

# CX-Series Circuit Breaker

Carling Technologies is proud to introduce the CX-Series circuit breaker, which features a unique and innovative patent pending 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.



#### **Additional Features:**

- Temperature stable hydraulic/magnetic overcurrent sensing technology.
- Optional relay trip circuit permitting remote operator system shut down.
- Choice of 6-32 or M3 mounting inserts providing secure panel mount installation.
- Choice of handle colors and legends, consult factory for details.

#### **Applications:**

- Ideal for integration into photovoltaic renewable energy systems. The CX-Series circuit breaker can be designed into the system's combiner box or main disconnect.
- Ideal for integration into Information Technologies' power distribution equipment utilizing high DC voltage input.



**Carling Technologies™**

Innovative Designs. Powerful Solutions.

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**Product Bulletin #137  
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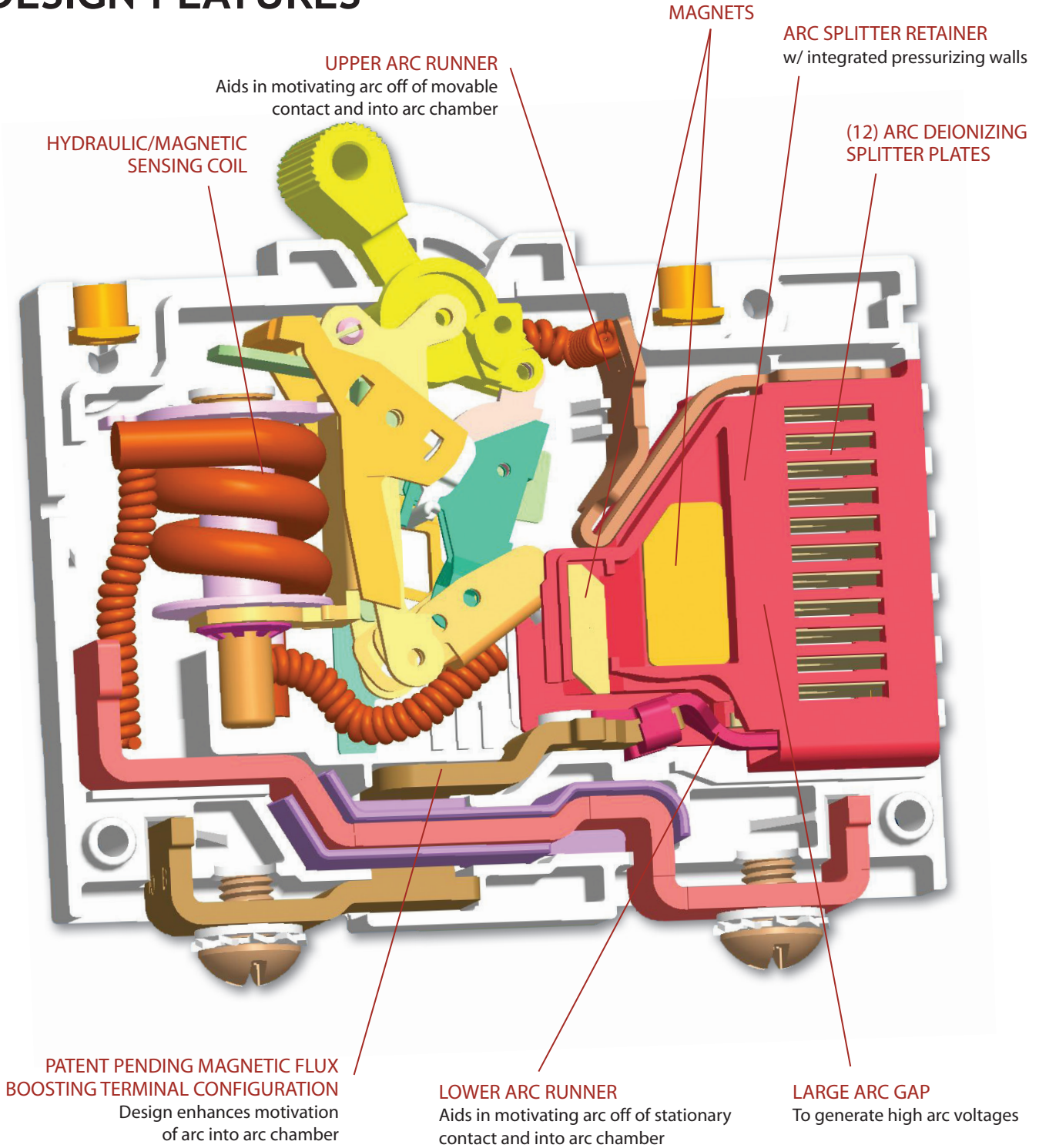
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# CX-Series Circuit Breaker DESIGN FEATURES



