

# CX-Series Circuit Breaker

*UL 489 Listed & Ideal for 380VDC Applications*

The CX-Series circuit breaker features a unique and innovative arc-quenching configuration that allows the breaker to safely handle high amperage and high DC voltage applications in a compact package.

By using a patent pending magnetic flux boosting terminal configuration, a strong magnetic field is created thus motivating the arc into an enhanced arc chamber improving the breaker's overall performance and reliability.

The permanent magnets located at the entrance of the arc chamber combined with the upper and lower arc runner increase the magnetic blow out force and aid in motivating the arc off of the contacts and into the arc chamber.

An enhanced arc chamber features arc splitter retainers with integrated pressurizing walls, which facilitates heat transfer from the arc thereby providing additional cooling and quick transition into the magnetically induced splitter plates. In turn, the twelve (12) splitter plates attract, segment and cool the arc for full extinction.

Combined, these innovative features make the CX-Series breaker the best in class, providing stable performance even in the most demanding applications.

## Resources:

*Download 3D CAD Files*



*Watch Product Video*



## Additional Features:

- ♦ UL 489 & UL 489B Listed
- ♦ TUV Certified IEC/EN 60947-2
- ♦ Temperature stable hydraulic/magnetic overcurrent sensing technology.
- ♦ Optional relay trip circuit permitting remote operator system shut down.

## Applications:

- ♦ Perfect fit for 380VDC Applications.
- ♦ UL 489 Listed and ideal for integration into Information Technologies' power distribution equipment utilizing high DC voltage input.
- ♦ The CX-Series is UL 489B Listed and ideal for integration into the combiner box or main disconnect of photovoltaic renewable energy systems.



