Surgelogic[®] Surge Protection Device

EMA, **EBA**, and **HWA** Series

Catalog 1310CT0202R5/07

2007

Class 1310



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Surgelogic[®] Surge Protection Device Product Descriptions

Product Descriptions



Description-EMA Series

The Surgelogic® EMA Series surge protective device is a modular parallel transient voltage surge suppressor (TVSS). The EMA device has multi-stage suppression circuits consisting of field-proven, fast-acting metal oxide varistors (MOVs).

A surge suppression path is provided for each mode, line-to-neutral (L–N), line-to-line (L–L), line-to-ground (L–G), and neutral-to-ground (N–G). Each surge suppression mode is individually fused and uses circuitry with thermal cutouts to isolate the TVSS and ensure shutdown in the event of MOV damage during severe overvoltages, even when operated on high-fault current power systems.



The suppression elements are encapsulated in a UL® Recognized potting material, another performance element that provides additional protection. A filter provides EMI / RFI noise attenuation. On-line diagnostics continuously monitor the device status, and LEDs signal a loss of a suppression circuit. An audible alarm with an enable / disable feature and dry contacts are included in the standard diagnostic package.

EMA Design Features

- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- · Individually fused suppression modes
- Thermal cutout
- Copper bus bar construction
- Solid state bi-directional
- Push-to-test on-line diagnostic display
- Front panel alarm with enable / disable switch
- LED indicators indicate loss of protection, or fully operational circuit

- High-energy parallel design for ANSI / IEEE C62.41 and C62.45 category B and C3 applications.
- Duty cycle tested (ANSI C62.41 C3, 10 kA 20 kV) minimum 5000 impulses
- Short circuit current rating: 200 kA
- EMI / RFI filtering up to -30 dB (100 kHz to 100 MHz)
- 5-year warranty
- UL 1449 Listed
- UL 1283 Listed



EMA Performance Features

Surge Capacity	L–N	L–G	N-G	(120 V Units)
120 kA / phase	60 kA	60 kA	120 kA	(90 kA)
160 kA / phase	80 kA	80 kA	120 kA	(90 kA)
240 kA / phase	120 kA	120 kA	120 kA	(90 kA)
320 kA / phase	160 kA	160 kA	240 kA	(180 kA)
480 kA / phase	240 kA	240 kA	240 kA	(180 kA)



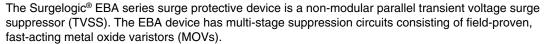
EMA Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number Service Voltage		L–N	L–G	N–G	L-L	MCOV ¹
TVS1EMA	120 / 240 V, 1-phase	400 V	400 V	400 V	800 V	150 V
TVS2EMA	208Y / 120 V, 3-phase or 3- or 4-wire	400 V	400 V	400 V	800 V	150 V
TVS3EMA	240 / 120 V, 3-phase high-leg delta	800 / 400 V	400 V	400 V	1500 / 800 V	275 / 150 V
TVS4EMA	480Y / 277 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1500 V	320 V
TVS7EMA	380Y / 220 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1500 V	320 V
TVS8EMA	600Y / 347 V, 3-phase, 3- or 4-wire	1200 V	1200 V	1200 V	2000 V	420 V

MCOV = Maximum Continuous Operating Voltage

Surgelogic[®] Surge Protection Device Product Descriptions

Description-EBA series





A surge suppression path is provided for each mode, line-to-neutral (L–N), line-to-line (L–L), line-to-ground (L–G), and neutral-to-ground (N–G). Each surge suppression mode is individually fused and uses circuitry with thermal cutouts to isolate the TVSS and ensure shutdown in the event of MOV damage during severe overvoltages, even when operated on high-fault current power systems.

The suppression elements are encapsulated in a UL® Recognized potting material, another performance element that provides additional protection. A filter provides EMI/RFI noise attenuation. On-line diagnostics continuously monitor the device status, and LEDs signal a loss of a suppression circuit. An audible alarm with an enable/disable feature and dry contacts are included in the standard diagnostic package.



