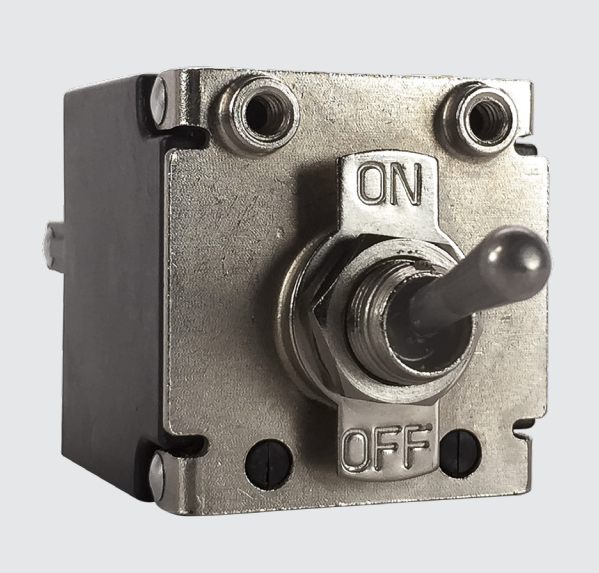
MS-Series
CIRCUIT BREAKER

Designed and tested to operate flawlessly in the harshest of environments, the MS-Series sealed toggle circuit breaker is ideally suited for COTS (commercial off the shelf) military applications. Our space saving envelope meets IP68 requirements and features a durable metal and sealed mounting bushing with MIL-PRF-39019F ingress protection when mounted in a panel.

This class-leading, affordable circuit breaker was designed in accordance with the requirements of MIL-PRF-55629 and MIL STD 202, making it the best choice for those applications where shock, vibration, moisture resistance, salt spray and thermal shock are of the utmost consideration. The MS-Series' compact size and reliability make it ideal for crucial communication equipment and other mission critical components.

1-3 poles; 0.20-30 amps; 65VDC, 240VAC, 120/240VAC; UL, CUL recognized & TUV certified.



Resources:

Configure a Complete Part

Download CAD & Sales Drawing >

Watch Product Video

Product Highlights:

- Sealed Toggle Actuator
- MIL-PRF-39019F Ingress Protection
- MIL-PRF-55629 and MIL STD 202 Compliant
- Compact Design

Typical Applications:

- COTS Military
  - Communication Equipment
- Off Highway Equipment
  - Construction, Mining & Agriculture
- Generators & Power Supplies
- Harsh Environment Applications

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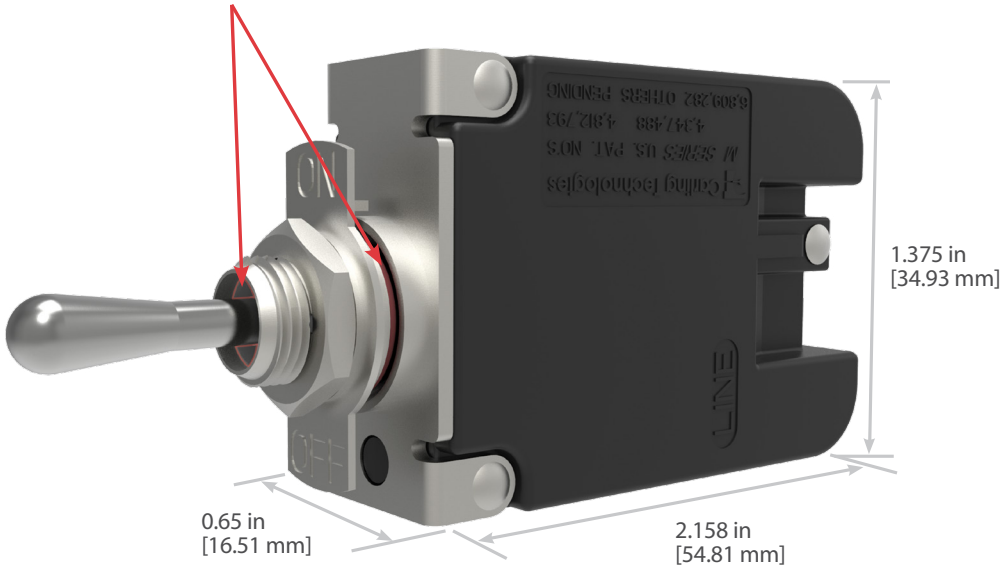
MS-Series
DESIGN FEATURES

