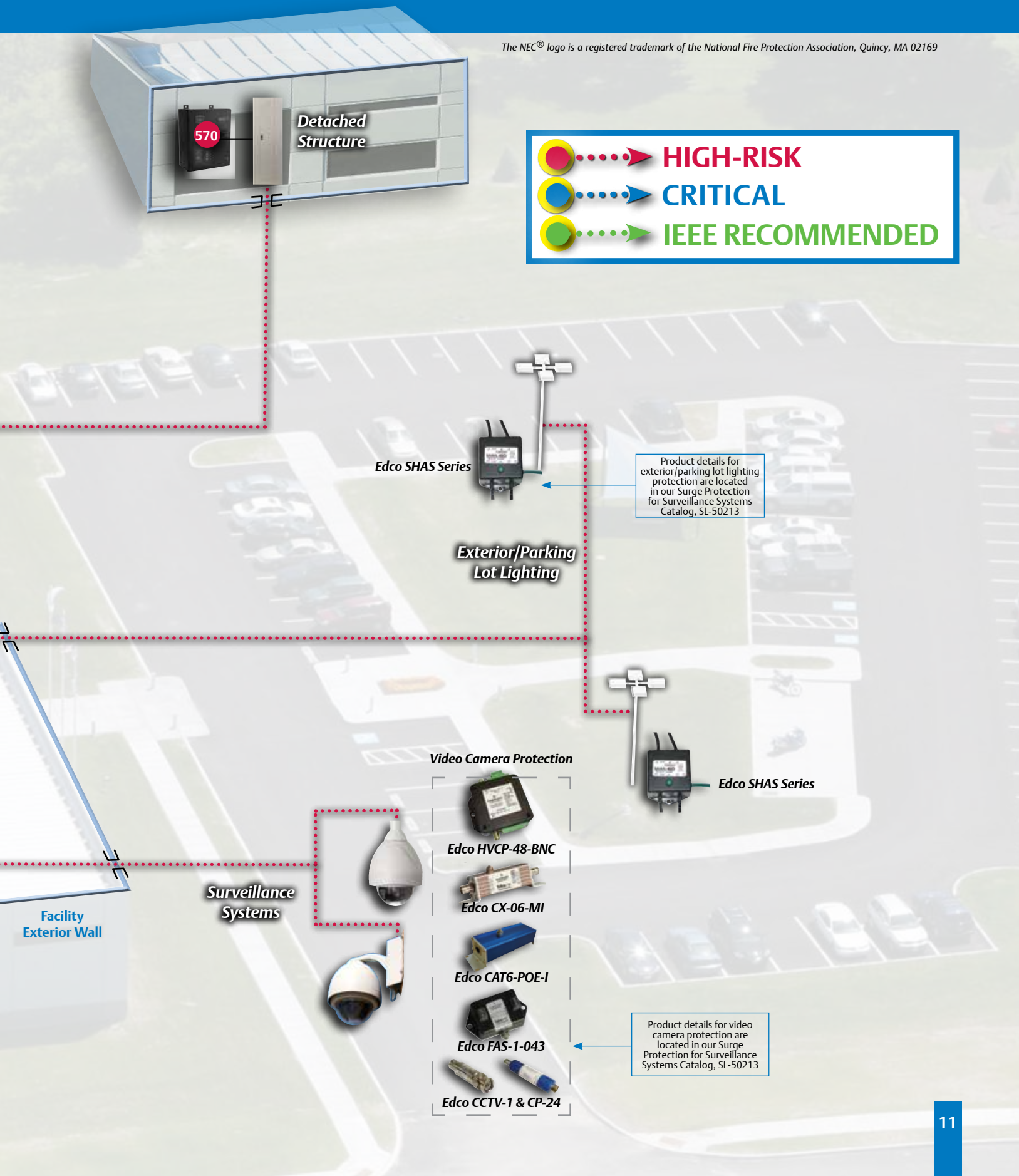
*"Section 8.6.4 (p. 301) "In addition to SPDs installed in the service entrance equipment, it is recommended that additional SPDs...be applied to downstream electrical switchboards and panelboards, and panelboards on the secondary of separately derived systems..."*



## Our Answer — Power Distribution One-Line Installation Diagram







# 500 Series *Surge Protective Devices*



## Introduction

Emerson Network Power's 500 Series SPDs are designed with strict industry requirements in mind. This diverse family of products uses patented surge technology to provide survivability and exceptional performance in the most extreme conditions. With a variety of technology, monitoring and packaging solutions, each model line within the 500 Series can be tailored to meet your specific requirements.

### The 500 Series includes:

- **True Surge Capability**—handles multiple impulses at its highest rated level
- **Individually Thermally Fused Surge Arrays**—ensures industry's highest levels of safety and performance
- **Redundant Protection**—multiple surge components each with a dedicated fuse
- **Repetitive Impulse Capability**—life cycle testing results demonstrate industry's most rugged design
- **Temporary Overvoltage Survivability**—able to withstand greater than twice the voltage for 30 cycle (IEEE defined swell condition); surviving where other commercially available thermally protected MOV designs fail
- **Industry Best Transient Response at High Surge Levels**—multi-stage hybrid design clamps transients at hundreds of volts lower than traditional MOV designs at impulse levels above 10kA

*A mission-critical design for your most important applications...*

## At A Glance

570

*Individual, thermally fused SAD/MOV active array, solid copper bus construction, redundant, replaceable modules.*

*Available surge levels are:  
125, 160, 200kA per mode  
250, 320, 400kA per phase*

*Motorola R56 approved model.  
Available surge level is:  
160kA per mode/160kA per phase*



560

*Individual, thermally fused MOV array design, solid copper bus construction, redundant, replaceable modules.*

*Available surge levels are:  
80, 125, 160, 200, 250, 375kA per mode  
160, 250, 320, 400, 500, 750kA per phase*

*Motorola R56 approved model.  
Available surge level is:  
160kA per mode/160kA per phase*



510

*Individual, thermally fused MOV array design, surge counter, audible alarm, green/red status LEDs, form C relay contacts, standard and optional enclosures, including NEMA 4X, 4, 3R and stainless steel.*

*Available surge levels are:  
65, 80, 100, 125, 160, 200, 250kA per mode  
130, 160, 200, 250, 320, 400, 500kA per phase*





## How Do They Compare?



		570	560	510	510
Components, Construction & Performance	Superior High-Energy Transient Response*	✓			
	Component Transition Circuit	✓			
	SAD/MOV Hybrid	✓			
	Redundant, Replaceable Module Arrays	✓	✓		
	Solid Copper Bus Construction	✓	✓		
	Life Cycle Testing	up to 45,000 per mode	✓		
		up to 24,000 per mode	✓	✓	
		up to 8,000 per mode	✓	✓	✓
	Replaceable Surge Modules	✓	✓	✓	
	Disconnect Switch	Optional	Optional	Optional	
	Swell Ride-through	✓	✓	✓	✓
	Thermally Fused MOV Arrays	✓	✓	✓	✓
	EMI/RFI Filtering	✓	✓	✓	✓
	UL 1449 Inominal Rating / Location Type (20kA / Type 1)	✓	✓	✓	✓
	Short Circuit Current Rating (SCCR) (200kAIC)	✓	✓	✓	✓
Warranty	up to 5 Years Onsite Labor	✓	✓		
	up to 10 Years Parts or Replacement	✓	✓	✓	✓
Surge Rating	Up to 375kA/750kA (Mode/Phase)	✓	✓		
	Up to 250kA/500kA (Mode/Phase)	✓	✓	✓	
	Up to 80kA/160kA (Mode/Phase)	✓	✓	✓	✓
Monitoring	Built-in-test	✓	✓		
	Surge & Swell Counters	Optional	Optional		
	Surge Counter	Optional	Optional	Optional	
	Audible Alarm	✓	✓	✓	✓
	Green/Red Status LEDs, Form C Relay Contacts	✓	✓	✓	✓

# Surge Protection Product Description



## 570 Surge Protective Device

### Multi-Stage System of Suppression

The Emerson Network Power 570 surge protective device (SPD) is the first hybrid product in the industry to offer a true, coordinated multi-stage system of suppression. It integrates the fast response time of the Silicone Avalanche Diode (SAD) with the high-energy capability of our 560 Metal Oxide Varistor (MOV) product line. Testing shows the 570 SPD is particularly effective at mitigating high events beyond 20,000 amps, making it the ideal choice for high-risk locations; areas where we would expect to see the highest energy levels.

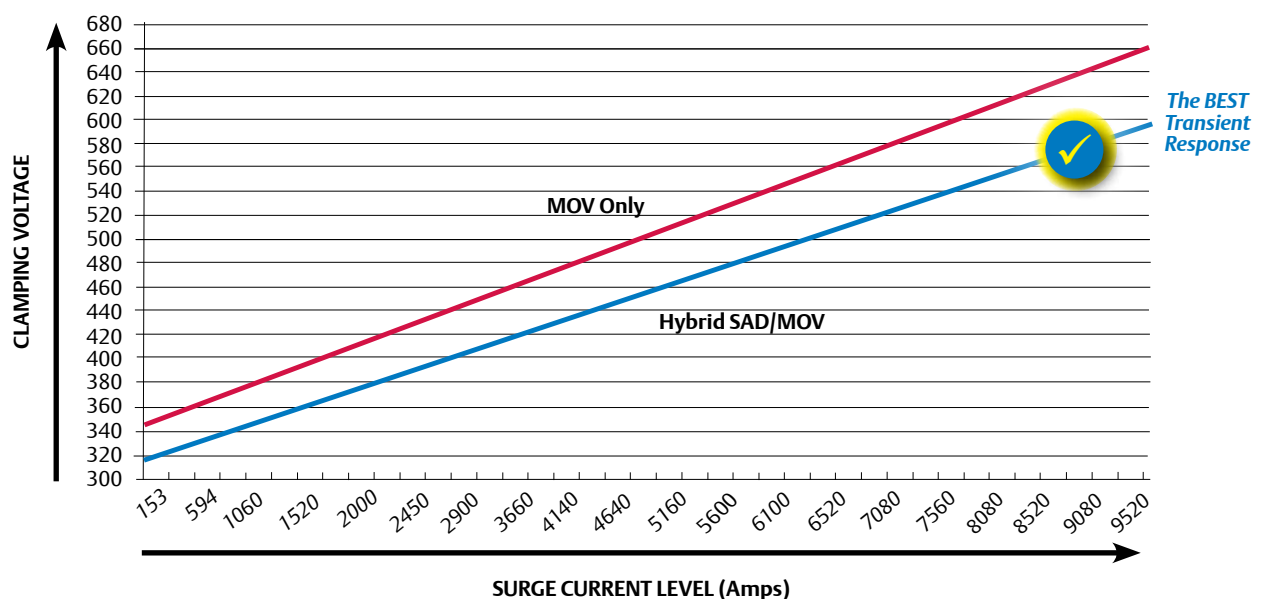
570 SPD specifications and ordering information are located on pages 16-17.



