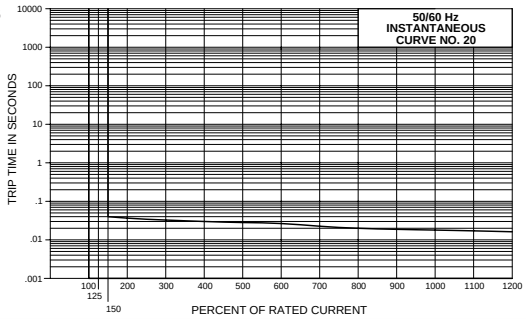
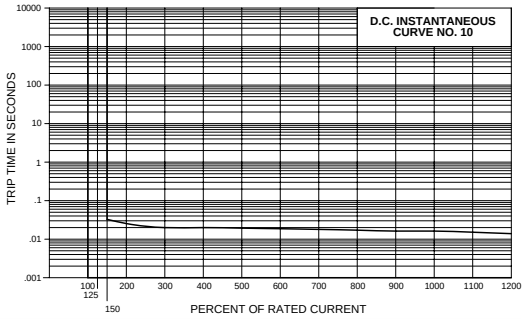
Time Delay Values (A, B, C & D-Series)

AC

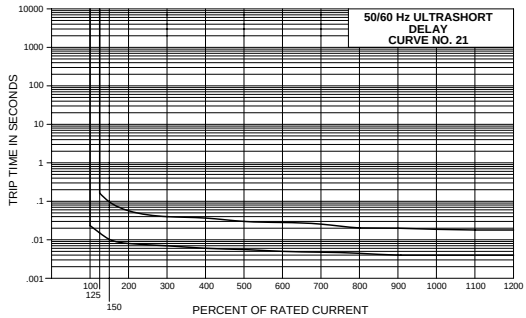
DC

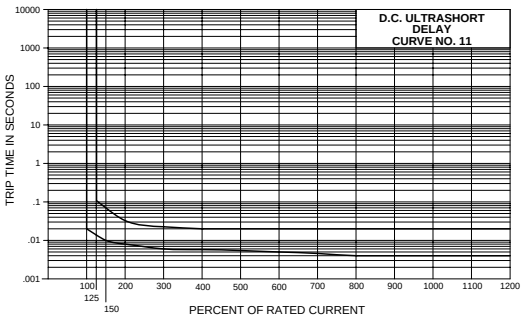
Instantaneous



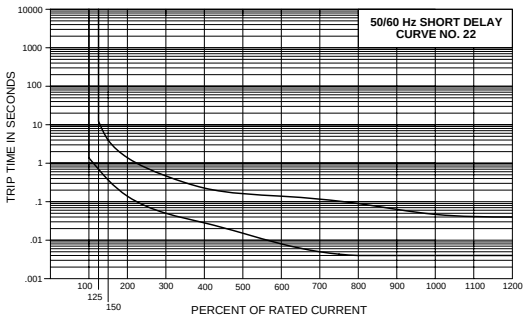


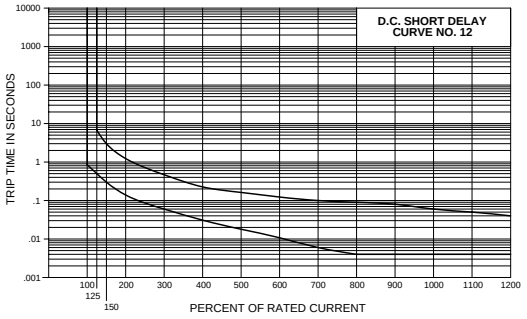
Ultrashort



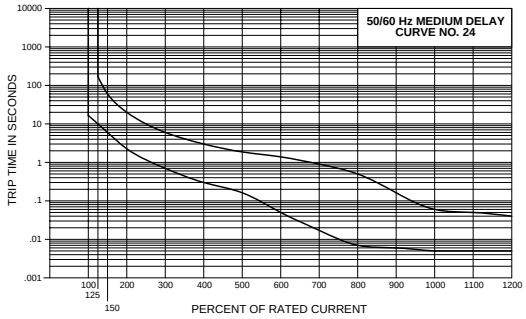


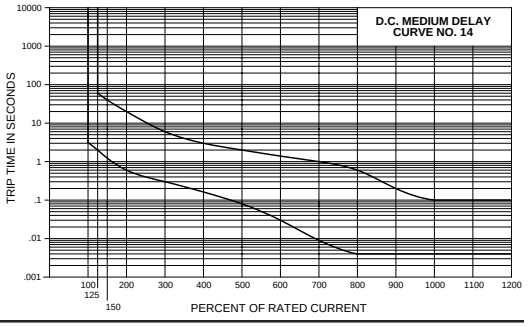
Short



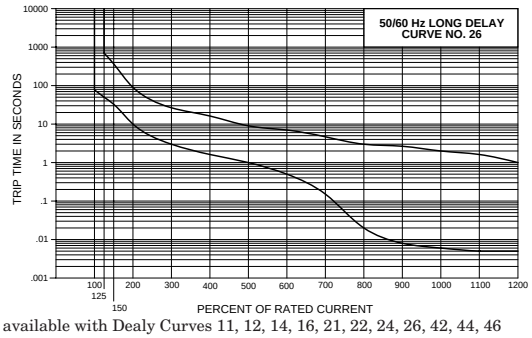


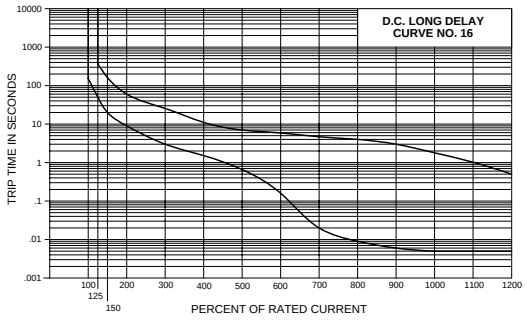
Medium





Long





NOTES

UL489 C-Series Breakers available with Dealy Curves 11, 12, 14, 16, 21, 22, 24, 26, 42, 44, 46

Delay Curves 11,12,14,16,21,22,24,26,42,44,46: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in this curve.

