

SURGELOGIC™ **Surge Protective Device** **Transient Voltage Surge Suppressor (TVSS)** **XGA, XT, XF, XP Series**

Class 1310



- Merlin Gerin**
- Modicon**
- Square D**
- Telemecanique**

Schneider Electric Brands

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SQUARE D
 Schneider Electric

Transient Voltage Surge Suppressor (TVSS) XGA Series



Description

The XGA series is a modular parallel transient voltage surge suppressor (TVSS) designed for service entrance or downstream applications. The XGA device is a multi-stage suppression circuit consisting of field-proven, fast-acting 40 mm 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 provide normal operation during severe overvoltages and high fault current conditions. The suppression elements are encapsulated in UL[®] Listed and patented Ceramgard[®], providing additional protection. A filter network is added to provide wave shape smoothing and a high level of EMI/RFI noise attenuation. On-line diagnostics continuously monitor the unit status and have redundant LEDs to signal a reduction in surge capacity or loss of a suppression circuit. An audible alarm with test and silence features is included in the standard diagnostic package.

Design Features

- Individually fused suppression modes
- Thermal cutout
- Copper bus bar connection
- Solid state bi-directional
- Front panel alarm with test/silence switch
- LED indicators indicate loss of protection, or fully operational circuit
- High-energy parallel design for category A, B, and C3 applications
- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- AC tracking filter with EMI/RFI filtering up to -50 dB from 100 kHz to 100 MHz

Performance Features

Surge Capacity	L–N	L–G	N–G
160 kA / phase	80 k	80 k	120 k
240 kA / phase	120 k	120 k	120 k

XGA Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number	Service Voltage	L–N	L–G	N–G	L–L	MCOV ▲
TVS1XGA...	120/240 V, 1-phase	330	330	330	700	150
TVS2XGA...	208Y/120 V, 3-phase, 4-wire	330	330	330	700	150
TVS3XGA...	240/120 V, 3-phase, high-leg delta	700/330	330	330	1200/700	275/150
TVS4XGA...	480Y/277 V, 3-phase, 4-wire	600	600	600	1200	320
TVS8XGA...	600Y/347 V, 3-phase, 4-wire	1000	1000	900	1800	420

▲ MCOV = maximum continuous operating voltage



Transient Voltage Surge Suppressor (TVSS) XT Series



Description

The XT series is a non-modular parallel transient voltage surge suppressor (TVSS) designed for service entrance or downstream applications. The XT device is a multi-stage suppression circuit consisting of field-proven, fast-acting 40 mm 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 provide normal operation during severe overvoltages and high fault current conditions. The suppression elements are encapsulated in UL® Listed and patented Ceramgard®, providing additional protection. A filter network is added to provide wave shape smoothing and a high level of EMI/RFI noise attenuation. On-line diagnostics continuously monitor the unit status and have redundant LEDs to signal a reduction in surge capacity or loss of a suppression circuit. An audible alarm with test and silence features is included in the standard diagnostic package.

Design Features

- Individually fused suppression modes
- Thermal cutout
- Solid state bi-directional
- Front panel alarm with test/silence switch
- LED indicators indicate loss of protection, or fully operational circuit
- High-energy parallel design for category A, B, and C3 applications
- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- AC tracking filter with EMI/RFI filtering up to -50 dB from 100 kHz to 100 MHz

Performance Features

Surge Capacity	L–N	L–G	N–G
120 kA / phase	80 k	40 k	120 k
160 kA / phase	80 k	80 k	120 k
240 kA / phase	120 k	120 k	120 k

XT Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number	Service Voltage	L–N	L–G	N–G	L–L	MCOV ▲
TVS1XT...	120/240 V, 1-phase	330	330	330	700	150
TVS2XT...	208Y/120 V, 3-phase, 4-wire	330	330	330	700	150
TVS3XT...	240/120 V, 3-phase, high-leg delta	700/330	330	330	1000/700	275/150
TVS4XT...	480Y/277 V, 3-phase, 4-wire	600	600	600	1200	320
TVS8XT...	600Y/347 V, 3-phase, 4-wire	1000	1000	900	1800	420

▲ MCOV = maximum continuous operating voltage



Transient Voltage Surge Suppressor (TVSS) XF Series



Description

The XF series is a non-modular parallel transient voltage surge suppressor (TVSS) designed for service entrance or downstream applications. The XF device is a multi-stage suppression circuit 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 provide normal operation during severe overvoltages and high fault current conditions. The suppression elements are encapsulated in UL[®] Listed and patented Ceramgard[®], providing additional protection. A filter network is added to provide wave shape smoothing and a high level of EMI/RFI noise attenuation. On-line diagnostics continuously monitor the unit status and have LEDs to signal a reduction in surge capacity or loss of a suppression circuit. Optional diagnostic packages include an audible alarm and dry contacts.

Design Features

- 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 category A, B, and C3 applications
- External mounting next to panelboards
- AC tracking filter with EMI/RFI filtering up to -50 dB from 100 kHz to 100 MHz

Performance Features

Surge Capacity	L-N	L-G	N-G
80 kA / phase	40 k	40 k	30 k

XF Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number	Service Voltage	L-N	L-G	N-G	L-L	MCOV ▲
TVS1XF80...	120/240 V, 1-phase	330	330	330	700	150
TVS2XF80...	208Y/120 V, 3-phase, 4-wire	330	330	330	700	150
TVS3XF80...	240/120 V, 3-phase, high-leg delta	700/330	330	330	1000/700	275/150
TVS4XF80...	480Y/277 V, 3-phase, 4-wire	600	600	600	1200	320
TVS8XF80...	600Y/347 V, 3-phase, 4-wire	1000	1000	900	1800	420

▲ MCOV = maximum continuous operating voltage



Transient Voltage Surge Suppressor (TVSS) XP Series



Description

The XP series is a non-modular parallel transient voltage surge suppressor (TVSS) designed for service entrance or downstream applications. The XP device is a multi-stage suppression circuit 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 provide normal operation during severe overvoltages and high fault current conditions. The suppression elements are encapsulated in UL® Listed and patented Ceramgard®, providing additional protection. A filter network is added to provide wave shape smoothing and a high level of EMI/RFI noise attenuation. On-line diagnostics continuously monitor the unit status and have LEDs to signal a reduction in surge capacity or loss of a suppression circuit. Optional diagnostic packages include an audible alarm and dry contacts.

