

Surgelogic™

Surge Protective Devices (SPDs)

EMA and EBA Series

Catalog
1310CT0202R08/12

2012

Class 1310



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Product Descriptions

EMA Series Surge Protective Devices

The Surgeloc™ EMA Series surge protective device (SPD) is a modular parallel device. 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 Thermal Cut-Off (TCO) circuitry to isolate the SPD and ensure shutdown in the event of MOV damage during severe overvoltages, even when operated on high-fault current power systems.

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 Series

EMA Design Features

- Voltage configurations include Wye, Delta and High Resistance Ground (HRG)
- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- Individually fused suppression modes
- Thermal cutout
- Copper bus bar construction
- Push-to-test on-line diagnostic display
- Front panel alarm with enable/disable switch
- LED indicators indicate loss of a suppression mode, or fully operational circuit
- Up to 10 modes of protection
- Duty cycle tested (ANSI C62.41 C_{high}, 10 kA 20 kV) 20,000 impulses
- High-energy parallel design for ANSI/IEEE C62.41 and C62.45 category B and C applications.
- Short circuit current rating: 200 kA
- EMI/RFI filtering up to -42 dB (100 kHz to 100 MHz)
- Sine Wave Tracking (SWT) standard
- Increased SWT optional with up to -54 dB at 100 kHz
- Ten-year warranty
- cULus UL 1449 3rd Edition Listed
- cULus UL 1283 5th Edition Listed
- Nominal Discharge Current Rating: 20 kA



EMA SPD with Integral Switch

EMA Performance Features

Surge Capacity	L-N	L-G	N-G
120 kA/phase	60 kA	60 kA	120 kA
160 kA/phase	80 kA	80 kA	120 kA
240 kA/phase	120 kA	120 kA	120 kA
320 kA/phase	160 kA	160 kA	240 kA
480 kA/phase	240 kA	240 kA	240 kA



EMA SPD with SWT Module

EMA Series Voltage Specifications

Catalog Number	Service Voltage	Voltage Protection Rating (VPR)				
		L-N	L-G	N-G	L-L	MCOV ¹
TVS1EMA...	120/240 V, 1-phase, 3-wire + ground	700 V	800 V	700 V	1200 V	150 V
TVS2EMA...	208Y/120 V, 3-phase, 4-wire + ground ^{2,3} Wye	700 V	800 V	700 V	1200 V	150 V
TVS4EMA...	480Y/277 V, 3-phase, 4-wire + ground ^{3,4} Wye	1200 V	1200 V	1200 V	2000 V	320 V
TVS5EMA...	480 V, 3-phase, 3-wire + ground, Delta	—	1800 V	—	2000 V	550 V
TVS6EMA...	240 V, 3-phase, 3-wire + ground, Delta	—	1200 V	—	1200 V	320 V
TVS8EMA...	600Y/347 V, 3-phase, 4-wire + ground ³ Wye	1500 V	1500 V	1500 V	2500 V	420 V
TVS9EMA...	600 V, 3-phase, 3-wire + ground, Delta	—	2500 V	—	2500 V	700 V
TVS2MEMA...	208Y/120 V, 3-phase or 4-wire + ground ² Wye	700 V	700 V	600 V	1000 V	150 V
TVS4MEMA...	480Y/277 V, 3-phase, 4-wire + ground ^{3,4} Wye	1200 V	1200 V	1000 V	1800 V	320 V
TVS4HEMA...	480Y/277 V, 3-phase, 3-wire + ground, HRG	—	1800 V	—	2000 V	550 V
TVS8HEMA...	600Y/347 V, 3-phase, 3-wire + ground, HRG	—	2500 V	—	2500 V	700 V

¹ MCOV = Maximum Continuous Operating Voltage

² 208Y/120 series also applies to the following voltage 220Y/127.

³ Can be used on 4-wire or 3-wire grounded neutral system.

⁴ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.



EMA High-Resistance Ground SPD

EMA Series Voltage Specifications for High-Leg Delta

Catalog Number	Service Voltage	Voltage Protection Rating (VPR)							
		L-N	H-N	L-G	H-G	N-G	L-L	H-L	MCOV ¹
TVS3EMA...	240/120 V, 3-phase 4-wire + ground, High-Leg Delta	700 V	1200 V	700 V	1000 V	700 V	1200 V	1500 V	150 V

¹ MCOV = Maximum Continuous Operating Voltage

EBA Series Surge Protective Devices (SPDs)



EBA Series

The Surgelogic™ EBA series surge protective device (SPD) is a modular brick parallel device. The EBA 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 Cut-Off (TCO) to isolate the SPD and ensure shutdown in the event of MOV damage during severe overvoltages, even when operated on high-fault current power systems.

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



EBA Series Interior

- External mounting next to panelboards, switchboards, switchgear, or motor control centers (MCCs)
- Individually fused suppression modes
- Thermal cutout
- Push-to-test on-line diagnostic display
- Front panel alarm with enable/disable switch
- LED indicators indicate loss of a suppression mode, or fully operational circuit
- Up to 10 modes of protection
- Duty cycle tested (ANSI C62.41 C_{high}, 10 kA 20 kV) 20,000 impulses
- High-energy parallel design for ANSI/IEEE C62.41 and C62.45 category B and C applications.
- Short circuit current rating: 200 kA
- EMI/RFI filtering up to -42 dB (100 kHz to 100 MHz)
- Sine Wave Tracking (SWT) standard
- Increased SWT optional with up to -54 dB at 100 kHz
- Ten-year warranty
- cULus UL 1449 3rd Edition Listed
- cULus UL 1283 5th Edition Listed
- Nominal Discharge Current Rating: 20 kA

EBA Performance Features

Surge Capacity	L-N	L-G	N-G
120 kA/phase	60 kA	60 kA	120 kA
160 kA/phase	80 kA	80 kA	120 kA
240 kA/phase	120 kA	120 kA	120 kA

EBA Series Voltage Specifications

Catalog Number	Service Voltage	Voltage Protection Rating (VPR)				
		L-N	L-G	N-G	L-L	MCOV ¹
TVS1EBA...	120/240 V, 1-phase, 3-wire + ground	700 V	800 V	700 V	1200 V	150 V
TVS2EBA...	208Y/120 V, 3-phase, 4-wire + ground ^{2,3} Wye	700 V	800 V	700 V	1200 V	150 V
TVS4EBA...	480Y/277 V, 3-phase, 4-wire + ground ^{3,4} Wye	1200 V	1200 V	1200 V	2000 V	320 V
TVS8EBA...	600Y/347 V, 3-phase, 4-wire + ground ³ Wye	1500 V	1500 V	1500 V	2500 V	420 V

¹ MCOV = Maximum Continuous Operating Voltage

² 208Y/120 series also applies to the following voltage 220Y/127.

