Surge Protection Devices

Overview Catalog

Current Technology

CONTENTS

SURGE FACT

Lightning has proven to be the most destructive environmental generator of power quality disturbances, yet only account for 20% of all transient surge activity. 80% of all transient surges are generated internally within a facility's electrical system.

SPDs

SURGE PROTECTION DEVICES (SPD) are designed to protect against transient surge conditions. Transient surges can reach values of hundreds of thousands of volts or instantaneous current flow of tens of thousands of amperes, but typically last less than one hundred microseconds in duration.

Transient surges generated within a facility typically account for 80% of the surge activity. These internally generated transients can be caused by switching power supplies (computers), electronic ballasts (building lighting) and variable frequency drives (air handlers, elevators, etc). The most destructive transient voltage surges can be attributed to lightning and utility load switching; however, experts predict that these two events account for 20% of all transient surge activity.

Reliable data sources suggest that lightning strikes have current magnitudes in excess of 200,000 amps. Moreover, lightning strikes are not single strike events. Strikes typically consist of four to six "hits" and sometimes can be as high as 40kA. Therefore, SPDs must be appropriately sized to provide adequate protection during multiple surge events.

Large transient surge conditions can damage printed circuit board traces and puncture semiconductors causing immediate or intermittent equipment failures. Continued exposure to surges can degrade printed circuit board traces or semiconductors resulting in seemingly random delayed equipment failures. Therefore, equipment failures cannot always be contributed to a single power quality event. Surge remnants on data lines can alter digital data and logic levels causing equipment failures and lockups.

Professionally installed Current Technology® products provide superior protection against transient surges preventing unnecessary downtime and costly repairs.

2008 NEC SECTION 708 COPS

COPS STANDS FOR CRITICAL OPERATIONS POWER SYSTEMS.

Section 708.20(d) requires facilities that must comply with the section to include surge protection devices at each voltage level within the facility. This is the first time the NEC has required the use of surge protection devices as part of a facilities design. COPS systems are to include any facility that if disrupted or destroyed would affect the economy, public health, or safety.

2014 NEC UPDATE

Modular Data Centers Article 646.3(I)
"Where provided, surge protective devices shall be listed and labeled and installed in a accordance with article 285."

Wind Electric Systems Article 694.10 (D)
"A SPD shall be installed between a wind electric system and any loads served by the premises electrical systems."

Emergency Systems Article 700.8
"A listed SPD shall be installed in or on all emergency switchboards and panelboards."

ISO 9001:2008 CERTIFIED

Thomas & Betts Power Solutions, LLC, a member of the ABB group, has been certified by an independent auditor and has achieved ISO 9001:2008 certification for our quality management system.

FACILITY-WIDE PROTECTION

SURGE CURRENT CAPACITIES: HOW MUCH IS ENOUGH?

CATEGORY C	
High Exposure	**Medium Exposure**
Select SL3 300–200kA	TransGuard TG3 300–200kA

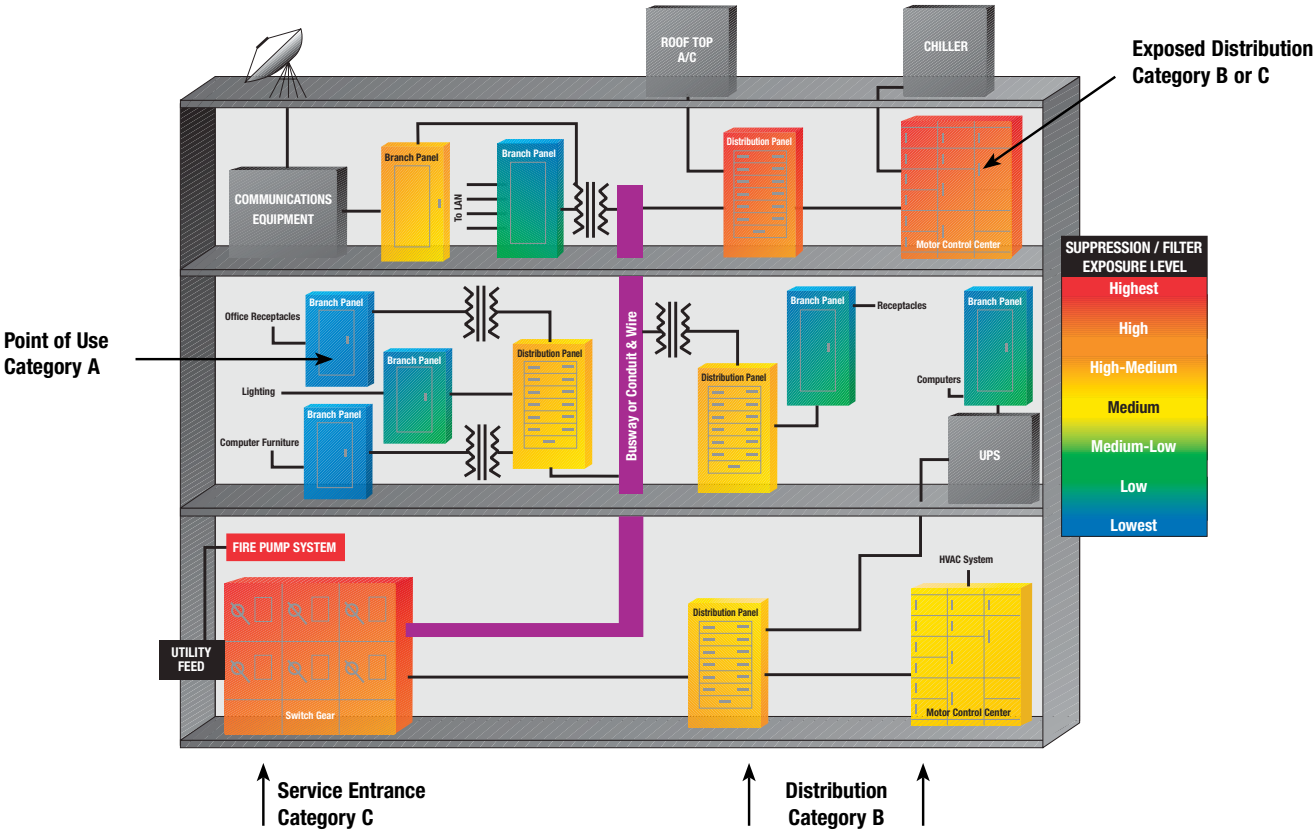
CATEGORY B		
High Exposure	**Medium Exposure**	**Low Exposure**
Select SL3 200–100kA	Select SL3 80–50kA	TransGuard TG3 125–80kA
TransGuard TG3 200–100kA	TransGuard TG3 150–100kA	CurrentGuard Plus 100–80kA
CurrentGuard Plus 200–100kA	CurrentGuard Plus 150–100kA	PX3 100–80kA

CATEGORY A
Low Exposure
Select SL3 80–50kA
TransGuard TG3 80–50kA
CurrentGuard 80–40kA
CurrentGuard Compact 50kA
CurrentGuard Flush Mount 80–40kA
PX3 80–50kA

These recommendations are based on an average exposure, based on the Isokeraunic map of the U.S. Product recommendations may vary by geographic location or facility.

HOW MUCH PROTECTION DOES YOUR FACILITY REQUIRE?