## Electrical Ratings

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

CX SERIES TABLE A: UL 489 LISTED BRANCH CIRCUIT BREAKERS					
CIRCUIT CONFIGURATION	VOLTAGE		MAX CURRENT RATING AMPS	INTERRUPT CAPACITY AMPS	NUMBER OF POLES
	MAX RATING	FREQUENCY			
SERIES	250	DC	15	5,000	1
	250 / 500	DC	15	10,000	2

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

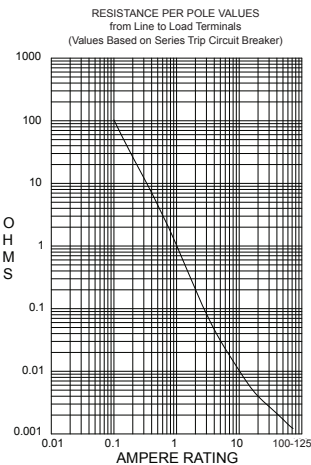
CX SERIES TABLE B: UL 1077 COMPONENT SUPPLEMENTARY PROTECTOR						
CIRCUIT CONFIGURATION	VOLTAGE		CURRENT RATING AMPS	INTERRUPT CAPACITY AMPS	NUMBER OF POLES	APPLICATION CODE
	MAX RATING	FREQUENCY				
SERIES	300	DC	1 - 75	5,000	1	TCI, OLO, U3
	300	DC	76 - 125	3,000	1	TCI, OLO, U3
	440	DC	1 - 30	10,000	2	TCI, OLO, U3
	440	DC	31 - 50	5,000	2	TCI, OLO, U3
	600	DC	1 - 75	5,000	2	TCI, OLO, U3
	600	DC	76 - 100	3,000	2	TCI, OLO, U3
SWITCH ONLY <sup>1</sup>	600	DC	1 - 100	3,000	2 or 3	---

1 - Requires inclusion of a relay trip voltage coil

### Electrical

#### Insulation Resistance Overload

Minimum of 100Megohms at 500 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

1- 2 poles, + Auxiliary Switch Pole. 10-32 or M5 Screw Terminals 1/4-20 or M6 Threaded Stud Terminals.

#### Termination Barrier Mounting

Standard with multi-pole constructions. Threaded insert: #6-32 UNC-2B, or M3X0.5-6H B ISO (2 per pole).

#### Actuator

Handle, 1 per pole.

#### Internal Circuit Config.

Series Trip

#### Materials

Housing - Glass filled Polyester  
Handle - Glass filled Polyester  
Line/Load Terminals - Copper Alloy.  
~150 Grams (~5.3 Ounces).

#### Weight

#### Standard Color

Housing - Gray.  
Handle - White, Black, Red, Green, Blue, Yellow, Gray, Orange.

### Mechanical

#### Endurance

10,000 ON-OFF operations @ 6 per minute; 6000 with rated current & voltage, and 4,000 cycles mechanical.

#### Trip Free

Trips on overload even when actuator is forcibly held in the "On" position.

#### Trip Indication

The operating handle moves positively to the "Off" position when an overload causes the breaker to trip.

### Environmental Shock

Withstands 100 Gs, 6ms saw tooth while carrying rated current per MILPRF-55629 and MIL-STD-202G, Method 213G, Test Condition "I". Instantaneous and ultra short curves tested at 90% of rated current.

#### Vibration

Withstands 0.060" excursion from 10-55 Hz & 10 Gs 55-500 Hz, at rated current per MIL-PRF-55629 and MILSTD-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).