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## DESIGN FEATURES

**HYDRAULIC/MAGNETIC SENSING COIL**

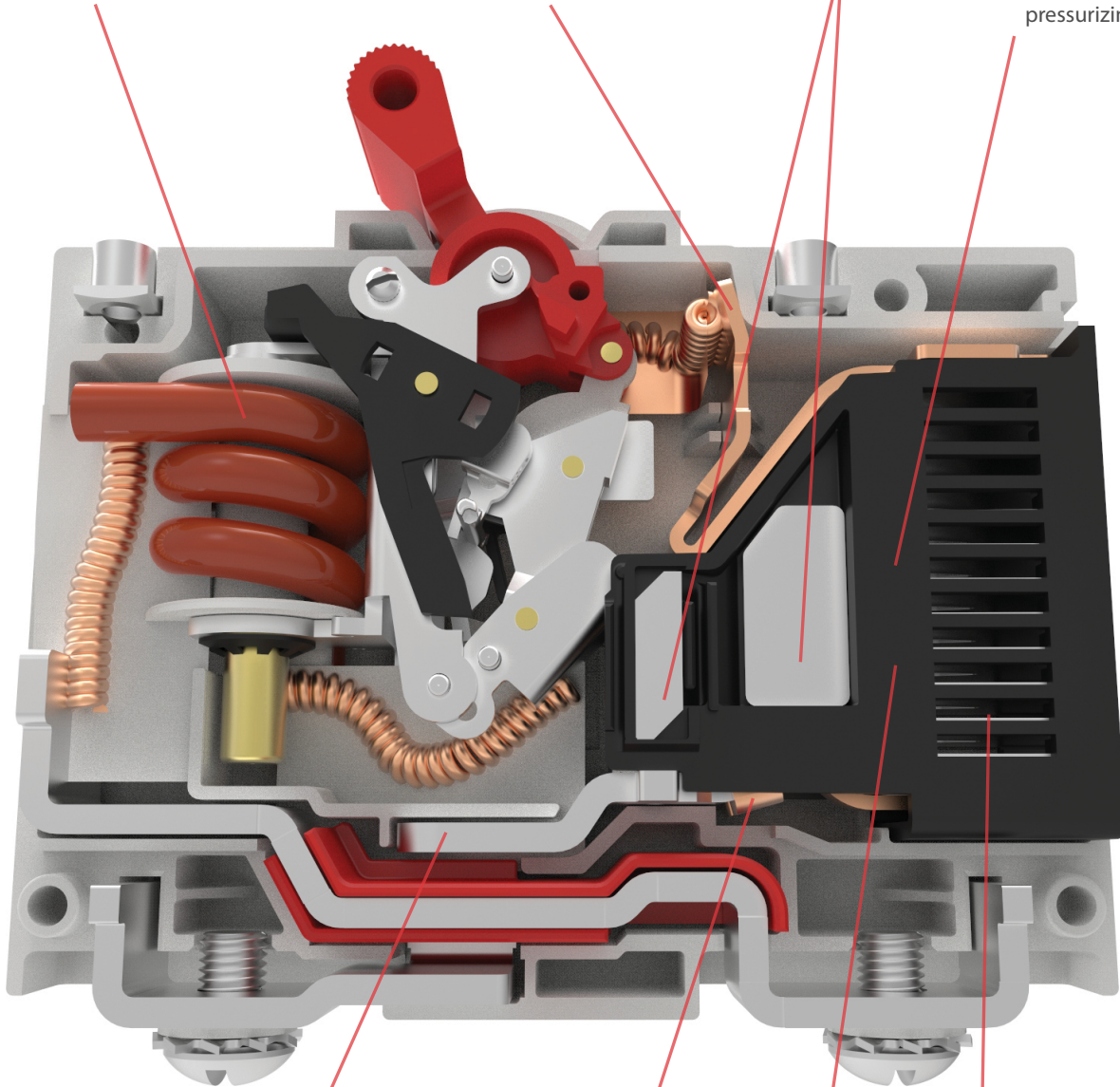
**UPPER ARC RUNNER**

Aids in motivating arc off of movable contact and into arc chamber

**MAGNETS**

**ARC SPLITTER RETAINER**

w/ integrated pressurizing walls



**PATENT PENDING MAGNETIC FLUX BOOSTING TERMINAL CONFIGURATION**

Design enhances motivation of arc into arc chamber

**LOWER ARC RUNNER**

Aids in motivating arc off of stationary contact and into arc chamber

**LARGE ARC GAP**

To generate high arc voltages

**(12) ARC DEIONIZING SPLITTER PLATES**

## Electrical Tables

**Table A:** Lists UL Listed (UL489) configuration and performance capabilities as a Molded Case Circuit Breaker

CX SERIES TABLE A : UL489 LISTED BRANCH CIRCUIT BREAKERS					
CIRCUIT CONFIGURATION	VOLTAGE		MAX CURRENT RATING AMPS	INTERRUPTING CAPACITY (AMPS)	NUMBER OF POLES
	MAX. RATING	FREQUENCY			
SERIES	250	D.C.	15	5,000	1
	250 / 500	D.C.	15	10,000	2
	410 / 205	D.C.	50	10,000	2

**Table B:** Lists UL Recognized configurations and performance capabilities as a Component Supplementary Protector

CX SERIES TABLE B : UL1077 COMPONENT SUPPLEMENTARY PROTECTOR						
CIRCUIT CONFIGURATION	VOLTAGE		MAX CURRENT RATING AMPS	INTERRUPTING CAPACITY (AMPS)	NUMBER OF POLES	APPLICATION CODE
	MAX. RATING	FREQUENCY				
SERIES	300	D.C.	1 - 75	5,000	1	TC1, OL0, U3
	300	D.C.	76 - 125	3,000	1	TC1, OL0, U3
	440	D.C.	1 -30	10,000	2	TC1, OL0, U3
	440	D.C.	31 - 63	5,000	2	TC1, OL0, U3
	600	D.C.	1 - 75	5,000	2	TC1, OL0, U3
	600	D.C.	76 - 115	3,000	2	TC1, OL0, U3
SWITCH ONLY <sup>1</sup>	600	D.C.	1 - 115	----	2 or 3	---

Notes:

- 1 Requires inclusion of a relay trip voltage coil

**Table C:** Lists UL Listed (UL489B) configuration and performance capabilities as a Molded Case Switch

CX SERIES TABLE C : UL489B LISTED PHOTOVATIC MOLDED CASE SWITCH						
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING (AMPS)	INTERRUPTING RATING (AMPS)	CONSTRUCTION NOTES
	MAX RATING	FREQUENCY	POLES			
SERIES	600	DC	2 <sup>1</sup>	50 - 100	600	May have a third pole that is a voltage trip pole
	600	DC	4 <sup>2</sup>	110 - 175	600	May have a fifth pole that is a voltage trip pole

Notes:

- 1 Two poles in series.  
2 Two poles in series in parallel with 2 poles in series.