IEEE C62.41 states that the best approach for total protection is using a cascaded strategy by installing SPD devices at multiple locations throughout the electrical distribution system of a facility. When multiple protector units are deployed at the main and secondary panels in a cascaded strategy, a facility has the most versatile power quality protection system against internally and externally generated transient surges.



Current Technology®

UL 1449 4th Edition

5 SPD TYPES CREATED

Type 1 – Historically referred to as a surge arrestor. Permanently connected SPD installed between the secondary of the service transformer and the line side of the service disconnect.

Type 2 – Historically referred to as a TVSS or SPD device. Permanently connected SPD installed on the load side of the main service disconnect.

Type 3 – Point of use SPDs, installed a minimum of 10m from the panel, cord connected, direct plug in, or receptacle types.

Type 4 and 5 – Components SPDs, including discrete components as well as component assemblies.

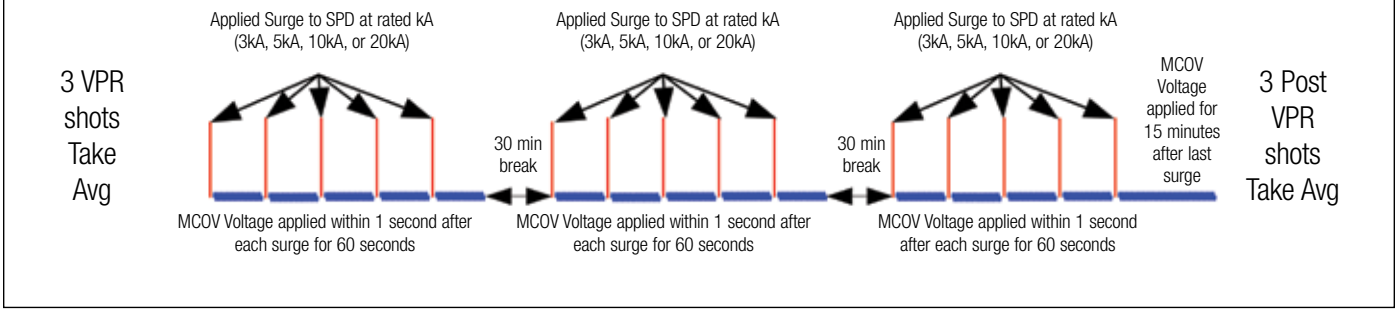
MEASURED LIMITING VOLTAGE TEST

SVR (Suppressed Voltage Rating) 6kV 500A is being replaced with VPR (Voltage Protective Rating) 6kV 3kA.

I_n TEST OR NOMINAL DISCHARGE SURGE CURRENT TEST

This is a new test designed to thermally stress the MOVs (Metal Oxide Varistor) and the design of the SPD. The manufacturer must claim the surge rating kA level per mode of the protection device and the MCOV (Maximum Continuous Operating Voltage) value per mode. Type 1 devices can be 10 or 20kA. Type 2 devices can be 3, 5, 10, or 20kA. During this test the unit is surged at the claimed kA level, 1 second after the surge the manufacturer's claimed MCOV voltage must be applied to the unit under test for 1 minute. This is repeated for a total of 5 surges, then the unit can rest for 30 minutes. After 30 minutes 5 more surges are applied, followed by another 30 minute rest, followed by a final set of 5 surges. Pre and post VPR shot clamping voltages can not deviate by more than +/– 10% for the test to be successful. The key to this test is that MCOV values are no longer determined based upon the value of the MOV used in the system. MCOV values are now tested values that are determined and/or verified during this test. A graphical representation of this test is shown below.

I_n NOMINAL DISCHARGE CURRENT TEST



UL96A COMPLIANCE

TO COMPLY WITH UL96A, MASTER LABEL, FOR A LIGHTNING PROTECTION SYSTEM UL REQUIRES THAT ALL SERVICE ENTRANCE SURGE DEVICES COMPLY WITH THE FOLLOWING:

1. *All Service Entrance SPDs must be listed by UL to UL 1449 4th Edition*
2. *All Service Entrance SPDs must be listed as either a Type 1 or Type 2 SPD*
3. *All Service Entrance SPDs must have a 20kA Nominal Discharge surge current rating*

c UL US LISTED

For more information go to **tnbpowersolutions.com/current_technology**

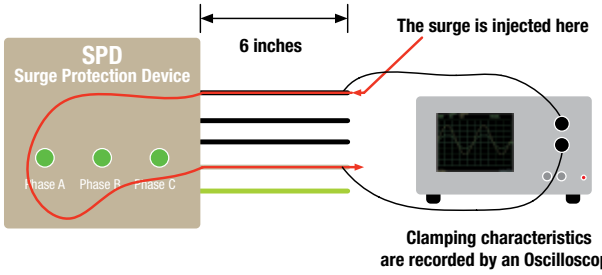
DOES AN INTERNALLY MOUNTED SURGE PROTECTOR REALLY HAVE SHORTER LEAD LENGTHS?

Hard wired surge protection is typically installed two ways, internally or externally to the switch gear. The benefits of internally mounted units have been touted by the panelboard manufacturers. These benefits are overstated, as these manufactures sell their own SPD devices.

SHORTEST LEAD LENGTH

All SPD manufacturers suggest in their installation instructions to keep the lead length as short as possible, realizing the impact lead length has on the installed performance of surge devices. Per UL 1449 and IEEE C62.45, all surge manufacturers evaluate their products with six inches of lead length. **The six inch lead length is chosen so that all SPD products can be evaluated based on the same test setup and criteria.**

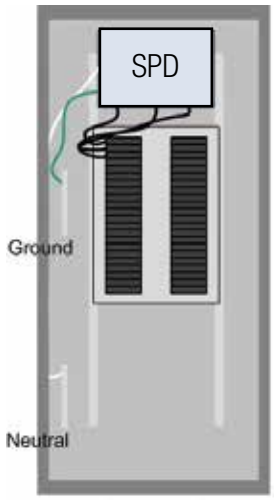
The diagram below illustrates how the test is performed.



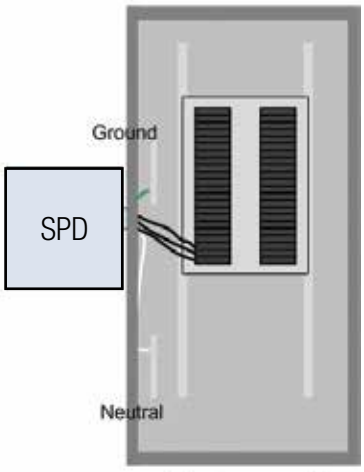
The surge current will flow through the phase conductor and travel a path inside the surge device, with any remaining current flowing back through the neutral conductor. The lead length of the phase conductor and the lead length of the neutral conductor will both have an impact on the overall performance of the surge device.

Tests have shown that every foot of standard cabling added to the installation length of an SPD increases the clamping levels (or let-through voltage) by as much as 100–150 volts per foot, severely impacting the installed performance of the surge device. This exposure to higher let-through voltages can put the downstream loads at serious risk.

The overall installed system lead length required to install the surge device dictates the let-through voltage capability (or performance) of the installed SPD. An integrated SPD tapped directly to the bus may have very short connections to the phases but the installed clamping levels must also take into account the lead length of the Neutral and Ground conductors



Internally mounted SPD



Externally mounted SPD

that are part of the installation. Most integrated SPDs are installed at the top or bottom of an extended panelboard where the Neutral and Ground buses are typically at the opposite end. If you follow the path the surge would have to take, the overall length for this type of installation can be up to six feet or longer, which is a significantly longer lead length than what most integrated surge manufacturers mention in their marketing material. The overall lead length for this internally mounted surge protective device will have a negative impact on its installed performance.