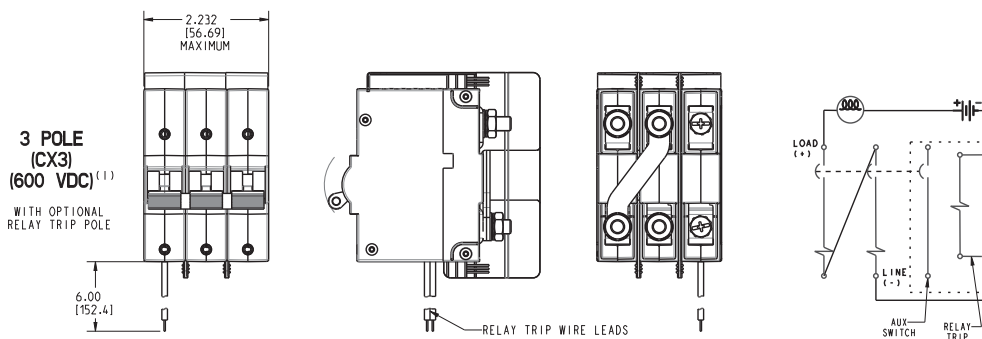
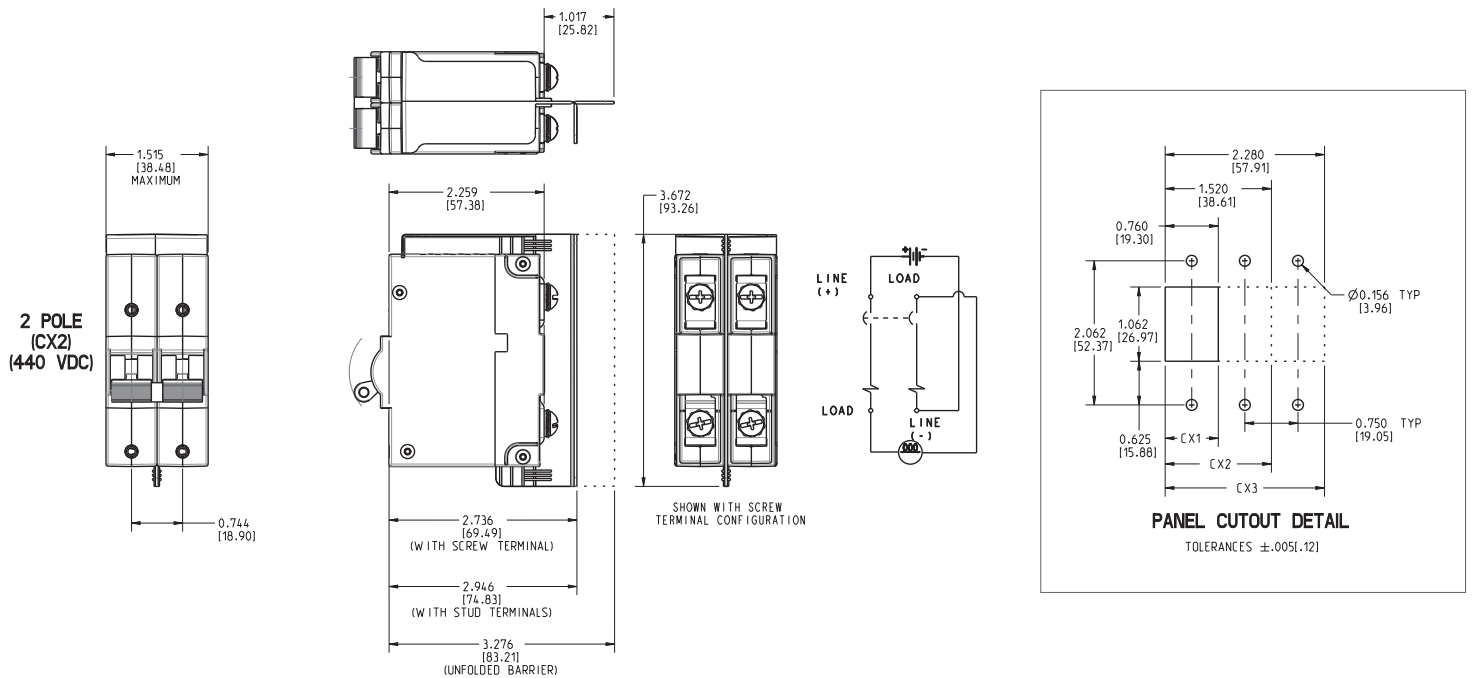
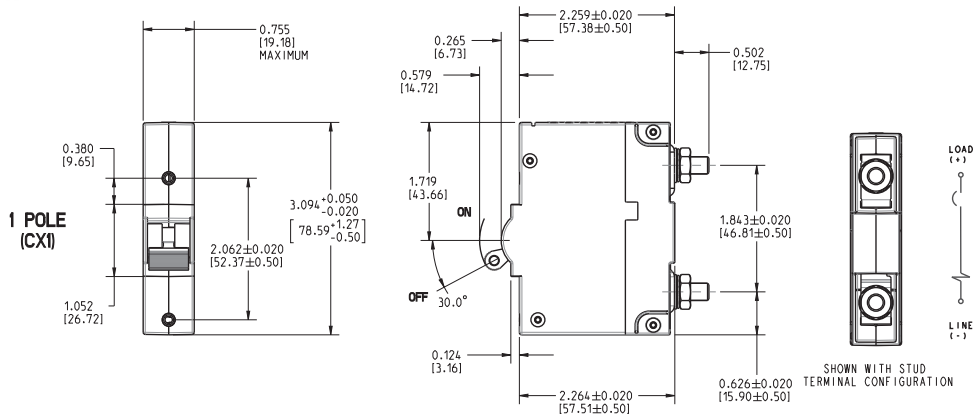
#### Thermal Shock