Recommended for  
HIGH-RISK Locations

### Comparison MOV vs SAD/MOV Hybrid

The graph below represents a transient response performance comparison of differing technologies. The hybrid technology clearly demonstrates an advantage over the MOV only technology; with approximately a 10% improvement as the energy levels increase. This could equate to a difference of several hundred volts during high energy events.







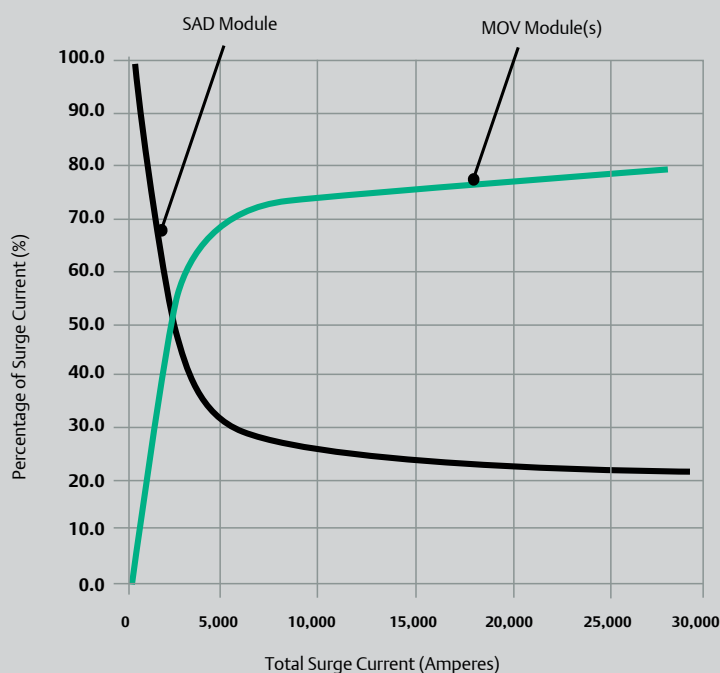
570

## Advanced Hybrid Surge Suppression Technology

### The Emerson Answer ..... Transitional Method .....

A closely regulated amount of energy is transitioned between the primary SAD module and the secondary MOV module(s). The primary/secondary hybrid design takes advantage of the tight clamping and rapid response characteristics of the SADs while incorporating the high-energy handling characteristics of the MOV. This is accomplished through an impedance matching network utilizing a series of controlled copper geometries in conjunction with custom engineered high-voltage/high-energy component distribution. This ultimately limits the amount of high-energy surge current through the SAD module to an acceptable level and diverting the remaining surge current through the MOV module(s).

Emerson Network Power 570 Hybrid Surge Current Sharing Data



### Other “Hybrid” Products Fall Into One of Two Categories:

- **Self-sacrificing:** This system significantly degrades or fails with nominal fluctuations or high-energy events. This design is extremely inconvenient to the customer, and more importantly, it leaves an opportunity for critical load upsets/failures.
- **Oversize components:** Higher rated components allow the system to survive nominal fluctuations or high-energy events—as a result clamping levels drastically increase and the level of protection decreases, defeating what it’s designed to do.

# Surge Protection Product Specifications

## 570 Surge Protective Device

## Specifications

General Specifications (All Models)	
Connection Type	Parallel Connected
Agency Listings	ANSI/UL 1449 Third Edition, UL 1283 (Type 2 Locations), cUL (Type 2 Locations), FCC Part 15 Class B
Maximum Continuous Operating Voltage Range	120VAC 125%, all others 115%
Short Circuit Rating	200kAIC
Maximum Surge Current Rating	125kA-200kA per mode/250kA-400kA per phase
UL1449 Location Type	Type 1, Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Operating Frequency Range	47 - 63 Hertz
50 ohm EMI/RFI Attenuation	63dB max from 10kHz to 100MHz
Protection Modes	All applicable modes standard (Line to Neutral, Line to Ground, Neutral to Ground and Line to Line)
Monitoring Features	Internal/External Status LEDs, Audible Alarm, Summary Alarm Contact (2 sets), Built-in-test circuit tests MOV/ fuse array capacities, Phase loss indication, Low voltage indication, Loss of power indication, Surge counters.
Response Time	<0.5 nanoseconds
Temperature	-40 to +60 degrees C
Operating Humidity	0% to 95% noncondensing
Enclosure	NEMA 4
Altitude	0 to 18,000 feet
Audible Noise	Less than 45dBa
Labor Warranty	5 Years on site labor
Parts Warranty	10 Years on all parts



General Specifications (Motorola R56 Approved Models Only)	
Connection Type	Parallel Connected
Maximum Surge Current Capacity	160kA per mode/160kA per phase
Short Circuit Current Rating (SCCR)	65kAIC
Motorola R56 Unit Type	Type 1 (SAD/MOV Hybrid)
Status Indication	LEDs, Relay alarm contacts
Enclosure	NEMA 4X
Protection Mode	L-N, L-L



Chart A		
Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
YC		277/480VAC, 254/440VAC
DB	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
DF		480VAC

Chart B	
Code	Monitoring Options
C	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets, Surge Counter
D	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets, Surge and Swell Counters

### Life Cycle Surge Testing (10kA, 20kV, IEEE Cat. C3)

Surge Rating	Per Mode	Per Phase
125kA	15,000	30,000
160kA-200kA Per Mode	30,000	60,000





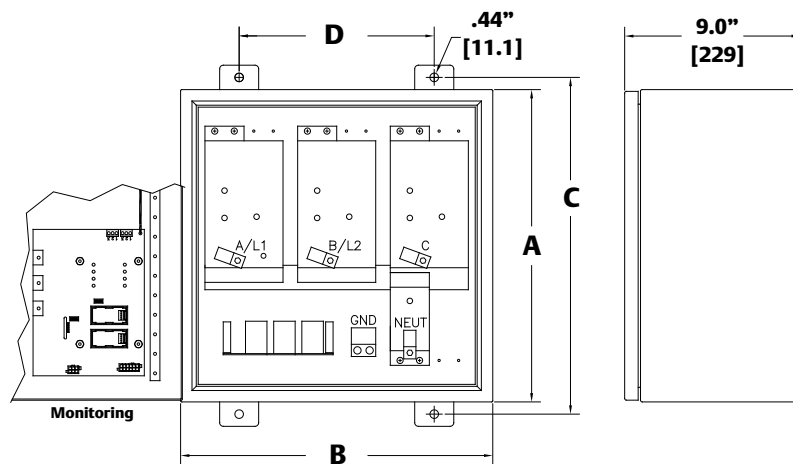
570

## Ordering Information

## Dimensional Data

Ordering Information								
Example Model Number: 570YC20ARDG1S								
570	YC	20	A	R	D	G	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
570	See Chart A on pg.16	12 125kA/Mode	A All Modes	N Terminal Block	See Chart B on pg.16	G NEMA 4 (Standard)	1 UL Type 1	S Standard
		16 160kA/Mode		R Rotary Disconnect		R NEMA 3R (Optional)	2 UL Type 2 UL 1283	
		20 200kA/Mode				H NEMA 4X (Stainless Steel) (Optional)		

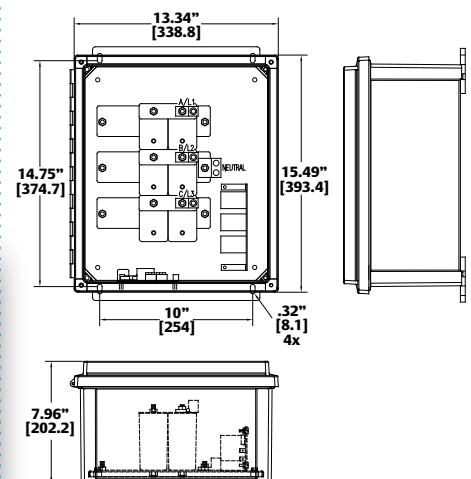
Ordering Information (Motorola R56 Approved Models)								
Example Model Number: 570YC16FNRJ1S								
570	YC	16	F	N	R	J	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
570	See Chart A on pg.16	16 160kA/Mode	F Line to Neutral	N Terminal Block	R LED, Relay Contacts	J NEMA 4X (Non-Metallic)	1 UL Type 1	S Standard



Dimensional Data					
Unit	Connection Type	A x B	C	D	Weight
125kA	Wire Lug (N)	16" x 12" (406 x 305)	17.25" (438)	9.5" (241)	35lb (15.9kg)
	Disconnect (R)	16" x 16" (406 x 406)	17.25" (438)	10" (254)	45lb (20.4kg)
160kA-200kA	Wire Lug (N)	20" x 16" (508 x 406)	21.25" (540)	10" (254)	55lb (24.9kg)
	Disconnect (R)	20" x 16" (508 x 406)	21.25" (540)	10" (254)	55lb (24.9kg)

### Dimensional Data (Motorola R56 Approved Models Only)

Unit	Weight
570SA16FNRJ1S	28lb (12.7kg)
570YA16FNRJ1S	32lb (14.5kg)



# Surge Protection Product Description

## 560 Surge Protective Device

### Proven Performance

Repetitive life cycle capability, high-energy capacity and years of proven field experience allow us to confidently recommend the 560 surge protective device for any “HIGH-RISK” location or “CRITICAL” process.

