


- 
- ▶ Fail-safe performance
 - ▶ Modular flexibility



SURGEBAN™

Transient suppression systems



JOSLYN.
THE #1 NAME IN SURGE SUPPRESSION

Joslyn® SurgeBan™ Transient Suppression Systems

Fail-safe performance.
Modular flexibility.



Joslyn AC and DC Surge Protection

Flexible, innovative surge solutions for system reliability

The Joslyn® name is recognized worldwide as the pioneer in the development and manufacture of electrical and electronic surge protection products.

Whether your application is for AC or DC power systems, voice or data communications, signaling, military or aerospace (with frequencies ranging from 1Hz to 2GHz), Joslyn sets the industry standard. Today, Joslyn products are protecting millions of AC and DC circuits in mission- and revenue-critical operations worldwide.

Put Joslyn technical expertise to work for you

Numerous Joslyn products have been awarded U.S. and European patents. Joslyn product engineers participate on the IEEE, PEG, NEMA, IEC and other electrical protection standards committees to ensure state-of-the-art product design. They are readily available to help you identify and correct application or installation variables that contribute to high-voltage let-through and subsequent equipment damage. You can look to us for help in choosing the optimum protection for your applications.

To assist you in total power systems engineering, Joslyn maintains professional alliances with major power cabinet and electronic equipment manufacturers, as well as electrical and grounding engineering consulting firms. We will coordinate integration of equipment offerings and engineering services to ensure economical solutions consistent with sound engineering practices.

Comprehensive solutions

More than 300 standard product configurations are available through the extensive Joslyn AC surge protector line. In addition to SurgeBan™ products for facilitywide installation, Joslyn AC devices include prewired units for equipment-level protection and custom-tailored solutions for OEMs. Our extensive knowledge of AC distribution systems worldwide makes Joslyn the leading name in standard and customized AC surge protection solutions.



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Customer Service

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From the leader in telecommunications surge protection, Joslyn® SurgeBan™ is the industry's first and only fail-safe suppression system. SurgeBan safely prevents costly equipment damage, data corruption and downtime caused by electrical transients.

Surge solutions for optimum system performance

SurgeBan features an innovative, modular design, making it the most versatile and convenient surge protection for telecommunications applications. From central offices, hut/shelters, subpanels and power pedestals to transfer switches, cabinets and other telecommunications installations, SurgeBan provides networkwide protection.

SurgeBan also safeguards commercial, industrial, educational and other types of facilities with zero tolerance for electrical and electronic system downtime or degradation.

For owners and operators dealing with rising network costs, unattended remote equipment and high subscriber expectations, system reliability is essential. Joslyn SurgeBan helps you meet these challenges by taking surge protection to a new level of performance and flexibility.

Fail-safe protection

Only SurgeBan meets the telecommunications industry's requirement for true, fail-safe protection. An individual thermal cut-off on each metal oxide varistor (MOV) protects against temporary overvoltage conditions and ensures clean end-of-life performance. During a sustained overvoltage event, other manufacturers' surge suppression devices may remain in the circuit under low available fault current and 'slow-cook,' damaging sensitive electronics by venting conductive gasses.



SurgeBan protects telephone network systems and other mission-critical operations from damage caused by electrical transients.



SurgeBan's dual-chamber design ensures that potential contaminants are completely contained within the separate thermal cut-off and MOV chambers. Because the monitoring circuitry is isolated within the module, monitoring continues even after a fault. Only SurgeBan goes off-line to deliver fail-safe performance.

Suppression technology options

SurgeBan's versatile, modular design gives you these choices:

- Suppression technology
 - MOV
 - MOV and filter
 - MOV/SAD hybrid
 - MOV/SAD hybrid and filter
- Surge current capacity (from 50kA to 400kA per phase)
- Up to seven protection modes

Easy module installation

Replacing SurgeBan modules is fast and easy. Using only a screwdriver, a technician can replace modules in less than five minutes. To ensure proper installation, each module is keyed and color-coded.

SurgeBan's optional Form "C" dry contacts enable remote monitoring to eliminate on-site checks at distant or unattended sites.

The measure of excellence

SurgeBan meets or exceeds industry guidelines for product safety and performance, as well as our own uncompromising quality standards. SurgeBan products are manufactured in our plants in the United States and tested by an independent, NVLAP-accredited laboratory. SurgeBan products are designed in compliance with these industry standards:

- Telcordia (Bellcore) TR-NWT-1011
- UL 1449 Listed, 2nd Edition File E74944
- cUL File E74944
- CE – Low-voltage directive and EMC directive

Compact enclosures

For reliable installation in indoor, outdoor and corrosive environments, SurgeBan units are housed in rugged NEMA 4X enclosures. Five space-saving enclosure sizes accommodate various voltage and mode configurations. NEMA 4-rated metal enclosures are available by special order.

10-year warranty

See warranty card for details. A five-year warranty extension is available.

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The Modular Advantage: MOVs, SADs and Filters

SurgeBan MOV base configuration

MOV modules are the basic building blocks of every SurgeBan product. SurgeBan combines 50kA or 100kA MOV modules to achieve the desired surge current capacity (up to 400kA per phase) in the smallest enclosure possible.



SurgeBan is configurable in more than 3,000 combinations, with robust MOVs serving as the foundation of every system.

The product has been life-cycle tested with 2,500 hits of 20kV/10kA to ensure high reliability. SurgeBan is single-pulse surge current tested per NEMA LS-1, guaranteeing performance to its rated capacity without product failure or clamping voltage deviation by more than 10%. SurgeBan is the only suppression product developed for the telecommunications industry that offers this performance assurance.

SurgeBan's front-panel status indicator lights report the condition of each phase and module. For convenient system monitoring, SurgeBan can be equipped with optional Form "C" dry contacts, a digital surge counter and an audible alarm.

SAD modules (optional)

SAD modules can be added to the SurgeBan's robust MOV base configuration. This hybrid product offers extremely fast response and the lowest UL 1449 suppression voltage rating (330V on 120V, 120/240V and 120/208V systems).

Filter modules (optional)

SurgeBan's UL 1283-rated high-frequency power filter module attenuates lower magnitude transients and high-speed noise signals. These conditions lead to system upset and degradation of electronic components. EMI-RFI attenuation values comply with NEMA LS-1 guidelines.



Fail-safe MOV (50kA and 100kA) and SAD modules ensure design flexibility. To eliminate noise, fail-safe high-frequency noise filters may be added to any system.