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).

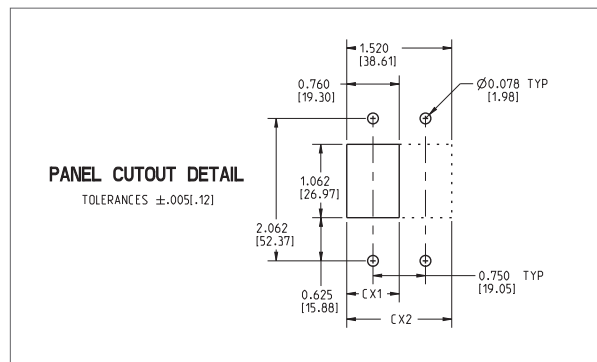
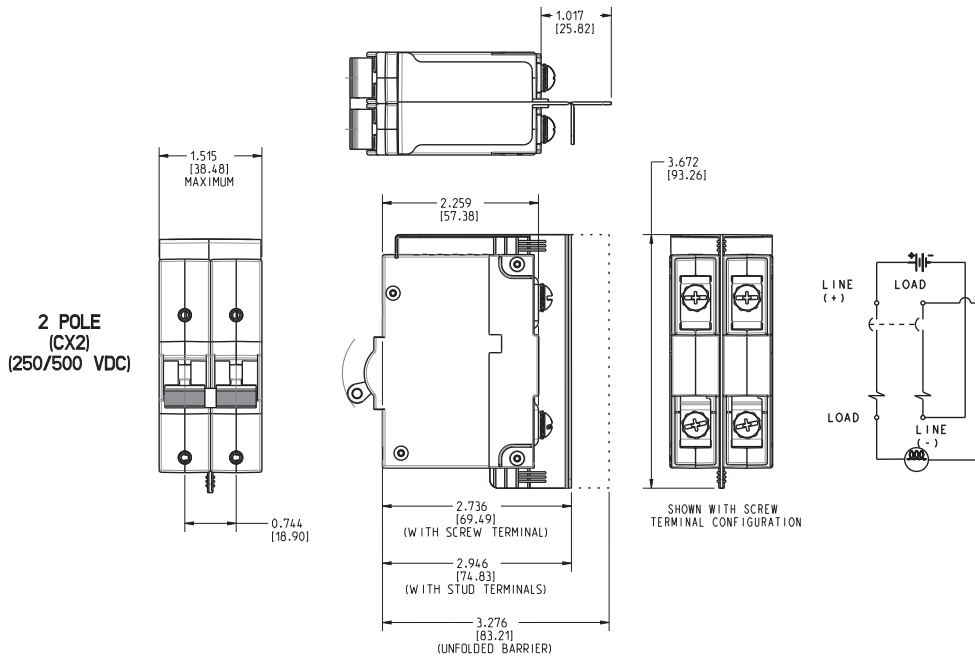
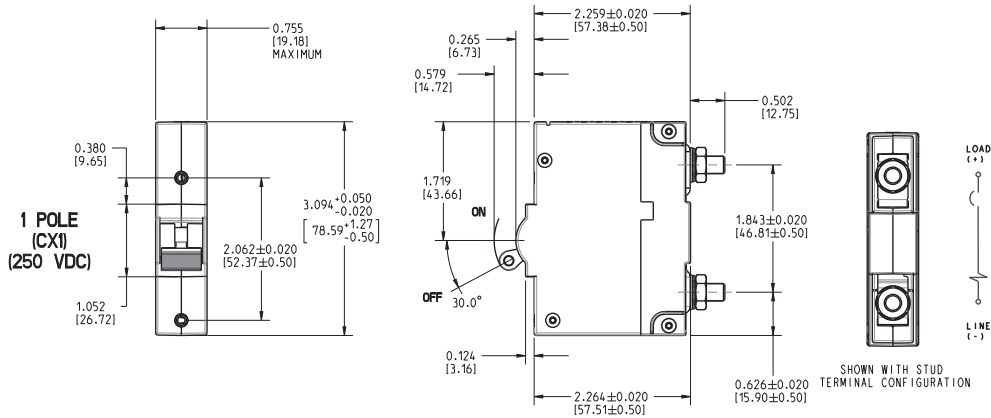
#### Operating Temperature