³ Can be used on 4-wire or 3-wire grounded neutral system.

⁴ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

EBA Series Voltage Specifications for High-Leg Delta

Catalog Number	Service Voltage	Voltage Protection Rating (VPR)							
		L-N	H-N	L-G	H-G	N-G	L-L	H-L	MCOV ¹
TVS3EBA...	240/120 V, 3-phase, High-Leg Delta	700 V	1000 V	700 V	1000 V	700 V	1200 V	1500 V	270 V

¹ MCOV = Maximum Continuous Operating Voltage

Application Information

The effects of lightning and the damage caused by lightning-generated transients are well known. The failure of electronic equipment in a facility located in a high lightning area can easily be attributed directly to lightning-generated transients. Transient suppression can be installed on the power distribution system to address these externally generated transients. Lower magnitude surges generated within a facility and their effect on microprocessor-based equipment are less obvious than the transients induced by lightning. Inductive motors, pumps, electric welders, etc. generate smaller transients, but the repeated damage can cause equipment to malfunction.

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

Square D™ brand SPD products offered by Schneider Electric provide surge suppression at every level of the electrical distribution system.

Typical Applications:

- 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 SPD devices.

Specifications for EMA and EBA SPDs

Description	
Relative Humidity	0 to 95% non-condensing
Operating Frequency	50/60 Hz
Storage Temperature	-40° to +149 °F (-40° to +65 °C)
Operating Temperature	-4° to +149 °F (-20° to +65 °C)
Standards	cULus UL 1449 3rd Edition, UL 1283 5th Edition, CSA C22.2 No. 8-M1986
Fusing	Individually-fused suppression modes (200 kAIR)

Selection

EMA Series SPDs



EMA SPD
with Integral Switch



EMA SPD
with SWT Module



EMA High-Resistance
Ground SPD

Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 3R ¹	NEMA 4X Stainless Steel ¹
120/240 V, 1-phase, 3-wire + ground	120	TVS1EMA12A()	TVS1EMA12S()
	160	TVS1EMA16A()	TVS1EMA16S()
	240	TVS1EMA24A()	TVS1EMA24S()
	320	TVS1EMA32A()	TVS1EMA32S()
	480	TVS1EMA48A()	TVS1EMA48S()
208Y/120 V, 3-phase, 4-wire + ground ²³ Wye	120	TVS2EMA12A()	TVS2EMA12S()
	160	TVS2EMA16A()	TVS2EMA16S()
	240	TVS2EMA24A()	TVS2EMA24S()
	320	TVS2EMA32A()	TVS2EMA32S()
	480	TVS2EMA48A()	TVS2EMA48S()
240/120 V, 3-phase, 4-wire + ground High-leg Delta	120	TVS3EMA12A()	TVS3EMA12S()
	160	TVS3EMA16A()	TVS3EMA16S()
	240	TVS3EMA24A()	TVS3EMA24S()
	320	TVS3EMA32A()	—
	480	TVS3EMA48A()	—
240 V, 3-phase, 3-wire + ground Delta	100	TVS6EMA10A()	TVS6EMA10S()
	120	TVS6EMA12A()	TVS6EMA12S()
	160	TVS6EMA16A()	TVS6EMA16S()
	200	TVS6EMA20A()	TVS6EMA20S()
	240	TVS6EMA24A()	TVS6EMA24S()
	320	TVS6EMA32A()	TVS6EMA32S()
	480	TVS6EMA48A()	TVS6EMA48S()
480Y/277 V, 3-phase, 4-wire + ground ³⁴ Wye	120	TVS4EMA12A()	TVS4EMA12S()
	160	TVS4EMA16A()	TVS4EMA16S()
	240	TVS4EMA24A()	TVS4EMA24S()
	320	TVS4EMA32A()	TVS4EMA32S()
	480	TVS4EMA48A()	TVS4EMA48S()
480Y/277 V, 3-phase, 3-wire + ground High-Resistance Ground	120	TVS4HEMA12A()	TVS4HEMA12S()
	160	TVS4HEMA16A()	TVS4HEMA16S()
	240	TVS4HEMA24A()	TVS4HEMA24S()
	320	TVS4HEMA32A()	TVS4HEMA32S()
	480	TVS4HEMA48A()	TVS4HEMA48S()
480 V, 3-phase, 3-wire + ground, Delta	100	TVS5EMA10A()	TVS5EMA10S()
	120	TVS5EMA12A()	TVS5EMA12S()
	160	TVS5EMA16A()	TVS5EMA16S()
	200	TVS5EMA20A()	TVS5EMA20S()
	240	TVS5EMA24A()	TVS5EMA24S()
	320	TVS5EMA32A()	TVS5EMA32S()
	480	TVS5EMA48A()	TVS5EMA48S()
600Y/347 V, 3-phase, 4-wire + ground ³ Wye	120	TVS8EMA12A()	TVS8EMA12S()
	160	TVS8EMA16A()	TVS8EMA16S()
	240	TVS8EMA24A()	TVS8EMA24S()
	320	TVS8EMA32A()	TVS8EMA32S()
	480	TVS8EMA48A()	TVS8EMA48S()
600Y/347 V, 3-phase, 3-wire + ground High-Resistance Ground	120	TVS8HEMA12A()	TVS8HEMA12S()
	160	TVS8HEMA16A()	TVS8HEMA16S()
	180	TVS8HEMA18A()	TVS8HEMA18S()
	240	TVS8HEMA24A()	TVS8HEMA24S()
	320	TVS8HEMA32A()	TVS8HEMA32S()
600 V, 3-phase, 3-wire + ground, Delta	100	TVS9EMA10A()	TVS9EMA10S()
	120	TVS9EMA12A()	TVS9EMA12S()
	160	TVS9EMA16A()	TVS9EMA16S()
	180	TVS9EMA18A()	TVS9EMA18S()
	200	TVS9EMA20A()	TVS9EMA20S()
	240	TVS9EMA24A()	TVS9EMA24S()
	320	TVS9EMA32A()	TVS9EMA32S()

¹ () Refer to "Options for EMA and EBA SPDs" table.