Versatile by design

SurgeBan's modularity allows you to configure a product to meet your protection needs.



Single-phase
100kA per phase
MOV/Filter hybrid



Split-phase
200kA per phase
MOV/SAD hybrid



Split-phase
400kA per phase
MOV/Filter hybrid



3-phase WYE
200kA per phase
MOV/SAD/Filter hybrid



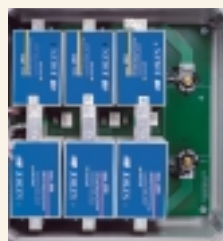
3-phase WYE
100kA per phase
MOV/SAD/Filter hybrid



3-phase WYE
400kA per phase
MOV/SAD hybrid



3-phase DELTA
200kA per phase
MOV/SAD/Filter hybrid



3-phase DELTA
50kA per phase
MOV/SAD/Filter hybrid

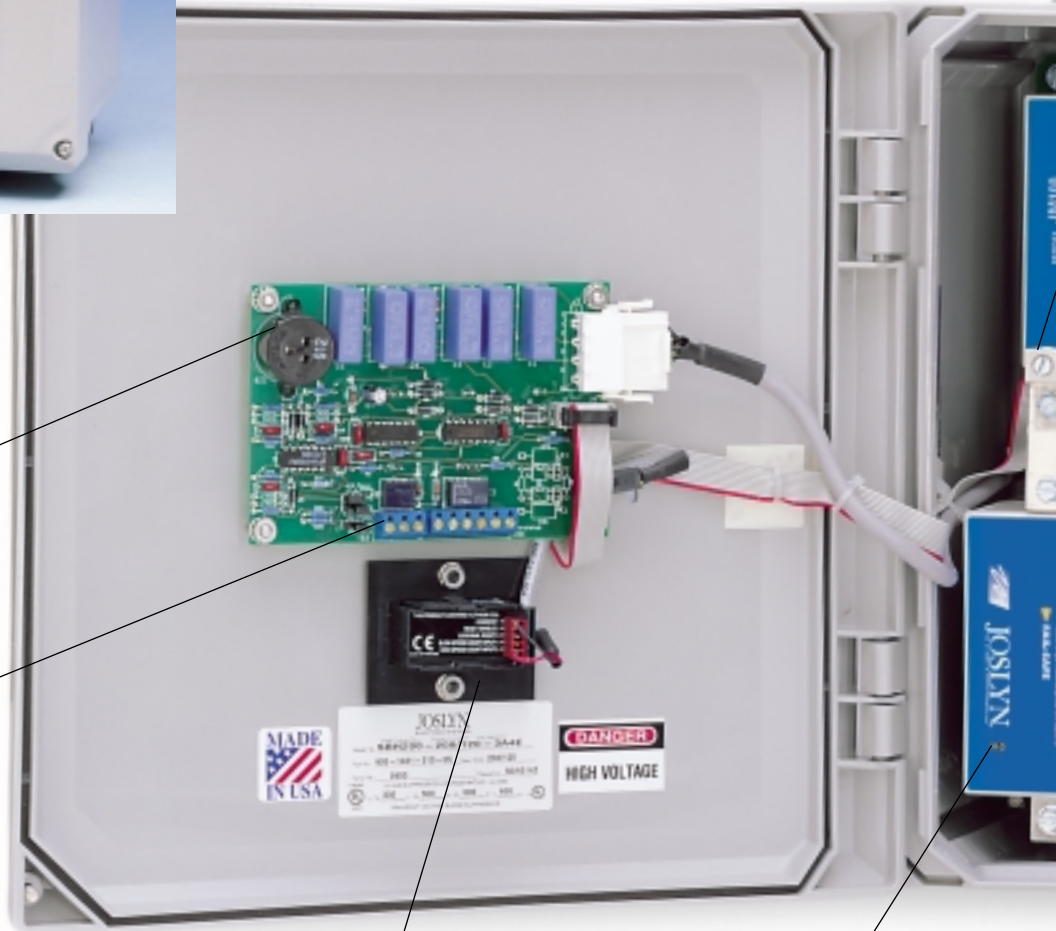


3-phase DELTA
100kA per phase
MOV/SAD/Filter hybrid

The complete surge



- ▶ NEMA 4X enclosure (standard) provides weatherproof, corrosion-resistant service.
- ▶ Status indicator lights show commercial power and suppressor status.
- ▶ 50kA, 100kA, 200kA and 400kA per phase surge current capacity models are available.