TESTED SINGLE SURGE RATED

Most SPD manufacturers simply add up the number of surge components used in the construction of their products and provide a surge capacity rating. All Current Technology products are single surge tested at their rated values by a 3rd party laboratory.

SL3 SURGE PROTECTION

TYPE 1 SPD

Select®

OPTIMUM PROTECTION

WHY SELENIUM?

- Selenium is the only technology that protects critical loads and downstream equipment from catastrophic overvoltages.
- Selenium provides additional protection to loads – lower clamping voltage than MOV only systems.
- Selenium conducts small routine transients – extending MOV life and ultimately the life of the unit.

SELECT® SL3™ OFFERS DOUBLE PROTECTION, SUPERIOR QUALITY

The innovative Select® SL3 provides outstanding performance in all power quality surge events including temporary over voltages.

The Select® SL3 product line combines selenium cells with the Current Technology patented Failure-Free Integrated Suppression Module (ISM™) to deliver the industry's best surge suppression performance. The ISM™ contains individual thermally fused and protected MOVs, surge-rated copper busing, robust filtering and advanced remote communications capabilities in a thermoplastic polycarbonate rated UL 94V-0 housing.

MODEL NUMBER SCHEME (SL3™)

E.g.: SL3-300-208-3Y-MDT-M6E-F2

SL3 — 300 — 208 — 3Y — MDT — M6E — F 2

Model | kA Rating | Voltage | Configuration | Enclosure | Cable Entry | Monitoring | Filter Option | Optional Feature

kA Rating

Available SL3™ kA Ratings: 050, 080, 100, 125, 150, 200, 250, 300

Voltage

(Consult factory for additional Voltages)

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Configuration

(Consult factory for additional Configurations)

1G	1 Phase, Grounded
2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3R	3 Phase, Grounded High Resistance
3H	3 Phase, Grounded, High Leg Delta
3D	3 Phase, Grounded Delta

Enclosure

MN	Metal Without Disconnect
MD*	Metal With Disconnect
SN	Stainless Steel Without Disconnect
SD*	Stainless Steel With Disconnect

**Not available on 50, 80 or 100kA units*

Cable Entry

T	Top Feed
B	Bottom Feed

Monitoring

M0	No local monitoring *(see remote MxX stand-alone option)*
M1	LED/Phase + Audible Alarm, Dry Relay Contacts
M2	M1 + Surge Counter
M3	Advanced Monitoring, Character Display, Modbus RTU
M4E	M3 + Ethernet, Modbus TCP
M5	Advanced Monitoring, Graphics Display, Modbus RTU
M6E	M5 + Ethernet, Modbus TCP

Filter

F	Filter
N	No Filter

Optional Features

2	Test Port
4	Enhanced Selenium

Stand-Alone Options

(To Be Ordered As Separate Items)

DTS	DTS-2 Diagnostic Test Set
MxX	Remote Monitor Extension M1X through M6EX
HPI	HPI Cable

MADE IN U. S. A.

c UL US LISTED

SL3™ SURGE PROTECTION

20-Year Best In Industry Warranty

1 **ISM** *(Reference page 10)*

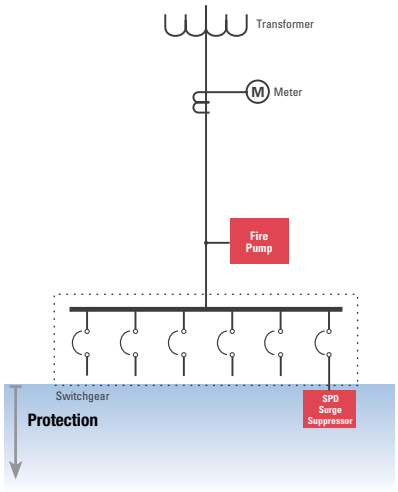
2 **Selenium Cells**

SELENIUM: THE ONLY ACCEPTABLE SOLUTION FOR SERVICE ENTRANCE APPLICATIONS

Using a proprietary engineering process known as Seamless Technology™, Current Technology combines selenium with MOVs, polypropylene capacitors and precise component geometry to deliver the industry's best suppression, highest tested single pulse surge current capacity ratings and – most importantly – longest product life. Current Technology's patented seamless technology is the industry's only power reliability design concept to take advantage of selenium's proven, long-lasting suppression capabilities, which safeguard today's busiest facilities with the most trusted and reliable protection available.

Patented seamless technology uses selenium cells combined with MOVs to provide superior bi-directional surge suppression. When coordinated as the "first line of defense" inside Select® SL3 suppression filter systems, selenium cells conduct routine, long duration surges, repetitive impulses and temporary over voltages, minimizing MOV wear and tear while protecting down stream equipment.
The result: superior quality, maximum performance and dramatically extended product life.

Type 2 SPD Installation

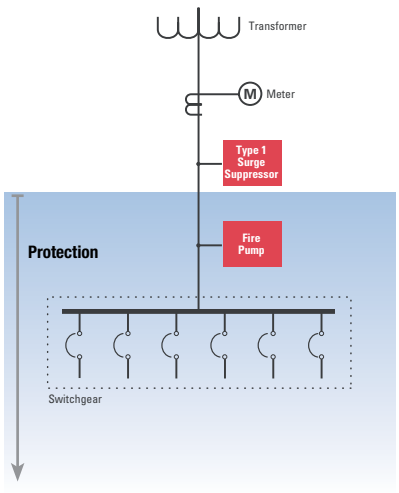


VALUABLE TYPE 1 PROTECTION TO SWITCHGEAR

Surge suppression equipment is designed to protect sensitive electronic equipment from electrical transients. A surge suppressor is installed on the load side of the main service disconnect, providing limited protection to the switchgear – one of the most expensive elements of an electrical installation.

As a Type 1 SPD, the Select® SL3 may be installed in front of the main service disconnect, intercepting external surges before they flow through the main disconnect. In this way, the main disconnect and downstream breakers are protected from damage by transients that could otherwise cause them to trip, shutting off power to an entire electrical system, or leaving the system at risk to damage from additional transients.

Type 1 SPD Installation



WHY TYPE 1 LISTING?

- Select® SL3 provides protection before the main service entrance, increasing protection for downstream loads.
- Select® SL3 allows greater installation flexibility.

TG3™ SURGE PROTECTION

TYPE 1 SPD

TransGuard®

SUPERIOR PROTECTION

RoHS Compliant

ELECTRICAL TRANSIENT SUPPRESSION FILTER SYSTEMS

TransGuard® TG3™ suppression filter systems feature a powerful failure-free ISM™ (Integrated Suppression Module). The ISM™ contains individual thermally fused and protected MOVs, surge-rated copper busing, robust filtering and advanced remote communications capabilities. The TG3™ protects today's facilities from costly downtime and equipment damage caused by routine or catastrophic electrical disturbances.

The result of an extensive design effort in Current Technology's research and development facility, Current Technology's dramatically different and improved suppression filter assembly enables TransGuard® TG3 models to provide unmatched performance and reliability.