EBA Design Features

- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- Individually fused suppression modes
- Thermal cutout
- · Solid state bi-directional
- Push-to-test on-line diagnostic display
- Front panel alarm with enable/disable switch
- LED indicators indicate loss of protection or fully operational circuit
- High-energy parallel design for ANSI/IEEE C62.41 and C62.45 category B and C3 applications
- Duty cycle tested (ANSI C62.41 C3, 10 kA 20kV) minimum 5000 impulses
- Short circuit current rating: 200 kA
- EMI/RFI filtering up to -30 dB (100 kHz to 100 MHz)
- 5-year warranty
- UL 1449 Listed
- UL 1283 Listed

EBA Performance Features

Surge Capacity	L-N	L-G	N-G	(120 V Units)
120 kA / phase	60 kA	60 kA	120 kA	(90 kA)
160 kA / phase	80 kA	80 kA	120 kA	(90 kA)
240 kA / phase	120 kA	120 kA	120 kA	(90 kA)

EBA Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number Service Voltage		L-N	L–G	N–G	L-L	MCOV ¹ ▲
TVS1EBA	120/240 V, 1-phase	400 V	400 V	400 V	800 V	150 V
TVS2EBA	208Y/120 V, 3-phase, 3- or 4-wire	400 V	400 V	400 V	800 V	150 V
TVS3EBA	240/120 V, 3-phase, high-leg delta	800/400 V	400 V	400 V	1500/800 V	275/150 V
TVS4EBA	480Y/277 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1500 V	320 V
TVS7EBA	380Y/220 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1500 V	320 V
TVS8EBA	600Y/347 V, 3-phase, 3- or 4-wire	1200 V	1200 V	1200 V	2000 V	420 V

MCOV = Maximum Continuous Operating Voltage



Surgelogic[®] Surge Protection Device Product Descriptions

Description-HWA Series



The Surgelogic® HWA series surge protective device is a non-modular, nipple mounted parallel transient voltage surge suppressor (TVSS). The HWA device has multi-stage suppression circuits consisting of field-proven, fast-acting metal oxide varistors (MOVs).

A surge suppression path is provided for each mode, line-to-neutral (L–N), line-to-line (L–L), line-to-ground (L–G), and neutral-to-ground (N–G). Each surge suppression mode is individually fused and uses circuitry with thermal cutouts to isolate the TVSS and ensure shutdown in the event of MOV damage during severe overvoltages, even when operated on high-fault current power systems.

The suppression elements are encapsulated in a UL® Recognized potting material, another performance element that provides additional protection. A filter provides EMI/RFI noise attenuation. On-line diagnostics continuously monitor the device status, and LEDs signal a loss of a suppression circuit. An audible alarm and dry contacts are included in the standard diagnostic package.

HWA Design Features

- External mounting to panelboards
- · Individually fused suppression modes
- · Thermal cutout
- · Solid state bi-directional
- LED indicators indicate loss of protection or fully operational circuit
- High-energy parallel design for ANSI/IEEE C62.41 and C62.45 category A, B, and C3 applications
- · Short circuit current rating: 200 kA
- EMI/RFI filtering up to -30 dB (100 kHz to 100 MHz)
- UL 1449 Listed
- UL 1283 Listed

HWA Performance Features

Surge Capacity	L-N	L-G	N-G
50 kA / phase	25 kA	25 kA	25 kA
80 kA / phase	40 kA	40 kA	40 kA
120 kA / phase	60 kA	60 kA	40 kA

HWA Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				VR)
Catalog Number	Service Voltage	L-N	L-G	N-G	L-L	MCOV ¹
TVS1HWA	120/240 V, 1-phase	400 V	400 V	400 V	800 V	150 V
TVS2HWA	208Y/120 V, 3-phase, 3- or 4-wire	400 V	400 V	400 V	800 V	150 V
TVS3HWA	240/120 V, 3-phase, high-leg delta	800/400 V	400 V	400 V	1500/800 V	275/150 V
TVS4HWA	480Y/277 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1600 V	320 V
TVS7HWA	380Y/220 V, 3-phase, 3- or 4-wire	800 V	800 V	800 V	1600 V	320 V
TVS8HWA	600Y/347 V, 3-phase, 3- or 4-wire	1200 V	1200 V	1200 V	2000 V	420 V

MCOV = Maximum Continuous Operating Voltage

Surgelogic[®] Surge Protection Device Application Information

Application Information

The effects of lightning and the damage caused by lightning-generated transients are well known. The failure of sensitive electronic equipment in a facility located in a high lightning area can easily be attributed directly to lightning-generated transients. Transient protection can be installed on the power distribution system to protect this equipment from these externally generated transients. Lower magnitude transients generated within a facility and their effect on microprocessor-based equipment are less obvious than the transients induced by lightning. Transient voltages generated from inductive motors, pumps, electric welders, etc., may not be large enough to cause immediate damage, but they can cause sensitive equipment to malfunction.

