

Surge Protection Devices



2.1 Surge Protection Devices and Lightning Arresters

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Product Description

Due to the evolution of electronics and microprocessors in the home, there is a continuous challenge to provide quality (clean) power for electronic loads such as appliances, computers/home office and entertainment systems. Surges caused by lightning, utility grid switching and other sources travel on current carrying conductors throughout the home, which can effect and destroy sensitive electronic loads.

Eaton offers a comprehensive family of surge products for use at service entrance. These products can help protect sensitive electronics against the damaging effects of surges.

Application Description

Two-Stage Protection

Two stages of surge suppression are recommended to provide the best protection for electronic equipment. Two-stage surge suppression should be provided for all cables entering a home, including power, Internet, coaxial and telephone.

Service Entrance Surge Protection

Eaton's service entrance surge protection units provide premier surge protection for AC power at the service entrance. These products provide protection for residential electrical equipment by reducing power surges to an acceptable level for surge strips to handle at the point of use.

UL 1449 3rd Edition Type 1 and Type 2 Surge Protection

- **Type 1 Surge Protective Device (SPD)**— Permanently connected Type 1 SPDs are intended for installation between the secondary of the service transformer and the line side of the service equipment overcurrent device, as well as the load side, including watt-hour meter socket enclosures and are intended to be

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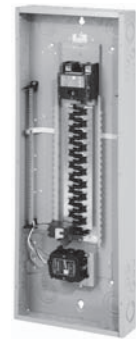
Description

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installed without an external overcurrent protective device. Type 1 devices are dual-rated for Type 2 applications as well, providing the highest ratings available for installation at the service entrance

- Eaton's CHSPT1 products provide Type 1 surge protection in accordance with UL® 1449 3rd Edition. These units can be universally mounted outside any manufacturer's primary service equipment
- **Type 2 Surge Protective Device**—Permanently connected Type 2 SPDs are intended for installation on the load side of the service equipment overcurrent device, including SPDs located at the branch panel
 - CHSPT2 products provide Type 2 surge protection in accordance with UL 1449 3rd Edition. These units can be mounted outside of any manufacturer's loadcenter or inside an Eaton Surge/Surge Ready loadcenter. Eaton also offers accessories to the CHSPT2 line for telephone and cable protection.

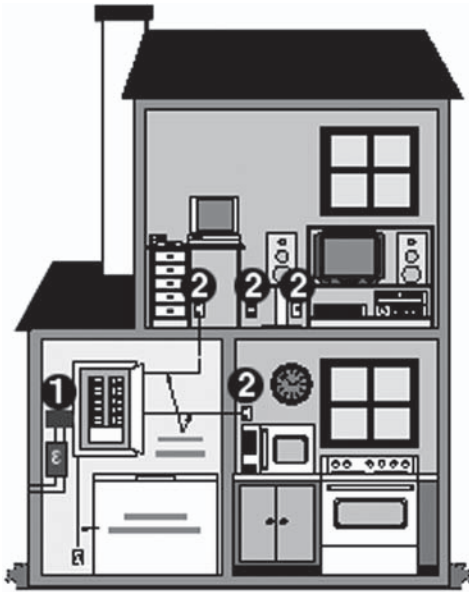
- **Factory-Installed Surge Protection**—Eaton's loadcenters with factory-installed surge protection include a CHSPT2ULTRA and a two-pole 50A circuit breaker. These loadcenters increase the effectiveness of surge protection due to reduced lead length. A modified deadfront allows for easy viewing of indicating lights for status indication



Surge Panel

- **Surge Ready Loadcenter**—The Surge-Ready loadcenter provides a mounting provision for the CHSPT2ULTRA. This loadcenter has a modified deadfront to allow for viewing of indicating lights.

Two-Stage Protection



① CHSP installed at the service entrance panel.

② SurgeTrap™ surge traps and strips located where sensitive electronics are plugged in.

Plug-On Surge Protection

- Type CHSA**—For use on single-phase 120/240 Vac systems. The CHSA easily plugs into a single-phase Type CH loadcenter and occupies two 3/4-inch (19.1 mm) pole spaces, similar to a two-pole Type CH breaker. When installed properly, it provides surge protection for the entire loadcenter. If internal components are damaged, the CHSA LED visual indicators will signal the need for a replacement. This device is suitable for service entry locations when installed in accordance with NEC® guidelines.
- Type BRSURGE**—For use on single-phase 120/240 Vac systems. This easily plugs into a single-phase Type BR loadcenter and occupies two 1-inch (25.4 mm) pole spaces similar to a two-pole Type BR breaker. When installed properly, it provides surge protection for the entire loadcenter. If internal components are damaged, the BRSURGE LED visual indicators will signal the need for replacement. This device is suitable for service entry locations when installed in accordance with NEC guidelines. This unit is also classified by UL for use in select GE, ITE/Siemens, and Crouse-Hinds Panels. (Refer to Pub No. 5655B65H01 for additional details.)