Audible alarm*

Form "C" dry contact terminals enable remote monitoring.*

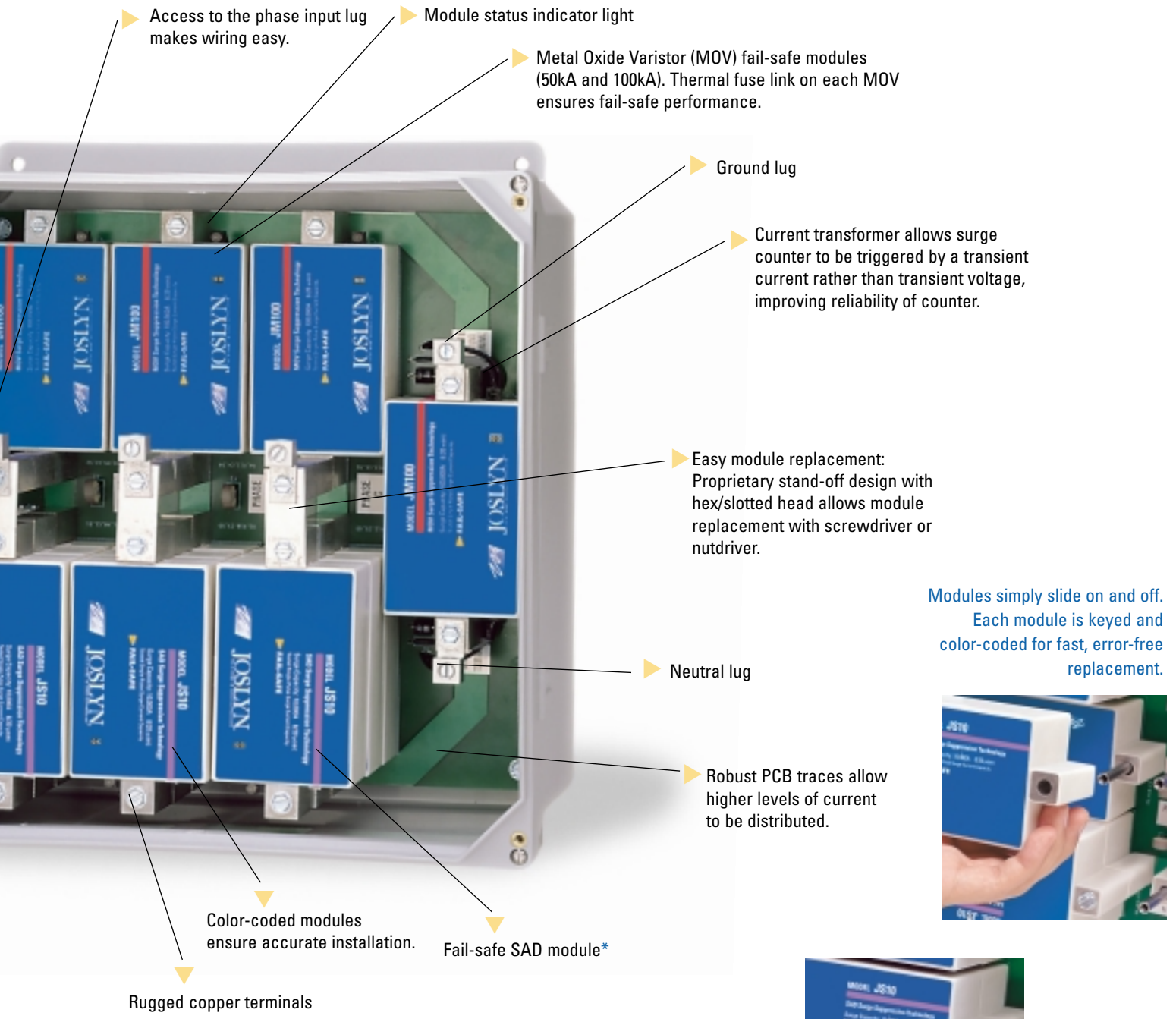
Surge counter*

**Optional feature*

Intermodule monitoring connection allows status monitoring of individual modules and eliminates wiring between modules.

protection solution.

Modular. Fail-Safe. Versatile.



Modules simply slide on and off. Each module is keyed and color-coded for fast, error-free replacement.



Using only a screwdriver or nutdriver, a technician easily can remove and replace top-level screws.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	120V	120/240V	230V*	277V
Phase Configuration	Single-phase	Split-phase	Single-phase	Single-phase
Model Number (MOV-based product)	SBM100-120-1A6†	SBM100-120/240-2A6†	SBM100-230-1A6†	SBM100-277-1A6†
Single-Pulse Surge Current Capacity				
Per Phase	100kA	100kA	100kA	100kA
Per Mode				
Line-to-Neutral	50kA	50kA	50kA	50kA
Line-to-Ground	50kA	50kA	50kA	50kA
Neutral-to-Ground	50kA	50kA	50kA	50kA
Line-to-Line	n/a	50kA	n/a	n/a
Varistor Maximum Continuous Operating Voltage (MCOV)	150	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	400	500	800	800
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	800	n/a	n/a
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	408	408	749	800
Line-to-Ground	421	421	763	821
Neutral-to-Ground	552	552	976	1008
Line-to-Line	n/a	744	n/a	n/a
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	437	437	811	896
Line-to-Ground	448	448	821	869
Neutral-to-Ground	672	672	880	944
Line-to-Line	n/a	800	n/a	n/a
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	571	571	997	1104
Line-to-Ground	592	592	987	1077
Neutral-to-Ground	896	896	1280	1360
Line-to-Line	n/a	971	n/a	n/a
Dimensions – inches (centimeters)				
Height	11.69 (29.69)	13.69 (34.77)	11.69 (29.69)	11.69 (29.69)
Width	8.40 (21.34)	10.40 (26.42)	8.40 (21.34)	8.40 (21.34)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	B	D	B	B
Unit Weight (approx.) – pounds (kilograms)	10 (4.5)	14.5 (6.6)	10 (4.5)	10 (4.5)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS100-120-1A6†	SBS100-120/240-2A6†	SBS100-230-1A6†	SBS100-277-1A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)				
Line-to-Neutral	330	330	600	600
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	600	n/a	n/a

MOV/Filter Hybrid

Model Number	SBC100-120-1A6†	SBC100-120/240-2A6†	SBC100-230-1A6†	SBC100-277-1A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N	L-N/L-L	L-N	L-N
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	SBH100-120-1A6†	SBH100-120/240-2A6†	SBH100-230-1A6†	SBH100-277-1A6†
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*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	120V	120/240V	230V*	277V
Phase Configuration	Single-phase	Split-phase	Single-phase	Single-phase
Model Number (MOV-based product)	SBM200-120-1A6†	SBM200-120/240-2A6†	SBM200-230-1A6†	SBM200-277-1A6†
Single-Pulse Surge Current Capacity				
Per Phase	200kA	200kA	200kA	200kA
Per Mode				
Line-to-Neutral	100kA	100kA	100kA	100kA
Line-to-Ground	100kA	100kA	100kA	100kA
Neutral-to-Ground	100kA	100kA	100kA	100kA
Line-to-Line	n/a	100kA	n/a	n/a
Varistor Maximum Continuous Operating Voltage (MCOV)	150	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	400	500	800	800
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	800	n/a	n/a
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	413	413	728	811
Line-to-Ground	424	424	733	773
Neutral-to-Ground	600	600	992	976
Line-to-Line	n/a	723	n/a	n/a
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	416	416	805	848
Line-to-Ground	427	427	821	821
Neutral-to-Ground	560	560	912	912
Line-to-Line	n/a	768	n/a	n/a
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	549	549	971	1045
Line-to-Ground	560	560	955	981
Neutral-to-Ground	800	800	1280	1280
Line-to-Line	n/a	912	n/a	n/a
Dimensions – inches (centimeters)				
Height	11.69 (29.69)	13.69 (34.77)	11.69 (29.69)	11.69 (29.69)
Width	8.40 (21.34)	10.40 (26.42)	8.40 (21.34)	8.40 (21.34)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	B	D	B	B
Unit Weight (approx.) – pounds (kilograms)	10 (4.5)	14.5 (6.6)	10 (4.5)	10 (4.5)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS200-120-1A6†	SBS200-120/240-2A6†	SBS200-230-1A6†	SBS200-277-1A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)				
Line-to-Neutral	330	330	600	600
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	600	n/a	n/a