Design Features

- Individually fused suppression modes
- Solid state bi-directional
- LED indicators indicate loss of protection, or fully operational circuit
- High-energy parallel design for category A, B, and C3 applications
- External mounting next to panelboards
- AC tracking filter with EMI/RFI filtering up to -50 dB from 100 kHz to 100 MHz

Performance Features

Surge Capacity	L–N	L–G	N–G
50 kA / phase	25 k	25 k	19.5 k

XP Series Voltage Specifications		UL Suppression Voltage Rating (SVR)				
Catalog Number	Service Voltage	L–N	L–G	N–G	L–L	MCOV ▲
TVS1XP50...	120/240 V, 1-phase	330	330	330	700	150
TVS2XP50...	208Y/120 V, 3-phase, 4-wire	330	330	330	600	150
TVS3XP50...	240/120 V, 3-phase, high-leg delta	700/330	330	330	1000/700	275/150

▲ MCOV = maximum continuous operating voltage



Transient Voltage Surge Suppressor (TVSS) 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.

TVSS products offered by Square D Company provide protection at every level of the electrical distribution system.

Typical applications include:

- Banking
- Education
- Government
- Petrochemical
- Military
- Publishing
- Transportation
- Wastewater/Sanitation
- Medical
- Financial
- Telecommunications
- Automated Manufacturing
- Retail
- Utility
- Insurance
- Data Processing

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



Transient Voltage Surge Suppressor (TVSS) Selection and Specifications

XGA Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ■
120/240 V, 1-phase, 3-wire	160 kA	TVS1XGA16*_ _
	240 kA	TVS1XGA24*_ _
208Y/120 V, 3-phase, 4-wire	160 kA	TVS2XGA16*_ _
	240 kA	TVS2XGA24*_ _
240/120 V, 3-phase, 4-wire (high-leg delta)	160 kA	TVS3XGA16*_ _
	240 kA	TVS3XGA24*_ _
480Y/277 V, 3-phase, 4-wire	160 kA	TVS4XGA16*_ _
	240 kA	TVS4XGA24*_ _
600Y/347 V, 3-phase, 4-wire	160 kA	TVS8XGA16*_ _
	240 kA	TVS8XGA24*_ _

■ * = enclosure option, _ = any other options

XT Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ■
120/240 V, 1-phase, 3-wire	120 kA	TVS1XT12*_ _
	160 kA	TVS1XT16*_ _
	240 kA	TVS1XT24*_ _
208Y/120 V, 3-phase, 4-wire	120 kA	TVS2XT12*_ _
	160 kA	TVS2XT16*_ _
	240 kA	TVS2XT24*_ _
240/120 V, 3-phase, 4-wire (high-leg delta)	120 kA	TVS3XT12*_ _
	160 kA	TVS3XT16*_ _
	240 kA	TVS3XT24*_ _
480Y/277 V, 3-phase, 4-wire	120 kA	TVS4XT12*_ _
	160 kA	TVS4XT16*_ _
	240 kA	TVS4XT24*_ _
600Y/347 V, 3-phase, 4-wire	120 kA	TVS8XT12*_ _
	160 kA	TVS8XT16*_ _
	240 kA	TVS8XT24*_ _

■ * = enclosure option, _ = any other options

XF Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ■
120/240 V, 1-phase, 3-wire	80 kA	TVS1XF80*_ _
208Y/120 V, 3-phase, 4-wire	80 kA	TVS2XF80*_ _
240/120 V, 3-phase, 4-wire (high-leg delta)	80 kA	TVS3XF80*_ _
480Y/277 V, 3-phase, 4-wire	80 kA	TVS4XF80*_ _
600Y/347 V, 3-phase, 4-wire	80 kA	TVS8XF80*_ _

■ * = enclosure option, _ = any other options

XP Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ■
120/240 V, 1-phase, 3-wire	50 kA	TVS1XP50*_ _
208Y/120 V, 3-phase, 4-wire	50 kA	TVS2XP50*_ _
240/120 V, 3-phase, 4-wire (high-leg delta)	50 kA	TVS3XP50*_ _

■ * = enclosure option, _ = any other options



Transient Voltage Surge Suppressor (TVSS) Selection and Specifications

Specifications

Relative Humidity	0 to 95% non-condensing
Operating Frequency	47–63 Hz
Storage Temperature	-20 to +65 °C (-4 to +149 °F)
Operating Temperature	0 to +50 °C (+32 to +122 °F)
Standards	ANSI/IEEE C62.41 and C62.45 C-UL, UL 1449 Second Edition UL Category Section 37.3 (25 kA test)
Fusing	Individually fused suppression modes

Enclosure Options

Enclosure Type	Environment	Provides Protection Against	Available on Series	Catalog Option Number
NEMA Type 1	Indoor	Contact with the enclosed equipment.	All	A, F ♦
NEMA Type 12	Indoor	Circulating dust, falling dirt, dripping liquids.	All	R
NEMA Type 3R	Outdoor	Falling rain, sleet. Undamaged by ice.	All	R
NEMA Type 4	Indoor/Outdoor	Windblown dust and rain, splashing water, hose-directed water.	XGA	4
			XT, XF, XP	R
NEMA Type 4X	Indoor/Outdoor	Windblown dust and rain, splashing water, hose-directed water. Resists corrosion.	XGA only	X
NEMA Type 4X Stainless	Indoor/Outdoor	Windblown dust and rain, splashing water, hose-directed water. Resists corrosion.	XGA only	S

♦ A = surface mount; F = flush mount

Other Options

Option	Description	Available on Series	Catalog Option Number
Remote Monitor and Dry Contacts	Displays the alarm status of the surge protective device up to 1,000 ft (305 m) away from the unit. This option comes with and uses the dry contacts option.	All	M
Internal Circuit Isolator	Provides a mechanical means to electrically isolate the entire surge suppressor after opening the enclosure door to facilitate the servicing of the unit's components.	XGA	I
Audible Alarm	The audible alarm provides sound if an inoperative condition occurs.	XGA, XT	None (standard)
		XF, XP	AA
Dry Contacts	Provides an available 9-pin D-Sub style connector to monitor power ON/OFF and alarm status.	All	D
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.	XGA, XT	C