- Type CHQSA**—For use on single-phase, 120/240 Vac systems. This unit easily plugs into a Square D single-phase loadcenter Type QO® and occupies two 3/4-inch (19.1 mm) pole spaces similar to a two-pole Type QO breaker. When installed properly, it provides surge protection for the entire loadcenter. If internal components are damaged, the CHQSA LED visual indicators will signal the need for a replacement. This device is suitable for service entrance locations installed in accordance with NEC guidelines. This device is UL classified to be used in place of Square D Type QO surge arresters (refer to Pub-23974).

- Type BRSURGECSA**—For use on single-phase 120/240 Vac systems. This easily plugs into a single-phase Type BR loadcenter and occupies two 1-inch (25.4 mm) pole spaces similar to a two-pole Type BR breaker. When installed properly, it provides surge protection for the entire loadcenter. If internal components are damaged, the BRSURGECSA LED visual indicators will signal the need for replacement. This device is suitable for service entry locations when installed in accordance with Canadian Electrical Code. This device is CSA® listed to be used in a Type BR loadcenter.

Type 3 Point-of-Use Surge Protection

Point-of-use surge strips are designed to offer premium surge protection for specific electronics while providing innovative features to enhance user convenience.

Standards and Certifications

- CHSPT1 Products: UL 1449 3rd Edition Type 1
- CHSPT2 Products: UL/cUL® 1449 3rd Edition Type 2
- CHSPTELE: UL 497A, cUL
- CHSPCABLE: UL 6500, cUL
- NEMA® 3R Enclosure for CHSPTELE and CHSPCABLE: UL 50 Enclosure
- BRSURGE, CHSA, BRSURGECSA, CHQSA: UL 1449 3rd Edition plug-in type; Type 2 SPD



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SPD Type 1 CHSP Service Entrance Surge Protection—UL 1449 3rd Edition

Product Features

- Commercial grade AC power protection
- Type 1 surge device for installation before or after the main service disconnect
- Convenient mounting options—universal fit to any manufacturer’s equipment
- Clear, visible LED indication displaying status of the surge protector

Catalog Number	Connection	Enclosure	Voltage	Phase	Frequency (Hz)	MCOV ^①	VPR ^②	I _n ^③	SCCR ^④	Surge Current Capacity, Per Phase Rating ^⑤
 CHSPT1ULTRA	Permanently connected device installed before or after the service disconnect overcurrent device.	NEMA 4	100/200, 110/220, 120/240	Single	50/60	L-L 300, L-N 150	L-L 1000, L-N 600	20 kA	200 kA	50 kA
 CHSPT1MAX	Permanently connected device installed before or after the service disconnect overcurrent device.	NEMA 4	100/200, 110/220, 120/240	Single	50/60	L-L 300, L-N 150	L-L 1000, L-N 600	20 kA	200 kA	45 kA
 CHSPT1MICRO	Permanently connected device installed before or after the service disconnect overcurrent device.	NEMA 4	100/200, 110/220, 120/240	Single	50/60	L-L 300, L-N 150	L-L 1000, L-N 600	20 kA	200 kA	36 kA
 CHSPT1-208Y	Permanently connected device installed before or after the service disconnect overcurrent device.	NEMA 4	120/208	Three-phase wye	50/60	L-L 300, L-N 150	L-L 1000, L-N 600	20 kA	200 kA	50 kA

Accessory for Type 1 CHSP Service Entrance Surge Protection

Catalog Number	Description
 SP1DINRAILKIT	Mounting kit for wall or DIN rail installation.

Notes




- ① MCOV: Maximum Continuous Operating Voltage that may be applied to the device per mode.
- ② VPR: Voltage Protection Rating is the measured limiting voltage after a surge event.
- ③ I_n: Nominal Discharge Current is the current that the device can withstand for 15 impulses.
- ④ SCCR: The amount of current the product can withstand under short-circuit conditions.
- ⑤ Surge Current Capacity: The maximum one time surge current rating per phase.

For warranty details, go to www.eaton.com/surgetrap.