A damaging transient voltage can enter a facility from several locations. The highest level of protection should be provided at the service entrance. A second level of protection should be provided at distribution points serving critical areas, for example, computer rooms, accounting areas, and laboratories. Other facility entry points that should be protected include panels serving outdoor lights or outdoor equipment, such as motors. Protection should also be provided for critical areas with sensitive equipment essential to the company.

Square D[®] brand TVSS products offered by Schneider Electric provide protection at every level of the electrical distribution system.

Typical applications include:

Banking

- Transportation
- Retail

- Education
- Wastewater/Sanitation
- Utility

- Government
- Medical
- Insurance

- Petrochemical
- Financial
- Data Processing

- Military
- Telecommunications
- Publishing
- · Automated Manufacturing

NOTE: Refer to the product-specific catalog for information about internally mounted TVSS devices.

Surgelogic[®] Surge Protection Device Selection and Specifications

Selection and Specifications

EMA Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ¹
	120 kA	TVS1EMA12*_
	160 kA	TVS1EMA16*_
120/240 V, 1-phase, 3-wire	240 kA	TVS1EMA24*_
	320 kA	TVS1EMA32*_
	480 kA	TVS1EMA48*_
	120 kA	TVS2EMA12*_
	160 kA	TVS2EMA16*_
208Y/120 V, 3-phase, 3- or 4-wire	240 kA	TVS2EMA24*_
	320 kA	TVS2EMA32*_
	480 kA	TVS2EMA48*_
	120 kA	TVS3EMA12*_
	160 kA	TVS3EMA16*_
240/120 V, 3-phase, 4-wire, high-leg delta	240 kA	TVS3EMA24*_
	320 kA	TVS3EMA32*_
	480 kA	TVS3EMA48*_
	120 kA	TVS4EMA12*_
	160 kA	TVS4EMA16*_
480Y/277 V, 3-phase, 3- or 4-wire	240 kA	TVS4EMA24*_
	320 kA	TVS4EMA32*_
	480 kA	TVS4EMA48*_
	120 kA	TVS7EMA12*_
	160 kA	TVS7EMA16*_
380Y/220 V, 3-phase, 3- or 4-wire	240 kA	TVS7EMA24*_
	320 kA	TVS7EMA32*_
	480 kA	TVS7EMA48*_
	120 kA	TVS8EMA12*_
	160 kA	TVS8EMA16*_
600Y/347 V, 3-phase, 3- or 4-wire	240 kA	TVS8EMA24*_
	320 kA	TVS8EMA32*_
	480 kA	TVS8EMA48*_

 $^{^{1}}$ * = enclosure option, _ = any other options

Surgelogic[®] Surge Protection Device Selection and Specifications

EBA Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ¹
	120 kA	TVS1EBA12*_
120/240 V, 1-phase, 3-wire	160 kA	TVS1EBA16*_
	240 kA	TVS1EBA24*_
	120 kA	TVS2EBA12*_
208Y/120 V, 3-phase, 3- or 4-wire	160 kA	TVS2EBA16*_
	240 kA	TVS2EBA24*_
	120 kA	TVS3EBA12*_
240/120 V, 3-phase, 4-wire, high-leg delta	160 kA	TVS3EBA16*_
	240 kA	TVS3EBA24*_
	120 kA	TVS4EBA12*_
480Y/277 V, 3-phase, 3- or 4-wire	160 kA	TVS4EBA16*_
	240 kA	TVS4EBA24*_
	120 kA	TVS7EBA12*_
380Y/220 V, 3-phase, 3- or 4-wire	160 kA	TVS7EBA16*_
	240 kA	TVS7EBA24*_
	120 kA	TVS8EBA12*_
600Y/347 V, 3-phase, 3- or 4-wire	160 kA	TVS8EBA16*_
	240 kA	TVS8EBA24*_