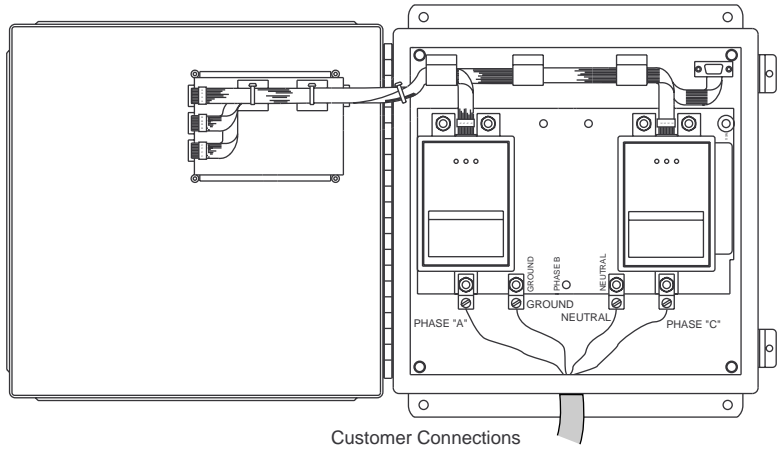
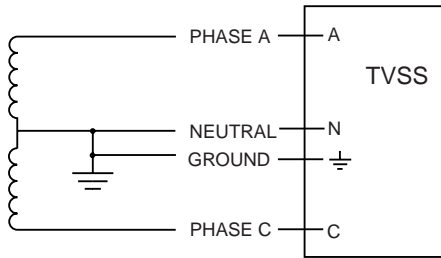
MA Module Replacements

System Voltage ●	Peak Surge Current Rating	Catalog Number		
		Phase A	Phase B	Phase C
120/240 V, 1-phase, 3-wire	160 kA	MA1XGA16	empty	MA1XGA16
	240 kA	MA1XGA24	empty	MA1XGA24
208Y/120 V, 3-phase, 4-wire	160 kA	MA1XGA16	MA1XGA16	MA1XGA16
	240 kA	MA1XGA24	MA1XGA24	MA1XGA24
120/240 V, 3-phase, 4-wire, high-leg delta ▼	160 kA	MA1XGA16	MA3XGA16	MA1XGA16
	240 kA	MA1XGA24	MA3XGA24	MA1XGA24
480Y/277 V, 3-phase, 4-wire	160 kA	MA4XGA16	MA4XGA16	MA4XGA16
	240 kA	MA4XGA24	MA4XGA24	MA4XGA24
600Y/347 V, 3-phase, 4-wire	160 kA	MA8XGA16	MA8XGA16	MA8XGA16
	240 kA	MA8XGA24	MA8XGA24	MA8XGA24

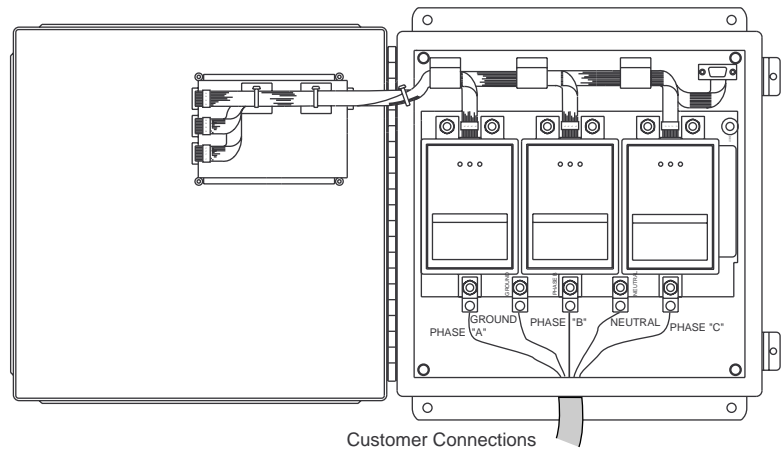
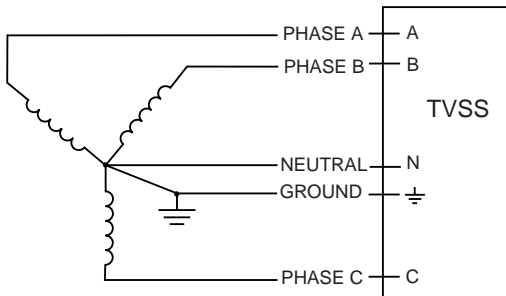
- With all system voltages, TVSS devices must be grounded in accordance with all applicable standards.
- ▼ Phase B modules are different than Phase A and Phase C modules.



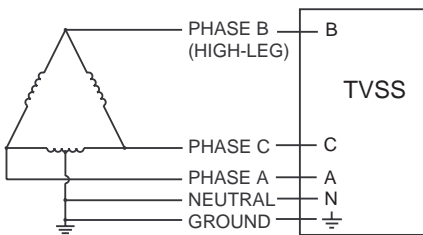
Transient Voltage Surge Suppressor (TVSS) XGA Series Wiring Diagrams



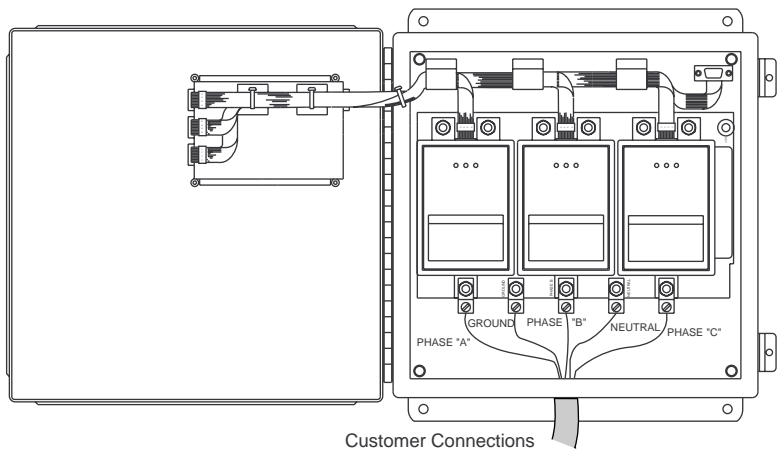
1-Phase, 3-Wire, Grounded Installation



3-Phase, 4-Wire, Grounded Wye Installation



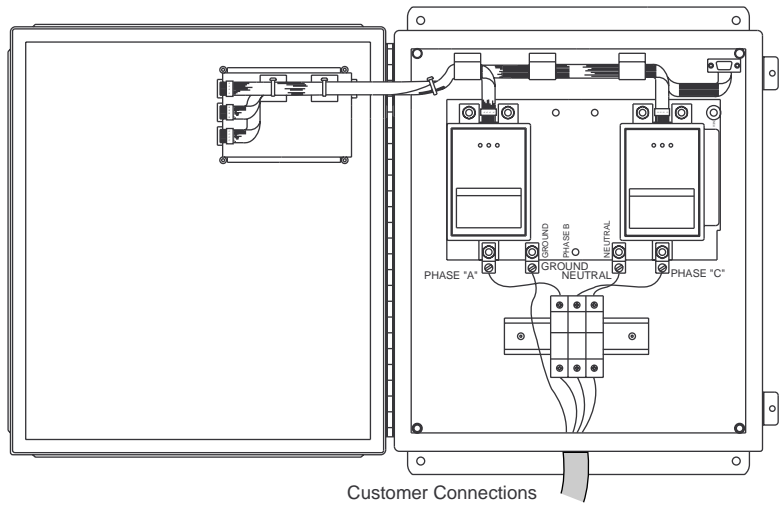
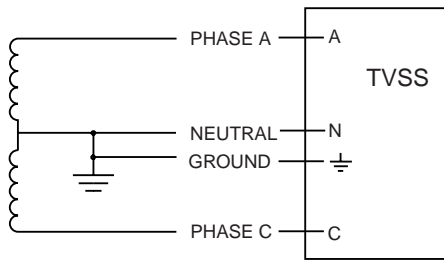
Note: The high-leg of the power system must connect to phase B of the TVSS.