MOV/Filter Hybrid

Model Number	SBC200-120-1A6†	SBC200-120/240-2A6†	SBC200-230-1A6†	SBC200-277-1A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N	L-N/L-L	L-N	L-N
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	SBH200-120-1A6†	SBH200-120/240-2A6†	SBH200-230-1A6†	SBH200-277-1A6†
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*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	120V	120/240V	230V*	277V
Phase Configuration	Single-phase	Split-phase	Single-phase	Single-phase
Model Number (MOV-based product)	SBM400-120-1A6†	SBM400-120/240-2A6†	SBM400-230-1A6†	SBM400-277-1A6†
Single-Pulse Surge Current Capacity				
Per Phase	400kA	400kA	400kA	400kA
Per Mode				
Line-to-Neutral	200kA	200kA	200kA	200kA
Line-to-Ground	200kA	200kA	200kA	200kA
Neutral-to-Ground	200kA	200kA	200kA	200kA
Line-to-Line	n/a	200kA	n/a	n/a
Varistor Maximum Continuous Operating Voltage (MCOV)	150	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	400	500	800	800
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	800	n/a	n/a
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	408	408	733	795
Line-to-Ground	416	416	725	741
Neutral-to-Ground	608	608	824	880
Line-to-Line	n/a	701	n/a	n/a
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	421	421	752	789
Line-to-Ground	411	411	741	784
Neutral-to-Ground	544	544	912	928
Line-to-Line	n/a	731	n/a	n/a
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	533	533	885	965
Line-to-Ground	528	528	875	933
Neutral-to-Ground	752	752	1392	1392
Line-to-Line	n/a	864	n/a	n/a
Dimensions – inches (centimeters)				
Height	11.69 (29.69)	13.69 (34.77)	11.69 (29.69)	11.69 (29.69)
Width	8.40 (21.34)	10.40 (26.42)	8.40 (21.34)	8.40 (21.34)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	B	D	B	B
Unit Weight (approx.) – pounds (kilograms)	14.5 (6.6)	22.0 (10.0)	14.5 (6.6)	14.5 (6.6)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS400-120-1A6†	SBS400-120/240-2A6†	SBS400-230-1A6†	SBS400-277-1A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)				
Line-to-Neutral	330	330	600	600
Line-to-Ground	500	500	800	900
Neutral-to-Ground	500	700	900	900
Line-to-Line	n/a	600	n/a	n/a

MOV/Filter Hybrid

Model Number	SBC400-120-1A6†	SBC400-120/240-2A6†	SBC400-230-1A6†	SBC400-277-1A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N	L-N/L-L	L-N	L-N
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	n/a	n/a	n/a	n/a
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*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	208/120V	400/230V*	480/277V
Phase Configuration	Three-phase WYE	Three-phase WYE	Three-phase WYE
Model Number (MOV-based product)	SBM100-208/120-3A6†	SBM100-400/230-3A6†	SBM100-480/277-3A6†
Single-Pulse Surge Current Capacity			
Per Phase	100kA	100kA	100kA
Per Mode			
Line-to-Neutral	50kA	50kA	50kA
Line-to-Ground	50kA	50kA	50kA
Neutral-to-Ground	50kA	50kA	50kA
Line-to-Line	50kA	50kA	50kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500
UL 1449 Let-Through Voltage Rating			
Line-to-Neutral	500	800	900
Line-to-Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	800	1500	1800
Additional Clamping Voltages			
B3 Ringwave (6kV / 500A)			
Line-to-Neutral	408	749	800
Line-to-Ground	421	763	821
Neutral-to-Ground	552	976	1008
Line-to-Line	744	1381	1493
B3/C1 Combination Wave (6kV / 3kA)			
Line-to-Neutral	437	811	896
Line-to-Ground	448	821	869
Neutral-to-Ground	672	880	944
Line-to-Line	800	1488	1637
C3 Combination Wave (20kV / 10kA)			
Line-to-Neutral	571	997	1104
Line-to-Ground	592	987	1077
Neutral-to-Ground	896	1280	1360
Line-to-Line	971	1744	1920
Dimensions – inches (centimeters)			
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E
Unit Weight (approx.) – pounds (kilograms)	15.0 (6.8)	15.0 (6.8)	15.0 (6.8)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid			
Model Number	SBS100-208/120-3A6†	SBS100-400/230-3A6†	SBS100-480/277-3A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)			
Line-to-Neutral	330	600	700
Line-to-Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	700	1200	1200
MOV/Filter Hybrid			
Model Number	SBC100-208/120-3A6†	SBC100-400/230-3A6†	SBC100-480/277-3A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N/L-L	L-N/L-L	L-N/L-L
100kHz	-50	-50	-50
1MHz	-32	-32	-32
10MHz	-33	-33	-33
100MHz	-47	-47	-47
MOV/SAD/Filter Hybrid			
Model Number	SBH100-208/120-3A6†	SBH100-400/230-3A6†	SBH100-480/277-3A6†

*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	208/120V	400/230V*	480/277V
Phase Configuration	Three-phase WYE	Three-phase WYE	Three-phase WYE
Model Number (MOV-based product)	SBM200-208/120-3A6†	SBM200-400/230-3A6†	SBM200-480/277-3A6†
Single-Pulse Surge Current Capacity			
Per Phase	200kA	200kA	200kA
Per Mode			
Line-to-Neutral	100kA	100kA	100kA
Line-to-Ground	100kA	100kA	100kA
Neutral-to-Ground	100kA	100kA	100kA
Line-to-Line	100kA	100kA	100kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500
UL 1449 Let-Through Voltage Rating			
Line-to-Neutral	500	800	900
Line-to-Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	800	1500	1800
Additional Clamping Voltages			
B3 Ringwave (6kV / 500A)			
Line-to-Neutral	413	728	811
Line-to-Ground	424	733	773
Neutral-to-Ground	600	992	976
Line-to-Line	723	1344	1461
B3/C1 Combination Wave (6kV / 3kA)			
Line-to-Neutral	416	805	848
Line-to-Ground	427	821	821
Neutral-to-Ground	560	912	912
Line-to-Line	768	1472	1552
C3 Combination Wave (20kV / 10kA)			
Line-to-Neutral	549	971	1045
Line-to-Ground	560	955	981
Neutral-to-Ground	800	1280	1280
Line-to-Line	912	1691	1760
Dimensions – inches (centimeters)			
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E
Unit Weight (approx.) – pounds (kilograms)	15.0 (6.8)	15.0 (6.8)	15.0 (6.8)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS200-208/120-3A6†	SBS200-400/230-3A6†	SBS200-480/277-3A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)			
Line-to-Neutral	330	600	700
Line-to-Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	700	1200	1200