^{1 * =} enclosure option, _ = any other options

HWA Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number
	50 kA	TVS1HWA50X
120/240 V, 1-phase, 3-wire	80 kA	TVS1HWA80X
	120 kA	TVS1HWA12X
	50 kA	TVS2HWA50X
208Y/120 V, 3-phase, 3- or 4-wire	80 kA	TVS2HWA80X
	120 kA	TVS2HWA12X
	50 kA	TVS3HWA50X
240/120 V, 3-phase, 4-wire, high-leg delta	80 kA	TVS3HWA80X
	120 kA	TVS3HWA12X
	50 kA	TVS4HWA50X
480Y/277 V, 3-phase, 3- or 4-wire	80 kA	TVS4HWA80X
	120 kA	TVS4HWA12X
	50 kA	TVS7HWA50X
380Y/220 V, 3-phase, 3- or 4-wire	80 kA	TVS7HWA80X
	120 kA	TVS7HWA12X
	50 kA	TVS8HWA50X
600Y/347 V, 3-phase, 3- or 4-wire	80 kA	TVS8HWA80X
	120 kA	TVS8HWA12X

Specifications

Relative Humidity	0 to 95% non-condensing
Operating Frequency	47–63 Hz
Storage Temperature	-40 to +65 °C (-40 to +149 °F)
Operating Temperature	EMA, EBA: 0° to +50 °C (+32° to +122 °F)
Operating remperature	HWA: -25° to +60 °C (-13° to +140 °F)
Standards	CUL, UL 1449 Second Edition, UL1283
Fusing	Individually fused suppression modes (200 kAIR)

Surgelogic[®] Surge Protection Device Selection and Specifications

Enclosure Options

Enclosure Type	Environment	Provides Protection Against	Available on Series	Catalog Option Number
NEMA 1	Indoor	Contact with the enclosed equipment.	EMA, EBA	А
NEMA 12	Indoor	Circulating dust, falling dirt, dripping liquids.	EMA, EBA	Α
NEMA 3R	Outdoor	Falling rain, sleet. Undamaged by ice.	EMA, EBA	А
NEMA 4X Stainless	Indoor/Outdoor	Windblown dust and rain, splashing water, hose-directed water. Resists corrosion (120 kA-240 kA units only).	EMA, EBA	S
NEMA 4X Plastic	Indoor/Outdoor	Windblown dust and rain, splashing water, hose-directed water. Resists corrosion.	HWA only	None (standard)

Other Options

Option	Description	Available on Series	Catalog Option Number
Audible Alarm	The audible alarm provides sound if an inoperative condition occurs.	All	None (standard)
Dry Contacts	Provides available Form C type contacts.	All	None (standard)
Integral Disconnect	Provides a mechanical means to electrically disconnect the entire surge suppressor to facilitate the servicing of the unit's components.	EMA, EBA	1
Surge Counter	Displays the combined total number of transient voltage surges detected from L–G, L–L, L–N, and N–G since the counter was last reset.	EMA, EBA	С
Remote Monitor Displays the alarm status of the surge protective device up to 1,000 ft (305 m) away from the unit. This option uses the dry contacts.		All	TVS12RMU
Flush-Mount Collar	Provides a mechanical means to install the surge protective device flush to	EMA, EBA	TVS12FMK (12 in.)
	the surface of a wall (120 kA–240 kA units only).		TVS20FMK (20 in.)