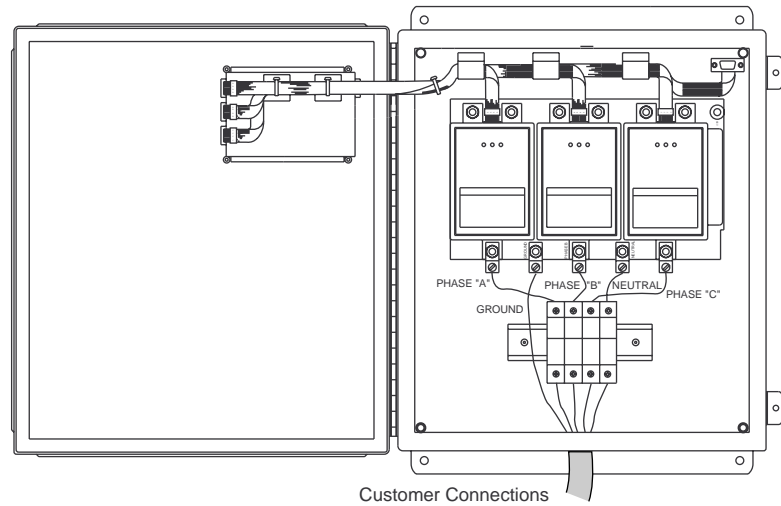
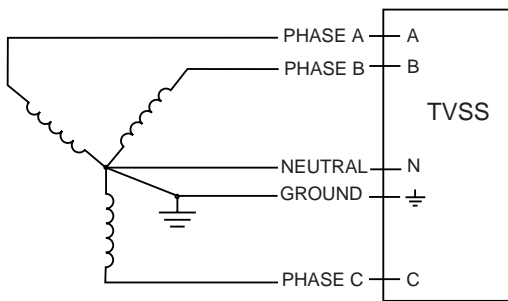
3-Phase, 4-Wire, High-Leg Delta Installation



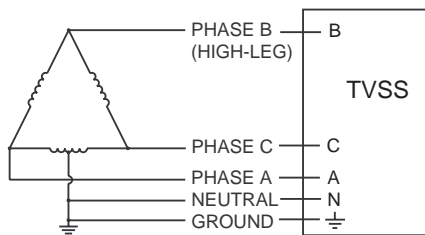
Transient Voltage Surge Suppressor (TVSS) XGA Series Wiring Diagrams



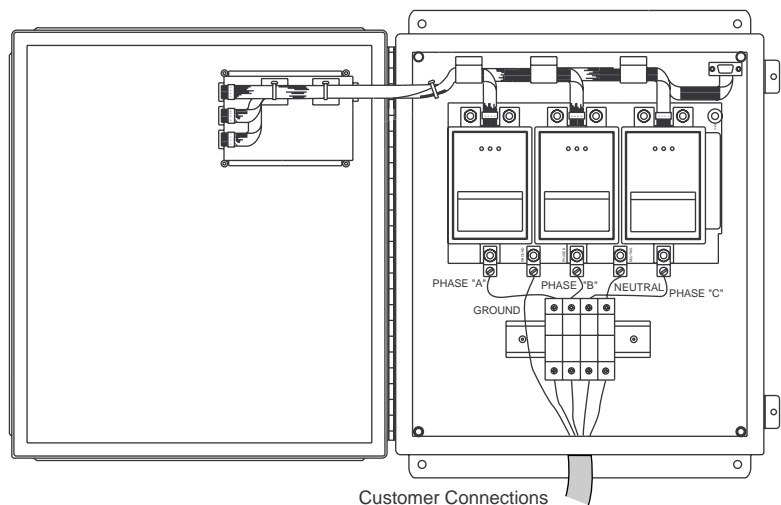
1-Phase, 3-Wire, Grounded Installation with Circuit Isolator



3-Phase, 4-Wire, Grounded Wye Installation with Circuit Isolator



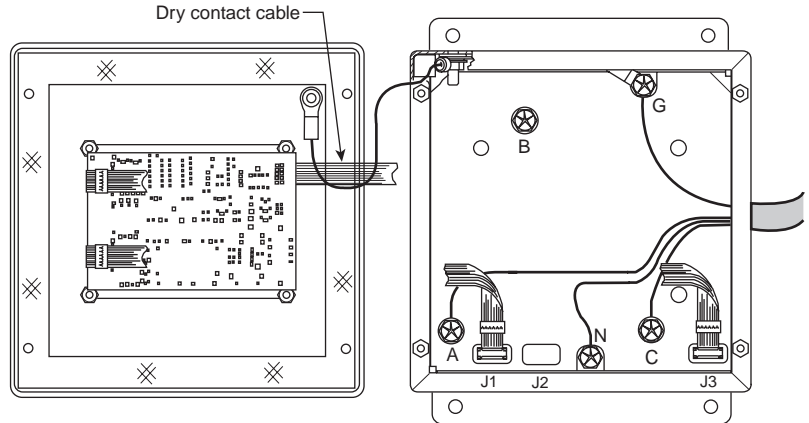
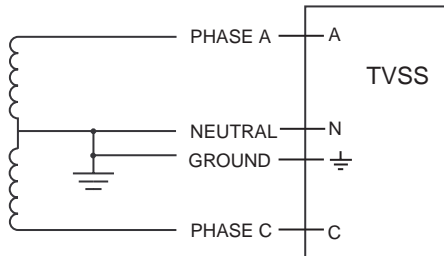
Note: The high-leg of the power system must connect to phase B of the TVSS.