² 208Y/120 series also applies to the following voltage 220Y/127.

³ Can be used on 4-wire or 3-wire grounded neutral system.

⁴ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Surge Protective Devices (SPDs) Selection

L-L Enhanced (MEMA) Series SPDs



External Modular
L-L Enhanced

Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 3R ¹	NEMA 4X Stainless Steel ¹
208Y/120 V, 3-phase, 4-wire + ground ² Wye	120	TVS2MEMA12A()	TVS2MEMA12S()
	180	TVS2MEMA18A()	TVS2MEMA18S()
	270	TVS2MEMA27A()	TVS2MEMA27S()
	360	TVS2MEMA36A()	TVS2MEMA36S()
480Y/277 V, 3-phase, 4-wire + ground ³ Wye	120	TVS4MEMA12A()	TVS4MEMA12S()
	180	TVS4MEMA18A()	TVS4MEMA18S()
	270	TVS4MEMA27A()	TVS4MEMA27S()
	360	TVS4MEMA36A()	TVS4MEMA36S()

¹ () Refer to "Options for EMA and EBA SPDs" table.

² 208Y/120 series also applies to the following voltage 220Y/127.

³ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

EBA Series SPDs



EBA Series

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ¹
120/240 V, 1-phase, 3-wire + ground	120 kA	TVS1EBA12()
	160 kA	TVS1EBA16()
	240 kA	TVS1EBA24()
208Y/120 V, 3-phase, 4-wire + ground ^{2,3} Wye	120 kA	TVS2EBA12()
	160 kA	TVS2EBA16()
	240 kA	TVS2EBA24()
240/120 V, 3-phase, 4-wire + ground High-Leg Delta	120 kA	TVS3EBA12()
	160 kA	TVS3EBA16()
	240 kA	TVS3EBA24()
480Y/277 V, 3-phase, 4-wire + ground ^{3,4} Wye	120 kA	TVS4EBA12()
	160 kA	TVS4EBA16()
	240 kA	TVS4EBA24()
600Y/347 V, 3-phase, 4-wire + ground ³ Wye	120 kA	TVS8EBA12()
	160 kA	TVS8EBA16()
	240 kA	TVS8EBA24()

¹ () Refer to "Options for EMA and EBA SPDs" table.

² 208Y/120 series also applies to the following voltage 220Y/127.

³ Can be used on 4-wire or 3-wire grounded neutral system.

⁴ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Options for EMA and EBA SPDs

Option	Description
(1)	UL 1449 3rd Edition Type 1
(I) ¹	Integral Switch
(SWT)	Sine Wave Tracking Module (not applicable for Delta or HRG)
(I1) ¹	UL 1449 Type 1 and Integral Switch
(SWT1)	UL 1449 Type 1 and Sine Wave Tracking Module (not applicable for Delta or HRG)
(ISWT) ¹	Integral Switch and Sine Wave Tracking Module (not applicable for Delta or HRG)
(ISWT1) ¹	UL 1449 3rd Edition Type 1, Integral Switch and Sine Wave Tracking Module (not applicable for Delta or HRG)

¹ Not available in stainless steel for 320 and 480 kA

EMA and EBA SPD Accessories

Catalog Number	Description
TVS12RMU	Remote Monitor
TVS12FMK	12-inch Flush Mount Kit
TVS20FMK	20-inch Flush Mount Kit

Replacement Modules

EMA Replacement Modules



MA Replacement Module



Delta Replacement Module



HRG Replacement Module

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers		
		Phase A	Phase B	Phase C
120/240 V, 1-phase, 3-wire + ground	120	MA11MA12	—	MA11MA12
	160	MA11MA16	—	MA11MA16
	240	MA11MA24	—	MA11MA24
208Y/120 V, 3-phase, 4-wire + ground ¹ Wye	120	MA11MA12	MA11MA12	MA11MA12
	160	MA11MA16	MA11MA16	MA11MA16
	240	MA11MA24	MA11MA24	MA11MA24
120/240 V, 3-phase, 4-wire + ground ² High-Leg Delta	120	MA11MA12	MA31MA12	MA11MA12
	160	MA11MA16	MA31MA16	MA11MA16
	240	MA11MA24	MA31MA24	MA11MA24
240 V, 3-phase, 3-wire + ground Delta	100	MA61MA10	MA61MA10	MA61MA10
	120	MA61MA12	MA61MA12	MA61MA12
	160	MA61MA16	MA61MA16	MA61MA16
	200	MA61MA20	MA61MA20	MA61MA20
480Y/277 V, 3-phase, 4-wire + ground ³ Wye	120	MA61MA24	MA61MA24	MA61MA24
	120	MA41MA12	MA41MA12	MA41MA12
	160	MA41MA16	MA41MA16	MA41MA16
	240	MA41MA24	MA41MA24	MA41MA24
480Y/277 V, 3-phase, 3-wire + ground ³ High-Resistance Ground	100	MA41MA10H	MA41MA10H	MA41MA10H
	120	MA41MA12H	MA41MA12H	MA41MA12H
	160	MA41MA16H	MA41MA16H	MA41MA16H
	200	MA41MA20H	MA41MA20H	MA41MA20H
	240	MA41MA24H	MA41MA24H	MA41MA24H
480 V, 3-phase, 3-wire + ground Delta	100	MA51MA10	MA51MA10	MA51MA10
	120	MA51MA12	MA51MA12	MA51MA12
	160	MA51MA16	MA51MA16	MA51MA16
	200	MA51MA20	MA51MA20	MA51MA20
600Y/347 V, 3-phase, 4-wire + ground Wye	240	MA51MA24	MA51MA24	MA51MA24
	120	MA81MA12	MA81MA12	MA81MA12
	160	MA81MA16	MA81MA16	MA81MA16
	240	MA81MA24	MA81MA24	MA81MA24
600Y/347 V, 3-phase, 3-wire + ground High-Resistance Ground	100	MA81MA10H	MA81MA10H	MA81MA10H
	120	MA81MA12H	MA81MA12H	MA81MA12H
	160	MA81MA16H	MA81MA16H	MA81MA16H
	180	MA81MA18H	MA81MA18H	MA81MA18H
600 V, 3-phase, 3-wire + ground Delta	120	MA91MA12	MA91MA12	MA91MA12
	160	MA91MA16	MA91MA16	MA91MA16
	180	MA91MA18	MA91MA18	MA91MA18