EMA Module Replacements

Contain Vallage 1	Peak Surge	Catalog Number		
System Voltage ¹	Current Rating	Phase A	Phase B	Phase C
	120 kA	MA1IMA12	empty	MA1IMA12
120/240 V, 1-phase, 3-wire	160 kA	MA1IMA16	empty	MA1IMA16
	240 kA	MA1IMA24	empty	MA1IMA24
	120 kA	MA1IMA12	MA1IMA12	MA1IMA12
208Y/120 V, 3-phase, 3- or 4-wire	160 kA	MA1IMA16	MA1IMA16	MA1IMA16
	240 kA	MA1IMA24	MA1IMA24	MA1IMA24
	120 kA	MA1IMA12	MA3IMA12	MA1IMA12
240/120 V, 3-phase, 4-wire, high-leg delta ²	160 kA	MA1IMA16	MA3IMA16	MA1IMA16
	240 kA	MA1IMA24	MA3IMA24	MA1IMA24
480Y/277 V, 3-phase, 3- or 4-wire	120 kA	MA4IMA12	MA4IMA12	MA4IMA12
	160 kA	MA4IMA16	MA4IMA16	MA4IMA16
	240 kA	MA4IMA24	MA4IMA24	MA4IMA24
	120 kA	MA7IMA12	MA7IMA12	MA7IMA12
380Y/220 V, 3-phase, 3- or 4-wire	160 kA	MA7IMA16	MA7IMA16	MA7IMA16
	240 kA	MA7IMA24	MA7IMA24	MA7IMA24
	120 kA	MA8IMA12	MA8IMA12	MA8IMA12
600Y/347 V, 3-phase, 3- or 4-wire	160 kA	MA8IMA16	MA8IMA16	MA8IMA16
	240 kA	MA8IMA24	MA8IMA24	MA8IMA24

With all system voltages, TVSS devices must be grounded in accordance with all applicable standards.

 $^{^{2}\,\,}$ Phase B modules are different than Phase A and Phase C modules.

Surgelogic[®] Surge Protection Device Selection and Specifications

EBA Module Replacements

System Voltage ¹	Peak Surge Current Rating	Catalog Number
	120	MA1IBA12
120/240 V, 1-phase, 3-wire	160	MA1IBA16
	240	MA1IBA24
	120	MA2IBA12
208Y/120 V, 3-phase, 3- or 4-wire	160	MA2IBA16
	240	MA2IBA24
	120	MA3IBA12
240/120 V, 3-phase, 4-wire, high-lag delta	160	MA3IBA16
	240	MA3IBA24
	120	MA4IBA12
480Y/277 V, 3-phase, 3- or 4-wire	160	MA4IBA16
	240	MA4IBA24
	120	MA7IBA12
380Y/220 V, 3-phase, 3- or 4-wire	160	MA7IBA16
	240	MA7IBA24
	120	MA8IBA12
600Y/347 V, 3-phase, 3- or 4-wire	160	MA8IBA16
	240	MA8IBA24

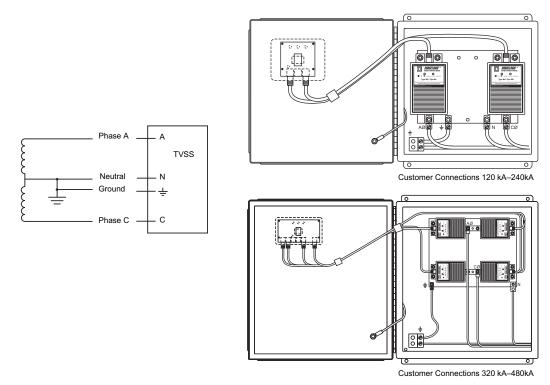
With all system voltages, TVSS devices must be grounded in accordance with all applicable standards.