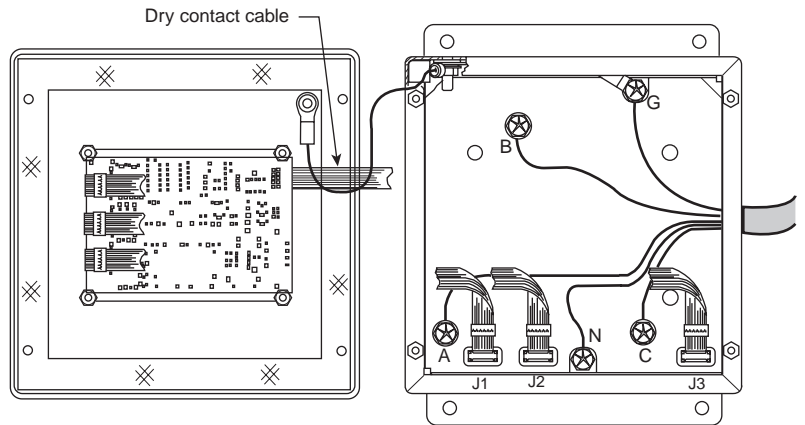
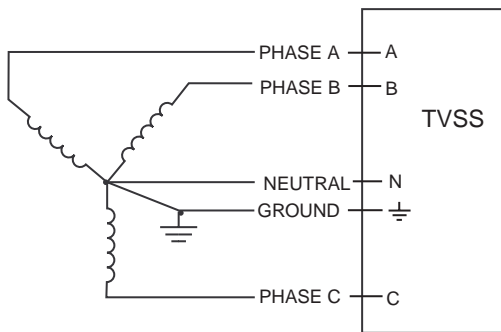
3-Phase, 4-Wire, High-Leg Delta Installation with Circuit Isolator



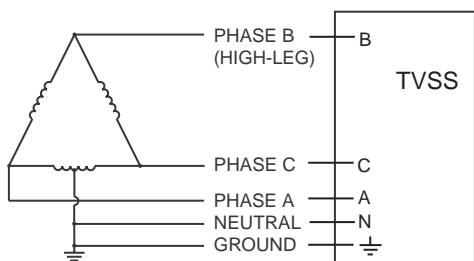
Transient Voltage Surge Suppressor (TVSS) XT Series Wiring Diagrams



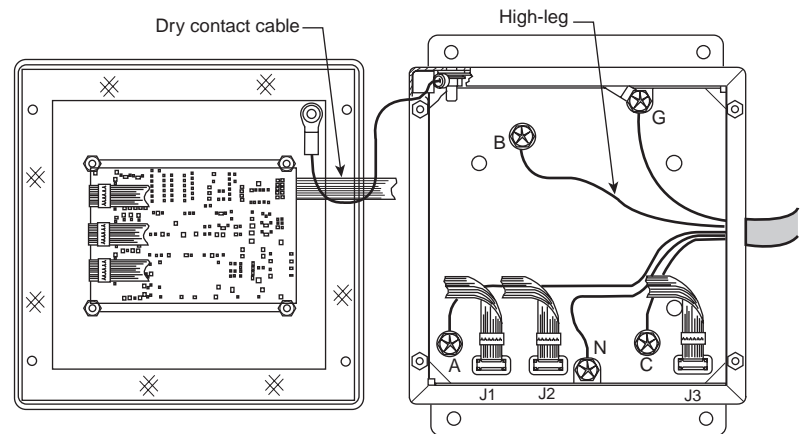
1-Phase, 3-Wire, Grounded Installation



3-Phase, 4-Wire, Grounded Wye Installation



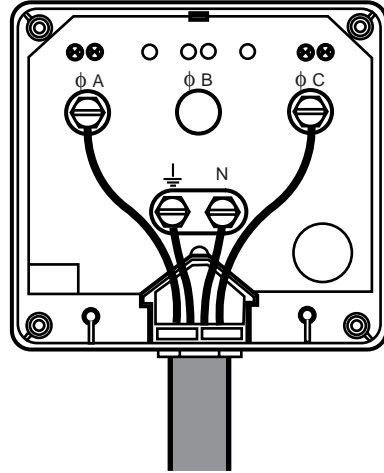
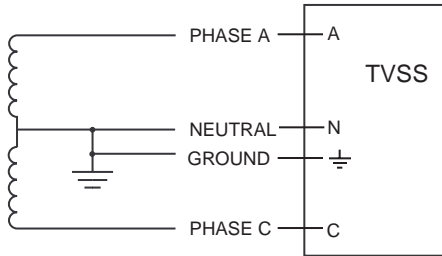
Note: The high-leg of the power system must connect to phase B of the TVSS.



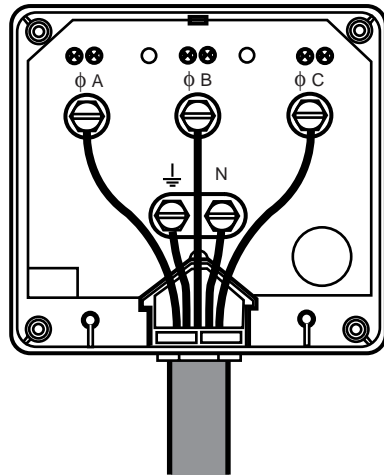
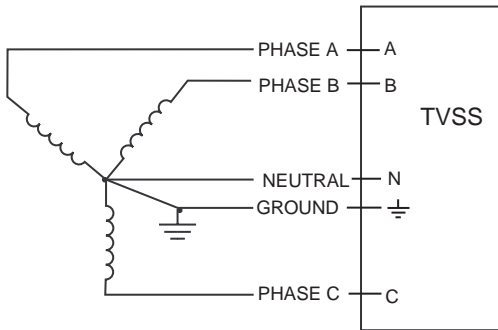
3-Phase, 4-Wire, High-Leg Delta Installation



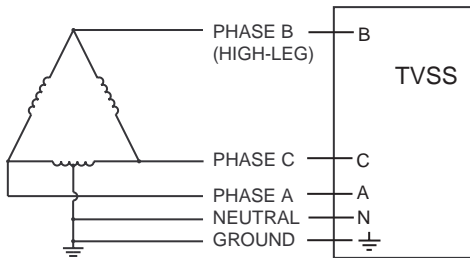
Transient Voltage Surge Suppressor (TVSS) XF/XP Series Wiring Diagrams