**Table D:** TUV Certified Configuration to IEC / EN 60947-2. Low Voltage Switchgear and Controlgear - Circuit Breakers

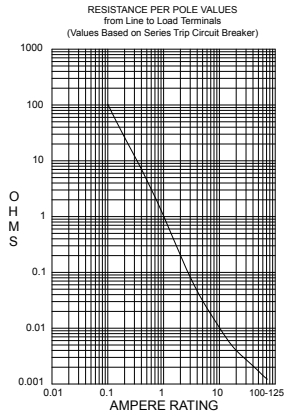
CX-SERIES TABLE D : TUV IEC/EN 60947-2 LOW VOLTAGE SWITCH GEAR & CONTROL GEAR / CIRCUIT BREAKER					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING (AMPS)	INTERRUPTING CAPACITY
	MAX. RATING	FREQUENCY	POLES		ICS / ICU (AMPS)
SERIES	440	DC	2	1-63	4,000

\*Manufacturer reserves the right to change product specification without prior notice.

## Electrical

Maximum Voltage  
Overload

600 VDC  
50 operations at 600% of rated current for UL489, and at 150% of rated current for UL1077.



Current (amps)	Tolerance (%)
0.1 -5.0	15%
5.1-20.0	25%
20.1-125	35%

## Physical

Number of Poles  
Termination  
Termination Barrier  
Mounting  
Actuator  
Internal Circuit Config.  
Materials  
Weight  
Standard Color

1- 2 poles, + Auxiliary Switch Pole.  
10-32 or M5 Screw Terminals  
1/4-20 or M6 Threaded Stud Terminals  
Standard with multi-pole constructions  
Threaded insert: #6-32 UNC-2B, or M3X0.5-6H B ISO (2 per pole)  
Handle, 1 per pole.  
Series Trip  
Housing - Glass filled Polyester  
Handle - Glass filled Polyester  
Line/Load Terminals - Copper Alloy.  
~150 Grams (~5.3 Ounces).  
~150 Grams (~5.3 Ounces).  
Housing - Gray.  
Handle - White, Black, Red, Green, Blue, Yellow, Gray,

## Mechanical

Endurance  
Trip Free  
Trip Indication

Max 10,000 ON-OFF operations @ 6 per minute; 6000 with rated current & voltage, and 4,000 cycles mechanical.  
Trips on overload even when actuator is forcibly held in the "On" position.  
The operating handle moves positively to the "Off" position when an overload causes the breaker to trip.

## Environmental

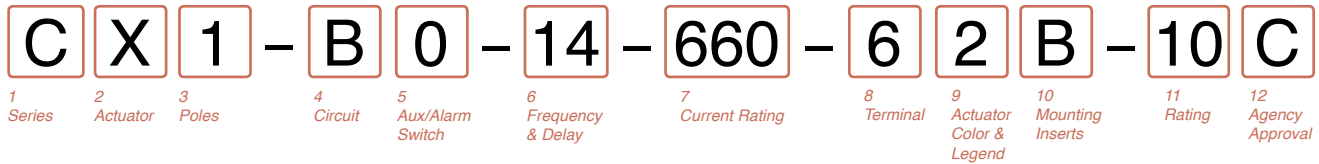
Shock  
Vibration

Withstands 100 Gs, 6ms saw tooth while carrying rated current per MIL-PRF-55629 and MIL-STD-202G, Method 213G, Test Condition "1". Instantaneous and ultra short curves tested at 90% of rated current  
Withstands 0.060" excursion from 10-55 Hz & 10 Gs 55-500 Hz, at rated current per MIL-PRF-55629 and MIL-STD-202G, Method 240D, Test Cond. A. Instantaneous & ultrashort curves tested at 90% of rated current.  
Moisture Resistance  
MIL-PRF-55629 and MIL-STD-202G, Method 106G, i.e., Ten 24-hour cycles at +25°C to +65°C, 80-98% RH.  
Salt Spray  
Method 101, Condition A (90-95% RH at 5% NaCl Solution, 96 hrs).  
Thermal Shock  
MIL-PRF-55629 and MIL-STD-202G, Method 107G, Condition A (5-cycles at -55°C to +25°C to +85°C to +25°C).  
Operating Temperature  
-40°C to +85°C.