Delay Curves 32,34,36: Breakers to hold 100% and must trip at 135% of rated current and greater within the time limit shown in this curve.

Delay Curves 10,20: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve.

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.

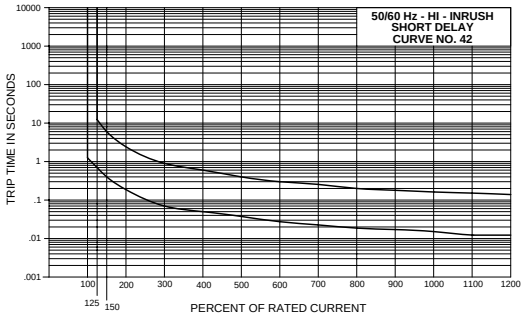
On 50 amp and less current ratings, the minimum inrush pulse tolerance handling capability is 12 times the rated current on standard delays and 25 times the rated current on high inrush delays. These values are based on a 60 Hz 1/2 cycle, 8 ms pulse. High inrush delays should be specified for applications with high initial surge currents of short duration such as switching power supplies, highly capacitive and transformer loads.

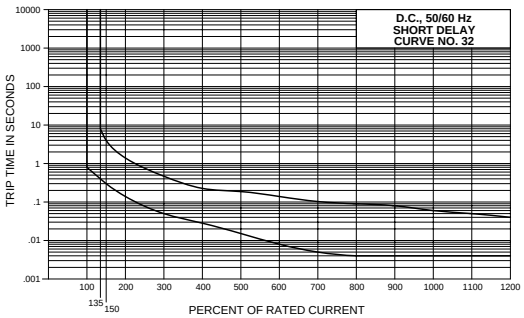
Time Delay Values (A, B, C & D-Series)