-40°C to +85°C.

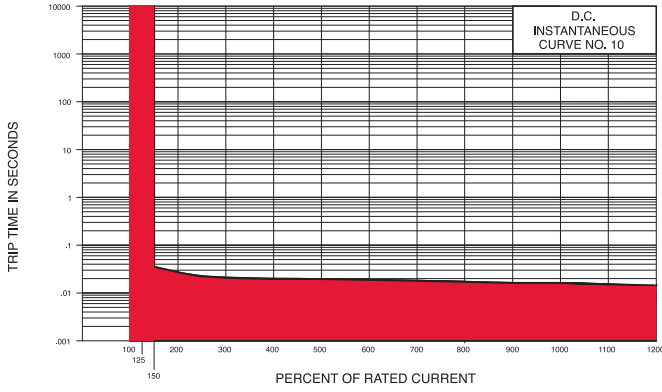
# 4 | CX-Series Circuit Breaker UL1077- Dimensional Specifications in. [mm]



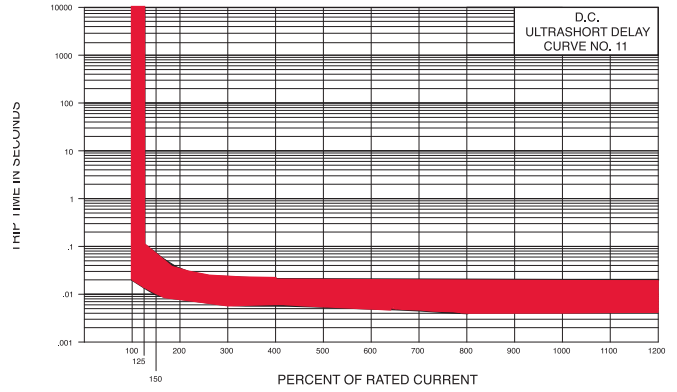
(1) 600V RATING REQUIRES MINIMUM OF 2 PROTECTED POLES



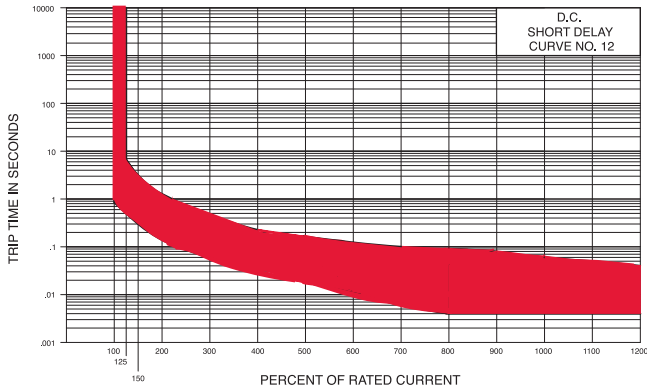
**Instantaneous - DC 10**



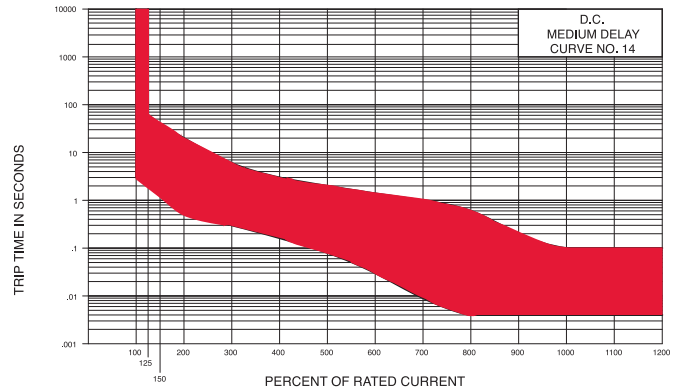
**Ultrashort - DC 11**



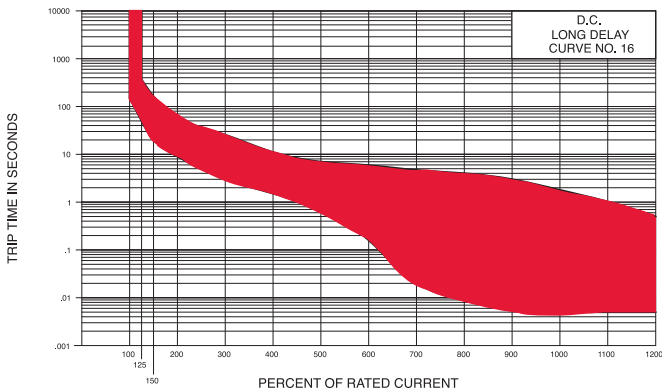
**Short - DC 12**



**Medium - DC 14**



**Long - DC 16**





**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)      G<sup>2</sup> Relay Trip (Voltage)  
B Series Trip (Current)

**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>o</sup> CURRENT RATING (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<sup>o</sup> TERMINAL**  
2 Screw Terminal, 10-32      5 Screw Terminal, M5  
3 Stud, 1/4-20      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      B M3 Thread

**11 MAX. APPLICATION RATING**  
10 300VDC      11<sup>4</sup> 440VDC      06<sup>5</sup> 600VDC

**12 AGENCY APPROVAL**  
A Without approvals      C UL 1077 Recognized

Notes:

- 1 Only available with agency approvals when tied to a protected pole. Requires special P/N. Consult Factory.
- 2 Voltage trip circuit coil not rated for continuous duty - use instantaneous delay code 10.
- 3 Auxiliary switch (S.P.S.T) function is available with the inclusion of an additional pole (Circuit code A or G). Requires special P/N consult factory.