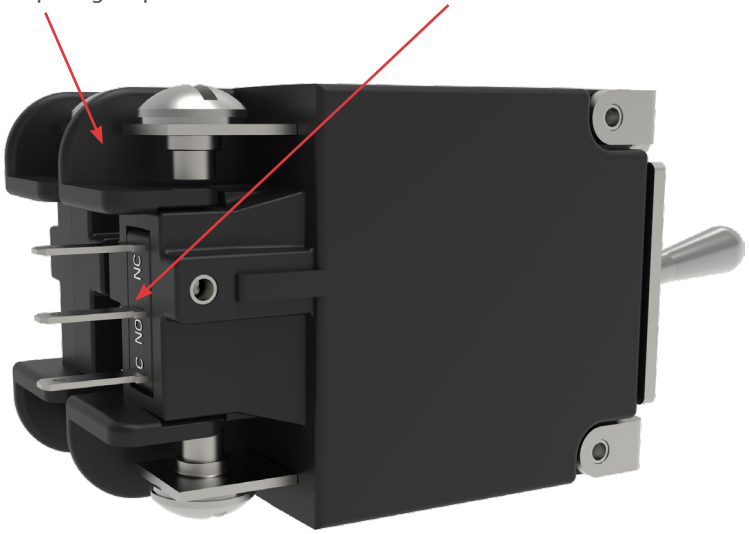
SEALS
IP68 Designed and tested to comply with MIL-PRF-39019F Ingress Protection

COMPACT SIZE
Max performance in compact size: 0.20-30 Amps; 65 VDC, 240 VAC 120/240 VAC



TERMINAL BARRIERS
Meet UL 1077 Spacing Requirements

OPTIONAL AUXILIARY SWITCH
Provides Breaker Status Indication



Electrical Tables

Table A: Lists UL & cUL Configuration & Performance Capabilities

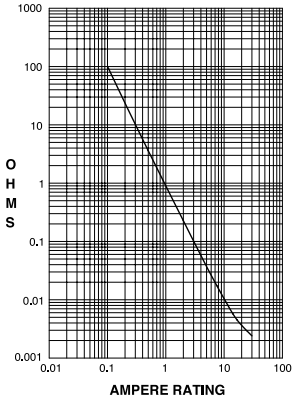
MS-SERIES TABLE A: COMPONENT SUPPLEMENTARY PROTECTORS									
	Voltage			Current Rating		Short Circuit Capacity (Amps)[1]			
Circuit Configuration	Max Rating	Frequency	Phase	General Purpose Amps	Poles Breaking	UL / cUL		TUV	
						U1	U3	Inc[2]	Icn
Series	65	DC	---	0.02 - 30	1	3000	300	3000	300
	240	50 / 60	1	0.02 - 30	1, 2	2000	300	3000	300
	120 / 240	50 / 60	1	0.02 - 30	2 or 3	2000	300	3000	300

Notes:
1 Short Circuit Current Rating (SC) Codes — The short-circuit current rating, followed by a letter and number designating the test conditions and any calibration following the short-circuit test as defined below:
U - Indicates that the short circuit test was performed without a series fuse
1 - Indicates that a re-calibration was not performed as part of the short circuit testing
3 - Indicates that the protector has proven to be suitable for further use after the short circuit test
Re-calibration, dielectric strength and voltage withstand tests were performed after the short circuit testing
2 - Inc rating obtained with a 50 Amp type gL fuse

Electrical

Current Ratings	.02 - 30 Amps
Voltage Rating	65VDC, 240VAC, 120/240VAC
Short Circuit Rating	See Table A
Auxiliary Switch Rating	5A @ 125VAC, 3A @ 32VDC, .1A @ 125VAC, 32VDC
Dielectric Strength	UL,CSA 1500V, 50/60 Hz for one minute between all electrically isolated terminals.
Insulation Resistance	Minimum of 100 Megohms @ 500VDC
Time Delay	See delay curve
Impedance	

RESISTANCE, IMPEDANCE VALUES
from Line to Load Terminals
(Values Based on Series Trip Circuit Breaker)



CURRENT (AMPS)	TOLERANCE (%)
0.20 - 30.0	25

Physical

Number of Poles	1-3 poles
Weight	Approximately 1.8 oz (50 G) per pole
Dimensions	See form & fit drawing

Agency Certifications

UL Standard 1077
CUL Standard C22.2

TUV Certified

Mechanical

Current Ratings	10,000 On-Off operations @ 6 per minute with rated current and voltage.
Trip Free	Trips on short circuit and overload, even when the actuator is forcibly held in the “On” position.
Trip Indication	The operating handle moves positively to the “Off” position when a short circuit or overload causes the circuit breaker to trip.