FEATURES

- Individual thermally fused and protected MOVs
- UL Listed Type 1 SPD
- UL96A compliant
- RoHS compliant
- Single surge rated and tested
- Extensive kA and voltage offerings
- Advanced remote monitoring capabilities

MODEL NUMBER SCHEME (TG3™)

E.g.: TG3-300-208-3Y-MDT-M6E-F2

TG3 — 300 — 208 — 3Y — MDT — M6E — F 2

Model | kA Rating | Voltage | Configuration | Enclosure | Cable Entry | Monitoring | Filter Option | Optional Feature

kA Rating

Available TG3™ kA Ratings: 050, 080, 100, 125, 150, 200, 250, 300

Voltage

(Consult factory for additional Voltages)

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Configuration

(Consult factory for additional Configurations)

1G	1 Phase, Grounded
2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3R	3 Phase, Grounded High Resistance
3H	3 Phase, Grounded, High Leg Delta
3D	3 Phase, Grounded Delta

Enclosure

MN	Metal Without Disconnect
MD	Metal With Disconnect
SN	Stainless Steel Without Disconnect
SD	Stainless Steel With Disconnect
PN	Fiberglass Reinforced Polyester Without Disconnect

Cable Entry

T	Top Feed
B	Bottom Feed

Monitoring

M0	No local monitoring *(see remote MxX stand-alone option)*
M1	LED/Phase + Audible Alarm, Dry Relay Contacts
M2	M1 + Surge Counter
M3	Advanced Monitoring, Character Display, Modbus RTU
M4E	M3 + Ethernet, Modbus TCP
M5	Advanced Monitoring, Graphics Display, Modbus RTU
M6E	M5 + Ethernet, Modbus TCP

Filter

F	Filter
N	No Filter

Optional Feature

2	Test Port (only available in metal or stainless steel enclosure for 125kA or above)

Stand-Alone Options

(To Be Ordered As Separate Items)

DTS	DTS-2 Diagnostic Test Set
MxX	Remote Monitor Extension M1X through M6EX
HPI	HPI Cable

MADE IN U. S. A.

c UL US LISTED

For more information go to **tnbpowersolutions.com/current_technology**

PX3™ SURGE PROTECTION

TYPE 1 SPD

Panel Extension

RoHS Compliant

PANEL EXTENSION ELECTRICAL TRANSIENT SUPPRESSION FILTER SYSTEMS

The PX3™ offers an externally mounted surge solution that can be physically attached to the top or bottom of any panelboard, providing a reduced profile surge solution. Designed for quick and easy installation, the PX3™ suppression filter systems feature a powerful failure-free ISM™ (Integrated Suppression Module). The ISM™ contains individual thermally fused and protected MOVs, surge-rated copper busing, robust filtering and advanced remote communications capabilities. Unlike printed circuit board based designs, the ISM's breakthrough technology does not rely on printed circuit board traces to carry full surge current magnitude. Instead, cumulative surge current travels on copper bus bars to multiple MOV paths. Printed circuit board trace failures are eliminated and current sharing is enhanced. Integral to the ISM™ is MOV fusing rated at 200 kAIC. This internal fusing ensures uninterrupted protection at rated surge current levels and protects all paths and elements.

FEATURES

- Provides direct bus connection capability to reduce wiring lead lengths, minimizing installation impedances and improving clamping voltages
- Removable end-plates allow installation above or below panelboards
- 15-Year standard product warranty
- Offers space-saving design that fits within a standard 6-inch deep wall and conserves horizontal wall space

FEATURES

- Provides electronic grade power filtering for existing lighting and appliance distribution panels
- Extends equipment life by reducing equipment degrading high-frequency line noise and transients
- Easily mounts with most major brands of low-voltage (less than 600V) lighting and appliance panelboards
- Available in surface- or flush-mount configurations
- RoHS compliant

MODEL NUMBER SCHEME (PX3™)

E.g.: PX3-080-208-3Y-MFT-M6E-F2D

PX3 — 080 — 208 — 3Y — MFT — M6E — F 2 D

Model | kA Rating | Voltage | Configuration | Enclosure | Monitoring | Filter Option | Optional Feature | Integral Disconnect

kA Rating

Available PX3™ kA Ratings: 050, 080, 100, 125*, 150*, 200*

Voltage

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600*

Configuration

1G	1 Phase, Grounded
2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3R	3 Phase, Grounded High Resistance
3H	3 Phase, Grounded, High Leg Delta
3D	3 Phase, Grounded Delta

Enclosure

MFT	Metal, Flush Mount, Top Feed
MFB	Metal, Flush Mount, Bottom Feed
MST	Metal, Surface Mount, Top Feed
MSB	Metal, Surface Mount, Bottom Feed
SFT	Stainless, Flush Mount, Top Feed
SFB	Stainless, Flush Mount, Bottom Feed
SST	Stainless, Surface Mount, Top Feed
SSB	Stainless, Surface Mount, Bottom Feed

Not available with Integral Disconnect models.

Monitoring

M0	No local monitoring *(see remote MxX stand-alone option)*
M1	LED/Phase + Audible Alarm, Dry Relay Contacts
M2	M1 + Surge Counter
M3	Advanced Monitoring, Character Display, Modbus RTU
M4E	M3 + Ethernet, Modbus TCP
M5	Advanced Monitoring, Graphics Display, Modbus RTU
M6E	M5 + Ethernet, Modbus TCP

Filter

F	Filter
N	No Filter

Optional Features

1	Panel Mounted In-House
2	Test Port
4	Full Flush Cover
5	GE Version
6	Square D Version
7	Siemens, Eaton-Cutler Hammer

Disconnect Option

D	Integral Disconnect
Blank	No Disconnect

Stand-Alone Options

(To Be Ordered As Separate Items)

DTS	DTS-2 Diagnostic Test Set
MxX	Remote Monitor Extension M1X through M6EX
HPI	HPI Cable

MADE IN U. S. A.

c UL US LISTED

FC CE

Current Technology®

MasterMind®

MASTERMIND® MONITORING OPTIONS FOR SL3™, TG3™ AND PX3™ PRODUCTS

The Current Technology® MasterMind® monitoring system offers multiple levels of advanced, multifunction, power quality monitoring for SL3™, TG3™, and PX3™ suppression filter systems. A robust, full-featured system, the MasterMind provides real-time data on product performance and distribution system power quality. This critical information can now be accessed remotely through the addition of both modbus and ethernet communications options. The MasterMind® system is capable of providing time date stamps, magnitudes, and durations for most types of power quality events. End users have the ability to set alarm conditions by establishing the magnitude and duration required to trigger an alarm event. Memory capacity will allow for up to 2,000 events and 1,000 P.Q. records to be recorded.

% PROTECTION SENSING

All MasterMind® monitoring options sense and communicate the available surge protection for each phase. This capability assures the operator that critical loads are fully and safely protected at all times. Most surge devices standardize on providing LED indication for communicating the status of the surge device. They say, if the LED is on, the surge device is working and if the LED is off, the surge device has failed. The MasterMind® provides real-time analysis of the percent of protection remaining so that the true status of the suppression filter system is known.

NOT A STANDARD SURGE COUNTER

The surge counter function of the MasterMind® exceeds the capability of standard surge counters by not only counting but categorizing surges into three industry recognizable categories. Most surge device counters utilize a current transformer that detects the amount of current flow through neutral or ground. When the current is high enough for the current transformer to detect it, the surge counter is incremented. Some surge devices that employ both surge protection and filtering protection can have false surge counts caused by noise filtering. The MasterMind® surge counter registers and records surge events in excess of 100A to eliminate false readings. Surges detected by the MasterMind® system will be categorized as low, medium, or high depending upon the level of surge current associated with each event.