¹ 208Y/120 series also applies to the following voltage 220Y/127

² High-Leg Delta (Phase B modules are different than Phase A and Phase C modules)

³ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240

L-L Enhanced MA (L-N, L-G) Replacement Modules



MA Replacement Module

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers		
		Phase A	Phase B	Phase C
208Y/120 V, 3-phase, 4-wire + ground ¹ Wye	120	MA11MA12	MA11MA12	MA11MA12
	180	MA11MA16	MA11MA16	MA11MA16
	270	MA11MA16	MA11MA16	MA11MA16
	360	MA11MA24	MA11MA24	MA11MA24
480Y/277 V, 3-phase, 4-wire + ground ² Wye	120	MA41MA12	MA41MA12	MA41MA12
	180	MA41MA16	MA41MA16	MA41MA16
	270	MA41MA26	MA41MA26	MA41MA26
	360	MA41MA24	MA41MA24	MA41MA24

¹ 208Y/120 series also applies to the following voltage 220Y/127.

² 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Surge Protective Devices (SPDs) Replacement Modules

L-L Enhanced MA (L-L) Replacement Modules



L-L Enhanced Replacement Module

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers		
		Phase A	Phase B	Phase C
208Y/120 V, 3-phase, 4-wire + ground ¹ Wye	120	MA2IMA40LL	MA2IMA40LL	MA2IMA40LL
	180	MA2IMA60LL	MA2IMA60LL	MA2IMA60LL
	270	MA2IMA90LL	MA2IMA90LL	MA2IMA90LL
	360	MA2IMA12LL	MA2IMA12LL	MA2IMA12LL
480Y/277 V, 3-phase, 4-wire + ground ² Wye	120	MA4IMA40LL	MA4IMA40LL	MA4IMA40LL
	180	MA4IMA60LL	MA4IMA60LL	MA4IMA60LL
	270	MA4IMA90LL	MA4IMA90LL	MA4IMA90LL
	360	MA4IMA12LL	MA4IMA12LL	MA4IMA12LL

¹ 208Y/120 series also applies to the following voltage 220Y/127.

² 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

EBA Replacement Modules



EBA Replacement Module

System Voltage	Peak Surge Current Rating (kA)	Catalog Number
120/240 V, 1-phase, 3-wire + ground	120	MA1IBA12
	160	MA1IBA16
	240	MA1IBA24
208Y/120 V, 3-phase, 4-wire + ground ¹	120	MA2IBA12
	160	MA2IBA16
	240	MA2IBA24
240/120 V, 3-phase, 4-wire + ground ² High-Leg Delta	120	MA3IBA12
	160	MA3IBA16
	240	MA3IBA24
240/120 V, 3-phase, 4-wire + ground ³ Wye	120	MA4IBA12
	160	MA4IBA16
	240	MA4IBA24
600Y/347 V, 3-phase, 4-wire + ground Wye	120	MA8IBA12
	160	MA8IBA16
	240	MA8IBA24

¹ 208Y/120 series also applies to the following voltage 220Y/127.

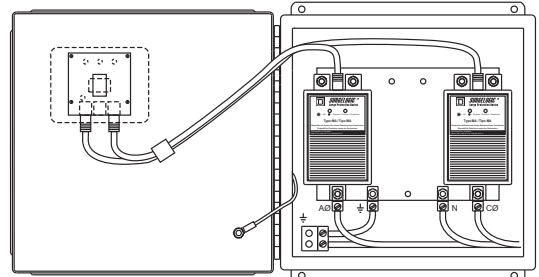
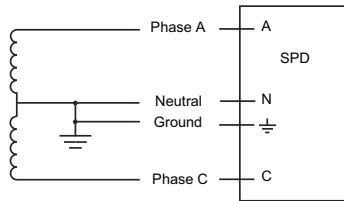
² High-leg delta (Phase B modules are different than Phase A and Phase C modules).

³ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

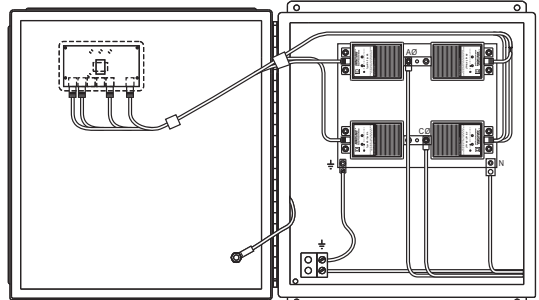
Wiring Diagrams

EMA Series

EMA 1-Phase, 3-Wire, Grounded Installation

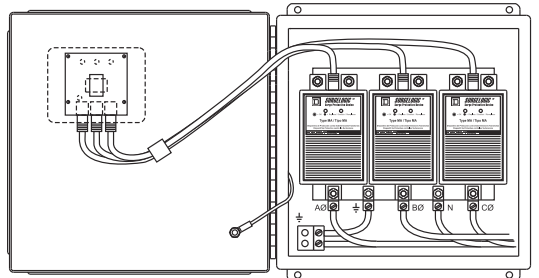
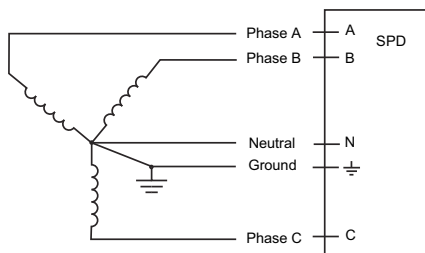