MOV/Filter Hybrid

Model Number	SBC200-208/120-3A6†	SBC200-400/230-3A6†	SBC200-480/277-3A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N/L-L	L-N/L-L	L-N/L-L
100kHz	-50	-50	-50
1MHz	-32	-32	-32
10MHz	-33	-33	-33
100MHz	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	SBH200-208/120-3A6†	SBH200-400/230-3A6†	SBH200-480/277-3A6†
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*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	120/208V	400/230V*	480/277V
Phase Configuration	Three-phase WYE	Three-phase WYE	Three-phase WYE
Model Number (MOV-based product)	SBM400-208/120-3A6†	SBM400-400/230-3A6†	SBM400-480/277-3A6†
Single-Pulse Surge Current Capacity			
Per Phase	400kA	400kA	400kA
Per Mode			
Line-to-Neutral	200kA	200kA	200kA
Line-to-Ground	200kA	200kA	200kA
Neutral-to-Ground	200kA	200kA	200kA
Line-to-Line	200kA	200kA	200kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150	300	320
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500
UL 1449 Let-Through Voltage Rating			
Line-to-Neutral	500	800	900
Line-to-Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	800	1500	1800
Additional Clamping Voltages			
B3 Ringwave (6kV / 500A)			
Line-to-Neutral	408	733	795
Line-to-Ground	416	725	741
Neutral-to-Ground	608	824	880
Line-to-Line	701	1323	1520
B3/C1 Combination Wave (6kV / 3kA)			
Line-to-Neutral	421	752	789
Line-to-Ground	411	741	784
Neutral-to-Ground	544	912	928
Line-to-Line	731	1392	1595
C3 Combination Wave (20kV / 10kA)			
Line-to-Neutral	533	885	965
Line-to-Ground	528	875	933
Neutral-to-Ground	752	1392	1392
Line-to-Line	864	1584	1915
Dimensions – inches (centimeters)			
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E
Unit Weight (approx.) – pounds (kilograms)	25.5 (11.6)	25.5 (11.6)	25.5 (11.6)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid			
Model Number	SBS400-208/120-3A6†	SBS400-400/230-3A6†	SBS400-480/277-3A6†
UL 1449 Let-Through Voltage Rating (enhanced rating)			
Line-to Neutral	330	600	700
Line-to Ground	500	900	900
Neutral-to-Ground	600	1000	1000
Line-to-Line	700	1200	1200
MOV/Filter Hybrid			
Model Number	SBC400-208/120-3A6†	SBC400-400/230-3A6†	SBC400-480/277-3A6†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N/L-L	L-N/L-L	L-N/L-L
100kHz	-50	-50	-50
1MHz	-32	-32	-32
10MHz	-33	-33	-33
100MHz	-47	-47	-47
MOV/SAD/Filter Hybrid			
Model Number	n/a	n/a	n/a

*CE compliant

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	240/120 x 208V	240V	400V	480V
	Grounded High-Leg DELTA			
Phase Configuration	3-phase GHL DELTA	3-phase DELTA	3-phase DELTA	3-phase DELTA
Model Number (MOV-based product)	SBM100-240/120-7A6†	SBM50-240-5A9†	SBM50-400-5A9†	SBM50-480-5A9†
Single-Pulse Surge Current Capacity				
Per Phase	100kA	50kA	50kA	50kA
Per Mode				
Line-to-Neutral	50kA	n/a	n/a	n/a
Line-to-Ground	50kA	50kA	50kA	50kA
Neutral-to-Ground	50kA	n/a	n/a	n/a
Line-to-Line	50kA	50kA	50kA	50kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150x300 ¹	300/300 ³	460/600 ³	550/640 ³
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	500x800 ²	n/a	n/a	n/a
Line-to-Ground	500x900 ²	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	800x1500 ²	800	1500	1800
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	408x749 ²	n/a	n/a	n/a
Line-to-Ground	421x763 ²	763	1120	1307
Neutral-to-Ground	552	n/a	n/a	n/a
Line-to-Line	744x1381 ²	744	1381	1493
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	437x811 ²	n/a	n/a	n/a
Line-to-Ground	448x821 ²	821	1264	1461
Neutral-to-Ground	672	n/a	n/a	n/a
Line-to-Line	800x1488 ²	800	1488	1637
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	571x997 ²	n/a	n/a	n/a
Line-to-Ground	592x987 ²	987	1541	1701
Neutral-to-Ground	896	n/a	n/a	n/a
Line-to-Line	971x1744 ²	971	1744	1920
Dimensions – inches (centimeters)				
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E	E
Unit Weight (approx.) – pounds (kilograms)	15.0 (6.8)	12.0 (5.4)	12.0 (5.4)	12.0 (5.4)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS100-240/120-7A6†	SBS50-240-5A9†	SBS50-400-5A9†	SBS50-480-5A9†
UL 1449 Let-Through Voltage Rating (enhanced rating)				
Line-to-Neutral	330x600	n/a	n/a	n/a
Line-to-Ground	500x900	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	700x1200	700	1200	1200

MOV/Filter Hybrid

Model Number	SBC100-240/120-7A6†	SBC50-240-5A9†	SBC50-400-5A9†	SBC50-480-5A9†
Filter Attenuation (dB – 50 ft. Noise Source)				
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	SBH100-240/120-7A6†	SBH50-240-5A9†	SBH50-400-5A9†	SBH50-480-5A9†
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High-Leg DELTA Units: ¹MCOV is 150V for modes A-N, C-N, C-G and N-G modes. MCOV is 300V for modes B-N and B-G.

²Let-Through: YYY x ZZZ where ZZZ represents let-through voltages for Phase B modes.

DELTA Units: ³ MCOV: YYY/ZZZ where YYY represents MCOV for Phase-to-Ground modes. ZZZ represents MCOV for Phase-to-Phase modes.

† Monitoring option. See page 18.