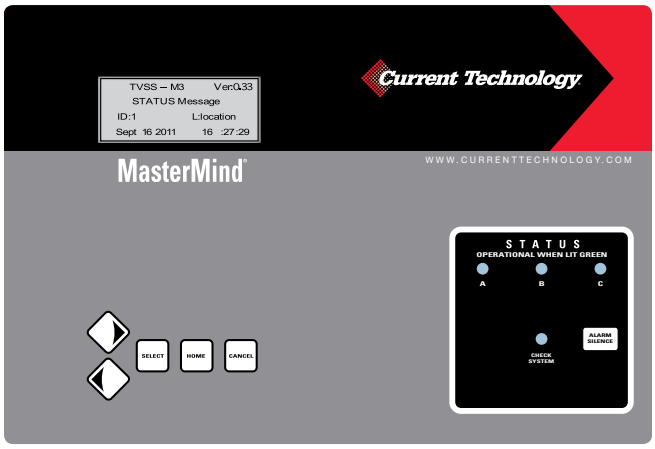
REMOTE COMMUNICATIONS

Methods for remote communications include ModBus-TCP/IP over ethernet, webserver via the ethernet connection, and modbus over RS485, or standard dry relay contacts. The ethernet and modbus options provide the end user access to the critical power quality data and health of the surge unit remotely. With the webserver, there is a platform for the end user to easily view all of the available information arranged in an easily recognizable display format. The versatility of the remote connectivity available with the MasterMind® monitoring package allows for access to the surge unit from just about anywhere and at any time.

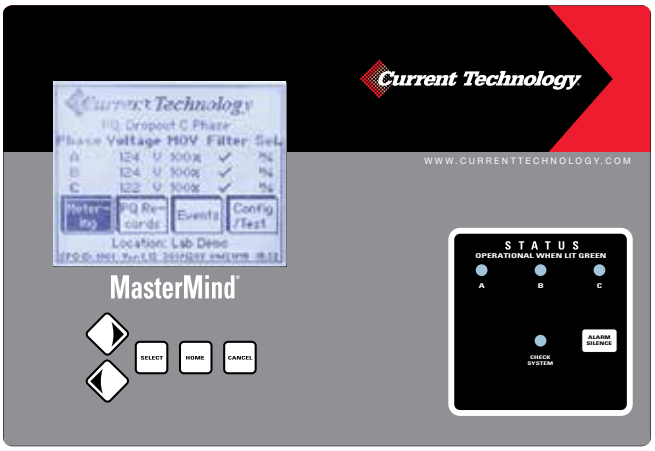
For more information go to **tnbpowersolutions.com/current_technology**

MasterMind® Monitoring Options

A FULL-FEATURED MONITORING OPTION FOR SL3™, TG3™ AND PX3™ PRODUCTS



M3 or M4E local display



M5 or M6E local display

M3 Monitoring

- Local display with membrane switch user interface
- Power Quality Monitor that provides time, date, magnitude and duration of the following
  - Sags
  - Swells
  - Dropouts
  - Outages
  - THD
  - Frequency
  - Volts RMS per phase
  - Surges
    - Low 100A–500A
    - Med 500A–3000A
    - High 3000A+
  - Remaining surge protection percentage
- User settable alarm thresholds (magnitude and duration)
- Dry relay contacts
- Audible alarm, alarm silence
- Per phase LED indication
- ModBus RTU remote communications capability

M5 Monitoring

- Large local display with membrane switch user interface
- Power Quality Monitor that provides time, date, magnitude and duration of the following
  - Sags
  - Swells
  - Dropouts
  - Outages
  - THD
  - Frequency
  - Volts RMS per phase
  - Surges
    - Low 100A–500A
    - Med 500A–3000A
    - High 3000A+
  - Remaining surge protection percentage
- User settable alarm thresholds (magnitude and duration)
- Dry relay contacts
- Audible alarm, alarm silence
- Per phase LED indication
- ModBus RTU remote communications capability

M4E Monitoring

- M3 features plus...
- Ethernet, ModBus TCP remote communications capability
- Web Interface

M6E Monitoring

- M5 features plus...
- Ethernet, ModBus TCP remote communications capability
- Web Interface

RoHS Compliant

ISM™ INTEGRATED SUPPRESSION MODULE

The ISM™ (Integrated Suppression Module) features a suppression filter assembly, with individual thermally fused and protected MOVs, for improved current sharing. Surge rated copper bussing, robust filtering and advanced remote communications capabilities.

- Component SPD suitable for use in Type 1 or Type 2 applications
- Individual thermally fused and protected MOVs – ensures seamless product performance in the event of single MOV failure
- Heavy-duty filter capacitors ensure industry's best high frequency noise and transient filtering
- Solid copper bus construction – cumulative surge current is carried on copper bus bars, eliminating reliance on PCB trace for conducting full surge current.
- Advanced remote communications capabilities
- Thermoplastic polycarbonate rated UL 94V-0 housing

MODEL NUMBER SCHEME (ISM™)

E.g.: ISM-300-240-3D-F

ISM — 300 — 240 — 3D — F

Model | kA Rating | Voltage | Configuration | Filter

kA Rating *(Must Choose One)*

Available ISM™ kA Ratings: 050, 080, 100, 125, 150, 200, 250, 300

Voltage* *(Must Choose One)*

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Configuration* *(Must Choose One)*

1G	1 Phase, Grounded
2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3R	3 Phase, Grounded High Resistance
3H	3 Phase, Grounded, High Leg Delta
3D	3 Phase, Grounded Delta

Filter *(Must Choose One)*

F	Filter
N	No Filter

Stand-Alone Options
(To Be Ordered As Separate Items)

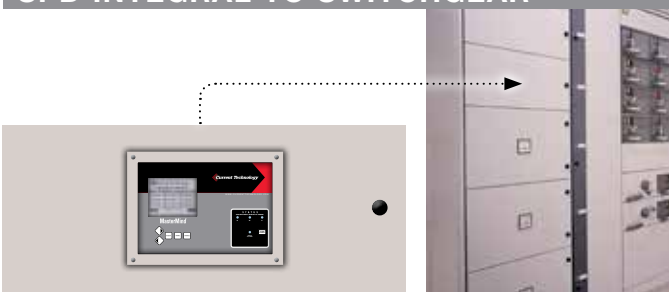
DTS	DTS-2 Diagnostic Test Set
HPI	HPI Cable

Stand-Alone Monitoring Options

M1X	LED/Phase + Audible Alarm, Dry Relay Contacts
M2X	M1 + Surge Counter
M3X	Advanced Monitoring, Character Display, Modbus RTU
M4EX	M3 + Ethernet, Modbus TCP
M5X	Advanced Monitoring, Graphics Display, Modbus RTU
M6EX	M5 + Ethernet, Modbus TCP

**Not all Voltage and Configurations are displayed, contact Thomas & Betts Power Solutions for additional options.*

SPD INTEGRAL TO SWITCHGEAR



Example showing the ISM integrated into the switchgear and the M6EX remotely mounted on the surface of the switchgear.