Customer Connections 120 kA–240kA

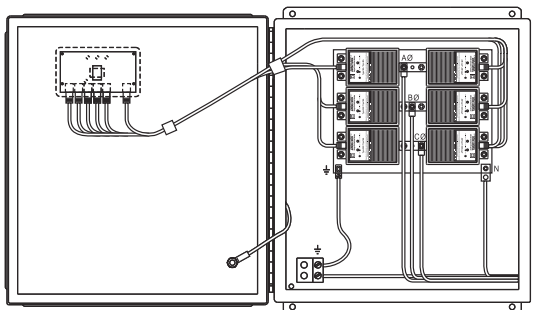


Customer Connections 320 kA–480kA

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



Customer Connections 120 kA–240kA

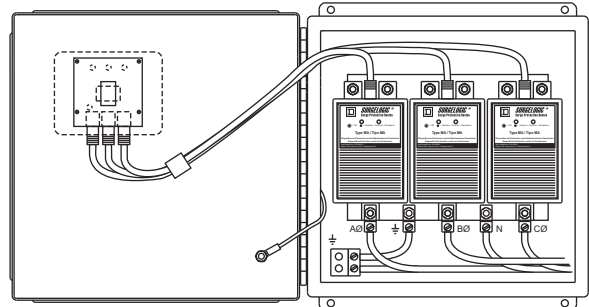
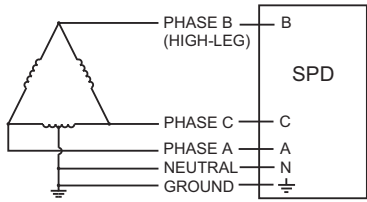


Customer Connections 320 kA–480kA

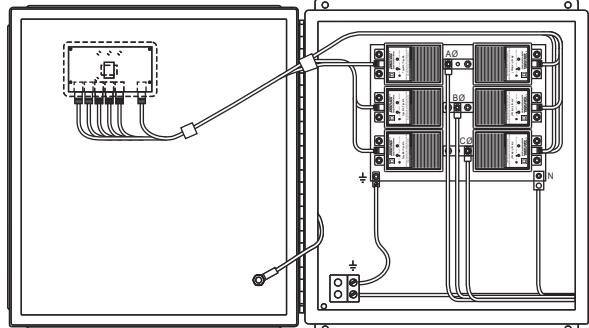
Surge Protective Devices (SPDs)

Wiring Diagrams

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

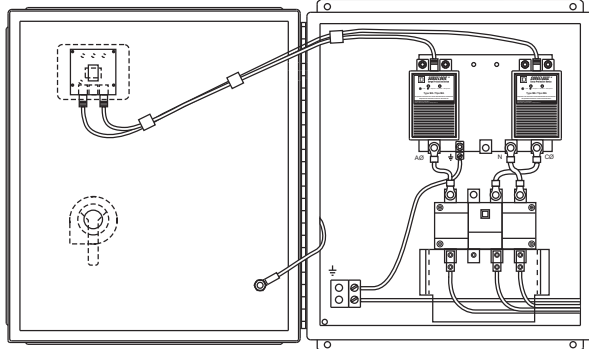
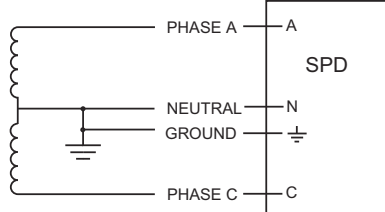


Customer Connections 120 kA–240kA

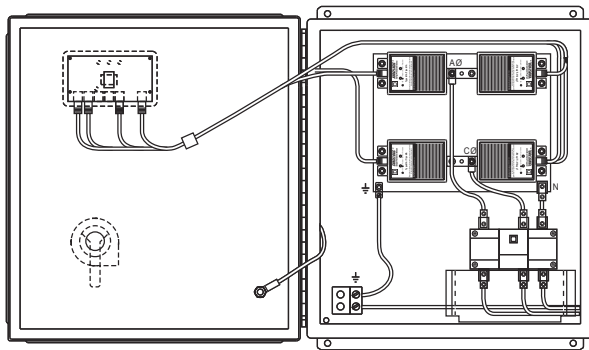


Customer Connections 320 kA–480kA

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

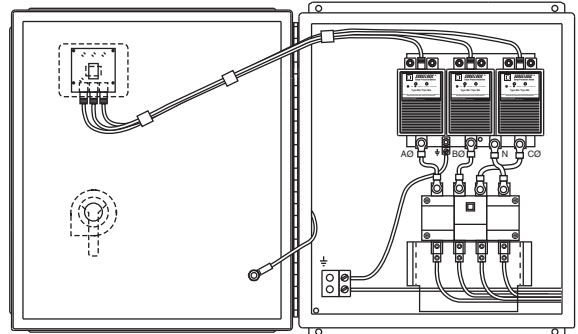
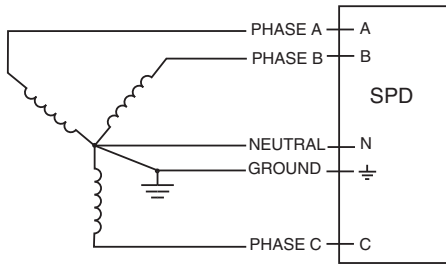


Customer Connections 120 kA–240kA

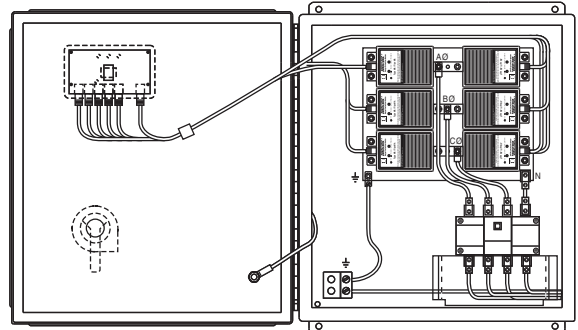


Customer Connections 320 kA–480kA

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

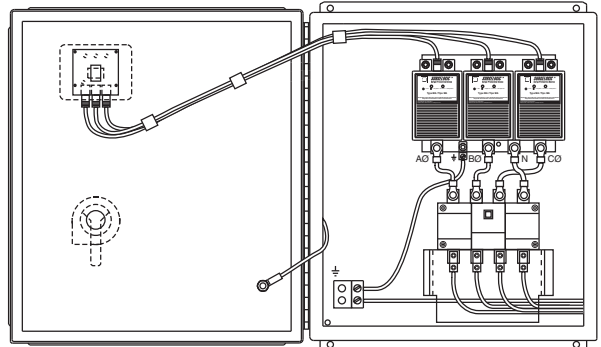
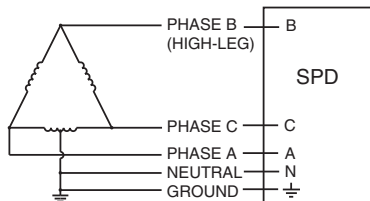