560 SPD specifications and ordering information are located on pages 20-21.



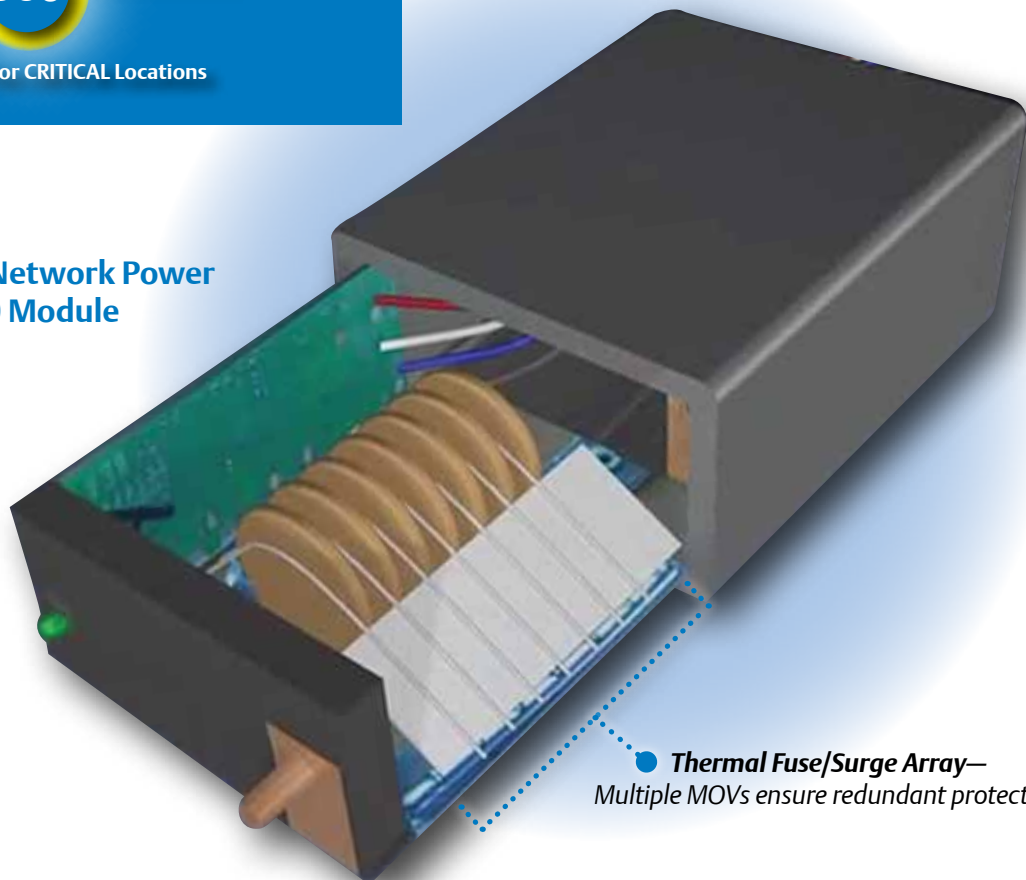
Recommended for CRITICAL Locations

### Fusing

It all starts with our patented surge arrays, a fuse technology that's the core of our design advantage. We were the first in the industry to provide fusing with both thermal and fault current protection in an SPD, consistently exceeding industry safety and performance levels.

- **Coordinated Surge Path** — the surge path between the suppression element and the fuse ensure the array can deliver its rated surge performance without interruption to the link.
- **Fault Tested Array** — the fuse/surge array is designed to quickly and safely open in the case of both limited and high current fault conditions.
- **Balanced Configuration** — placement of the fuse link and surge components in a custom engineered geometrical pattern serve to balance the array, resulting in improved repetitive capability and an over-voltage withstand that's unmatched in the surge protection industry.

### Emerson Network Power 560 Module



● **Thermal Fuse/Surge Array**—  
Multiple MOVs ensure redundant protection





560



*Testing the Limits...Emerson Network Power's state-of-the-art surge protection test lab in Binghamton, NY*

### Surge Current

Real world events look a little different than what is simulated in a controlled lab setting. An  $8 \times 20 \mu s$  waveform is a nice place to start when testing a surge protector, but in reality, impulse levels and waveform characteristics are diverse. Factors such as the magnitude of the event, the number of impulses in the event and the proximity of the event to your system, all impact what the surge protective device will actually experience when installed.

We put the design of our Emerson Network Power 560 surge protective device to the test by subjecting it to a wide variety of impulse characteristics and levels; testing the limits and longevity of the design.

### Survivability

To ensure our 560 surge protective device is ready for your harshest environments, we tested it to multiple waveforms, multiple times and at the highest rated levels:

- **Endurance Testing** — Minimum of 15,000 impulses per module at 20,000 volts and 10,000 Amps.
- **Waveforms** — Long duration ( $10 \times 350 \mu s$ ) representing a close strike and shorter duration ( $8 \times 20 \mu s$ ) representing an indirect impulse is applied at a variety of levels.
- **High-Energy Testing** — Testing conducted on the complete unit – including fuse elements, and accessories such as disconnects and monitoring boards. The entire product withstands and performs multiple times at its highest rated level.



# Surge Protection Product Specifications

## 560 Surge Protective Device

## Specifications

### General Specifications (All Models)

Connection Type	Parallel Connected
Agency Listings	ANSI/UL 1449 Third Edition, UL 1283 (Type 2 Locations), cUL (Type 2 Locations), FCC Part 15 Class B
Maximum Continuous Operating Voltage Range	120VAC 125%, all others 115%
Maximum Surge Current Rating	80kA-375kA per mode/160kA-750kA per phase
Short Circuit Rating	200kAIC
UL 1449 Location Type	Type 1, Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Operating Frequency Range	47 - 63 Hertz
50 ohm EMI/RFI Attenuation	63 dB max from 10kHz to 100MHz
Protection Modes	All applicable modes standard (Line to Neutral, Line to Ground, Neutral to Ground and Line to Line)
Monitoring Features	Internal/External Status LEDs, Audible Alarm, Summary Alarm Contact (2 sets), Built-in test circuit tests MOV/fuse array capacities, Phase loss indication, Low voltage indication, Loss of power indication, Surge counters (optional)
Response Time	<0.5 nanoseconds
Temperature	-40 to +60 degrees C
Operating Humidity	0% to 95% noncondensing
Enclosure	NEMA 4
Altitude	0 to 18,000 feet
Audible Noise	Less than 45 dBA
Labor Warranty	5 Years on site labor
Parts Warranty	10 Years on all parts



### General Specifications (Motorola R56 Approved Models Only)

Connection Type	Parallel Connected
Maximum Surge Current Capacity	160kA per mode/160kA per phase
Short Circuit Current Rating (SCCR)	65kAIC
Motorola R56 Unit Type	Type 2 (MOV only)
Status Indication	LEDs, Relay alarm contacts
Enclosure	NEMA 4X
Protection Mode	L-N, L-L



### Chart A

Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
YC		277/480VAC, 254/440VAC
DB	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
DF		480VAC

### Chart B

Code	Monitoring Options
A	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets
C	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets, plus Surge Counter
D	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets, plus Surge and Swell Counters

### Life Cycle Surge Testing (10kA, 20kV, IEEE Cat. C3)

Surge Rating	Per Mode	Per Phase
80kA-125kA Per Mode	15,000	30,000
160kA-200kA Per Mode	30,000	60,000
375kA Per Mode	45,000	90,000





560

## Ordering Information

## Dimensional Data

### Ordering Information

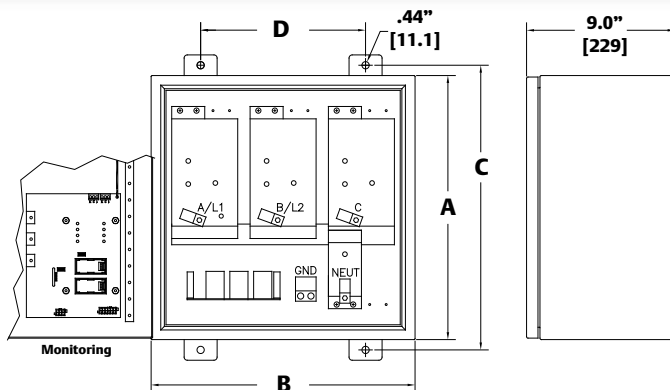
Example Model Number: **560YA16ARCG1S**

560	YA	16	A	R	C	G	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
560	See Chart A on pg.20	08 80kA/Mode	A All Modes	N Terminal Block	See Chart B on pg.20	G NEMA 4 (Standard)	1 UL Type 1	S Standard
		12 125kA/Mode		R Rotary Disconnect		R NEMA 3R (Optional)	2 UL Type 2 UL 1283/cUL	
		16 160kA/Mode				H NEMA 4X (Stainless Steel) (Optional)		
		20 200kA/Mode						
		25 250kA/Mode						
		37 375kA/Mode						

### Ordering Information (Motorola R56 Approved Models)

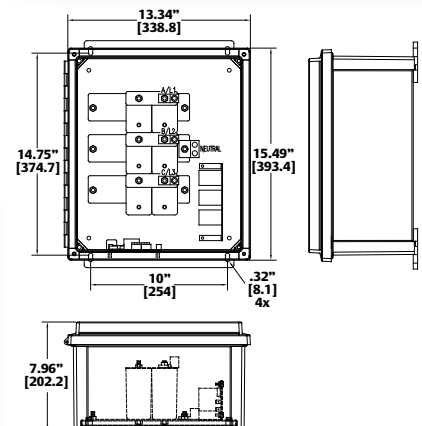
Example Model Number: **560SA16FNRJ1S**

560	SA	16	F	N	R	J	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
560	See Chart A on pg. 20	16 100kA/Mode	F Line to Neutral	N Terminal Block	R LED, Relay Contacts	J NEMA 4X (Non-Metallic)	1 UL Type 1	S Standard



### Dimensional Data (Motorola R56 Approved Models Only)

Unit	Weight
560SA16FNRJ1S	24lb (12.7kg)
560YA16FNRJ1S	28lb (14.5kg)



### Dimensional Data

Surge Rating	Connection Type	A x B	C	D	Weight
08-12	Wire Lug (N)	16" x 12" (406 x 305)	17.25" (438)	9.5" (241)	35lb (15.9kg)
	Disconnect (R)	16" x 16" (406 x 406)	17.25" (438)	10" (254)	45lb (20.4kg)
16-25	Wire Lug (N)	20" x 16" (508 x 406)	21.25" (540)	10" (254)	55lb (24.9kg)
	Disconnect (R)	20" x 20" (508 x 508)	21.25" (540)	14" (356)	85lb (38.6kg)

# Surge Protection Product Description



## 510 Surge Protective Device

The Emerson Network Power 510 is a multi-phase, multi-mode surge protector, which incorporates the same fuse/surge array design philosophy as the 570 and 560 products. A coordinated, multi-component/multi-fuse approach is the key to addressing even the harshest conditions. With a short circuit rating of 200kAIC, a UL 1449 Type 1 rating, along with a myriad of enclosure and surge levels; the 510 can be placed on any panel within your facility, making it the ideal choice for cascaded applications.

*510 SPD specifications and ordering information are located on pages 24-25.*



IEEE Recommends CASCADING Surge Protection

### Protection Redundancy – Cascaded Surge Protection

In engineering, redundancy is the duplication of critical components or functions of a system with the intent of increasing reliability of the system – usually in the form of back-up.

IEEE encourages protection redundancy by cascading multiple surge protection devices throughout a facility.

Emerson Network Power carries this recommendation to the product level with built-in redundant features; including multiple surge arrays which consist of multiple surge components.

Not only will your facility be fully or “redundantly” protected, but the SPD itself is designed with redundancy in mind.

#### This Strategy is as Easy as...

1

Cascade multiple surge protective devices throughout your facility.

Make sure to choose the Emerson Network Power 500 Series...

2

Multiple surge arrays within each SPD.

3

Multiple fuse/surge components placed within each SPD array.



## Protection Redundancy Explained



### Facility-Wide Protection Redundancy

**1** Cascade surge protection throughout your facility. Place high-capacity SPDs at your high-risk locations, followed by protection at downstream electrical panels.