PRODUCT SPECIFICATIONS

General Specifications

Safety Listings	C-UL-US Listed per UL1449 4th Edition 2015 Type 1 or 2 – Component SPD suitable for use in Type 1 or 2 SPD Applications; UL1283; CSA C22.2 No. 8-M1986, C233.1-87 CE marked (IEC 61643-11) FCC/RoHS compliant
Protection Method	Thermally Protected MOVs, Capacitive Filter
Product Design	Individual Thermally Fused and Protected MOVs, and All Copper, Tin-plated Bus
Installation Location	Indoor
Operating Environment	-40°C to +60°C 5% – 95% Non-Condensing Humidity
Fault Current (SCCR)	200 kAIC
Connection Method	Parallel
Protection Modes	All Modes (L-N, L-G, N-G, L-L)
Response Time	< 0.5 Nanoseconds
Operating Frequency	47 – 63 Hz
Warranty	15 Years

Filtering Attenuation Frequencies (Per Mil-Std-220B January 2000)*

10 KHz	100 KHz	1 MHz	10 MHz	Max at 142 KHz
18.1 dB	44 dB	22.8 dB	15.3 dB	54.6 dB

Maximum Continuous Operating Voltage (MCOV)

Voltage	L-N MCOV	Voltage	L-L MCOV
120 V	150 V	240 V	300 V
277 V	320 V	480 V	552 V
347 V	420 V	600 V	690 V

** Data based on actual tests. Contact factory for test reports*

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For more information go to **tnbpowersolutions.com/current_technology**

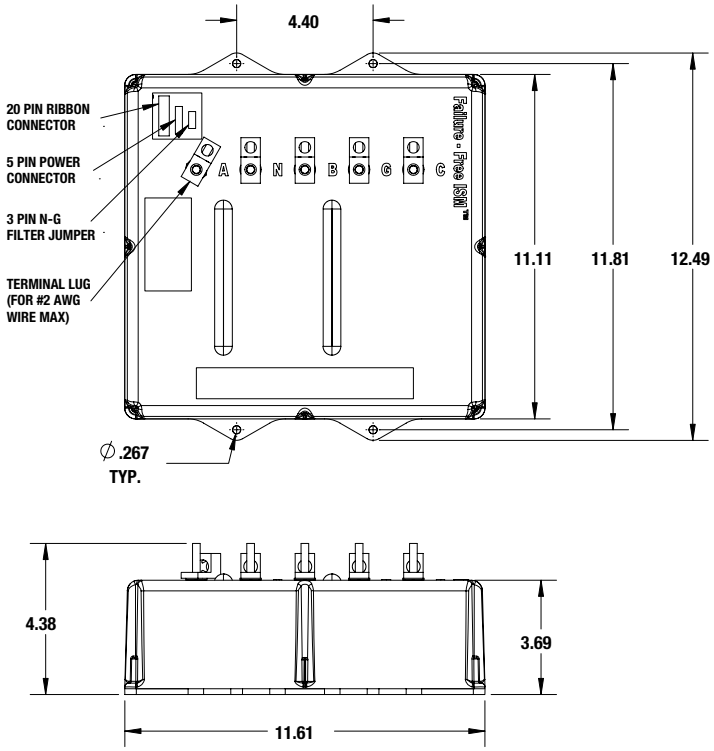
Typical Clamping Voltage Data

System Voltage	Mode	B3 Ringwave	B3/C1 Comb. Wave	C3 Comb. Wave	UL 1449 14th Edition
120/240 120/208	L-N	300	400	550	600
	L-G	400	400	600	600
	N-G	325	475	800	600
	L-L	425	725	900	1,000
277/480	L-N	500	875	1,050	1,000
	L-G	825	825	1,025	1,200
	N-G	650	875	1,200	1,000
	L-L	700	1,625	1,825	2,000

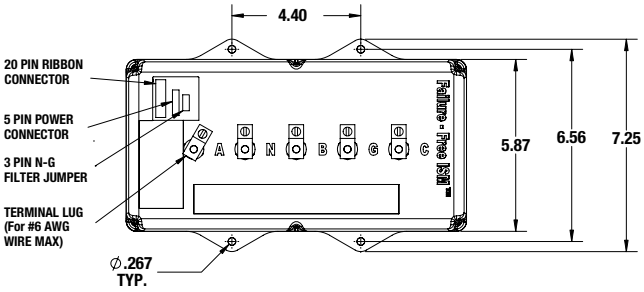
All ISM™ systems clamping voltages are in compliance with test and evaluation procedures outlined in NEMA LS 1-1992 (R2000), paragraphs 2.210 and 3.10.

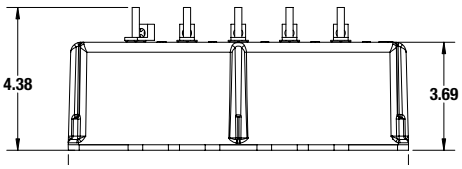
ISM™ – Integrated Suppression Module
Individual thermally fused and protected MOV component of SL3™, TG3™ and PX3™ products.

125kA – 300kA



50kA – 100kA





VOLTAGE/CONFIGURATION OPTIONS

Not all voltage configurations are displayed, contact Thomas & Betts Power Solutions for additional configurations.

Voltage	1 Phase, Grounded (1G)	2 Phase, Grounded, Split Phase (2G)	3 Phase, Grounded Wye (3Y)	3 Phase, Grounded High Resistance (3R)	3 Phase, Grounded, High Leg Delta (3H)	3 Phase, Grounded Delta (3D)
	Configuration					
120	X					
208	X		X	X		X
220	X	X		X		X
230	X					X
240	X	X			X	X
380		X	X	X		X
415		X	X	X		X
480		X	X	X		X
600		X	X	X		X

CurrentGuard™ SERIES

RoHS Compliant

CurrentGuard™ Plus

FEATURES

- UL 1449 4th Edition Type 1 SPD
- Individually fused MOVs provide superior protection and continuous operation
- 200kAIC short circuit current rating allows direct bus connection without the need of an upstream overcurrent protection device
- Includes best-in-class UL 1283 enhanced EMI/RFI filter
- All modes of protection (L–N, L–G, N–G & L–L)
- Surge event counter – standard
- DTS-2 compatible for proactive field testing
- NEMA 4 steel enclosure
- 15-Year standard product warranty
- RoHS compliant

MODEL NUMBER SCHEME

E.g.: CGP200-120/208-3GY

CGP200 — 120/208-3GY — D

Model | kA Rating | Voltage | Disconnect

kA Rating

Available kA Ratings:
60, 80, 100, 120, 150, 200

Voltage*

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Available Option

S	Stainless Steel Enclosure

Stand-Alone Option
(To Be Ordered As Separate Items)

D	External Disconnect

Configuration*

G	1-Phase, 2-Wire Plus Ground
2G	2-Phase, 3-Wire Plus Ground
3GY	3-Phase Wye, 4-Wire Plus Ground
3GHD	3-Phase High-Leg Delta, 4-Wire Plus Ground
3DG	3-Phase Delta, 3-Wire Plus Ground

Standard Monitoring Features

- Status Indicator Lights (one per phase)
- Service Indicator Light
- Form C Contacts (NO/NC)
- Audible Alarm with Silence Button
- Surge Counter

**Consult factory for additional voltage configurations*

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RoHS Compliant

CurrentGuard™

FEATURES

- UL 1449 4th Edition Type 1 SPD
- Each mode protected by surge rated overcurrent fuse
- 200kAIC short circuit current rating allows direct bus connection without the need of an upstream overcurrent protection device
- UL 1283 EMI/RFI filter
- All modes of protection (L-N, L-G, N-G & L-L)
- DTS-2 compatible for proactive field testing
- NEMA 4 steel enclosure
- 10-Year standard product warranty
- RoHS compliant