Environmental

Designed in accordance with requirements of specification MIL PRF-55629 & MIL-STD-202G as follows:

Shock	Withstands 100G’s, 6ms, saw tooth while carrying rated current per Method 213, Condition I. Instantaneous curves tested at 80% of rated current.
Vibration	Withstands 0.060” excursion from 10-55 Hz, and 10G’s 55-500 Hz, at rated current per Method 204C, Test Condition A. Instantaneous curves tested at 80% of rated current.
Salt Spray	Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96 hrs)
Moisture Resistance	Method 106G
Thermal Shock	Method 107D, Condition A (Five cycles @ -55°C to +25°C to +85°C to +25°C
Operating Temperature	-40°C to +85°C
Ingress Protection Level	MIL-PRF-55629C when mounted in panel.
Other	Materials used in this product are non-nutrient to fungus growth.

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

M	S	1	-	B	-	14	-	615	-	C	-	1	C	B	-	A	-	0A	A
1 Series	*2 Actuator*	*3 Poles*		*4 Circuit*		*5 Frequency & Delay*		*6 Current Rating*		*7 Terminal*		*8 Actuator Color*	*9 Front Panel Hardware*	*10 Legend Plate*		*11 Bushing Color*		*12 Voltage Code*	*13 Agency Approval*

1 SERIES
M

2 ACTUATOR
S Sealed Toggle

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

4 CIRCUIT
A Switch Only (no coil) [1,2]
B Series Trip (current)
M Series Trip (current) Aux switch .110 QC x 0.20 QC (silver contacts)
9 Series Trip (current) Aux switch .110 QC x 0.20 QC (gold contacts)

5 FREQUENCY & DELAY
03 DC, 50/60Hz, Switch Only [1]
10 DC, Instantaneous
12 DC, Short
14 DC, Medium
20 50/60Hz Instantaneous
22 50/60Hz Short
24 50/60Hz Medium
30 DC, 50/60Hz Instantaneous
32 DC, 50/60Hz Short
34 DC, 50/60Hz Medium
62 50/60Hz Short, High-inrush [4]
64 50/60Hz Medium, High-inrush [4]
72 DC, Short, High-inrush [4]
74 DC, Medium, High-inrush [4]
92 DC, 50/60Hz Short, High-inrush [4]
94 DC, 50/60Hz Medium, High-inrush [4]

6 CURRENT RATING (AMPERES)

CODE	AMPERES						
220	0.200	**295**	0.950	**460**	6.00	**614**	14.00
225	0.250	**410**	1.00	**465**	6.50	**615**	15.00
230	0.300	**512**	1.25	**470**	7.00	**616**	16.00
235	0.350	**415**	1.50	**475**	7.50	**617**	17.00
240	0.400	**517**	1.75	**480**	8.00	**717**	17.50
245	0.450	**420**	2.00	**485**	8.50	**618**	18.00
250	0.500	**522**	2.25	**490**	9.00	**619**	19.00
255	0.550	**425**	2.50	**495**	9.50	**620**	20.00
260	0.600	**527**	2.75	**610**	10.00	**622**	22.00
265	0.650	**430**	3.00	**710**	10.50	**624**	24.00
270	0.700	**435**	3.50	**611**	11.00	**625**	25.00
275	0.750	**440**	4.00	**711**	11.50	**630**	30.00
280	0.800	**445**	4.50	**612**	12.00		
285	0.850	**450**	5.00	**712**	12.50		
290	0.900	**455**	5.50	**613**	13.00		

Notes:
1 Series code “A” only available with delay code “03”
2 Only available when tied to a protected pole
3 Requires a 2 or 3 pole device
4 Only available without agency approvals (Approval Code A)

7 TERMINAL
1 Push-On 0.250 Tab (QC)
2 Screw 8-32 (Upturned Lugs)
3 Screw 8-32 (Bus Type)
C Screw Terminal M4 (Upturned Lugs)
E Screw Terminal M4 (Bus Type)
L Solder Lug

8 ACTUATOR & MARKING COLOR
1 Dull Metallic

9 FRONT PANEL HARDWARE
A No Outer Panel Hardware
B Hex Nut, Nickel Plated
C Hex Nut, Nickel Plated with Locking Ring
F Panel Dress Nut, Nickel Plated
G Panel Dress Nut, Nickel Plated with Locking Ring