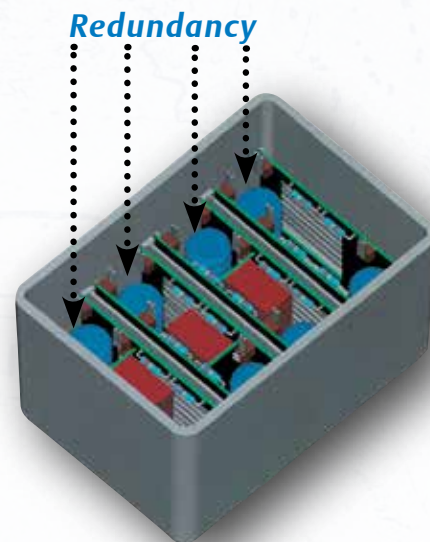


#### The Purpose...

Mitigate the initial impulse and clamp in stages as the transient works its way through the electrical system towards your critical loads.

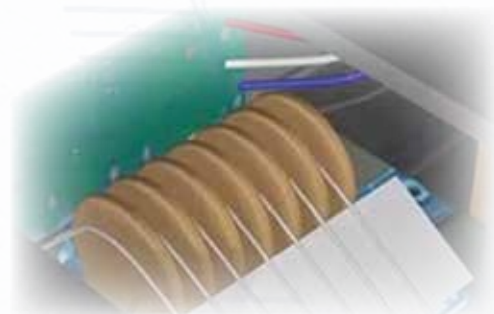
### The SPD – Redundant Surge Arrays

**2** We carry the cascaded concept into our surge design by using multiple surge modules within our SPD.



### Component Level

**3** Our individual component level fuse design is the key to addressing high surge levels. Each fuse link can be coordinated with the requirements of the individual component – sized to handle the surge yet disconnect immediately in case of a fault. Having multiple components in an array and multiple arrays in a device not only allows the surge protection levels to expand while maintaining the safety, but it also provides “Protection Redundancy”.



# Surge Protection Product Specifications

## 510 Surge Protective Device

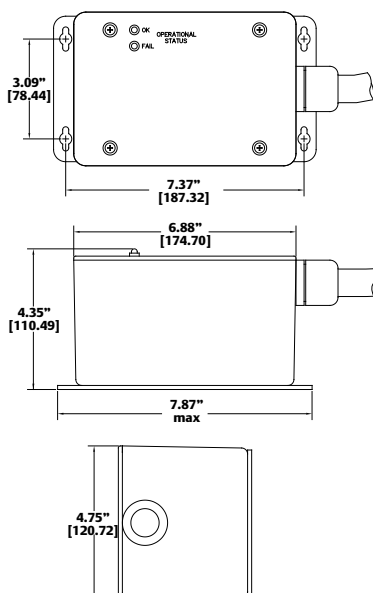
## Specifications

General Specifications	
Connection Type	Parallel Connected
Agency Listings	ANSI/UL 1449 Third Edition, UL 1283 (Type 2 Locations), cUL (Type 2 Locations)
Maximum Continuous Operating Voltage Range	120VAC 125%, all others 115%
Maximum Surge Current Rating	65kA-250kA per mode/130kA-500kA per phase
UL 1449 Short Circuit Rating	200kAIC
UL 1449 Location Type	Type 1, Type 2
Nominal Discharge Current ( $I_N$ )	20kA
Operating Frequency Range	47 - 63 Hertz
50 ohm EMI/RFI Attenuation	63dB max from 10kHz to 100MHz
Protection Modes	All applicable modes standard (Line to Neutral, Line to Ground, Neutral to Ground and Line to Line)
Monitoring Features	Internal/External Status LEDs, Audible Alarm, Summary Alarm Contact, Built-in-test circuit tests MOV/fuse array capacities, Phase loss indication, Low voltage indication, Loss of power indication, Surge counter (optional)
Response Time	<0.5 nanoseconds
Temperature	-40 to +60 degrees C
Operating Humidity	0% to 95% non-condensing
Status Indication	LEDs, Relay Alarm Contacts, Audible Alarm
Enclosure	NEMA 4X, 12, 1
Altitude	0 to 18,000 feet
Audible Noise	Less than 45dBA
Parts Warranty	10 Years on all parts



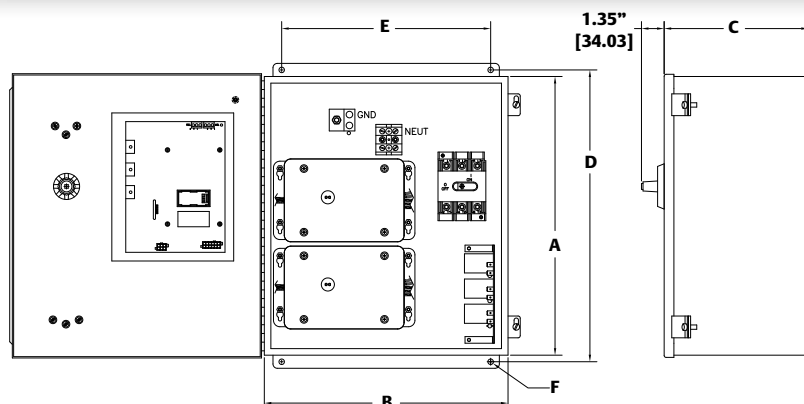
## Dimensional Data

### ① NEMA 4X (Non-Metallic) Enclosure



### ② NEMA 12 (Metallic) Enclosure

Surge Rating (2)	A x B x C	D	E	F	Weight
06, 08	16" x 14" x 8" (406 x 356 x 203)	16.75" (425.5)	12" (304.8)	0.31" (7.9)	32lb (14.5kg)
10, 12, 16	16" x 14" x 8" (406 x 356 x 203)	16.75" (425.5)	12" (304.8)	0.31" (7.9)	41lb (18.6kg)
20, 25	20" x 16" x 9" (508 x 406 x 229)	21.25" (539.8)	10" (254)	0.44" (11.2)	56lb (25.4kg)





510

## Ordering Information




Ordering Information								
Example Model Number: 510YA08ANAJ1S								
510	YA	08	A	N	A	J	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
NEMA 4X (Non-Metallic) Enclosure (See dimensional data ❶ on page 24)								
	See Chart A Below	06 65kA/Mode	A All Modes	N Terminal Block	See Chart B Below	J NEMA 4X (Non-Metallic)	1 UL Type 1	S Standard
		08 80kA/Mode					2 UL Type 2 UL 1283/cUL	
NEMA 12 (Metallic) Enclosure (See dimensional data ❷ on page 24)								
	See Chart A Below	06 65kA/Mode	A All Modes	N Terminal Block	See Chart B Below	L NEMA 12 (Standard)	1 UL Type 1	S Standard
		08 80kA/Mode		R Rotary Disconnect		G NEMA 4 (Optional)	2 UL Type 2 UL 1283/cUL	
		10 100kA/Mode				R NEMA 3R (Optional)		
			12 125kA/Mode			H NEMA 4X (Stainless Steel) (Optional)		
			16 160kA/Mode					
			20 200kA/Mode					
			25 250kA/Mode					
NEMA 1 (Non-Metallic) Panelboard Extension								
	See Chart A Below	06 65kA/Mode	A All Modes	N Terminal Block	R LED, Relay Contacts	S 1-Panelboard Surface Trim	2 UL Type 2 UL 1283/cUL	S Standard
		08 80kA/Mode			C LED, Alarm, Relay, Surge Counter	F 1-Panelboard Flush Trim		

Chart A		
Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
YC		277/480VAC, 254/440VAC
DB	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
DF		480VAC

Chart B	
Code	Monitoring Options
A	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets
C	Green/Red LEDs, Audible Alarm w/Silence Switch, Relay Contacts (2) Sets, plus Surge Counter



# 400 Series *Surge Protective Devices*



## Introduction

Emerson Network Power's 400 Series is a UL listed Type 1 family of surge protectors that are designed around the latest thermally protected MOV technology. This platform of products is available in any voltage and phase configuration and offers a wide range of surge levels and optional accessories. The compact design and robust performance make the 400 Series products an ideal choice for reliable, high-energy protection.

### The 400 Series includes:

- **Thermally Protected MOV Technology**
- **Surge Current Ratings** – meets or exceeds industry performance requirements
- **UL 1449 3rd Edition Type 1 SPD, UL 1283 EMI/RFI filter, IEC and CE compliant**
- **Short Circuit Current Rating of 200kAIC**
- **Surge Impulse Rated and Tested**
- **Series Status Includes** – audible alarm, surge counters, form C contacts, and green/red status LEDs; including N-G overvoltage

*Technology, agency listing and design flexibility, make the 400 Series an ideal choice to meet most project specifications...*

## At A Glance

460

*Modular design, standard steel enclosure with a variety of options, including a disconnect switch.*

Available surge levels are:  
50, 100, 150, 200kA per mode  
100, 200, 300, 400kA per phase



440

*Non-modular design, with optional surge counter, N-G overvoltage, and steel enclosure.*

Available surge levels are:  
50, 100, 150kA per mode  
100, 200, 300kA per phase



430

*Non-modular design, EMI/RFI filtering with an optional steel enclosure.*

Available surge levels are:  
50, 100kA per mode  
100, 200kA per phase



425

*Non-modular design, all mode protection, LED, form C relay/audible alarm status indication.*

Available surge level is:  
50kA per mode/100kA per phase



420

*Non-modular design, reduced mode protection, (L-N, N-G or L-L), LED, form C contact status indication.*

Available surge level is:  
50kA per mode/50kA per phase



## How Do They Compare?

		460	440	430	425	420
Components, Construction & Performance	Replaceable Surge Modules	✓				
	Disconnect Switch	Optional				
	Life Cycle Testing	up to 12,000 per mode	✓			
		up to 8,000 per mode	✓			
		up to 6,000 per mode	✓	✓		
		up to 3,500 per mode	✓	✓	✓	
		up to 500 per mode	✓	✓	✓	✓
	EMI/RFI Filtering	✓	✓	✓		
	Steel Enclosure	✓	Optional	Optional		
	Warranty	up to 10 Years Parts or Replacement	✓	✓	✓	
		up to 5 Years Parts or Replacement	✓	✓	✓	✓
	UL 1449 Inominal Rating / Location Type (20kA / Type 1)	✓	✓	✓	✓	✓
	Short Circuit Current Rating (SCCR) (200kAIC)	✓	✓	✓	✓	✓
	Thermally Protected MOV	✓	✓	✓	✓	✓
Surge Rating	Up to 200kA/400kA (Mode/Phase)	✓				
	Up to 150kA/300kA (Mode/Phase)	✓	✓			
	Up to 100kA/200kA (Mode/Phase)	✓	✓	✓		
	Up to 50kA/100kA (Mode/Phase)	✓	✓	✓	✓	
	Up to 50kA/50kA (Mode/Phase)	✓	✓	✓	✓	✓
Monitoring	Surge Counter	Optional	Optional			
	Surge Indication LED	✓	✓			
	N-G Overvoltage Indication	✓	✓	✓		
	Audible Alarm	✓	✓	✓	✓	
	Green/Red Status LEDs, Form C Relay Contacts	✓	✓	✓	✓	✓

# Surge Protection Product Description/Specifications

## 460 Surge Protective Device

### High Capacity/Modular Surge Protection Solutions

The Emerson Network Power 460 is a modular, surge protective device capable of diverting high-energy transients. The 460 incorporates either single or dual modules that contain multiple, large block MOVs. Each MOV incorporates a thermal disconnecting feature that monitors the status of each inner metal disc and safely removes the component during abnormal conditions. The 460 has been tested under a variety of transient conditions. It's rugged design, performance and versatility makes this product an ideal choice for applications anywhere in your facility.