SPD Type 2 CHSP Service Entrance Surge Protection—UL 1449 3rd Edition; cUL

Product Features

- AC power protection
- Universally connects to any manufacturer's loadcenter (breaker box)
- Quick connect design—easy to mount telephone and cable protection modules
- LED status indication

Catalog Number	Connection	Enclosure	Voltage	Phase	Frequency (Hz)	MCOV ^①	VPR ^②	I _n ^③	SCCR ^④	Surge Current Capacity, Per Phase Rating ^⑤	
CHSPT2ULTRA 	CHSPT2ULTRA	Can be attached to the outside of any manufacturer's loadcenter (breaker box). This product should be connected on the load side of the loadcenter main service disconnect through a dedicated circuit breaker (follow NEC Guidelines).	NEMA 4	120/240 Vac rated line voltage	Single	60	150V L-N, 300V L-L	600V L-N, 1000V L-L, 800V N-G, 600V L-G	20 kA ^⑥	22 kA	108 kA (L1-N 54 kA, L1-G 54 kA, L2-N 54 kA, L2-G 54 kA)
CHSPT2MAX 	CHSPT2MAX	Can be attached to the outside of any manufacturer's loadcenter (breaker box). This product should be connected on the load side of the loadcenter main service disconnect through a dedicated circuit breaker (follow NEC Guidelines).	NEMA 4	120/240 Vac rated line voltage	Single	60	150V L-N, 300V L-L	600V L-N, 1000V L-L, 800V N-G, 600V L-G	10 kA	22 kA	72 kA (L1-N 36 kA, L1-G 36 kA, L2-N 36 kA, L2-G 36 kA)
CHSPT2MICRO 	CHSPT2MICRO	Can be attached to the outside of any manufacturer's loadcenter (breaker box). This product should be connected on the load side of the loadcenter main service disconnect through a dedicated circuit breaker (follow NEC Guidelines).	NEMA 4	120/240 Vac rated line voltage	Single	60	150V L-N, 300V L-L	600V L-N, 1000V L-L, 800V N-G, 600V L-G	5 kA	22 kA	36 kA (L1-N 18 kA, L1-G 18 kA, L2-N 18 kA, L2-G 18 kA)

Notes

- ^① MCOV: Maximum Continuous Operating Voltage that may be applied to the device per mode.
^② VPR: Voltage Protection Rating is the measured limiting voltage after a surge event.
^③ I_n: Nominal Discharge Current is the current that the device can withstand for 15 impulses.
^④ SCCR: The amount of current the product can withstand under short-circuit conditions.
^⑤ Surge Current Capacity: The maximum one time surge current rating per phase.
^⑥ When used with a 50A two-pole circuit breaker, 10 kA when used with a 15A two-pole circuit breaker.

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Accessories for CHSP Type 2 Service Entrance Protection

Catalog Number	Description	Installation	Surge Current Capacity	DC Breakdown Voltage	Voltage
 <p>CHSPCABLE</p>	CHSPCABLE	Quick Connect design—add additional telephone and AC protection modules; protects two quad shield cables; bi-directional	Indoor installation; or rain-tight when used with recommended enclosure	10 kA per line	145V
 <p>CHSPTELE</p>	CHSPTELE	Quick Connect design—add additional AC and cable protection modules; protects four telephone lines	Indoor installation; or rain-tight when used with recommended enclosure	20 kA per line	230V Ring 90–120 Vac/ Tone 48–52 Vdc
 <p>CHSPT23PACK</p>	CHSPT23PACK	3-Pack: CHSPT2ULTRA+CHSPTELE+CHSPCABLE; Surge protection for AC power, telephone and cable—see individual product features		See individual product ratings	
 <p>CHSP3RTELCABLE</p>	CHSP3RTELCABLE	Raintight enclosure for CHSPTELE and CHSPCABLE; top or bottom feed; enclosure only, surge not included; accommodates up to two devices			
 <p>CHSPFMKIT</p>	CHSPFMKIT	Flushmount kit for: CHSPT2ULTRA, CHSPT2MAX, CHSPT2MICRO, CHSPTELE, CHSPCABLE			
 <p>MSEGR2</p>	MSEGR2	Outdoor communication grounding device; meets 2008 NEC requirements for intersystem bonding termination			

Note

For warranty details, go to www.eaton.com/surgetrap.

Factory-Installed Surge Protection

- Includes a CHSPT2ULTRA and a two-pole 50A circuit breaker
- Increases the effectiveness of surge protection due to reduced lead length
- A modified deadfront allows for easy viewing of indicating lights for status indication