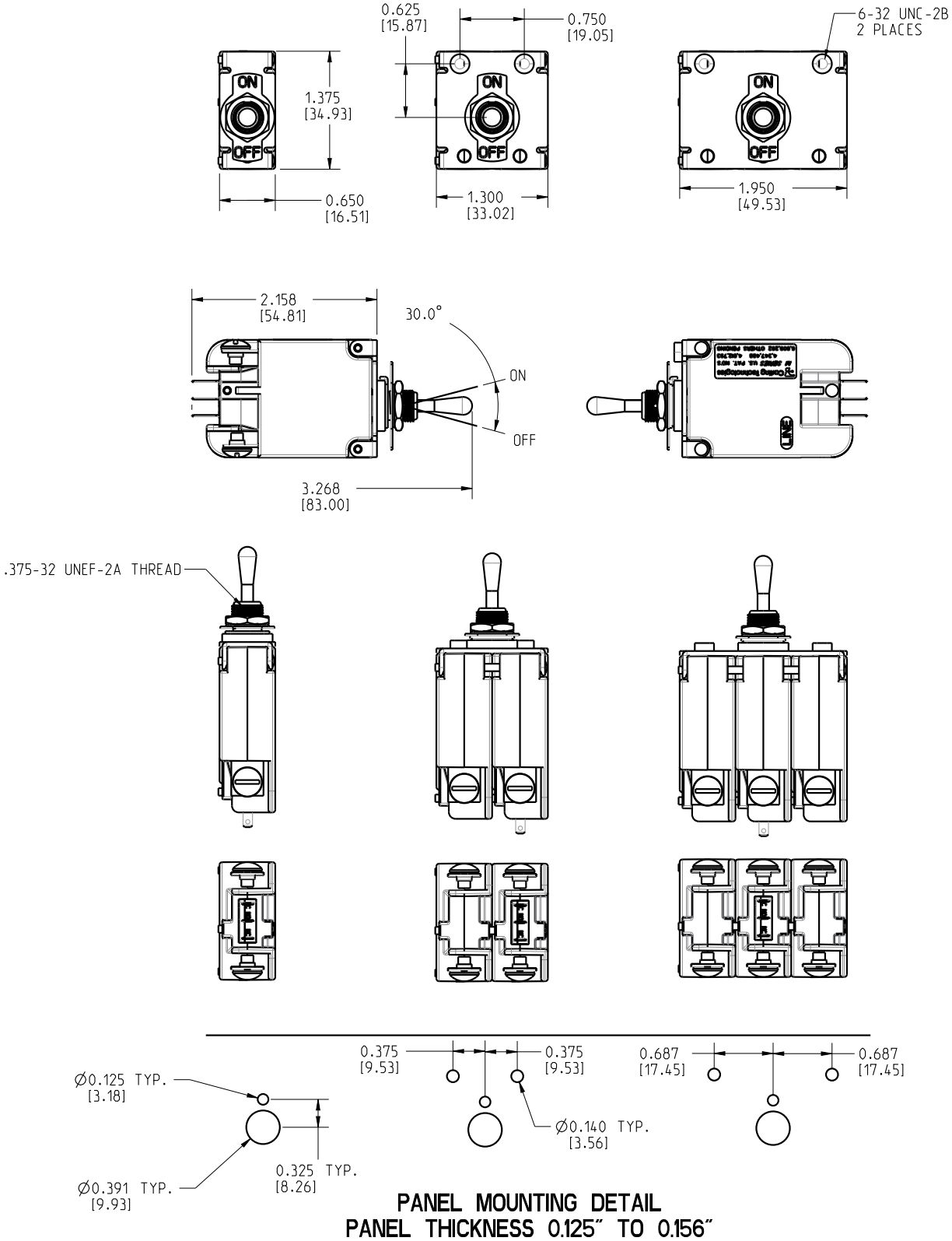
10 LEGEND PLATE
A No Legend Plate
B On-Off Vertical
C On-Off Horizontal
D I-O Vertical
E I-O Horizontal
F Dual Vertical
G Dual Horizontal

11 BUSHING COLOR
A Nickel Plated / Multipole Version

12 VOLTAGE CODE
0A 65 VDC
0D 240 VAC
0C 120/240 VAC [3]
0N 65 VDC / 120/240 VAC [3]
17 65 VDC / 240 VAC

13 AGENCY APPROVAL
A Without approvals
B UL Recognized
C UL & cUL Recognized
E TUV Certified, UL Recognized, CUL Recognized
U TUV Certified

Dimensional Specifications: in. [mm]



PANEL MOUNTING DETAIL
PANEL THICKNESS 0.125″ TO 0.156″

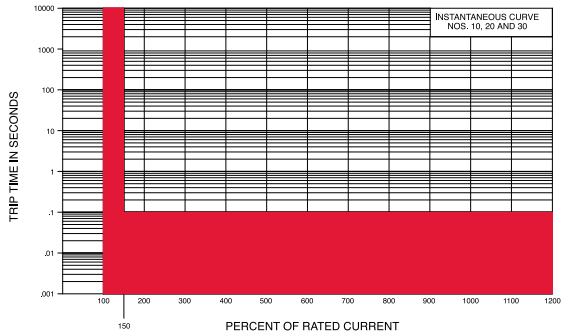
Notes:
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified.