Customer Connections 120 kA - 240 kA

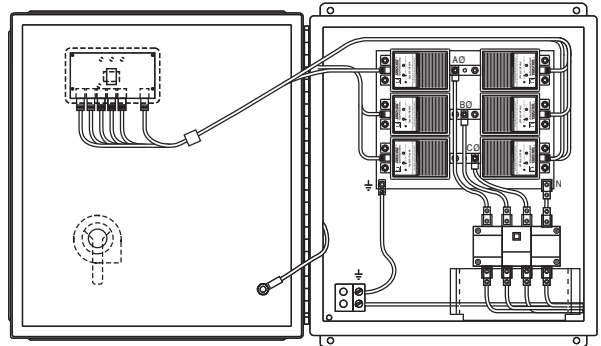


Customer Connections 320 kA - 480 kA

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



Customer Connections 120 kA - 240 kA

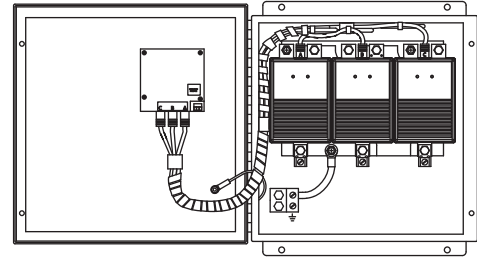
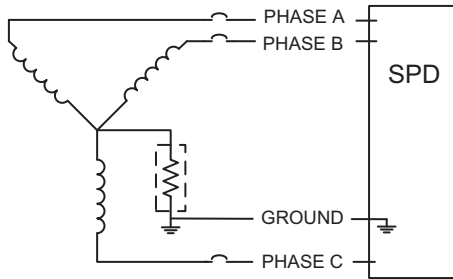


Customer Connections 320 kA - 480 kA

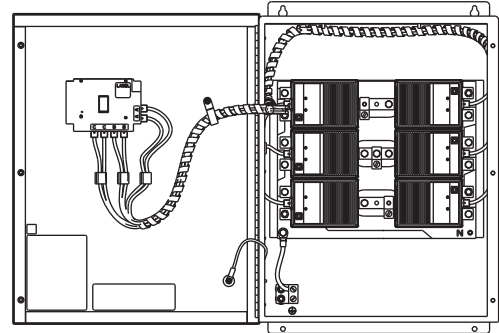
Surge Protective Devices (SPDs)

Wiring Diagrams

EMA High Resistance Grounded (HRG) Wye Installation

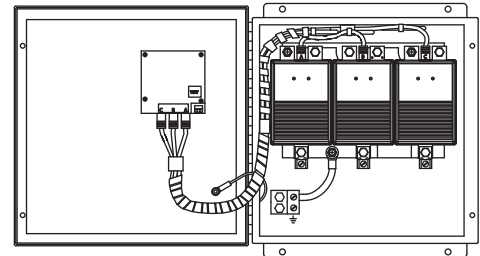
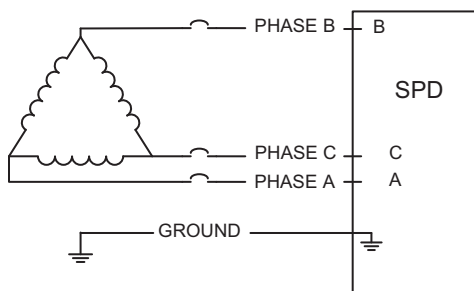


Customer Connections 120–240 kA

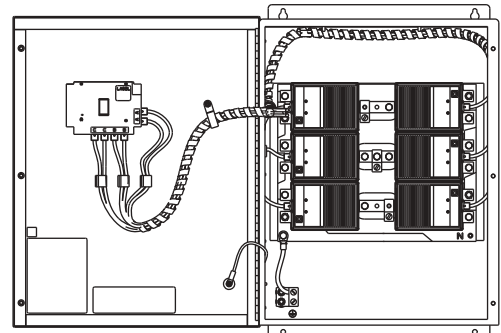


Customer Connections 320–480 kA

EMA 3-Phase, 3-Wire, Grounded Delta Installation



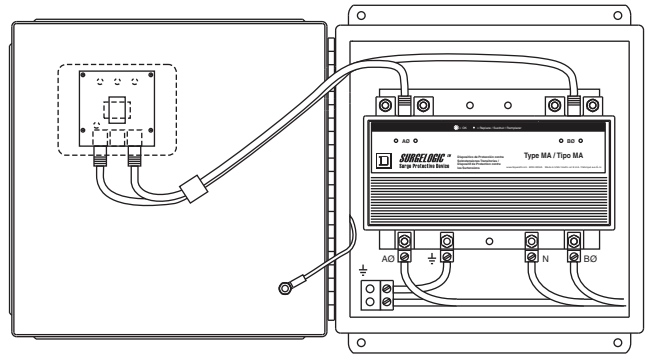
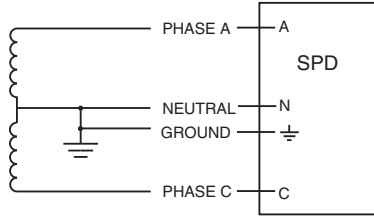
Customer Connections 120–240 kA



Customer Connections 320–480 kA

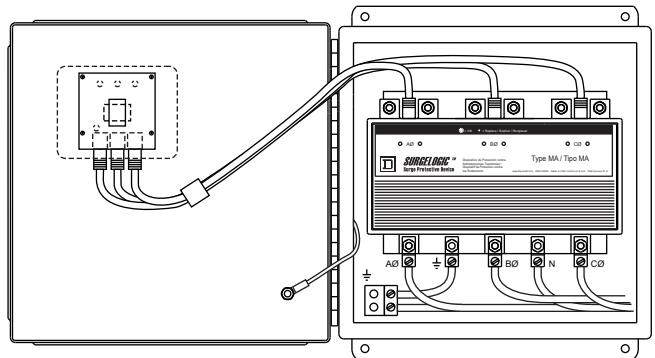
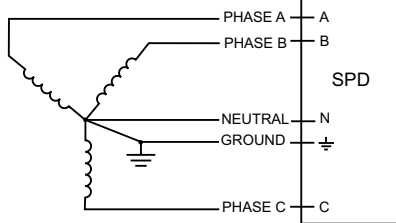
EBA Series