- 4 440VDC rating not available with factory installed terminal bus.
- 5 600VDC only available with factory installed terminal bus.
- 6 Single pole units available up to 125A, multipole units limited to 100A max.
- 7 Screw terminals are limited to 50A max.



**1 SERIES**  
C

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

**3 POLES**  
1 One    2 Two

**4 CIRCUIT**  
B Series Trip (Current)

**5 AUXILIARY/ALARM SWITCH**  
0 w/o Aux Switch

**6 FREQUENCY & DELAY**  
11 DC Ultra Short  
12 DC Short  
14 DC Medium  
16 DC Long

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

220	0.200	285	0.850	440	4.000	710	10.500
225	0.250	290	0.900	445	4.500	611	11.000
230	0.300	295	0.950	450	5.000	711	11.500
235	0.350	410	1.000	455	5.500	612	12.000
240	0.400	512	1.250	460	6.000	712	12.500
245	0.450	415	1.500	465	6.500	613	13.000
250	0.500	517	1.750	470	7.000	614	14.000
255	0.550	420	2.000	475	7.500	615	15.000
260	0.600	522	2.250	480	8.000		
265	0.650	425	2.500	485	8.500		
270	0.700	527	2.750	490	9.000		
275	0.750	430	3.000	495	9.500		
280	0.800	435	3.500	610	10.000		

**8 TERMINAL**  
2 Screw Terminal, 10-32    5 Screw Terminal, M5  
3 Stud, 1/4-20    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    B M3 Thread

**11 MAX. APPLICATION RATING**  
12 250VDC    13' 250 / 500VDC

**12 AGENCY APPROVAL**  
A Without approvals    G UL 489 Listed

Notes:  
1 250/500 rating requires two pole breaker.

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