MODEL NUMBER SCHEME

E.g.: CG200-277/480-3GY

CG200 — 277/480-3GY

Model | kA Rating | Voltage

kA Rating

Available kA Ratings:
40, 60, 80, 100, 120, 150, 200

Voltages*

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Available Option

S	Stainless Steel Enclosure

Stand-Alone Option
(To Be Ordered As Separate Items)

D	External Disconnect

Configuration*

G	1-Phase, 2-Wire Plus Ground
2G	2-Phase, 3-Wire Plus Ground
3GY	3-Phase Wye, 4-Wire Plus Ground
3GHD	3-Phase High-Leg Delta, 4-Wire Plus Ground
3DG	3-Phase Delta, 3-Wire Plus Ground

Standard Monitoring Features

- Status Indicator Lights (one per phase)
- Service Indicator Light
- Form C Contacts (NO/NC)
- Audible Alarm with Silence Button

**Consult factory for additional voltage configurations*

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RoHS Compliant

CurrentGuard™ Flush Mount

FEATURES

- UL 1449 4th Edition Type 1 SPD
- Each mode protected by surge rated overcurrent fuse
- 200kAIC short circuit current rating allows direct bus connection without the need of an upstream overcurrent protection device
- Compact design to allow for flush mount installation
- Flush Mount plate available
- UL 1283 EMI/RFI filter
- All modes of protection (L-N, L-G, N-G & L-L)
- DTS-2 compatible for proactive field testing
- NEMA 4 steel enclosure
- 10-Year standard product warranty
- RoHS compliant

MODEL NUMBER SCHEME

E.g.: CGF40-120/208-3GY *(as shown in above photo)*

CGF40 — 120/208-3GY — S

Model | kA Rating | Voltage | Option

kA Rating

Available kA Ratings:
40, 60, 80

Voltage*

208	120/208
240	120/240
380	220/380
480	277/480
600	347/600

Available Option

S	Stainless Steel Enclosure

Configuration*

G	1-Phase, 2-Wire Plus Ground
2G	2-Phase, 3-Wire Plus Ground
3GY	3-Phase Wye, 4-Wire Plus Ground
3GHD	3-Phase High-Leg Delta, 4-Wire Plus Ground
3DG	3-Phase Delta, 3-Wire Plus Ground

Standard Monitoring Features

Status Indicator Lights (one per phase)
Service Indicator Light
Form C Contacts (NO/NC)

**Consult factory for additional voltage configurations*

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c UL us LISTED CE

c ETL us LISTED Intertek

RoHS Compliant

CurrentGuard™ Compact

RUGGED AND COMPACT

CurrentGuard™ Compact incorporates the same best-in-class features of the CurrentGuard™ series of products in a rugged, compact enclosure. Pre-wired and measuring only 6"W x 6"H x 4"D CurrentGuard™ Compact easily installs in applications with minimum space requirements.

FEATURES

- UL 1449 4th Edition Type 1 SPD
- Ideal for in-wall recess panel applications
- Surge rated component-level fusing
- UL 1283 EMI/RFI filter
- All modes of protection (L-N, L-G, N-G & L-L)
- Ultra compact weatherproof NEMA 4 steel enclosure
- Flush Mount plate available
- Small footprint and pigtail connection
- DTS-2 compatible for proactive testing
- 10-Year standard product warranty
- RoHS compliant

MODEL NUMBER SCHEME

E.g.: CGC 050-120/208-3GY

CGC 050 — 120/208-3GY — M

Model | Voltage | Option

kA Rating

Available kA Rating:
050

Voltages*

208	120/208
240	120/240
480	277/480

Configuration*

2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3H	3 Phase, Grounded, High Leg Delta

Standard Monitoring Features

Status Indicator Lights (one per phase)

Optional Monitoring Features

M – Status Indicator Lights
Audible Alarm
Alarm Silence
Dry Relay Contacts

**Consult factory for additional voltage configurations*

Current Technology®

LoadGuard™

SERIES-CONNECTED SUPPRESSION FILTER SYSTEM

SERIES-CONNECTED SUPPRESSION FILTER SYSTEM

The LoadGuard™ MSU (Modular Series Unit) is engineered for hard-wired installation within or adjacent to electrical loads such as outdoor lighting, robotics, process automation systems, motors, HVAC systems, pumps, heaters, programmable logic controllers and other point-of-use applications.

Compact and powerful, the LoadGuard™ MSU protects these and other individual components from damaging electrical transients, high-frequency noise and high-energy disturbances. LoadGuard™ provides 50kA of surge protection for loads up to 24A.

DTS-2

DIAGNOSTIC TEST SET

The Current Technology DTS-2 tester provides actual clamping performance values for SPDs. Every Current Technology product is evaluated with this tester at the factory to establish its benchmark of performance. The portable DTS-2 tester can be deployed in the field to test units that have been in service for the remaining useful life of an installed product by comparing its latest clamping values against its benchmark values. The end user is given the opportunity to repair or replace the SPD before it fails, rather than waiting for it to fail and being left unprotected.

SURGE CURRENT PROTECTION

Parallel MOV Arrays: LoadGuard™ products employ MOVs in parallel arrays placed at the input and output terminals to protect critical loads from high-energy transient damage. MSU surge current capacity is 50kA per mode.

FEATURES

- Recognized to UL 1449 4th Edition as a Type 2 compliant assembly
- Industry's best surge current rating
- Series-connected design
- Rugged, nonmetallic enclosure
- Sand-encapsulated
- Component-level fusing
- High frequency noise filtering
- Compact footprint/easy installation
- Status indicator light

MODEL NUMBER SCHEME

E.g.: MSU-050-120/240-2G-24A-6

MSU — 050 — 120/240 — 2G — 24A — 6

Model | kA Rating | Voltage | Configuration | Load Current | Modes of Protection

kA/mode
050kA

Voltage*	
208	120/208
240	120/240
380	220/380
480	277/480

MADE IN U. S. A.

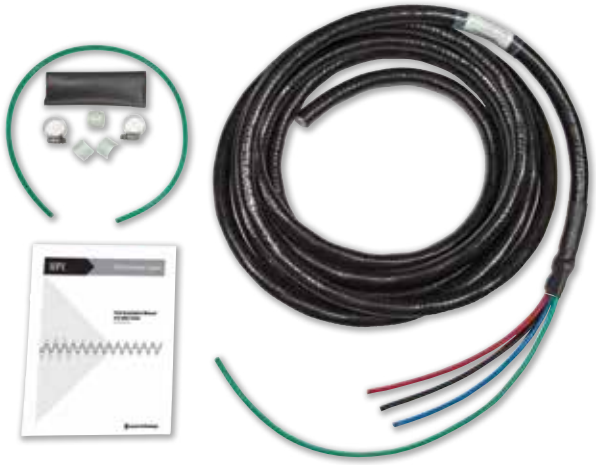
Configuration*	
1G	1 Phase, Grounded
2G	2 Phase, Grounded, Split Phase
3Y	3 Phase, Grounded Wye
3R	3 Phase, Grounded High Resistance
3H	3 Phase, Grounded, High Leg Delta
3D	3 Phase, Grounded Delta

Load Current
24A

Modes of Protection
3 or 6

**Consult factory for additional voltage configurations*

For more information go to **tnbpowersolutions.com/current_technology**



HPI™

SPD CONNECTION SYSTEM

Wire Gauge	Nominal Length	
	Factory Terminated Cable*	Unterminated Cable
6 AWG	5 – 30 ft.	10, 25, 50, 100 feet only
10 AWG	5 – 30 ft.	10, 25, 50, 100 feet only

*Lengths in 5 ft. increments (Factory Terminated Cable pictured above)

HIGH-PERFORMANCE INTERCONNECT SYSTEM

Installing SPD units using standard off-the-shelf cable can increase the clamping voltage unless the cable length is kept short.