Surgelogic[®] Surge Protection Device Wiring Diagrams

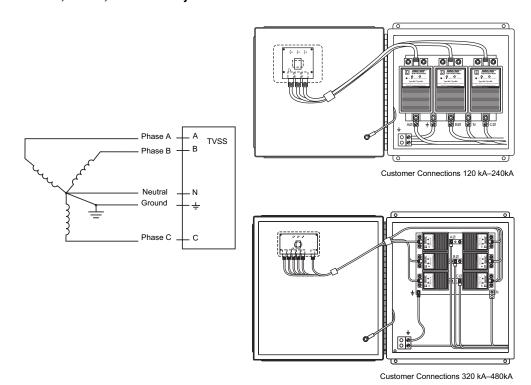
Wiring Diagrams

EMA Series

EMA 1-Phase, 3-Wire, Grounded Installation

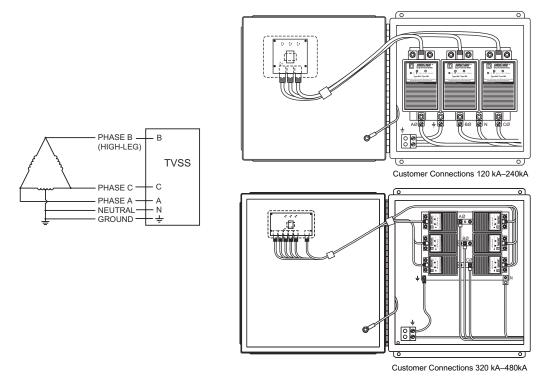


EMA 3-Phase, 4-Wire, Grounded Wye Installation

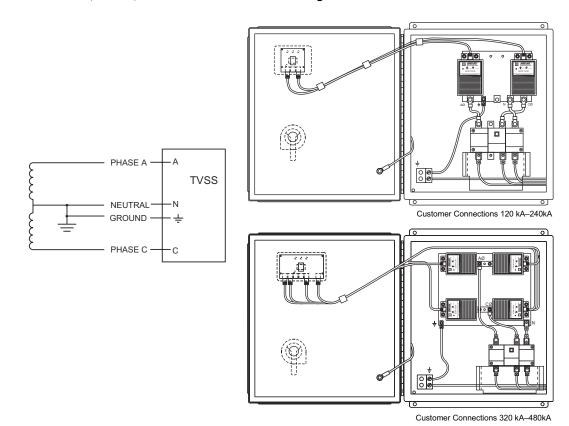


Surgelogic[®] Surge Protection Device Wiring Diagrams

EMA 3-Phase, 4-Wire, High-Leg Delta Installation

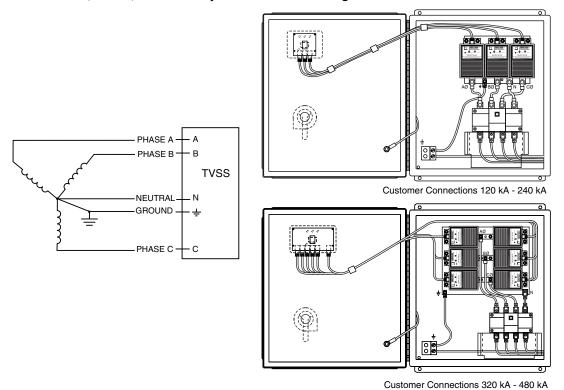


EMA 1-Phase, 3-Wire, Grounded Installation with Integral Disconnect

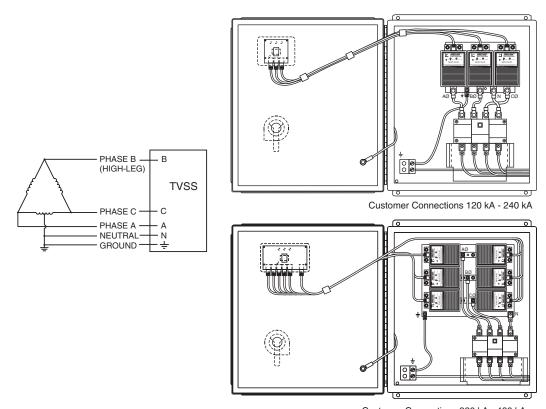


Surgelogic[®] Surge Protection Device Wiring Diagrams

EMA 3-Phase, 4-Wire, Grounded Wye Installation with Integral Disconnect



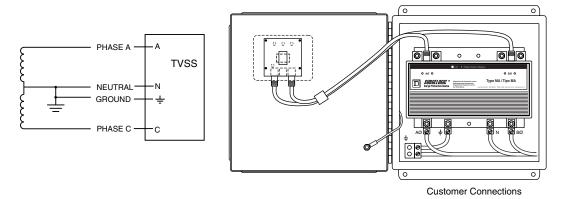
EMA 3-Phase, 4-Wire, High-Leg Delta Installation with Integral Disconnect