Recommended for HIGH-RISK Locations

## At A Glance

- **UL**–1449 3rd edition, type 1 or 2,  $I_n$  20kA, cUL (type 2)
- **Surge Current Rating:**  
50, 100, 150, 200kA/mode  
100, 200, 300, 400kA/phase
- **All Modes of Protection**–L-L, L-N, L-G, N-G  
*Optional–discrete 10-mode available*
- **Large Block, Utility Grade 34mm MOVs**
- **Thermally Protected MOV Technology**
- **Short Circuit Rating**–200kAIC
- **Status Monitoring**–green/red LEDs, N-G overvoltage, surge indication, audible alarm w/silence switch, form C contacts and surge counter
- **NEMA 12/4 Steel Enclosure**–standard
- **Optional Accessories**–rotary disconnect
- **UL 1283 EMI/RFI Filtering**
- **ANSI/IEEE**–C62.11, C62.41, C62.45
- **IEC 61643-11 Tested, CE compliant**
- **Warranty**–10 Years

## Specifications

General Specifications	
Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 150%, all others 115%
Short Circuit Current Rating (SCCR)	200kAIC
Protection Modes	All Possible Modes including (L-N, L-G, N-G, L-L)
Operating Frequency Range	47-63Hz
UL 1449 Location Type	Type 1/Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Status Indication - Standard	Green/Red LEDs, Audible Alarm, Relay Alarm Contacts, N-G Overvoltage
Standard Enclosure	NEMA 12/4 (Steel)
50 ohm EMI/RFI Attenuation	60/40dB Max
Certifications	ANSI/UL 1449, Third Edition Type 1 or Type 2; cUL 1283 (ROHS Compliant), IEC, CE
Warranty	10 Years





460

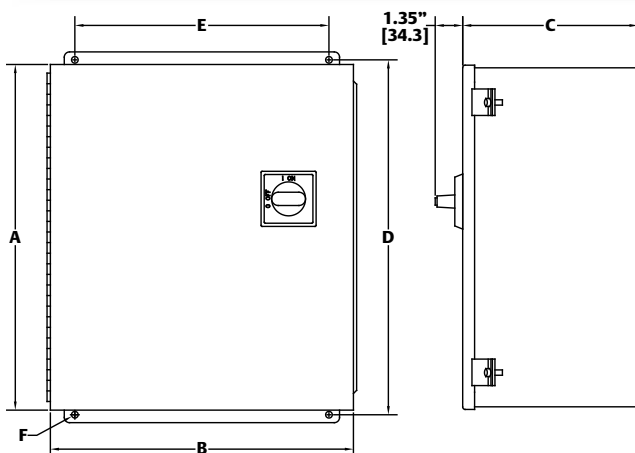
## Ordering Information

## Dimensional Data

Ordering Information								
Example Model Number: 460YC10ARCL1S								
460	YC	10	A	R	C	L	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
460	See Chart A Below	05 50kA/Mode	A All Modes	N Terminal Block	See Chart B Below	L NEMA 12/4 (Steel)	1 UL Type 1	S Standard
		10 100kA/Mode	L Discrete 10-Mode (See Below)	R Rotary Disconnect			2 UL Type 2 UL 1283	
		15 150kA/Mode						
		20 200kA/Mode						

Chart A		
Code	Source Configuration	Voltage
<b>SA</b>	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
<b>YA</b>	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
<b>YC</b>		277/480VAC, 254/440VAC
<b>YD</b>		346/600VAC
<b>DB</b>	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
<b>DF</b>		480VAC
<b>DG</b>		600VAC

Chart B	
Code	Monitoring Options
<b>L</b>	Green/Red LEDs, Audible Alarm w/ Silence Switch, Relay Contacts (2) Sets, plus N-G Overvoltage, Surge LED
<b>C</b>	Green/Red LEDs, Audible Alarm w/ Silence Switch, Relay Contacts (2) Sets, plus N-G Overvoltage, Surge Counter



Dimensional Data					
Surge Rating	A x B x C	D	E	F	Weight
100-150kA Mode	12x12x6 [305x305x152]	12.75 [324]	10.00 [254]	.31 [8]	21lb (9.5kg)
200kA Mode	16x14x8 [406x356x203]	16.75 [426]	12.00 [305]	.31 [8]	35lb (15.9kg)

### Discrete 10-Mode Option

The 460 offers a Discrete "10-Mode" protection option, (up to 200kA/mode, 600kA/phase when adding L-N+L-G+L-L modes). This may be a requirement on some commercial projects based on performance advantage claims; including increased operational life, enhanced durability due to lower component stress, improved transient response and increased surge current sharing. We have a long history of achieving those same results with our standard mode/connection methods and configurations. However, for those projects that are specified with this requirement, the 460 is available in a Discrete 10-Mode construction format. Simply enter the letter 'L' in the mode selection column for all WYE configured models.



# Surge Protection Product Description/Specifications

## 440 Surge Protective Device

### High-Capacity/Non-Modular Surge Protection Solutions

The Emerson Network Power 440 is a non-modular, surge protective device that incorporates the same design platform as the 460 SPD; high-energy capable, thermally protected large block MOVs and a similar assortment of accessories. The 440 is ideal for use in distribution and sub-distribution applications and its non-modular construction allows it to be installed in areas where space is limited.



Recommended for CRITICAL Locations

## At A Glance

- **UL**–1449 3rd edition, type 1 or 2,  $I_n$  20kA, cUL (type 2)
- **Surge Current Rating**–  
50, 100, 150kA/mode  
100, 200, 300kA/phase
- **All Modes of Protection**–L-L, L-N, L-G, N-G  
*Optional*–discrete 10-mode available
- **Large Block, Utility Grade 34mm MOVs**
- **Thermally Protected MOV Technology**
- **Short Circuit Rating**–200kAIC
- **Status Monitoring**–green/red LEDs, N-G overvoltage, surge indication, audible alarm, form C contacts and surge counter
- **NEMA 4X Non-Metallic Enclosure**–standard, *optional* NEMA 12 steel enclosure
- **Optional Construction**–direct bus connection
- **UL 1283 EMI/RFI Filtering**
- **ANSI/IEEE**–C62.11, C62.41, C62.45
- **IEC 61643-11 Tested, CE compliant**
- **Warranty**–10 Years

## Specifications

General Specifications	
Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 150%, all others 115%
Short Circuit Current Rating (SCCR)	200kAIC
Protection Modes	All Possible Modes including (L-N, L-G, N-G, L-L)
Operating Frequency Range	47-63Hz
UL 1449 Location Type	Type 1/Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Status Indication - Standard	Green/Red LEDs, Audible Alarm, Relay Alarm Contacts
Standard Enclosure	NEMA 4X (Non-Metallic)
50 ohm EMI/RFI Attenuation	60/40dB Max
Certifications	ANSI/UL 1449, Third Edition Type 1 or Type 2; cUL 1283 (ROHS Compliant), IEC, CE
Warranty	10 Years



440

## Ordering Information

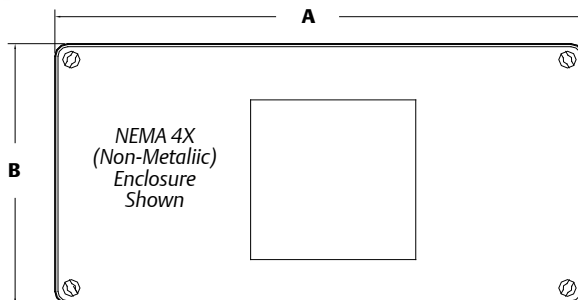
## Dimensional Data

Ordering Information								
Example Model Number: <b>440YC10ANLJ1S</b>								
440	YC	10	A	N	L	J	1	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
440	See Chart A Below	05 50kA/Mode	A All Modes	N Terminal Block	See Chart B Below	J NEMA 4X (Non-Metallic)	1 UL Type 1	S Standard
		10 100kA/Mode	L Discrete 10-Mode (See Below)			L NEMA 12 (Steel) (Optional)	2 UL Type 2 UL 1283	
		15 150kA/Mode						



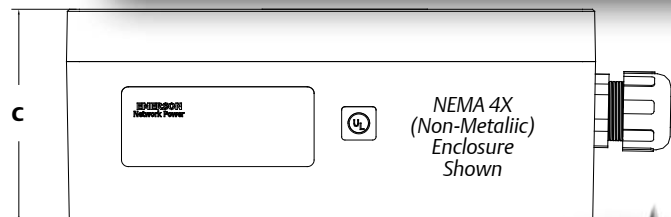
Chart A		
Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA		120/208VAC, 127/220VAC
YC	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	277/480VAC, 254/440VAC
YD		346/600VAC
DB		220VAC, 230VAC, 240VAC
DF	Three Phase Delta, 3W+G (L1, L2, L3, G)	480VAC
DG		600VAC

Chart B	
Code	Monitoring Options
A	Green/Red LEDs, Audible Alarm, Relay Contacts (2) Sets
L	Green/Red LEDs, Audible Alarm, Relay Contacts (2) Sets, plus N-G Overvoltage, Surge LED
C	Green/Red LEDs, Audible Alarm, Relay Contacts (2) Sets, plus N-G Overvoltage, Surge Counter



1/2 NPT FLEXIBLE CONDUIT AND CONNECTOR ASSEMBLY INCLUDED, 24" LONG.

Dimensional Data				
Enclosure	A	B	C	Weight
NEMA 4X	9.6" [244]	4.9" [124]	3.2" [81]	3.8lb (1.8kg)
NEMA 12	10" [254]	8" [203]	4.25" [107.95]	12.7lb (7.8kg)



### Discrete 10-Mode Option

The 440 offers a Discrete "10-Mode" protection option, (up to 100kA/mode, 300kA/phase when adding L-N+L-G+L-L modes). This may be a requirement on some commercial projects based on performance advantage claims; including increased operational life, enhanced durability due to lower component stress, improved transient response and increased surge current sharing. We have a long history of achieving those same results with our standard mode/connection methods and configurations. However, for those projects that are specified with this requirement, the 440 is available in a Discrete 10-Mode construction format. Simply enter the letter 'L' in the mode selection column for all WYE configured models.