Surge Installed**Surge Installed Loadcenters**

Catalog Number	Description	Cover Catalog Number	
		Combination	Surface
CHSUR42N225L ①	42 ckt, 225A, convertible	CHSUR8LF	CHSUR8LS
CHSUR42L225L2 ①	42 ckt, 225A, convertible ②	CHSUR8LF	CHSUR8LS
CHSUR42B200L2 ①	42 ckt, 200A, main breaker	CHSUR8LF	CHSUR8LS
CHSUR32N225K ①	32 ckt, 225A, convertible	CHSUR8KF	CHSUR8KS
CHSUR32L225K ①	32 ckt, 225A, convertible ②	CHSUR8KF	CHSUR8KS
CHSUR32B200K ①	32 ckt, 200A, main breaker	CHSUR8KF	CHSUR8KS
CHSUR32B150K ①	32 ckt, 150A, main breaker	CHSUR8KF	CHSUR8KS
CHSUR32B100K ①	32 ckt, 100A, main breaker	CHSUR8KF	CHSUR8KS
CHSUR24L125E ①	24 ckt, 125A, convertible ②	CHSUR8EF	CHSUR8ES
CHSUR24B100E ①	24 ckt, 100A, main breaker	CHSUR8EF	CHSUR8ES
BRSUR4040N200	40/40 ckt, 200A, convertible	Cover included	
BRSUR4040L200	40/40 ckt, 200A, main lug	Cover included	
BRSUR4040B200	40/40 ckt, 200A, main breaker	Cover included	
BRSUR3040N200	30/40 ckt, 200A, convertible	Cover included	
BRSUR3040L200	30/40 ckt, 200A, main lug	Cover included	
BRSUR3040B200	30/40 ckt, 200A, main breaker	Cover included	

Surge Ready Loadcenters

- Provides a mounting provision for CHSPT2ULTRA
- A modified deadfront allows for easy viewing of indicating lights

Surge Ready**Surge Ready Loadcenters (Provision Only, CHSPT2ULTRA and Breaker Not Included)**

Catalog Number	Description	Cover Catalog Number	
		Combination	Surface
CHEC42N225L ①	42 ckt, 225A, convertible	CHSUR8LF	CHSUR8LS
CHEC42L225L ①	42 ckt, 225A, convertible ②	CHSUR8LF	CHSUR8LS
CHEC42B200L ①	42 ckt, 200A, main breaker	CHSUR8LF	CHSUR8LS
CHEC32L225K ①	32 ckt, 225A, convertible ②	CHSUR8KF	CHSUR8KS
CHEC32N225K ①	32 ckt, 225A, convertible	CHSUR8KF	CHSUR8KS
CHEC32B200K ①	32 ckt, 200A, main breaker	CHSUR8KF	CHSUR8KS
CHEC32B150K ①	32 ckt, 150A, main breaker	CHSUR8KF	CHSUR8KS
CHEC32B100K ①	32 ckt, 100A, main breaker	CHSUR8KF	CHSUR8KS
CHEC24L125E ①	24 ckt, 125A, convertible ②	CHSUR8EF	CHSUR8ES
CHEC24B100E ①	24 ckt, 100A, main breaker	CHSUR8EF	CHSUR8ES

Notes

- ① Order cover separately.
② With main lugs installed.

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SPD Type 2 Plug-On Surge Protection—UL 1449 3rd Edition

Product Features

- Convenient surge protection for the loadcenter

Catalog Number	Description	Connection	Voltage	Phase	Frequency (Hz)	MCOV ^①	VPR ^②	I _n ^③	SCCR ^④	Surge Current Capacity, Per Phase Rating ^⑤
BRSURGE	 BRSURGE UL for use in a single-phase Type BR loadcenter. This unit is classified by UL for use in select GE, ITE/Siemens and Crouse-Hinds panels (refer to Pub. No. 5655B65H01 for additional details).	Plug on to the loadcenter bus; see instructions.	120/240	Single	60	L1-N 150V, L-L 300V	L1-N 600V, L-L 1000V	3k	10k	18 kA
CHSA	 CHSA UL and CSA for use in a Type CH loadcenter.	Plug on to the loadcenter bus; see instructions.	120/240	Single	60	L1-N 150V, L-L 300V	L1-N 600V, L-L 1000V	3k	10k	18 kA
BRSURGECSA	 BRSURGECSA CSA for use in an Eaton Type BR loadcenter.	Plug on to the loadcenter bus; see instructions.	120/240	Single	60	L1-N 150V, L-L 300V	L1-N 600V, L-L 1000V	3k	10k	18 kA
CHQSA	 CHQSA This device is UL classified to be used in place of Square D Type QO surge arresters (refer to Pub-23974).	Plug on to the loadcenter bus; see instructions.	120/240	Single	60	L1-N 150V, L-L 300V	L1-N 600V, L-L 1000V	3k	10k	18 kA

Notes

- ① MCOV: Maximum Continuous Operating Voltage that may be applied to the device per mode.
- ② VPR: Voltage Protection Rating is the measured limiting voltage after a surge event.
- ③ I_n: Nominal Discharge Current is the current that the device can withstand for 15 impulses.
- ④ SCCR: The amount of current the product can withstand under short-circuit conditions.
- ⑤ Surge Current Capacity: The maximum one-time surge current rating per phase.

For warranty details, go to www.eaton.com/surgetrap.