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**1 SERIES**  
C

**2 ACTUATOR**  
X Handle, one per pole

**3 POLES**  
1 One  
2 Two  
3 Three

**4 CIRCUIT**  
A<sup>1</sup> Switch Only (no coil)  
B Series Trip (current)  
G<sup>2</sup> Relay Trip (voltage)

**5 AUXILIARY SWITCH**  
0 w/o Aux Switch<sup>3</sup>

**6 FREQUENCY & DELAY**  
03 DC 50/60Hz, Switch Only  
10 DC Instantaneous  
11 DC Ultra Short  
12 DC Short  
14 DC Medium  
16 DC Long

**7<sup>4</sup> CURRENT RATING (AMPERES)**

CODE	AMPERES	CODE	AMPERES	CODE	AMPERES	CODE	AMPERES
220	0.200	420	2.000	611	11.000	670	70.000
225	0.250	522	2.250	711	11.500	675	75.000
230	0.300	425	2.500	612	12.000	680	80.000
235	0.350	527	2.750	712	12.500	685	85.000
240	0.400	430	3.000	613	13.000	690	90.000
245	0.450	435	3.500	614	14.000	695	95.000
250	0.500	440	4.000	615	15.000	810	100.000
255	0.550	445	4.500	616	16.000	911	115.000
260	0.600	450	5.000	617	17.000	912	125.000
265	0.650	455	5.500	618	18.000		
270	0.700	460	6.000	620	20.000		
275	0.750	465	6.500	622	22.000		
280	0.800	470	7.000	624	24.000		
285	0.850	475	7.500	625	25.000		
290	0.900	480	8.000	630	30.000		
295	0.950	485	8.500	635	35.000		
410	1.000	490	9.000	640	40.000		
512	1.250	495	9.500	650	50.000		
415	1.500	610	10.000	660	60.000		
517	1.750	710	10.500	665	65.000		

**8 TERMINAL**  
2 Screw Terminal, 10-32  
3 Stud, 1/4-20  
5 Screw Terminal, M5  
6 Stud, M6

**9 ACTUATOR COLOR & LEGEND**

Actuator Color	I-O	ON-OFF	Dual	Legend Color
White	A	B	1	Black
Black	C	D	2	White
Red	F	G	3	White
Green	H	J	4	White
Blue	K	L	5	White
Yellow	M	N	6	Black
Gray	P	Q	7	Black
Orange	R	S	8	Black