# Surge Protection Product Description/Specifications

## 430 Surge Protective Device

### Non-Modular Surge Protection Solutions

The Emerson Network Power 430 is a non-modular compact, surge protective device that offers high-end surge capability at a competitive price. The 430 uses thermally protected MOVs, provides EMI/RFI filtering in a package that focuses on basic features and reliable performance. A great product for the IEEE recommended “cascaded surge protection” approach—install at important branch panel locations.



IEEE Recommends CASCADING Surge Protection

## At A Glance

- **UL**–1449 3rd edition, type 1 or 2,  $I_n$  20kA, cUL (type 2)
- **Surge Current Rating**–  
50 or 100kA/mode  
100 or 200kA/phase
- **All Modes of Protection**–L-L, L-N, L-G, N-G
- **Large Block, Utility Grade 34mm MOVs**
- **Thermally Protected MOV Technology**
- **Short Circuit Rating**–200kAIC
- **Status Monitoring**–green/red LEDs, audible alarm, form C contacts
- **NEMA 4X Non-Metallic Enclosure**–standard, optional NEMA 12 steel enclosure
- **UL 1283 EMI/RFI Filtering**
- **ANSI/IEEE**–C62.11, C62.41, C62.45
- **IEC 61643-11 Tested, CE compliant**
- **Warranty**–10 Years

## Specifications

### General Specifications

Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 150%, all others 115%
Short Circuit Current Rating (SCCR)	200kAIC
Protection Modes	All Possible Modes including (L-N, L-G, N-G, L-L)
Operating Frequency Range	47-63Hz
UL 1449 Location Type	Type 1/Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Status Indication - Standard	Green/Red LEDs, Audible Alarm, Relay Alarm Contacts
Standard Enclosure	NEMA 4X (Non-Metallic)
50 ohm EMI/RFI Attenuation	60/40dB Max
Certifications	ANSI/UL 1449, Third Edition Type 1 or Type 2; cUL 1283 (ROHS Compliant), IEC, CE
Warranty	10 Year Replacement



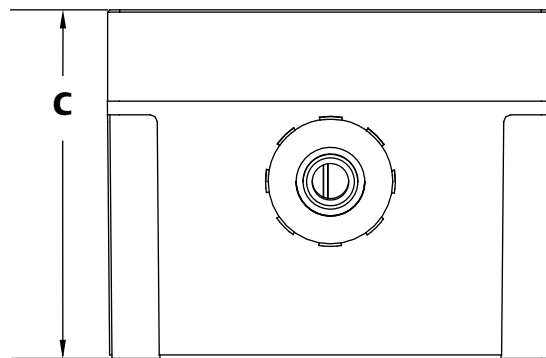
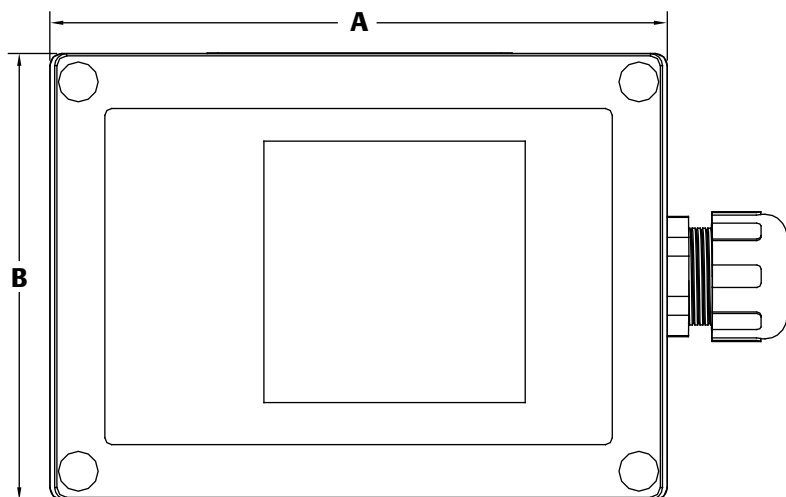
430

## Ordering Information

## Dimensional Data

Ordering Information								
Example Model Number: <b>430YA10ANAJ1S</b>								
<b>430</b>	<b>YA</b>	<b>10</b>	<b>A</b>	<b>N</b>	<b>A</b>	<b>J</b>	<b>1</b>	<b>S</b>
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
<b>430</b>	<b>See Chart A Below</b>	<b>10</b> 100kA/Mode	<b>A</b> All Modes	<b>N</b> Terminal Block	<b>A</b> LED, Audible Alarm, Relay Contacts	<b>J</b> NEMA 4X (Non-Metallic)  <b>L</b> NEMA 12 (Steel) (Optional)	<b>1</b> UL Type 1  <b>2</b> UL Type 2 UL 1283	<b>S</b> Standard

Chart A		
Code	Source Configuration	Voltage
<b>SA</b>	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
<b>YA</b>	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
<b>YC</b>		277/480VAC, 254/440VAC
<b>YD</b>		346/600VAC
<b>DB</b>	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
<b>DF</b>		480VAC
<b>DG</b>		600VAC



Dimensional Data				
Enclosure	A	B	C	Weight
NEMA 4X	7.1" [180]	5.1" [130]	4.0" [102]	3.1lb (1.4kg)
NEMA 12	8" [203]	6" [152]	3.0" [76]	8.4lb (3.8kg)

# Surge Protection Product Description/Specifications

## 425 Surge Protective Device

### Type 1/All-Mode Surge Protection Solutions

The Emerson Network Power 425 is a compact surge protective device that offers protection in each connected mode—line to neutral, line to ground, neutral to ground or line to line and line to ground. The 425 uses thermally protected MOVs, is designed in a NEMA 4X enclosure, and is tested as a UL 1449 Type 1 device, so it can be placed on the line or load side of the main disconnect. The compact design and extensive testing makes this device ideal for most panel and equipment locations.



IEEE Recommends CASCADING Surge Protection

## At A Glance

- **UL**–1449 3rd edition, type 1 or 2,  $I_n$  20kA, cUL (type 2)
- **Surge Current Rating**–  
50kA/mode  
100kA/phase
- **All Modes of Protection**–L-L, L-N, L-G, N-G
- **Large Block, Utility Grade 34mm MOVs**
- **Thermally Protected MOV Technology**
- **Short Circuit Rating**–200kAIC
- **Status Monitoring**–green/red LEDs, form C contacts, audible alarm
- **NEMA 4X Non-Metallic Enclosure**–standard
- **ANSI/IEEE**–C62.11, C62.41, C62.45
- **IEC 61643-11 Tested, CE compliant**
- **Warranty**–10 Years

## Specifications

General Specifications	
Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 150%, all others 115%
Short Circuit Current Rating (SCCR)	200kAIC
Maximum Surge Current Rating	50kA per Mode/100kA per Phase
Operating Frequency Range	47-63Hz
UL 1449 Location Type	Type 1/Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Status Indication	Green/Red LEDs, Audible Alarm, Relay Alarm Contacts
Standard Enclosure	NEMA 4X (Non-Metallic)
Certifications	ANSI/UL 1449 Third Edition Type 1 or Type 2; cUL (ROHS Compliant)
Warranty	10 Year Replacement





## Specifications

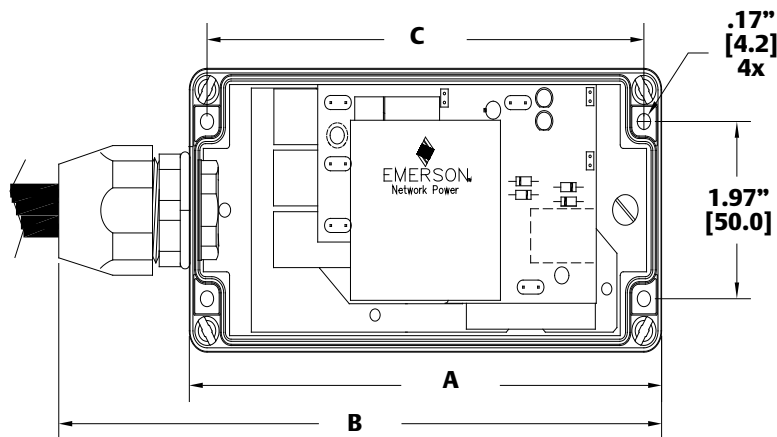
## Ordering Information

## Dimensional Data

Ordering Information								
Example Model Number: <b>425SA05AWAJ1S</b>								
<b>425</b>	<b>SA</b>	<b>05</b>	<b>A</b>	<b>W</b>	<b>A</b>	<b>J</b>	<b>1</b>	<b>S</b>
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
<b>425</b>	<b>See Chart A Below</b>	<b>05</b> 50kA/Mode	<b>A</b> All Modes	<b>W</b> Wire Leads	<b>A</b> LED, Audible Alarm, Relay Contacts	<b>J</b> NEMA 4X (Non-Metallic)	<b>1</b> UL Type 1  <b>2</b> UL Type 2 cUL	<b>S</b> Standard

Chart A

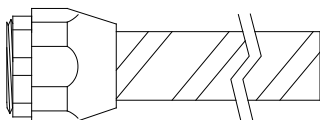
Code	Source Configuration	Voltage
<b>SA</b>	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
<b>YA</b>	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
<b>YC</b>		277/480VAC, 254/440VAC
<b>YD</b>		346/600VAC
<b>DB</b>	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
<b>DF</b>		480VAC
<b>DG</b>		600VAC



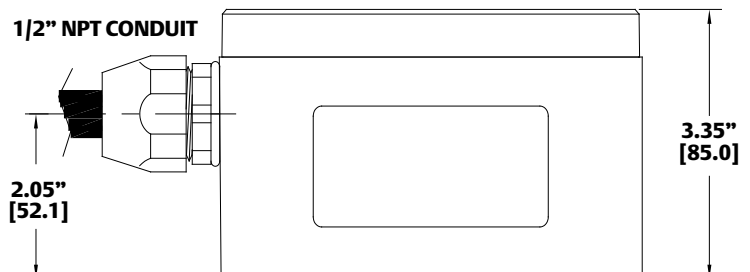
Dimensional Data

Enclosure	A	B	C	Weight
NEMA 4X	6.30 [160]	8.04 [204.2]	5.83 [148.0]	1.9lbs [.86kg]

1/2" NPT FLEXIBLE CONDUIT  
AND CONNECTOR ASSEMBLY  
INCLUDED, 12" LONG



1/2" NPT CONDUIT



# Surge Protection Product Description/Specifications

## 420 Surge Protective Device

### Type 1 Surge Protection Solutions

The Emerson Network Power 420 is a compact surge protective device that protects line to neutral and neutral to ground. The 420 uses thermally protected MOVs, is tested as a UL 1449 Type 1 device and is in a NEMA 4X enclosure, making this an ideal choice for both panel and equipment locations.