M, MS-SERIES TIME DELAY VALUES										
	PERCENT OF RATED CURRENT									
	Delay	100%	135%	150%	200%	400%	600%	800%	1000%	1200%
TRIP	10, 20, 30	No Trip	May Trip	.100 Max	.100 Max	.100 Max	.100 Max	.100 Max	.100 Max	.100 Max
TIME	12, 22, 32, 62, 72, 92	No Trip	.300 - 7.00	.200 - 5.00	.100 - 2.00	.030 - .500	.008 - .300	.006 - .150	.005 - .100	.005 - .100
SECONDS	14, 24, 34, 64, 74, 94	No Trip	3.00 - 70.0	2.00 - 40.0	1.00 - 15.0	.100 - 4.00	.008 - 2.00	.006 - .800	.005 - .350	.005 - .160

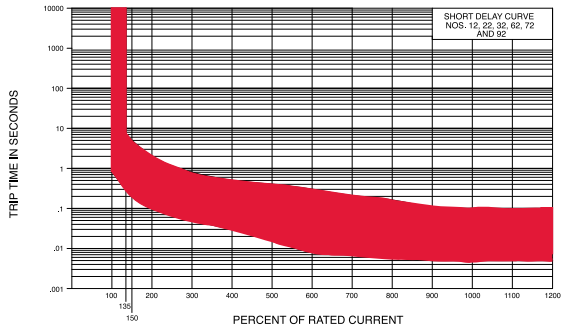
Notes:
1 Delay Curves 12,14, 22, 24, 32, 34, 62, 64, 72, 74, 92, 94: Breakers to hold 100% and must trip at 135% of rated current and greater within the time limit shown in this curve.
2 Delay Curves 10, 20, 30: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve.
3 All Curves: Curve data shown represents breaker response at ambient temperature of 77°F (25°C) with no preloading. Breakers are mounted in standard wall-mount position.
4 The minimum inrush pulse tolerance handling capability is 12 times the rated current on standard delays and 18 times the rated current on high inrush delays. These values are based on a 60 Hz 1/2 cycle, 8.33 ms pulse. High inrush delays should be specified for applications with high initial surge currents of short duration, such as switching power supplies, highly capacitive loads and transformer loads.

Dual Rated AC/DC

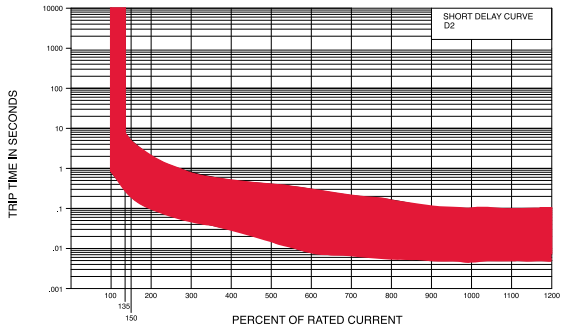
Instantaneous



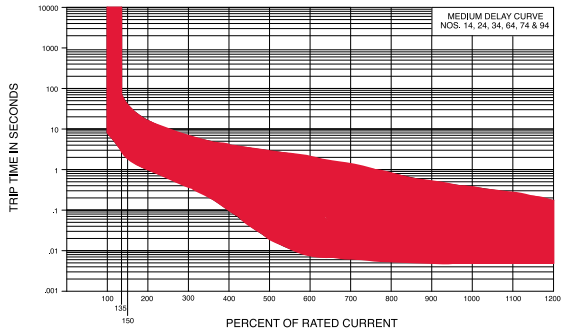
Short



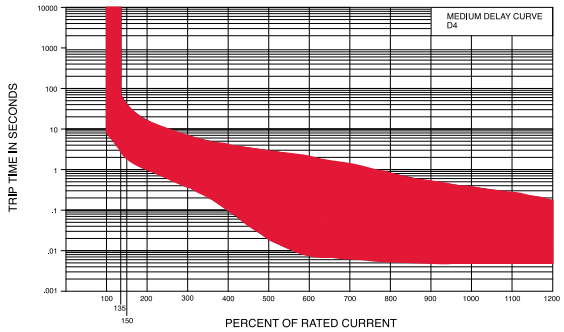
Short D2



Medium



Medium D4



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