**10 MOUNTING INSERTS**  
A 6-32 Thread w/o terminal bus  
B M3 Thread w/o terminal bus

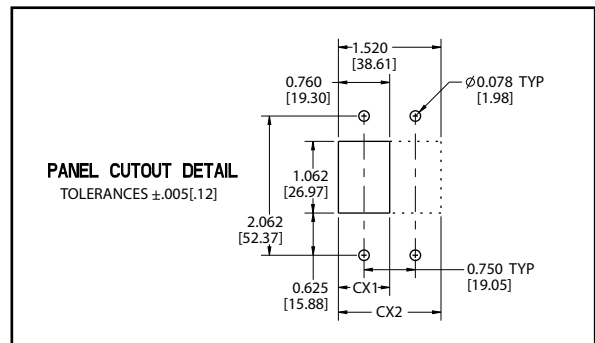
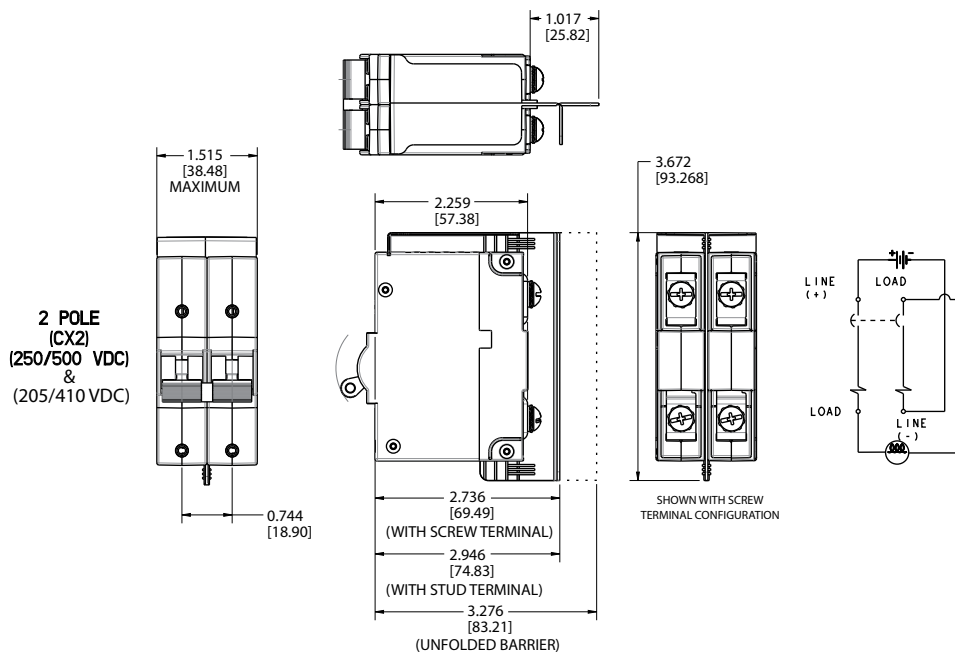
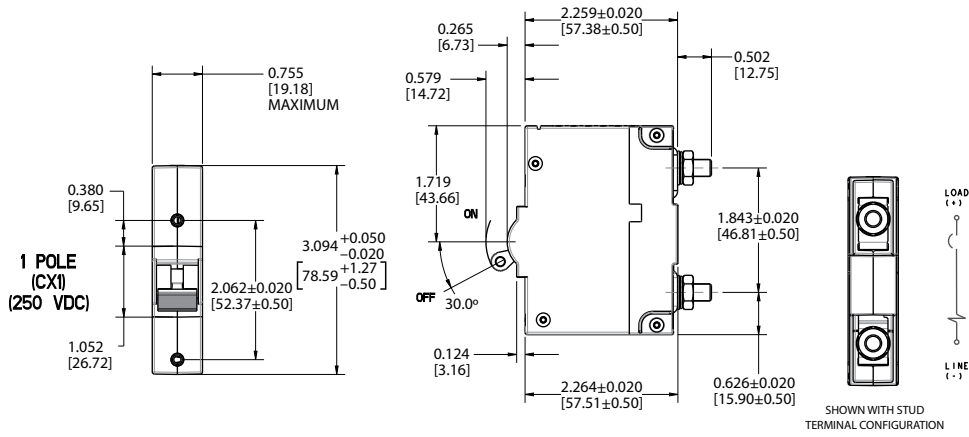
**11 MAX. APPLICATION RATING**  
10 300VDC  
11<sup>4</sup> 440 VDC w/o factory installed terminal bus  
14<sup>4</sup> 440VDC with factory installed terminal bus  
06<sup>5</sup> 600VDC

**12 AGENCY APPROVAL**  
A Without approvals  
C UL 1077 Recognized  
W UL 1077 Recognized & TUV Certified IEC/ EN 60947-2<sup>9</sup>

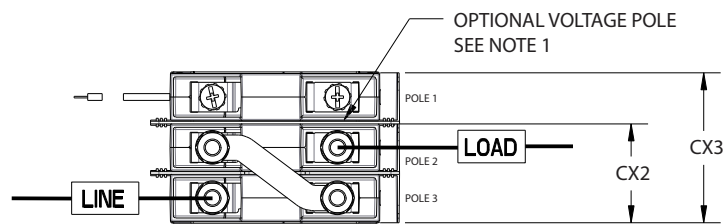
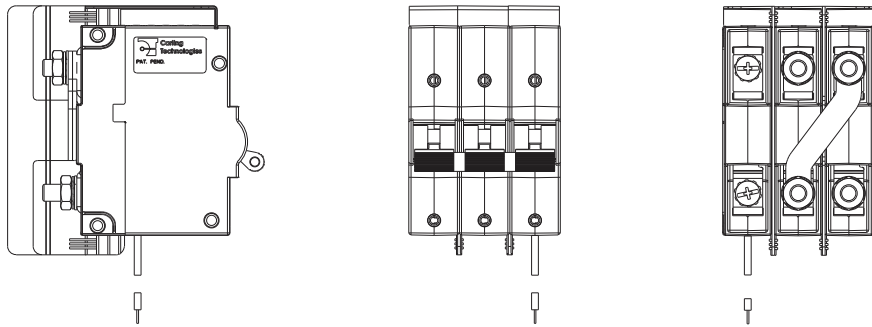
Notes:

- Only available when tied to a protected pole  
Requires special P/N consult factory for details
- Voltage trip circuit coil not rated for continuous duty - use instantaneous delay code 10
- Contacts Rated for 20A @ 80 VDC
- 440VDC Rating available in two different wiring configurations, see next page for more details
- 600 VDC only available with factory installed terminal bus (see next page for more details)
- Single pole units available up to 125A, multi pole units limited to 115A Max.  
(see next page for more details)
- 3 Pole units must include one Auxiliary switch pole (circuit code A or G) - Requires Special Part Number. (see next page for more details)
- Screw Terminals are limited to 50A max.
- Agency approval code W only available with 440 VDC rating & circuit code B.