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	240/120 x 208V	240V	400V*	480V
	Grounded High-Leg DELTA			
Phase Configuration	3-phase GHL DELTA	3-phase DELTA	3-phase DELTA	3-phase DELTA
Model Number (MOV-based product)	SBM200-240/120-7A6†	SBM100-240-5A9†	SBM100-400-5A9†	SBM100-480-5A9†
Single-Pulse Surge Current Capacity				
Per Phase	200kA	100kA	100kA	100kA
Per Mode				
Line-to-Neutral	100kA	n/a	n/a	n/a
Line-to-Ground	100kA	100kA	100kA	100kA
Neutral-to-Ground	100kA	n/a	n/a	n/a
Line-to-Line	100kA	100kA	100kA	100kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150x300 ¹	300/300 ³	460/600 ³	550/640 ³
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	500x800 ²	n/a	n/a	n/a
Line-to-Ground	500x900 ²	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	800x1500 ²	800	1500	1800
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	413x728 ²	n/a	n/a	n/a
Line-to-Ground	424x733 ²	733	1035	1253
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	723x1344 ²	723	1344	1461
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	416x805 ²	n/a	n/a	n/a
Line-to-Ground	427x821 ²	821	1131	1365
Neutral-to-Ground	560	n/a	n/a	n/a
Line-to-Line	768x1472 ²	768	1472	1552
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	549x971	n/a	n/a	n/a
Line-to-Ground	560x955	955	1344	1595
Neutral-to-Ground	800	n/a	n/a	n/a
Line-to-Line	912x1691	912	1691	1760
Dimensions – inches (centimeters)				
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E	E
Unit Weight (approx.) – pounds (kilograms)	12.0 (5.4)	12.0 (5.4)	12.0 (5.4)	12.0 (5.4)

ADDITIONAL CONFIGURATIONS

MOV/SAD Hybrid

Model Number	SBS200-240/120-7A6†	SBS100-240-5A9†	SBS100-400-5A9†	SBS100-480-5A9†
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UL 1449 Let-Through Voltage Rating (enhanced rating)

Line-to-Neutral	330x600	n/a	n/a	n/a
Line-to-Ground	500x900	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	700x1200	700	1200	1200

MOV/Filter Hybrid

Model Number	SBC200-240/120-7A6†	SBC100-240-5A9†	SBC100-400-5A9†	SBC100-480-5A9†
Filter Attenuation (dB – 50 ft. Noise Source)	L-N/L-L	L-L	L-L	L-L
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	SBH200-240/120-7A6†	SBH100-240-5A9†	SBH100-400-5A9†	SBH100-480-5A9†
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*CE compliant

High-Leg DELTA Units: ¹MCOV is 150V for modes A-N, C-N, C-G and N-G modes. MCOV is 300V for modes B-N and B-G.

²Let-Through: 111 x ZZZ where ZZZ represents let-through voltages for Phase B modes.

DELTA Units: ³ MCOV: YYY/ZZZ where YYY represents MCOV for Phase-to-Ground modes. ZZZ represents MCOV for Phase-to-Phase modes.

† Monitoring option. See page 18.

J-1615 11.00



MOV BASE CONFIGURATION

System Voltage (50/60Hz)	120/240 x 208V	240V	400V*	480V
	Grounded High-Leg DELTA			
Phase Configuration	3-phase GHL DELTA	3-phase DELTA	3-phase DELTA	3-phase DELTA
Model Number (MOV-based product)	SBM400-240/120-7A6†	SBM200-240-5A9†	SBM200-400-5A9†	SBM200-480-5A9†
Single-Pulse Surge Current Capacity				
Per Phase	400kA	200kA	200kA	200kA
Per Mode				
Line-to-Neutral	200kA	n/a	n/a	n/a
Line-to-Ground	200kA	200kA	200kA	200kA
Neutral-to-Ground	200kA	n/a	n/a	n/a
Line-to-Line	200kA	200kA	200kA	200kA
Varistor Maximum Continuous Operating Voltage (MCOV)	150x300 ¹	300/300 ³	460/600 ³	550/640 ³
Repetitive Surge-Current Capacity (20kV / 10kA)	2500	2500	2500	2,500
UL 1449 Let-Through Voltage Rating				
Line-to-Neutral	500x800	n/a	n/a	n/a
Line-to-Ground	500x900	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	800x1500	800	1500	1800
Additional Clamping Voltages				
B3 Ringwave (6kV / 500A)				
Line-to-Neutral	408x733 ²	n/a	n/a	n/a
Line-to-Ground	416x725 ²	725	1003	1211
Neutral-to-Ground	608	n/a	n/a	n/a
Line-to-Line	701x1323 ²	701	1323	1520
B3/C1 Combination Wave (6kV / 3kA)				
Line-to-Neutral	421x752 ²	n/a	n/a	n/a
Line-to-Ground	411x741 ²	741	1067	1285
Neutral-to-Ground	544	n/a	n/a	n/a
Line-to-Line	731x1392 ²	731	1392	1595
C3 Combination Wave (20kV / 10kA)				
Line-to-Neutral	533x885 ²	n/a	n/a	n/a
Line-to-Ground	528x875 ²	875	1237	1488
Neutral-to-Ground	752	n/a	n/a	n/a
Line-to-Line	864x1584 ²	864	1584	1915
Dimensions – inches (centimeters)				
Height	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)	13.69 (34.77)
Width	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)	12.40 (31.50)
Depth	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)	7.94 (20.17)
Enclosure Size (see page 17 for details)	E	E	E	E
Unit Weight (approx.) – pounds (kilograms)	25.5 (11.6)	22.5 (10.2)	22.5 (10.2)	22.5 (10.2)

Additional Configurations

MOV/SAD Hybrid

Model Number	SBS400-240/120-7A6†	SBS200-240-5A9†	SBS200-400-5A9†	SBS200-480-5A9†
UL 1449 Let-Through Voltage Rating (enhanced rating)				
Line-to-Neutral	330x600	n/a	n/a	n/a
Line-to-Ground	500x900	900	1500	1800
Neutral-to-Ground	600	n/a	n/a	n/a
Line-to-Line	700x1200	700	1200	1200

MOV/Filter Hybrid

Model Number	SBC400-240/120-7A6†	SBC200-240-5A9†	SBC200-400-5A9†	SBC200-480-5A9†
Filter Attenuation (dB – 50 ft. Noise Source)				
100kHz	-50	-50	-50	-50
1MHz	-32	-32	-32	-32
10MHz	-33	-33	-33	-33
100MHz	-47	-47	-47	-47

MOV/SAD/Filter Hybrid

Model Number	n/a	n/a	n/a	n/a
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*CE compliant

High-Leg DELTA Units: ¹MCOV is 150V for modes A-N, C-N, C-G and N-G modes. MCOV is 300V for modes B-N and B-G.

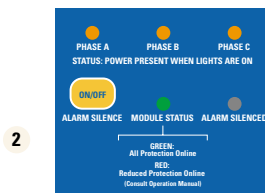
²Let-Through: YYY x ZZZ where ZZZ represents let-through voltages for Phase B modes.