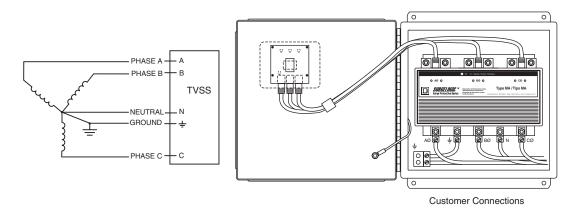
Surgelogic[®] Surge Protection Device Wiring Diagrams

EBA Series

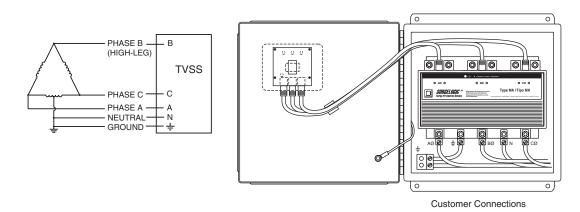
EBA 1-Phase, 3-Wire, Grounded Installation



EBA 3-Phase, 4-Wire, Grounded Wye Installation

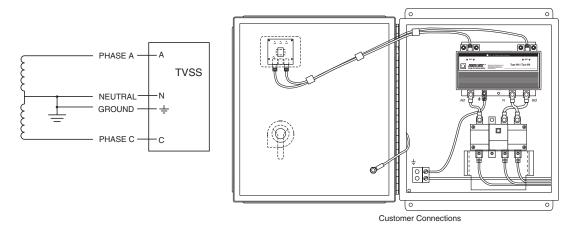


EBA 3-Phase, 4-Wire, High-Leg Delta Installation

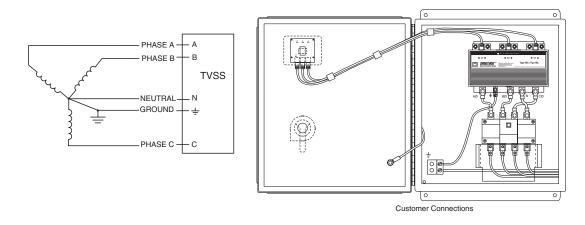


Surgelogic[®] Surge Protection Device Wiring Diagrams

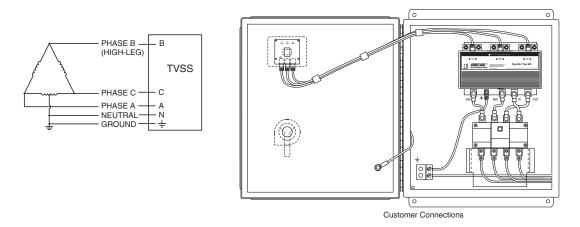
EBA 1-Phase, 3-Wire, Grounded Installation with Integral Disconnect



EBA 3-Phase, 4-Wire, Grounded Wye Installation with Integral Disconnect



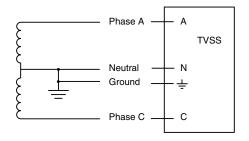
EBA 3-Phase, 4-Wire, High-Leg Delta Installation with Integral Disconnect

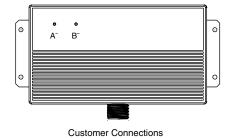


Surgelogic[®] Surge Protection Device Wiring Diagrams

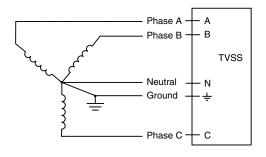
HWA Series

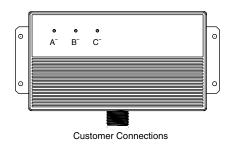
HWA 1-Phase, 3-Wire, Grounded Installation



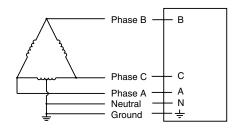


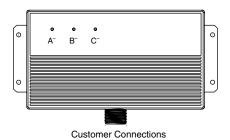
HWA 3-Phase, 4-Wire, Grounded Wye Installation