Current Technology's High Performance Interconnect (HPI™) SPD Connection System provides the lowest possible impedance connection improving SPD performance.

The HPI™ – SPD Connection System has 25% of the typical impedance of regular cable and allows the installer to increase the interconnection cable length by up to four times, while maintaining acceptable clamping voltage levels, ensuring maximum SPD unit performance.

Using the HPI™ – SPD Connection System adds more location flexibility within the electrical room and significantly reduces the installation time.

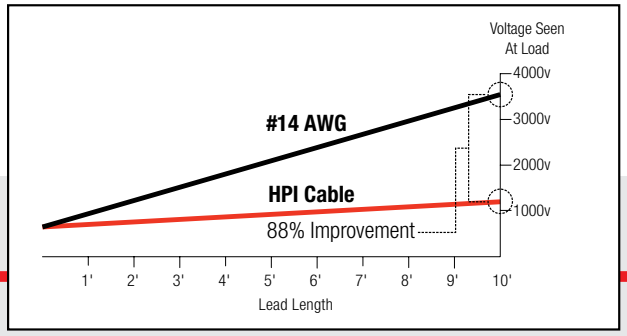
WHAT IS THE HPI™ SPD CONNECTION SYSTEM?

The HPI™ – SPD Connection System is a dual shielded, triple insulated multi-core power conductor specially constructed to minimize interconnection impedance for SPD installations.

The HPI™ – SPD Connection System is a UL approved connection means for use with Current Technology SPD products only.

BENEFITS

- Maximizes SPD unit performance
- Allows the SPD unit to be installed outside of the switchgear
- Interconnect cable length can be increased up to four times
- Increases installation location options
- Improves installation quality
- Removes hazards of internal SPD installations
- Offered either pre-terminated at the SPD end or unterminated at both ends



LEAD LENGTH TEST

SIX INCH LEAD LENGTH TEST CRITERIA

Every SPD manufacturer tests their units with only six inches of lead length outside of the enclosure per the test criteria outlined in IEEE C62.41. Six inches of lead length does not represent the actual lead length required for installing an SPD. Current Technology applied a 20kV/10kA surge to a 14, 10, and 6 AWG wire measuring the voltage drop across a ten foot section of each wire. The graph shows the impact ten feet of 14 AWG wire would have to the installed performance of the SPD. The SPD, as tested with only six inches of lead length may drop the surge down to 700v, but with ten feet of 14 AWG wire, its installed performance is now 3,350v. The HPI cable was tested with the same 20kV/10kA surge with significant improvement. With ten feet of HPI cable the installed performance of the same SPD could be 1,150v. ***THIS REPRESENTS AN 88% IMPROVEMENT.***

HIGH ENERGY TEST LAB

ADVANCED LABORATORY ENVIRONMENT

Current Technology owns and operates one of the most complete testing laboratories in the SPD industry. The Current Technology engineering team understands all applicable industry standards and applies that knowledge to the product development and testing of our advanced SPD systems. The engineering team has undergone extensive training to receive certification as an official UL test lab under UL's Data Acquisition Program and ETL's Supervised Applicant Testing Program. Being part of the UL and ETL test programs results in quicker turnaround and reduced cost associated with developing new products, passing savings on to the customer.

HIGH POWER LIGHTNING GENERATOR

These generators produce up to 100kV/200kA, 8x20µs lighting-type impulses.
All Current Technology products are tested using the HPL generator to verify surge ratings of units.

MEDIUM CURRENT FAULT GENERATOR

These generators produce the UL 1449 Medium Current Fault voltages and currents. Voltages ranging from 120V to 600V, and currents 100A, 500A and 1000A can be produced in all combinations. All products have undergone review and testing through this new lab. The in-house lab enables Current Technology the ability to pre-test, redesign if necessary, and test for certification in a relatively short amount of time.

LIMITED CURRENT FAULT GENERATOR

These generators produce the UL 1449 Limited Current Fault voltages and currents. Voltages ranging from 120V to 600V, at a current of 10A, can be produced in all combinations. All Current Technology products have undergone review and testing through this new lab.

THREE KEYTEK SURGE GENERATORS

These generators produce the Industry Standard 8x20µs 6kV/500A impulses (and up to 20kV/10kA). They provide the Measured Limiting Voltage (MLV) and the Voltage Protective Rating (VPR) of the units. This is the test equipment "workhorse" of the SPD industry. Typically, this device will be used nonstop for weeks during launch of a new product series.

LECROY OSCILLOSCOPES

Current Technology has three high-speed LeCroy Digital Storage Oscilloscopes.
They capture, to electronic and paper file, all the required test shots for certification.
Networking of these files allows for easy access and storage of the certification information.

MASTERPLAN® FACILITY-WIDE PROTECTION

MORE POWER, MORE PROTECTION, INCREASED WARRANTY

Standard Warranty

Current Technology warrants products to meet all applicable industry standards and specifications and be free from defects in materials and/or workmanship. Should there be any failure of the product to meet these requirements, Current Technology shall either repair or replace the defective product.

Current Technology shall have no liability under this warranty for any problems or defects directly or indirectly caused by the misuse of the product, alteration of the product, accidents, or improper installation, application, operation or repair of the product.

Current Technology's standard product warranty periods are provided below.

MasterPLAN® Warranty Upgrade

Current Technology also offers the upgraded warranty MasterPLAN®. IEEE recommends for premium site protection a cascaded installation of surge protection devices throughout the electrical distribution system of a facility. If a Select® SL3–200kA or greater unit is used on the service entrance of a facility, all Current Technology products installed downstream of that service entrance will have their respective warranty periods upgraded to 20 years. In order to qualify for the MasterPLAN® warranty upgrade, all Current Technology products must be purchased at the same time, installed at the same time, and be installed electrically downstream of the service entrance Select® SL3 unit.

WARRANTY PERIOD

	Standard	MasterPlan®
Select® SL3™ 100–300kA	20 Years	—
Select® SL3™ 50–80kA	15 Years	20 Years
HPI®	15 Years	20 Years
TransGuard® TG3™	15 Years	20 Years
Panelboard Extension – PX3™	15 Years	20 Years
CurrentGuard™ Plus	15 Years	20 Years
CurrentGuard™	10 Years	20 Years
CurrentGuard™ Compact	10 Years	20 Years
CurrentGuard™ Flush Mount	10 Years	20 Years
Monitoring & Diagnostic Tools	5 Years	10 Years

Signature MasterPLAN®
20-Year Warranty
Facility-Wide Protection

WORLDWIDE SALES AND SERVICE

Our customers are supported by our worldwide network of more than 175 factory-trained representatives serving the protection needs of commercial, industrial, communications, government, military, education, retail, healthcare and transportation industries. Engineers and end-users with zero tolerance for downtime, data corruption or equipment damage resulting from routine or catastrophic electrical disturbances have made Current Technology the #1 name in surge suppression.

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