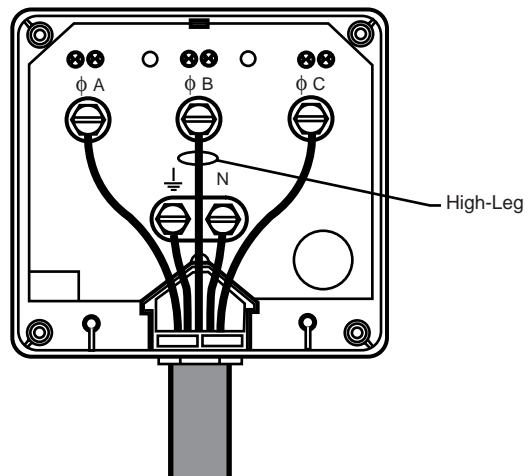
1-Phase, 3-Wire, Grounded Installation



3-Phase, 4-Wire, Grounded Wye Installation



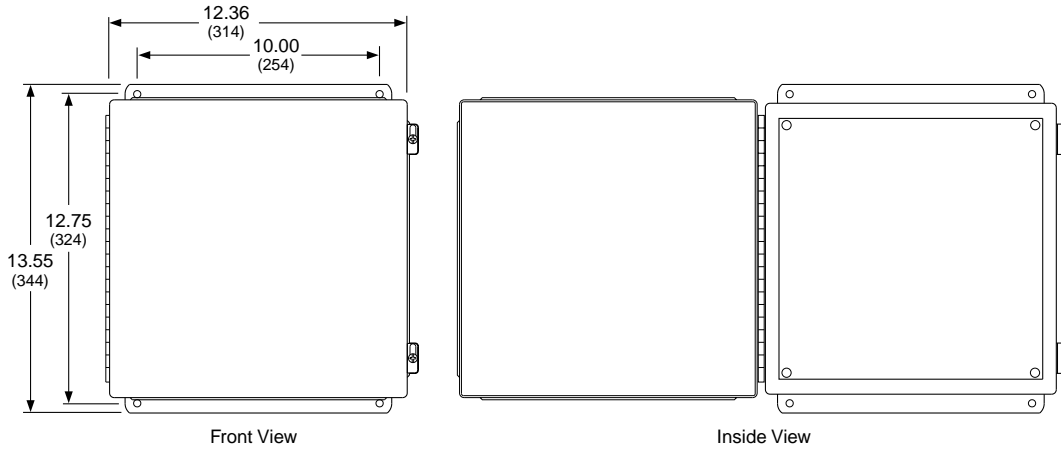
Note: The high-leg of the power system must connect to phase B of the TVSS.



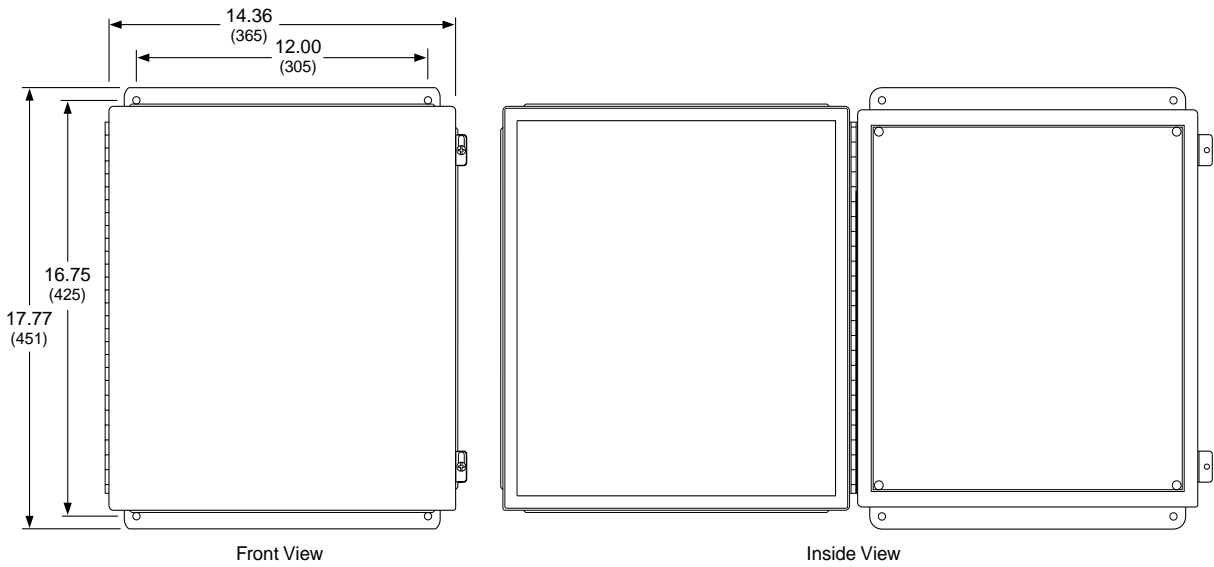
3-Phase, 4-Wire, High-Leg Delta Installation

Transient Voltage Surge Suppressor (TVSS) XGA Series Dimensions and Weights

NEMA Type 1 and NEMA Type 4 Enclosures NEMA Type 4X Stainless Steel Enclosure



NEMA Type 1 and NEMA Type 4 Enclosures with Circuit Isolator NEMA Type 4X Stainless Steel Enclosure with Circuit Isolator

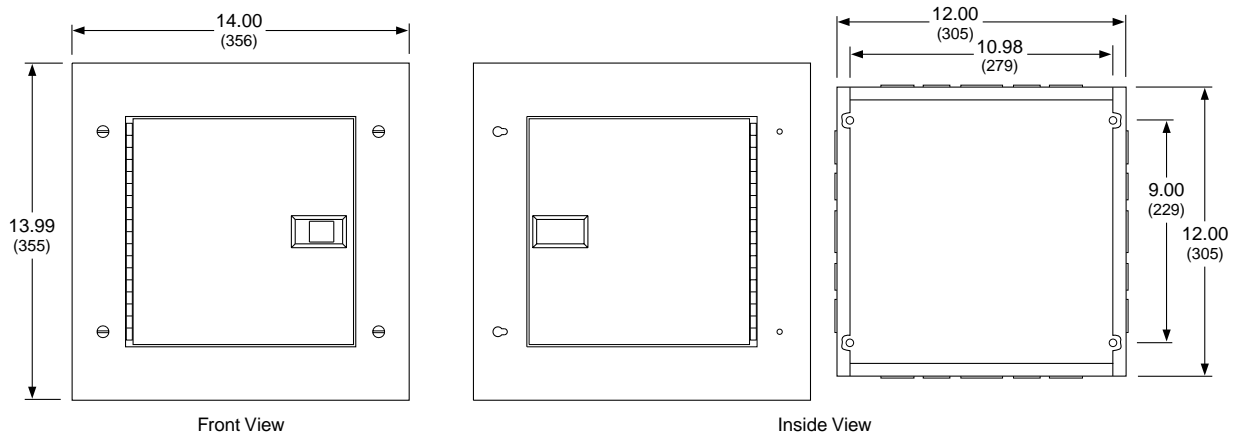


Dimensions	Inches (millimeters)
Weight	35 lb (16 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 6.5 in. (165 mm).