IEEE Recommends CASCADING Surge Protection

## At A Glance

- **UL**–1449 3rd edition, type 1 or 2,  $I_n$  20kA, cUL (type 2)
- **Surge Current Rating**–  
50kA/mode  
50kA/phase
- **Modes of Protection**–L-N, N-G or L-L
- **Large Block, Utility Grade 34mm MOVs**
- **Thermally Protected MOV Technology**
- **Short Circuit Rating**–200kAIC
- **Status Monitoring**–green/red LEDs, form C contacts
- **NEMA 4X Non-Metallic Enclosure**–standard
- **ANSI/IEEE**–C62.11, C62.41, C62.45
- **IEC 61643-11 Tested, CE compliant**
- **Warranty**–5 Years

## Specifications

General Specifications	
Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 150%, all others 115%
Short Circuit Current Rating (SCCR)	200kAIC
Maximum Surge Current Rating	50kA per Mode/50kA per Phase
Operating Frequency Range	47-63Hz
UL 1449 Location Type	Type 1/Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	20kA
Status Indication	Green/Red LEDs, Relay Alarm Contacts
Standard Enclosure	NEMA 4X (Non-Metallic)
Certifications	ANSI/UL 1449 Third Edition Type 1 or Type 2; cUL (ROHS Compliant)
Warranty	5 Year Replacement



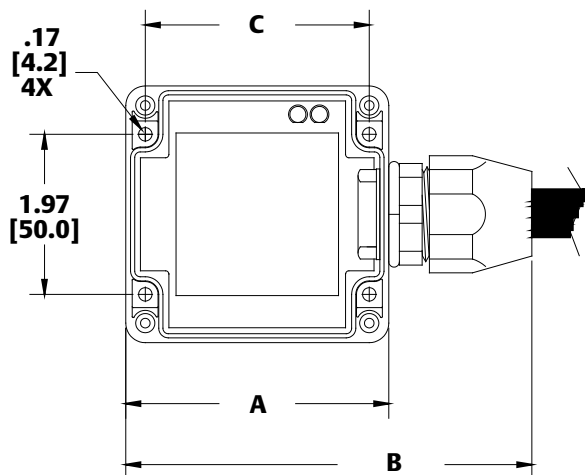
420

## Ordering Information

## Dimensional Data

Ordering Information								
Example Model Number: <b>420SA05BWRJ1S</b>								
<b>420</b>	<b>SA</b>	<b>05</b>	<b>B</b>	<b>W</b>	<b>R</b>	<b>J</b>	<b>1</b>	<b>S</b>
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
<b>420</b>	<b>See Chart A Below</b>	<b>05</b> 50kA/Mode	<b>B</b> L-N, N-G	<b>W</b> Wire Leads	<b>R</b> LED, Relay Contacts	<b>J</b> NEMA 4X (Non-Metallic)	<b>1</b> UL Type 1	<b>S</b> Standard
			<b>E</b> L-L				<b>2</b> UL Type 2 cUL	

Dimensional Data				
Enclosure	A	B	C	Weight
NEMA 4X	3.24 [82.2]	5.00 [126.9]	2.76 [70.0]	1.2lbs [.54kg]



**1/2 NPT FLEXIBLE CONDUIT  
AND CONNECTOR ASSEMBLY  
INCLUDED, 12" LONG**

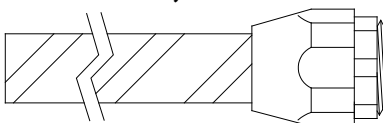
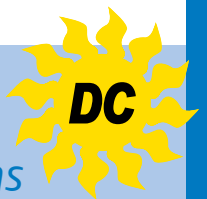


Chart A		
Code	Source Configuration	Voltage
<b>SA</b>	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
<b>YA</b>	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
<b>YC</b>		277/480VAC, 254/440VAC
<b>YD</b>		346/600VAC
<b>DB</b>	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
<b>DF</b>		480VAC
<b>DG</b>		600VAC

## 420-DC UL Listed Surge Protective Device for Photovoltaic Applications



- **UL Listed 1449-3** as DC SPD, for use in photovoltaic standard applications, (VZCA.E321351 and VZCA7.E321351)

Ordering Information (420 DC Voltage Options)			
	Model Numbers		
	420LP05AWSJ1S	420LQ05AWSJ1S	420LR05AWSJ1S
DC Voltage	0-300VDC	0-600VDC	0-1000VDC
Maximum Continuous Operating Voltage	424VDC	905VDC	1188VDC
Voltage Protection Level (Up) @ 6kV/3kA	<1000Vp	<2000Vp	<2500Vp



# 300 Series *Surge Protective Devices*



## Introduction

Emerson Network Power's 300 Series is a UL listed non-modular family of surge protectors. The 300 series incorporates thermally protected MOVs, has a surge capacity up to 80kA per mode and is available in a variety of voltage and phase configurations. The compact footprint, short circuit rating and basic features make this family an ideal choice for cascaded, branch panel protection.

### The 300 Series includes:

- **Thermally Protected MOVs**
- **UL 1449 3rd Edition Type 2 SPD**
- **Short Circuit Current Rating**—65 and 22kAIC
- **Single Surge Impulse Rated**
- **Status Indication**—LEDs and form C contacts

## At A Glance

330

*Non-modular design, steel enclosure, green/red LEDs, form C relay contacts.*

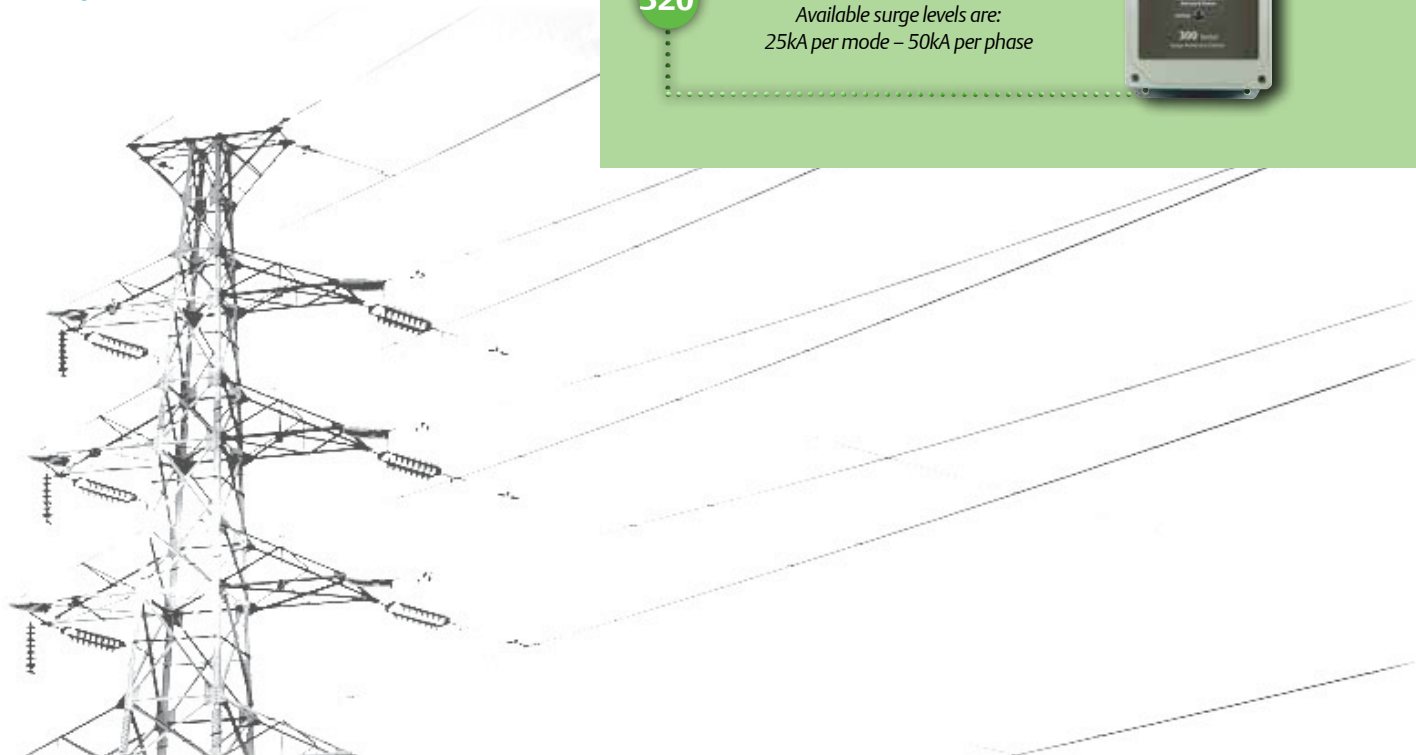
*Available surge levels are:  
50, 80kA per mode  
100 & 160kA per phase*



320

*Non-modular design, form C relay contacts*

*Available surge levels are:  
25kA per mode – 50kA per phase*



## How Do They Compare?



			330	320
Components, Construction & Performance	Steel Enclosure		✓	
	Short Circuit Current Rating (SCCR)	up to 65kAIC	✓	
		up to 22kAIC	✓	✓
	UL 1449 Inominal Rating / Location Type	10kA / Type 2	✓	
		3kA / Type 2	✓	✓
	Thermally Protected MOV		✓	✓
Surge Rating	Warranty	up to 5 Years Parts or Replacement	✓	✓
	Up to 80kA/160kA (Mode/Phase)		✓	
	Up to 50kA/100kA (Mode/Phase)		✓	
	Up to 25kA/50kA (Mode/Phase)		✓	✓
Monitoring	Up to 25kA/25kA (Mode/Phase)		✓	✓
	Green/Red Status LEDs		✓	
Monitoring	Status LED, Form C Relay Contacts		✓	✓

# Surge Protection Product Description/Specifications

## 330 Surge Protective Device

### Medium Exposure Surge Protection

The Emerson Network Power 330 offers protection from transients on distribution panels or any medium exposure locations. Available in 50kA/mode, 100kA/phase or 80kA/mode, 160kA/phase. The 330 features a small footprint, NEMA 12 enclosure, silver link fusing with thermal protection, all voltage and phase configurations, along with a 5 year warranty.