DELTA Units: ³ MCOV: YYY/ZZZ where YYY represents MCOV for Phase-to-Ground modes. ZZZ represents MCOV for Phase-to-Phase modes.

† Monitoring option. See page 18.

J-1615 10.00

Whether you choose an all-MOV configuration or an MOV/SAD hybrid, every SurgeBan is equipped with unmatched features for convenience and reliability.



Electrical

Overall system

- Connection method: parallel. Requires upstream overcurrent protection device.
- Simple, two-pin connector on each module eliminates the inconvenience of internal control wiring. **1**
- All-mode protection: Ensures 100% protection by safeguarding all electrical modes, as applicable (line-to-neutral; line-to-ground; line-to-line; neutral-to-ground).
- Surge current capacity: Choice of 50kA, 100kA, 200kA or 400kA per phase.
- Status indicator lights (front-panel): Commercial power status (amber/power on) and suppressor status (green/protection available; red/replace module). **2**
- Copper terminals provide robust module-to-module connectivity. **3**

Monitoring options

- Form "C" relay contacts: Enable time-saving, remote monitoring of the suppressor status and commercial power status.
- Audible alarm with silence switch: Sounds when any module requires replacement.
- Surge Counter: Eight-digit counter displays cumulative number of surges the product has suppressed. **4**

Modules

- Fail-safe, color-coded modules. **5**
- Back-up MOV protection: 20kA back-up for each MOV module ensures continuous protection.
- Individual thermal cut-off on each MOV.
- Individual thermal cut-off on each SAD array.
- Status indicator lights (bicolor): Green indicates protection is available. Red indicates module replacement is required. **6**
- Filtering attenuation frequency: 50dB at 100KHz and 47kB at 100MHz.

Mechanical

High-impact enclosure: NEMA 4X nonmetallic enclosure is available in five compact sizes (see page 17 for details). Metal enclosures are available by special order.

Operating environment

Ambient temperature: -40°C to +70°C (-40°F to +160°F)
 Humidity: 5% to 95% (noncondensing)
 Altitude: 16,000 ft. (5,000M)

10-year and extended warranties

- See warranty for details.
- Five-year extended warranty available for 15 years total coverage.

Operating characteristics of suppression device components

The most common elements found within a surge suppression device are

- metal oxide varistors (MOVs),
- silicon avalanche diodes (SADs), and
- filtration capacitors.

MOV

An MOV is a nonlinear electrical circuit element that diverts high levels of current while maintaining a low voltage drop across its terminals. It is the most common device used in surge suppression devices.

When the MOV receives a transient voltage that exceeds its rated maximum continuous operating voltage (MCOV), it changes from a high-impedance to a low-impedance element. In its low-impedance state, the MOV can provide an alternative path away from sensitive electrical loads for the damaging transient current. When the transient is eliminated and the voltage returns to nominal, the MOV returns to its high-impedance state, thus eliminating the diversion path and allowing normal current flow to the load to resume.

As shown in Fig. 1, a key benefit of the MOV is that it permits a relatively small voltage change across

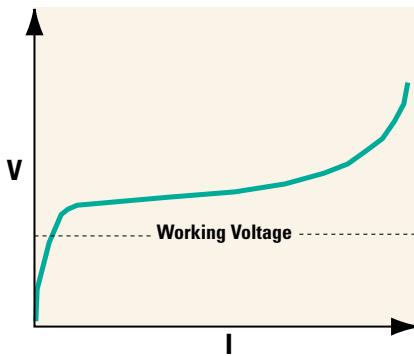


Fig. 1

its terminals while allowing disproportionately large surge current flow through it.

SAD

Best known for its fast response time, the SAD provides the lowest voltage clamping levels offered by a surge suppression component.

When the transient voltage reaches the SAD's breakdown voltage rating, the SAD lowers its normal high-impedance state and begins to conduct. This lower impedance allows the transient to be diverted through the SAD and away from the load. The SAD's voltage current curve is plotted in Fig. 2 and shows the component's fast response and steady voltage clamping.

Filtration capacitors

Lower magnitude impulses, also known as high-frequency noise, are common within electrical distribution systems.

With magnitudes reaching the tens to hundreds of volts, these impulses can cause electronic system upset and component degradation if left unaddressed.

While MOVs and SADs provide protection from large magnitude transient events, these traditional clamping components cannot eliminate high-frequency noise signals that occur below their "turn-on" voltage points. The addition of a frequency-based capacitive filter allows the suppression device to attenuate high-frequency noise signals, thereby increasing electronic system reliability.

MOV/SAD hybrid

An MOV/SAD hybrid combines the current-handling capabilities of MOVs with the fast response and reduced let-through voltage of SADs. This hybrid design leverages the unique strengths of each component. The MOV/SAD hybrid design offers high surge-current handling and the lowest voltage clamping values available.

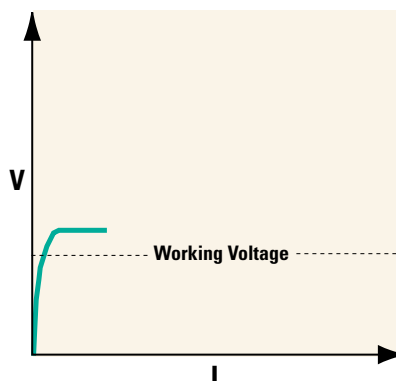
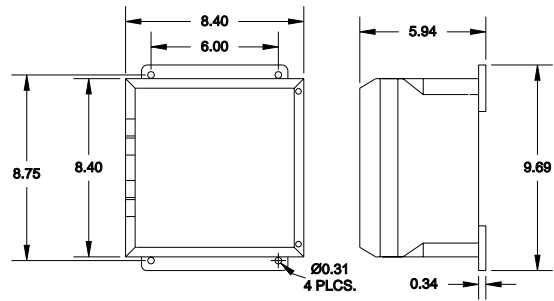