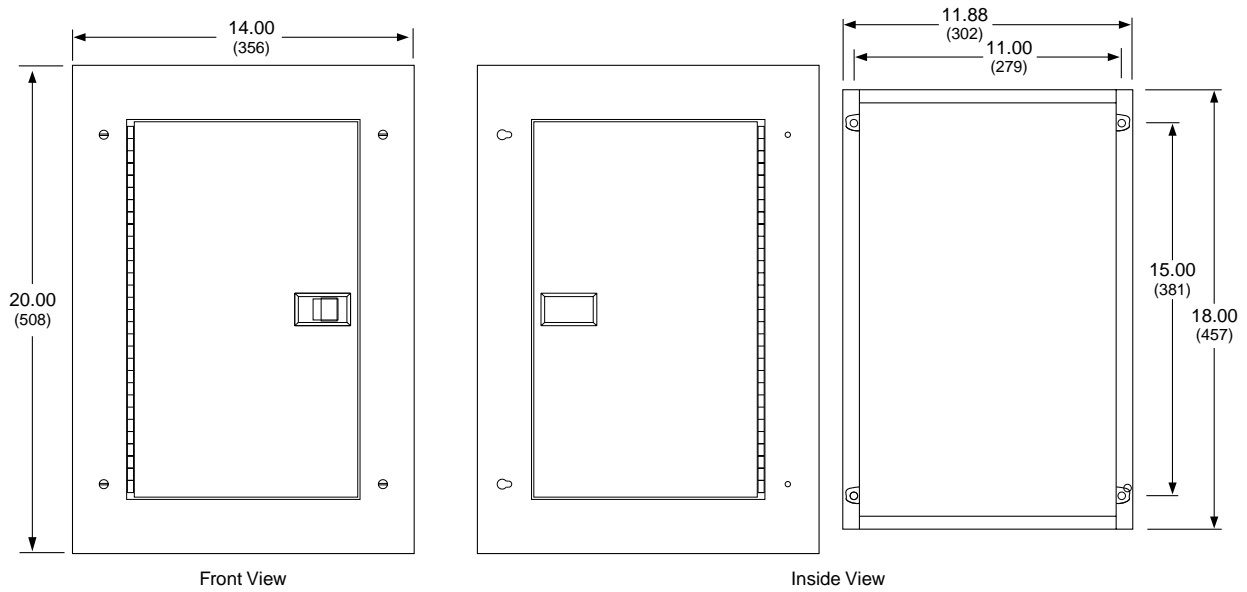


Transient Voltage Surge Suppressor (TVSS) XGA Series Dimensions and Weights

NEMA Type 1 Flush Mount Enclosure



NEMA Type 1 Flush Mount Enclosure with Circuit Isolator

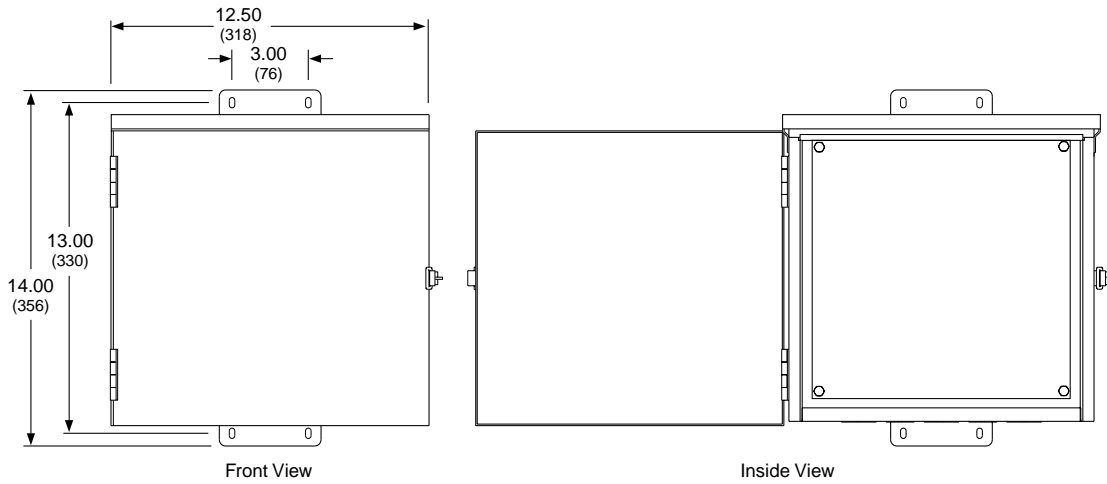


Dimensions	Inches (millimeters)
Weight	35 lb (16 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 6.25 in. (159 mm).