HWA 3-Phase, 4-Wire, High-Leg Delta Installation

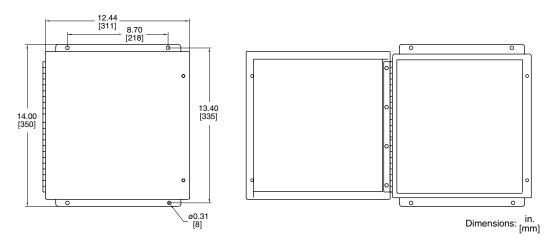




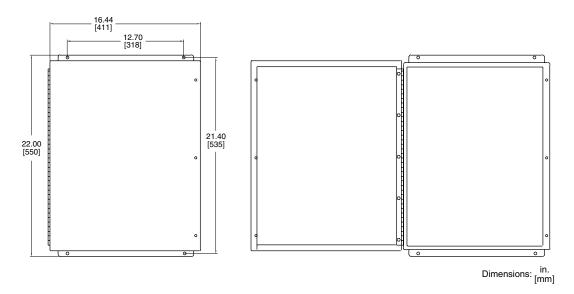
Dimensions and Weights

EMA/EBA Series

12 x 12 NEMA 1 / 3R / 12 Enclosures12 x 12 NEMA 1 / 3R / 12 Enclosures



16 x 20 NEMA 1 / 3R / 12 Enclosures with Integral Disconnect, NEMA 4X Stainless Steel Enclosure with or without Integral Disconnect



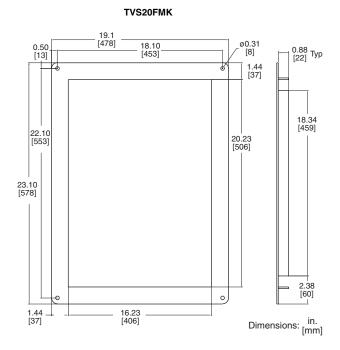
Dimensions	Inches [mm]
Approx. Weight	35 lbs (15 kg) maximum
Depth	6 in. (152 mm)

Surgelogic[®] Surge Protection Device Dimensions and Weights

12 inch (305 mm) and 20 inch (508 mm) Flush-Mount Collars

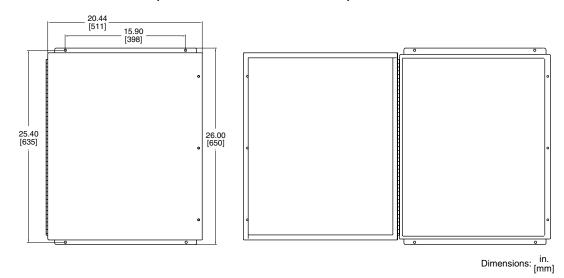
TVS12FMK

15.10 0.50 [378] 14.10 [8] 0.88 Typ 11.44 [37] 12.23 [306] 12.23 [306] 13.34 [259] 12.23 [306] 13.34 [259] 13.34



Dimensions	Inches [mm]
Approx. Weight	5.6 lbs (2.5 kg) maximum
Depth	1.01 in. (26 mm)

20 x 24 NEMA 1 / 3R / 12 Enclosures for 320 kA and 480 kA Units with or without Integral Disconnect (Flush Mount Collar Not Available)

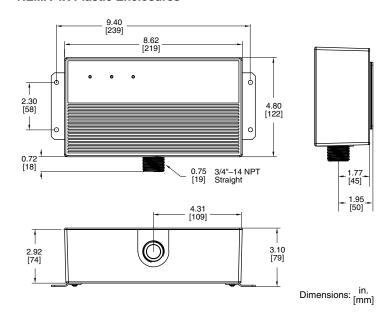


Dimensions	Inches [mm]
Approx. Weight	48 lbs (21 kg) maximum
Depth	6 in. (152 mm)

Surgelogic[®] Surge Protection Device Dimensions and Weights

HWA

NEMA 4X Plastic Enclosures



Dimensions	Inches [mm]
Approx. Weight	7 lbs (3 kg) maximum
Depth	3.10 in. (79 mm)
Wire Gauge	Power: #10 AWG, Dry Contacts: #22 AWG
Wire Length	24 in. (609.6 mm)

Surgelogic[®] Surge Protection Device Dimensions and Weights

1601 Mercer Road Lexington, KY 40511 USA 1-888-SquareD (1-888-778-2733) www.us.SquareD.com 19 Waterman Avenue, M4B 1 Y2 Toronto, Ontario 1-800-565-6699 www.schneider-electric.ca