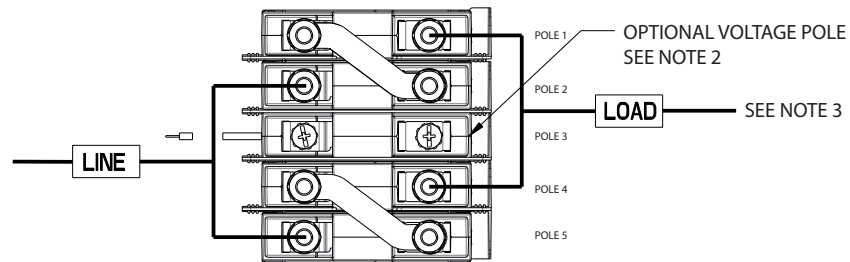








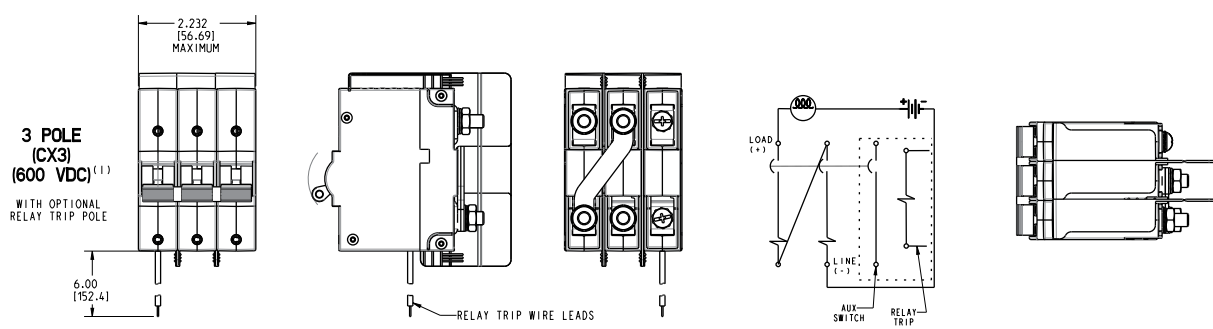
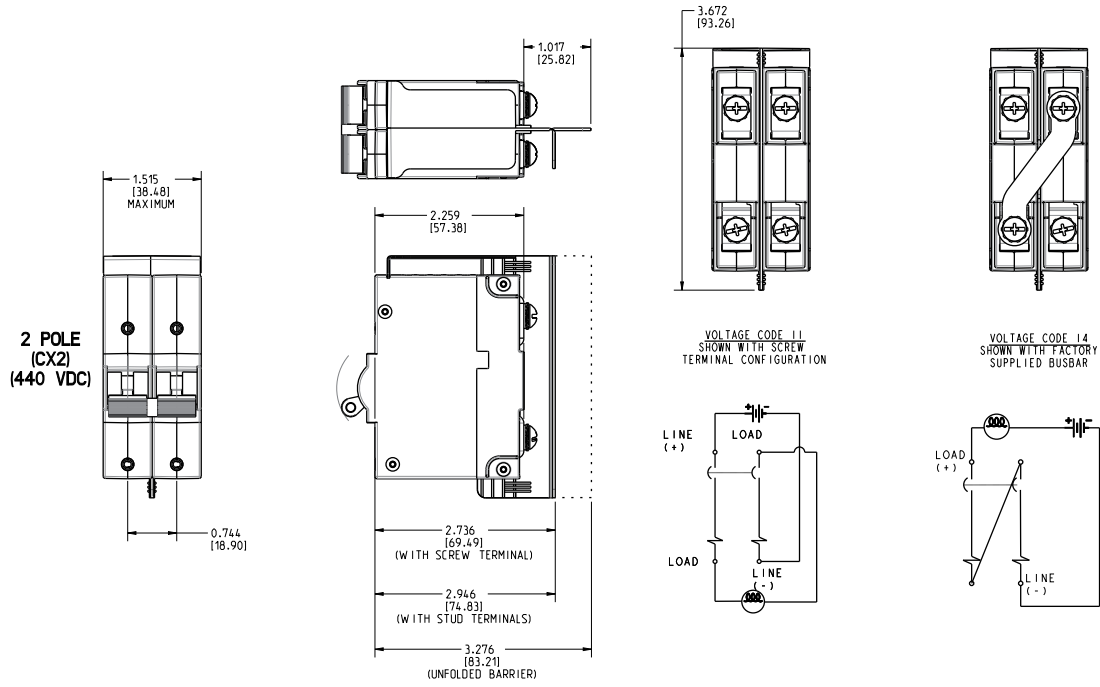
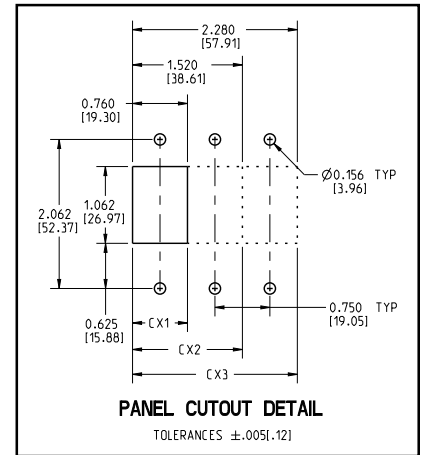
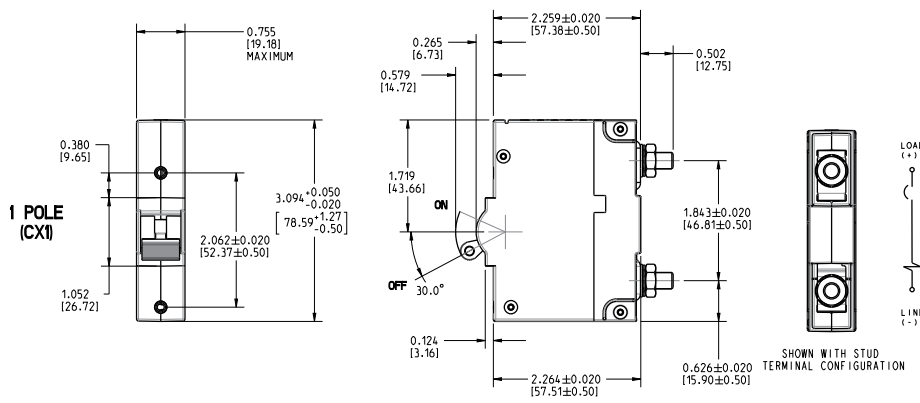
CX3 - 2 POLE SWITCH (CX2) SHOWN  
WITH OPTIONAL VOLTAGE POLE  
50A-100A DEVICE, 600VDC