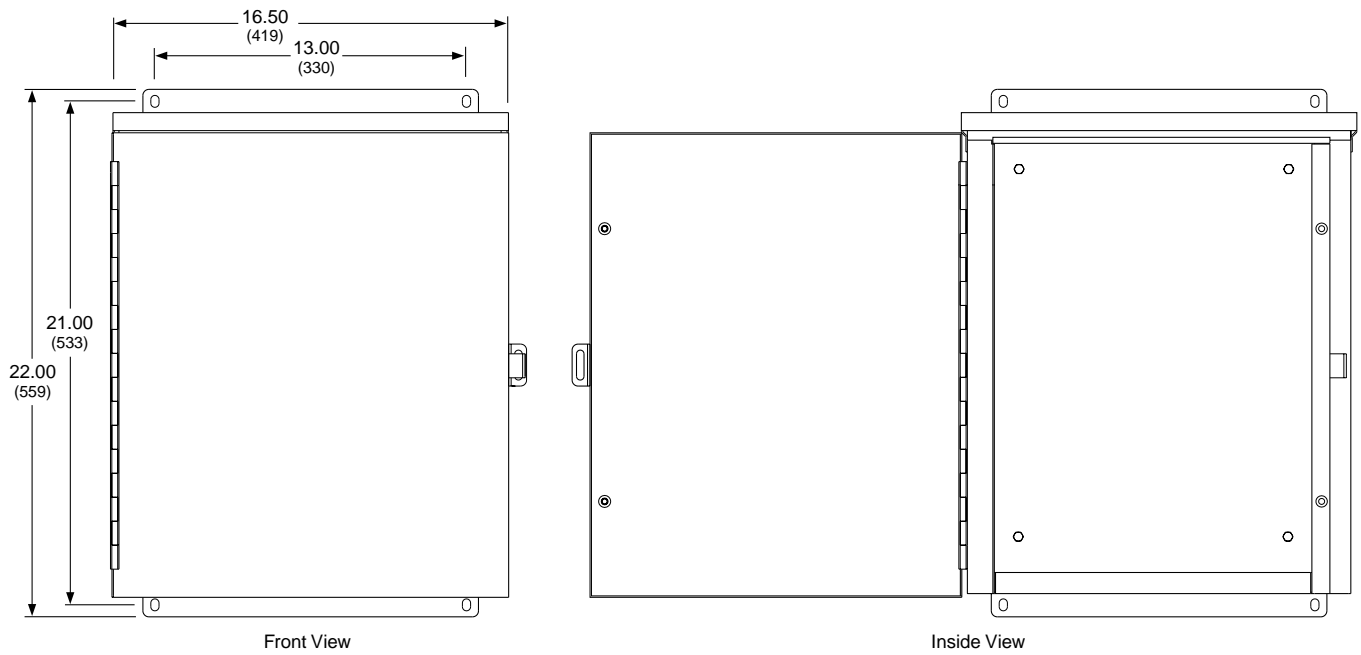


Transient Voltage Surge Suppressor (TVSS) XGA Series Dimensions and Weights

NEMA Type 12/3R Enclosure



NEMA Type 12/3R Enclosure with Circuit Isolator

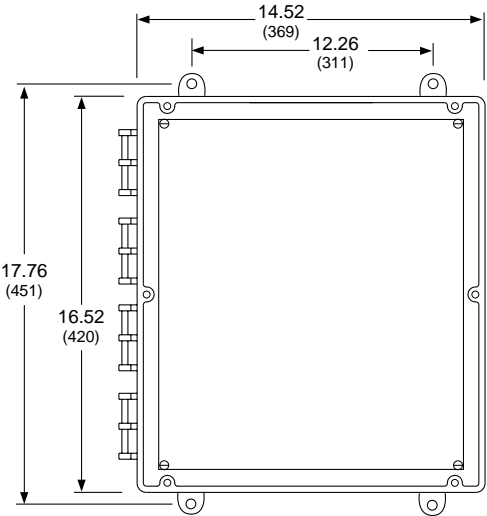


Dimensions	Inches (millimeters)
Weight	35 lb (16 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 6.5 in. (165 mm).



Transient Voltage Surge Suppressor (TVSS) XGA Series Dimensions and Weights

NEMA Type 4 Enclosure without Circuit Isolator NEMA Type 4X Enclosure with Circuit Isolator



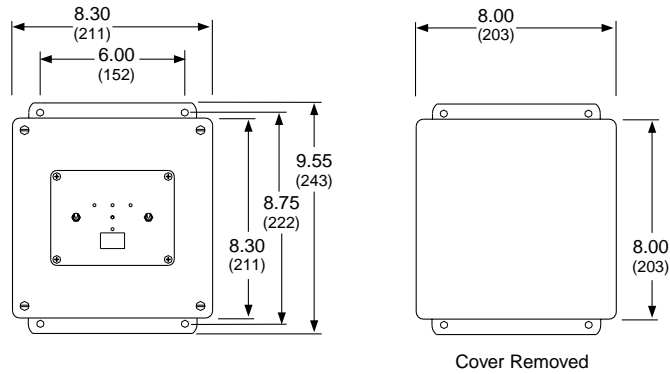
Front View, Clear Cover Removed

Dimensions	Inches (millimeters)
Weight	35 lb (16 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 8 in. (203 mm).



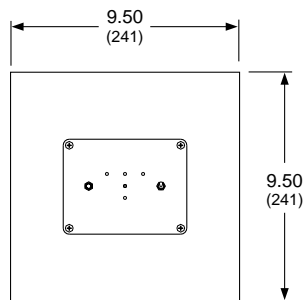
Transient Voltage Surge Suppressor (TVSS) XT Series Dimensions and Weights

NEMA Type 1, NEMA Type 12/3R, and NEMA Type 4 Cover Configuration with Window and Tamper Proof Option



Dimensions	Inches (millimeters)
Weight	17 lb (8 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane for the NEMA Type 1 enclosure is 6.0 in. (152 mm). For the NEMA Type 12/3R and NEMA Type 4 enclosures it is 5.5 in. (140 mm).

NEMA Type 1 Cover Configuration for Flush Mount

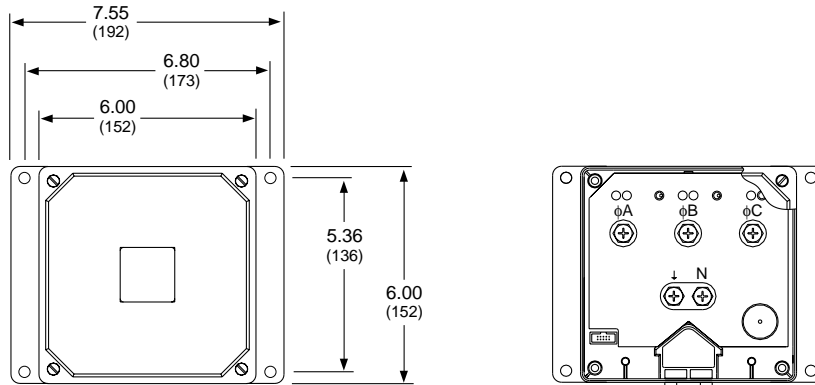


Dimensions	Inches (millimeters)
Weight	17 lb (8 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 5.7 in. (145 mm).



Transient Voltage Surge Suppressor (TVSS) XF/XP Series Dimensions and Weights

NEMA Type 1, NEMA Type 12/3R, and NEMA Type 4 Enclosures



Dimensions	Inches (millimeters)
Weight	6 lb (3 kg) maximum
Depth	The maximum depth of the outer face of the door to the mounting plane is 4.0 in. (100 mm).




Transient Voltage Surge Suppressor (TVSS)



Transient Voltage Surge Suppressor (TVSS)

Square D Company
8001 Highway 64 East
Knightdale, NC 27545
1-888-Square D
(1-888-778-2733)
www.squared.com

Schneider Canada Inc.
19 Waterman Avenue,
M4B 1 Y2
Toronto, Ontario
(416) 752-8020
www.schneider.ca

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Catalog No. 1310CT9901 November 1999