Fig. 2

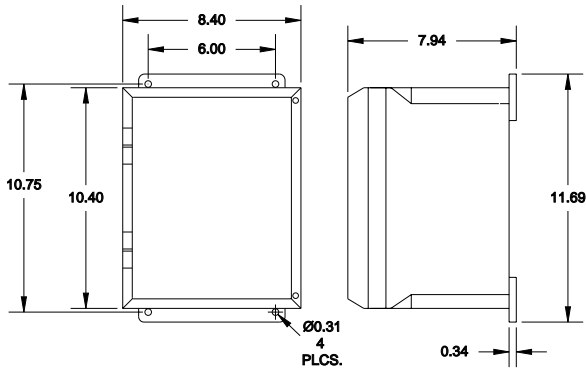


Enclosure Size	Measurement	H	W	D
A	inches	9.69	8.40	5.94
	centimeters	24.61	21.34	15.09
B	inches	11.69	8.40	7.94
	centimeters	29.69	21.34	20.17
C	inches	11.69	10.40	7.94
	centimeters	29.69	26.42	20.17
D	inches	13.69	10.40	7.94
	centimeters	34.77	26.42	20.17
E	inches	13.69	12.40	7.94
	centimeters	37.77	31.50	20.17

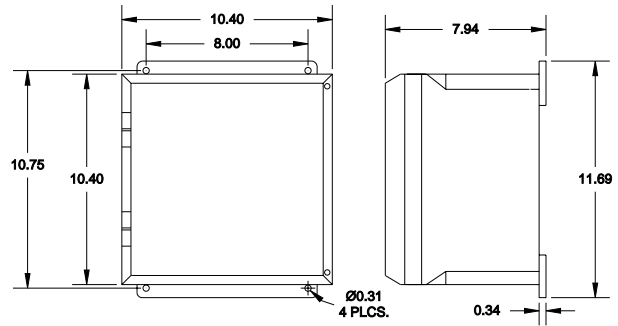
A



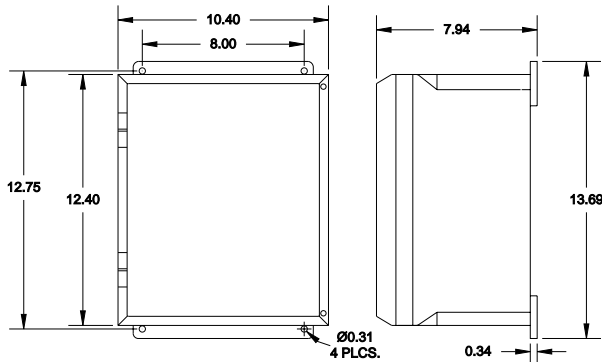
B



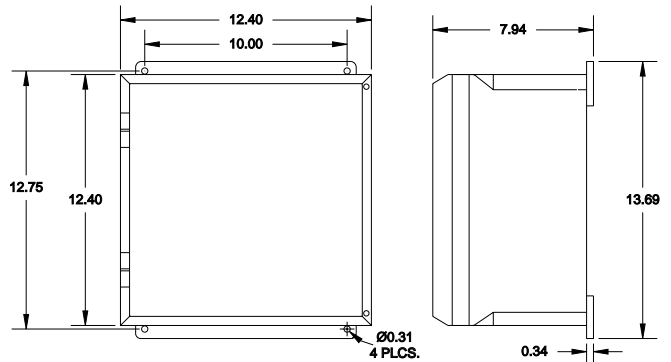
C



D



E



Ordering Information



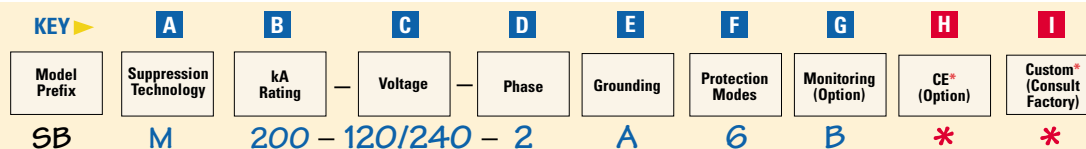
SURGEBAN™

Transient Suppression System

KEY	ITEM	DESCRIPTION	PART NUMBER CODE
A	Suppression Technology	MOV	M
		MOV/SAD	S
		MOV/Filter	C
		MOV/SAD/Filter	H
B	Top-Level kA Rating, Per Phase	50kA	50
		100kA	100
		200kA	200
		400kA	400
C	Voltage	120	120
		120/240 ²	120/240
		127 ¹	127
		208/120	208/120
		220/127	220/127
		230 ¹	230
		240	240
		240/120 ³	240/120
		277 ¹	277
		400	400
		400/230	400/230
D	Phase	Single-Phase	1
		Split-Phase	2
		Three-Phase WYE	3
		Two Sides of WYE	4
		Three-Phase DELTA	5
		Two Sides of DELTA	6
		Three-Phase High-Leg DELTA	7
		Corner-Grounded DELTA	8
E	Grounding	U.S. Standard / TNS	A
		TT	B
		IT	C
F	Modes of Protection Present	L-N protection present	1
		L-G protection present	2
		L-N and N-G protection present	3
		L-G and N-G protection present	4
		L-N and L-G protection present	5
		L-N, L-G and N-G protection present	6
		L-L protection present (DELTA configuration only)	7
		L-G protection present (DELTA configuration only)	8
		L-L and L-G protection present (DELTA configuration only)	9
G	Monitoring	Standard status indicator lights	A
		Lights with suppressor status Form "C" dry contacts	B
		Lights with suppressor and input status/power Form "C" dry contacts	C
		All of the above and audible alarm with disable switch	D
		All of the above and surge counter	E
H	CE Option	Nonstandard items. Consult factory for Part Number Code.	
		Metal enclosure with CE approval	M
		Plastic enclosure with CE approval	C
I	Customer-Specified Option	Nonstandard items. Consult factory for Part Number code.	

(1) Single-phase configuration only (2) Split-phase configuration only (3) High-leg DELTA configuration only

Example



Example: SBM200-120/240-2A6B

Description: SurgeBan, all-MOV unit. 200kA per phase, 120/240 V, split-phase, U.S. standard ground, L-N, L-G and N-G protection modes, with lights and suppressor status Form "C" dry contacts.

* Part Number required only when specifying this option. Contact Customer Service for Part Number.

Specifications subject to change without notice.

Responsive customer support



Our staff is ready to assist you from 7:00 a.m. to 5:00 p.m. (Pacific), Monday through Friday. When you require technical support, your call will be directed immediately to our Applications Engineering team. To place orders or to inquire about product pricing, availability or order status, please contact Joslyn Customer Service.

Customer Service

Tel: 800-752-8068, ext. 3
805-968-3551

Fax: 877-822-8406 (toll-free)
805-968-0922

Applications Engineering

Tel: 800-752-8068, ext. 3
805-968-3551

Fax: 805-968-8491

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