CX5 - 4 POLE SWITCH (CX4) SHOWN  
WITH OPTIONAL VOLTAGE POLE  
101A-175A DEVICE, 600VDC

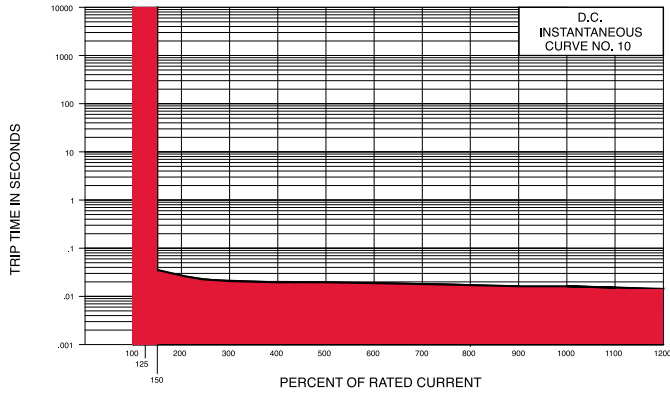
Notes:

- 1 3 pole configuration supplied with voltage coil on pole 1. Optional location pole 3. Consult factory.
- 2 5 pole configuration supplied with voltage coil in center pole. (Pole 3)
- 3 Line & Load connections requires bus connection as shown.  
Minimum cross section .127 in<sup>2</sup> (81.94 mm<sup>2</sup>)