EBA 1-Phase, 3-Wire, Grounded Installation



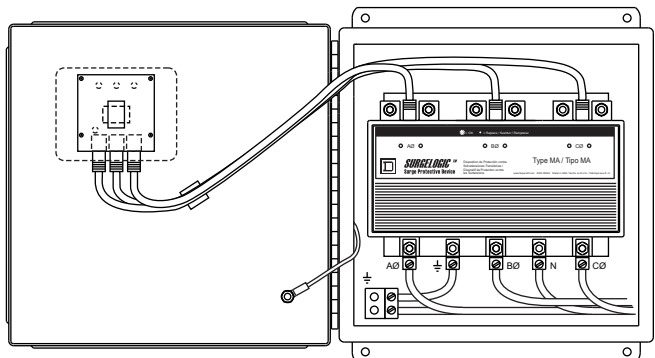
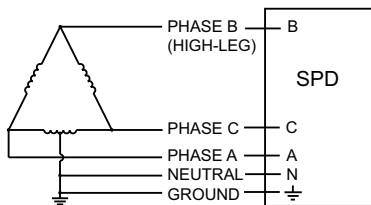
Customer Connections

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



Customer Connections

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

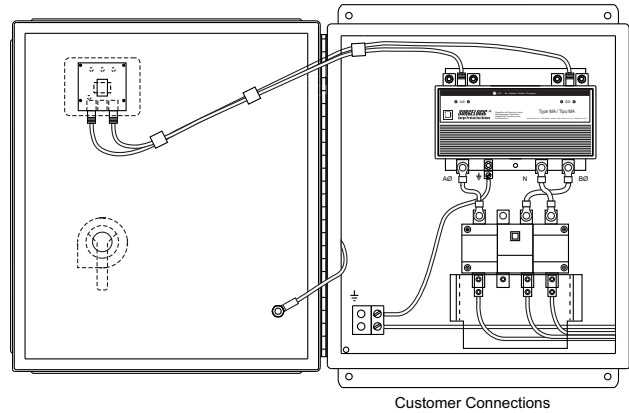
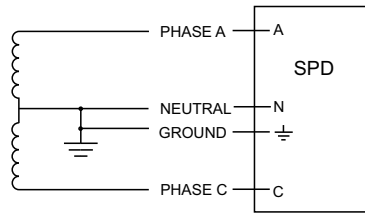


Customer Connections

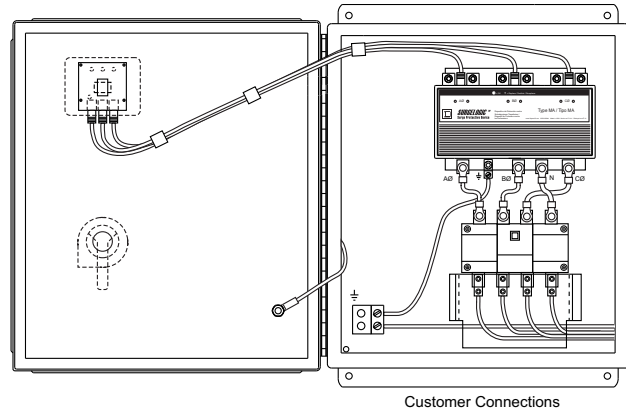
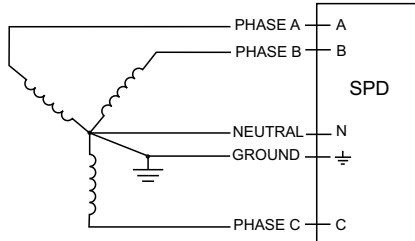
Surge Protective Devices (SPDs)

Wiring Diagrams

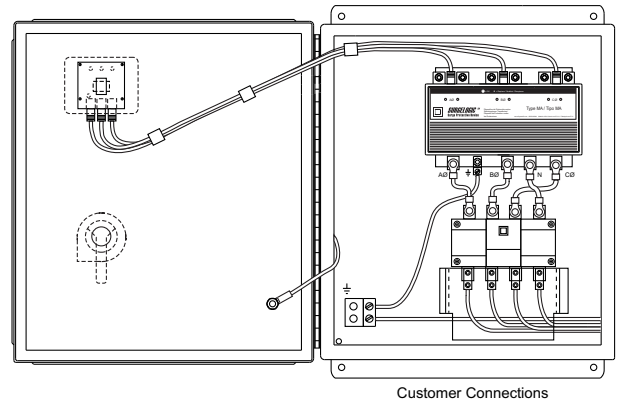
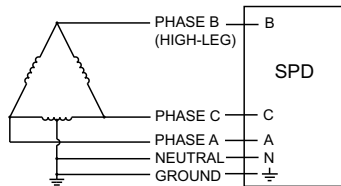
EBA 1-Phase, 3-Wire, Grounded Installation with Integral Switch



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



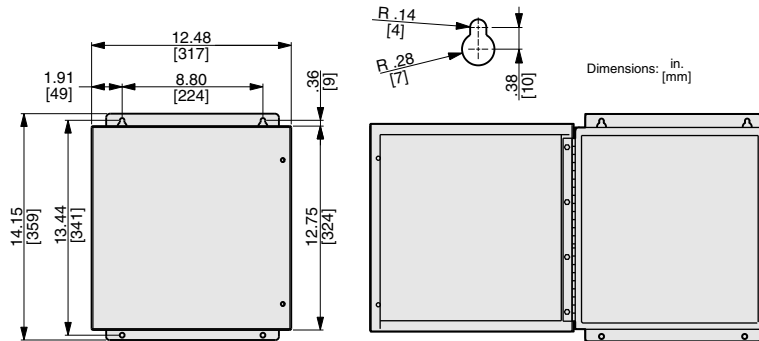
EBA 3-Phase, 4-Wire, High-Leg Delta Installation with Integral Switch