IEEE Recommends CASCADING Surge Protection

## At A Glance

- **Thermally Protected**—metal oxide varistor (MOV) technology
- **Surge Current Rating**—of 50kA/mode, 100kA/phase or 80kA/mode, 160kA/phase
- **All Modes of Protection**—including L-L, L-N, L-G, N-G
- **Status Monitoring**—green/red LEDs and relay alarm contacts
- **Short Circuit Current Rating**—65kAIC
- **UL Type 2,  $I_n$  10kA or 3kA**
- **NEMA 12 Steel**—rated enclosure
- **ANSI/IEEE**—C62.11, C62.41, C62.45 categories A, B, C3 tested
- **Warranty**—5 Years







330

## Specifications

## Ordering Information

## Dimensional Data

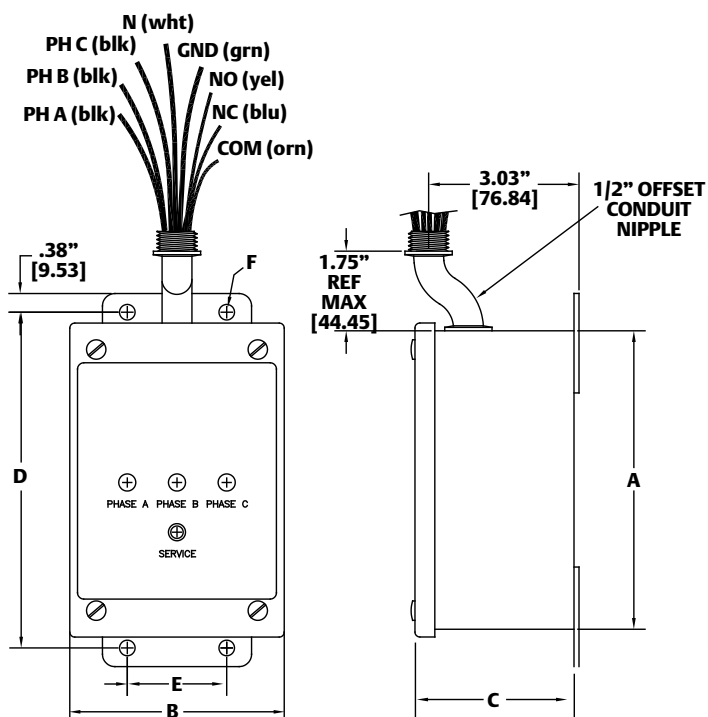
### General Specifications

Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 125%, all others 115%
Short Circuit Current Rating (SCCR)	65kAIC
Maximum Surge Current Rating	50kA-80kA per mode/100kA-160kA per phase
Operating Frequency Range	47-63Hz
EMI/RFI Noise Rejection	40dB Max
UL 1449 Location Type	Type 2
UL 1449 Nominal Discharge Current (I <sub>n</sub> )	3kA (50kA unit) , 10kA (80kA unit)
Connection Type	(50kA unit) #12 Wire Leads, 18" Long; (80kA unit) #10 Wire Leads, 24" Long
Status Indication	Green/Red LEDs, Relay Alarm Contacts
Standard Enclosure	NEMA 12 (Steel)
Certifications	ANSI/UL 1449 Third Edition Type 2; cUL
Warranty	5 Year Replacement

### Ordering Information

Example Model Number: **330SA08AWRL2S**

330	SA	08	A	W	R	L	2	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
330	See Chart A Below	05 50kA/Mode	A All Modes	W Wire Leads	R LED, Relay Contacts	L NEMA 12 (Steel)	2 UL Type 2 cUL	S Standard
		08 80kA/Mode						



### Chart A

Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
YC		277/480VAC, 254/440VAC
DB	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
DF		480VAC

### Dimensional Data

Surge Rating	A	B	C	Weight
50kA Mode/100kA Phase	6.00 [152.4]	4.00 [101.6]	3.23 [81.9]	10lbs [4.5kg]
80kA Mode/160kA Phase	8.25 [209.6]	6.95 [176.7]	3.78 [96.0]	14lbs [6.3kg]
	D	E	F	
50kA Mode/100kA Phase	6.75 [171.5]	2.00 [50.8]	0.31 Dia [8.0]	10lbs [4.5kg]
80kA Mode/160kA Phase	8.75 [222.3]	4.00 [101.6]	0.31 Dia [8.0]	14lbs [6.3kg]

# Surge Protection Product Description/Specifications

## 320 Surge Protective Device

### Low Exposure Surge Protection Solutions

The Emerson Network Power 320 is designed for use on branch panels or equipment in low exposure locations. Available in 25kA/mode, 25kA/phase or 25kA/mode, 50kA/phase. The 320 features a small footprint, NEMA 1 enclosure, silver link fusing with thermal protection, all voltage and phase configurations, plus a 5 year warranty.



IEEE Recommends CASCADING Surge Protection

## At A Glance

- **Thermally Protected**—metal oxide varistor (MOV) technology
- **Surge Current Rating**—of 25kA/mode, 25kA/phase or 25kA/mode, 50kA/phase
- **All Modes of Protection**—or reduced mode of protection design
- **Status Monitoring**—green LED and relay alarm contacts
- **Short Circuit Current Rating**—22kAIC
- **UL**—Type 2,  $I_n$  3kA
- **NEMA 1 Non-Metallic**—rated enclosure
- **ANSI/IEEE**—C62.11, C62.41, C62.45 categories A, B tested
- **Warranty**—5 Years





320

## Specifications

## Ordering Information

## Dimensional Data

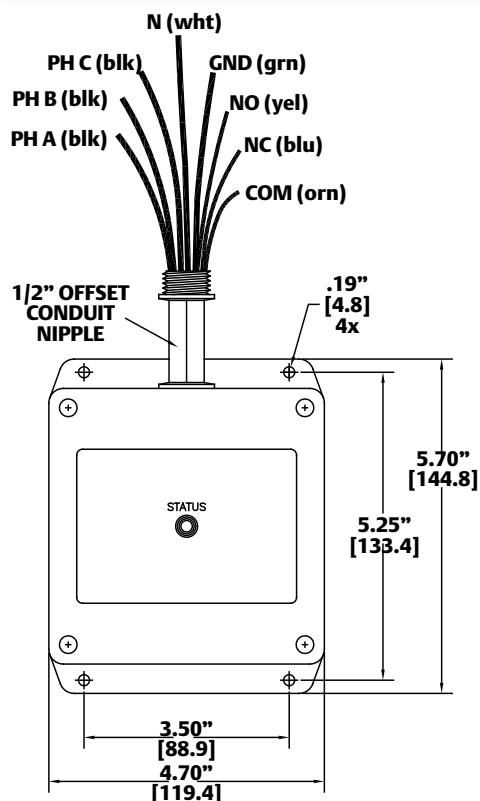
### General Specifications

Connection Type	Parallel Connected
Maximum Continuous Operating Voltage Range	120VAC 125%, all others 115%
Short Circuit Current Rating (SCCR)	22kAIC
Maximum Surge Current Rating	25kA per mode
Operating Frequency Range	47-63Hz
EMI/RFI Noise Rejection	40dB Max
UL 1449 Location Type	Type 2
UL 1449 Nominal Discharge Current ( $I_n$ )	3kA
Connection Type	#12 Wire Leads, 18" Long
Status Indication	Green LED, Relay Alarm Contacts
Standard Enclosure	NEMA 1 (Non-Metallic), 94V-0
Certifications	ANSI/UL 1449 Third Edition Type 2; cUL
Warranty	5 Year Replacement

### Ordering Information

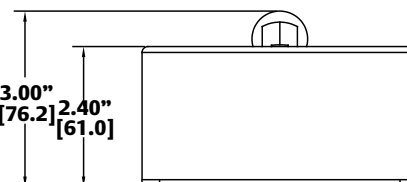
Example Model Number: **320SA02AWRC2S**

320	SA	08	A	W	R	C	2	S
SPD Series	Source Configuration	Surge Rating	Modes of Protection	Connection Type	Monitoring Options	Enclosure Type	UL 1449 Type	MOV Option
320	See Chart A Below	02 25kA/Mode	A All Modes	W Wire Leads	R LED, Relay Contacts	C NEMA 1 (Non-Metallic)	2 UL Type 2 cUL	S Standard



### Chart A

Code	Source Configuration	Voltage
SA	Single Phase, 3W+G (L1, L2, N, G)	120/240VAC
YA	Three Phase Wye, 4W+G (L1, L2, L3, N, G)	120/208VAC, 127/220VAC
YC		277/480VAC, 254/440VAC
DB	Three Phase Delta, 3W+G (L1, L2, L3, G)	220VAC, 230VAC, 240VAC
DF		480VAC



### Dimensional Data

Enclosure	Weight
NEMA 1	5lb (2.3kg)



# 500, 400, 300 Series Product Comparison

## 500 Series



## 400 Series



## 300 Series



### Components, Construction & Performance

Superior High-Energy Transient Response\*

Component Transition Circuit

SAD/MOV Hybrid

Redundant, Replaceable Module Arrays

Solid Copper Bus Construction

Life Cycle Testing Tested to:	up to 45,000 per mode
	up to 24,000 per mode
	up to 12,000 per mode
	up to 8,000 per mode
	up to 6,000 per mode
	up to 3,500 per mode
	up to 500 per mode

Enhanced EMI/RFI Filtering

Steel Enclosure

Replaceable Surge Modules

Disconnect Switch

Swell Ride-through

Thermally Fused MOV Arrays

UL 1449 Inominal Rating / Location Type	20kA / Type 1
	10 kA / Type 2
	3kA / Type 2

Short Circuit Current Rating (SCCR)	200kAIC
	65kAIC
	22kAIC

Warranty	5 Years Onsite Labor
	10 Years Parts or Replacement
	5 Years Parts or Replacement

Thermally Protected MOV

### Surge Rating

Mode/Phase	up to 375kA/750kA
	up to 250kA/500kA
	up to 200kA/400kA
	up to 150kA/300kA
	up to 100kA/200kA
	up to 80kA/160kA
	up to 50kA/100kA
	up to 50kA/50kA
	up to 25kA/50kA

### Monitoring

Built-in-test

Surge & Swell Counters

Surge Counter

Audible Alarm

Green/Red Status LEDs

Status LED, Form C Relay Contacts

Surge Indication LED

N-G Overvoltage Indication

\* The ability to attenuate transients at levels beyond 10kA

570	560	510	510	460	440	430	425	420	330	320
✓										
✓										
✓										
✓	✓									
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✓	✓	✓		✓	Optional	Optional			✓	
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Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	✓	
Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓		
Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	✓	
Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	Exceeds	✓	✓
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✓	✓	✓		✓	✓	✓			✓	
✓	✓	✓		✓	✓	✓	✓		✓	
Starts at 80kA/160kA	Starts at 80kA/160kA	Starts at 65kA/130kA	up to 65kA/130kA up to 65kA/65kA	✓	✓	✓	✓	✓	✓	✓
				✓	✓	✓	✓	✓		✓
✓	✓									
Optional	Optional									
Optional	Optional	Optional		Optional	Optional					
✓	✓	✓	✓	✓	✓	✓	✓			
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✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
				✓	Optional					
				✓	✓	✓				

For assistance in choosing the proper surge protective devices for your facility, call us at:

**1-800-288-6169 (US and Canada Only)**

**607-721-8840 (Outside U.S.)**

or

Email us at: [SurgeTech@Emerson.com](mailto:SurgeTech@Emerson.com)

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Binghamton, NY 13905

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607 721 8840 Phone (Outside U.S.)

607 722 8713 FAX

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