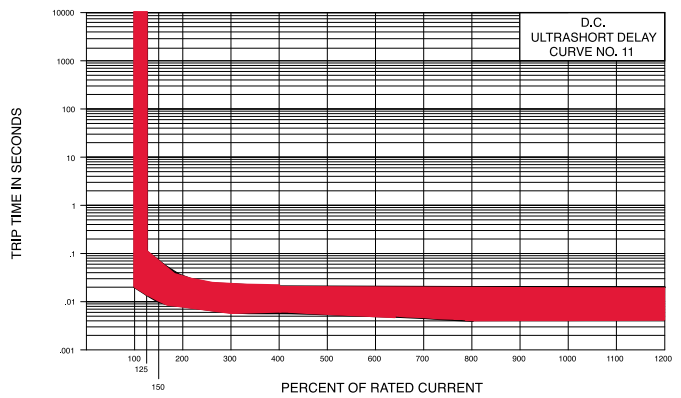


(1) 600V RATING REQUIRES MINIMUM OF 2 PROTECTED POLES

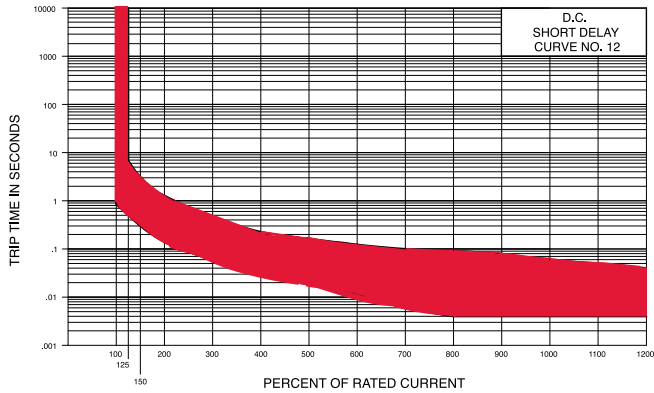
**Instantaneous - DC 10**



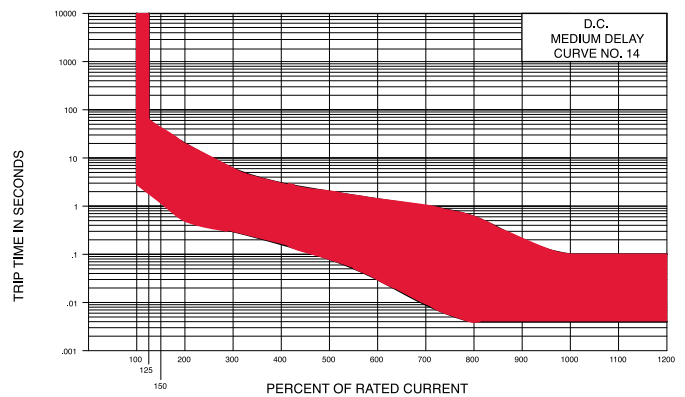
**Ultrashort - DC 11**



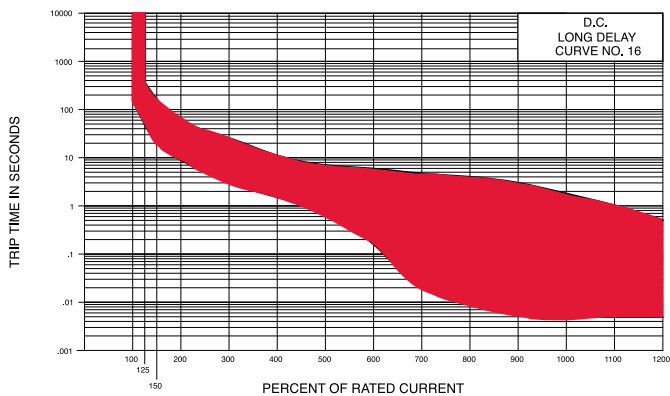
**Short - DC 12**



**Medium - DC 14**



**Long - DC 16**



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### About Carling

Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, circuit breakers, electronic controls, power distribution units, and multiplexed power distribution systems. With four ISO registered manufacturing facilities and technical sales offices worldwide, Carling Technologies Sales, Service and Engineering teams do much more than manufacture electrical components, they engineer powerful solutions! To learn more about Carling please visit [www.carlingtech.com/company-profile](http://www.carlingtech.com/company-profile).

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