Dimensions and Weights

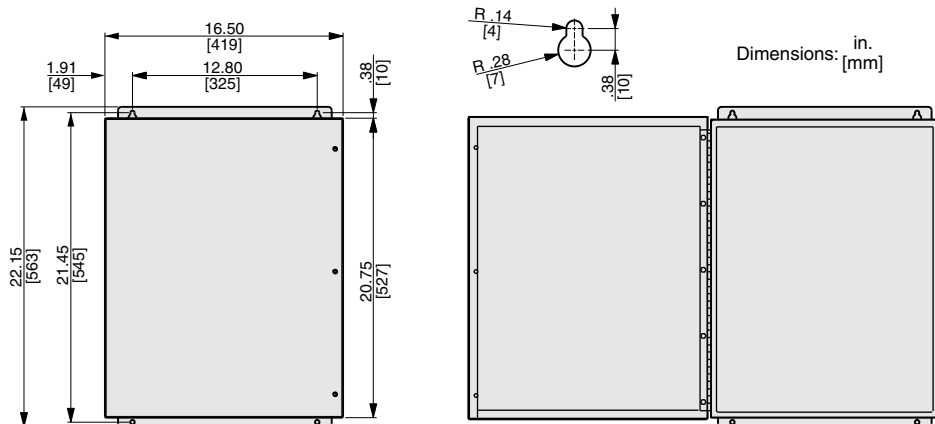
EMA/EBA Series

12 x 12 NEMA 1 / 3R / 12 Enclosures



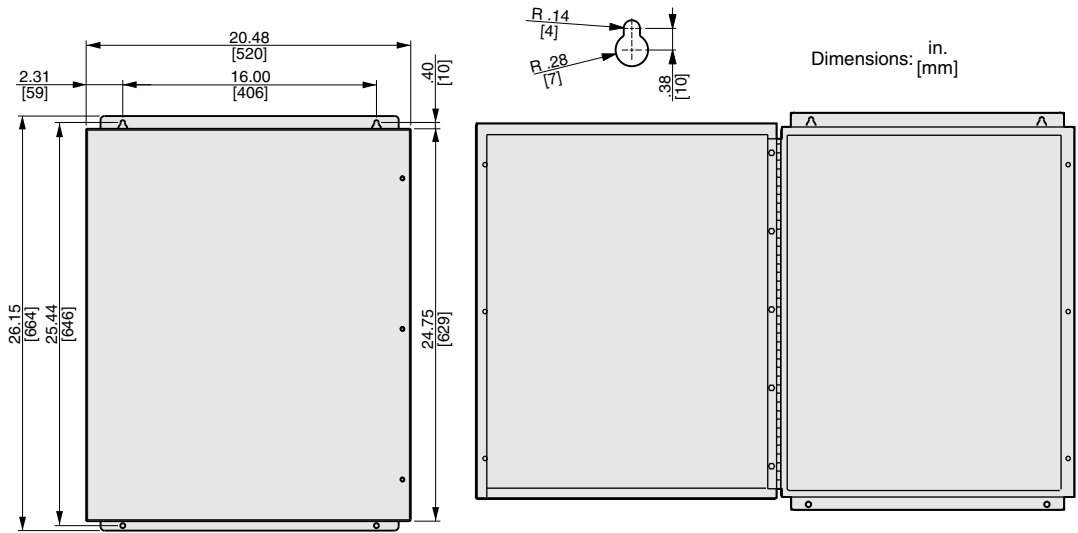
Approximate Weight	22 lbs ± 2 lbs
Door Depth	0.5 in. [12.7 mm]
Total Depth	6.24 in. [158.5]

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



Approximate Weight	31 lbs ± 7 lbs
Door Depth	0.5 in. [12.7 mm]
Total Depth	6.24 in. [158.5]

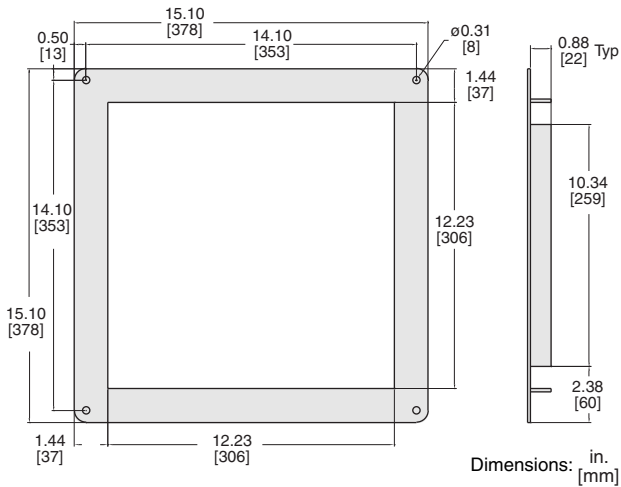
20 x 24 NEMA 1 / 3R / 12 Enclosures for 320 kA and 480 kA units with Integral Switch



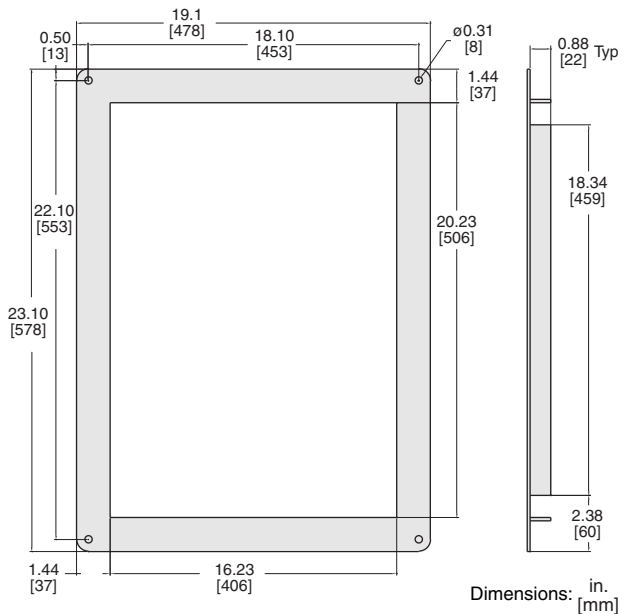
Approximate Weight	56 lbs ± 2 lbs
Door Depth	0.5 in. [12.7 mm]
Total Depth	6.24 in. [158.5 mm]

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

TVS12FMK



TVS20FMK



Approximate Weight	TVS12FMK	4.1 lbs
	TVS20FMK	6.3 lbs
Depth		1.01 in. [26 mm]

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