HI-INRUSH AC Delay Curves

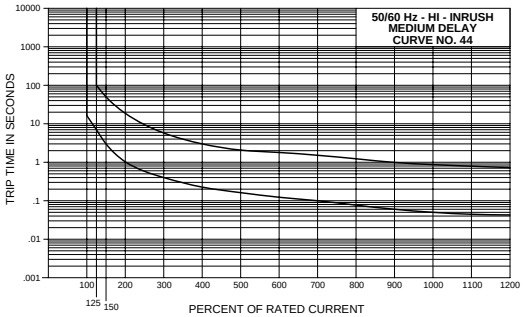
Dual Rated AC/DC Delay Curves

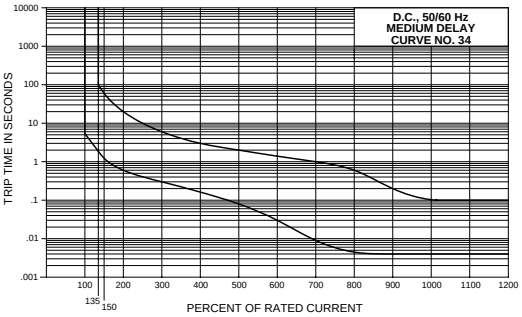
Short



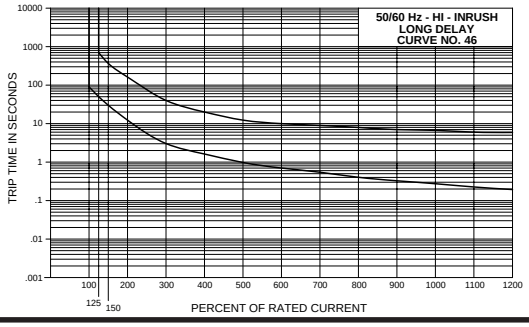


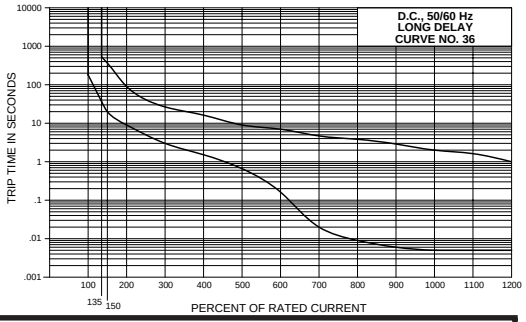
Medium





Long





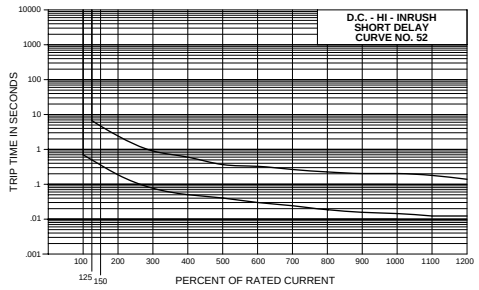
		PERCENT OF RATED CURRENT									
	DELAY	100%	125%	135%	150%	200%	400%	600%	800%	1000%	1200%
TRIP TIME (SECONDS)	10	NO TRIP	MAY TRIP	---	.032 MAX	.024 MAX	.020 MAX	.018 MAX	.016 MAX	.015 MAX	.013 MAX
	11	NO TRIP	.013 - .125	---	.010 - .070	.008 - .032	.006 - .020	.005 - .020	.004 - .020	.004 - .020	.004 - .020
	12	NO TRIP	.500 - 6.50	---	.300 - 3.00	.130 - 1.20	.031 - .220	.011 - .120	.004 - .090	.004 - .060	.004 - .040
	14	NO TRIP	2.00 - 60.0	---	1.20 - 40.0	.600 - 20.0	.150 - 3.00	.030 - 1.30	.004 - .600	.004 - .100	.004 - .100
	16	NO TRIP	45.0 - 345	---	20.0 - 150	9.00 - 60.0	1.40 - 11.4	.150 - 5.80	.009 - 3.70	.005 - 1.70	.005 - .500
	20	NO TRIP	MAY TRIP	---	.040 MAX	.035 MAX	.030 MAX	.025 MAX	.020 MAX	.017 MAX	.015 MAX
	21	NO TRIP	.014 - .150	---	.011 - .095	.008 - .055	.006 - .035	.005 - .027	.005 - .021	.004 - .018	.004 - .017
	22	NO TRIP	.700 - 12.0	---	.350 - 4.00	.130 - 1.30	.027 - .220	.008 - .130	.004 - .090	.004 - .045	.004 - .040
	24	NO TRIP	10.0 - 160	---	6.00 - 60.0	2.20 - 20.0	.300 - 3.00	.050 - 1.30	.007 - .500	.005 - .060	.005 - .040
	26	NO TRIP	50.0 - 700	---	32.0 - 350	10.0 - 90.0	1.50 - 15.0	.500 - 7.00	.020 - 3.00	.006 - 2.00	.005 - 1.00
	32	NO TRIP	MAY TRIP	.400 - 8.00	.300 - 4.00	.130 - 1.30	.027 - .220	.008 - .130	.004 - .090	.004 - .060	.004 - .040
	34	NO TRIP	MAY TRIP	1.80 - 100	1.20 - 60.0	.600 - 20.0	.150 - 3.00	.030 - 1.30	.004 - .600	.004 - .110	.004 - .100
	36	NO TRIP	MAY TRIP	35.0 - 520	20.0 - 350	9.00 - 90.0	1.40 - 15.0	.150 - 7.00	.009 - 3.70	.005 - 2.00	.004 - 1.00
	42	NO TRIP	.700 - 12.0	---	.400 - 6.00	.180 - 2.30	.050 - .600	.026 - .300	.018 - .200	.014 - .150	.012 - .130
	44	NO TRIP	7.00 - 100	---	3.00 - 50.0	1.10 - 18.0	.220 - 3.00	.120 - 1.70	.075 - 1.20	.050 - .850	.042 - .720
	46	NO TRIP	50.0 - 700	---	31.0 - 350	12.0 - 150	1.50 - 20.0	.700 - 10.0	.404 - 7.90	.260 - 6.50	.198 - 5.80
	52	NO TRIP	.500 - 6.50	---	.340 - 4.50	.180 - 2.30	.051 - .600	.030 - .320	.018 - .220	.014 - .200	.012 - .130
	54	NO TRIP	1.50 - 50.0	---	.750 - 35.0	.350 - 18.0	.110 - 3.00	.070 - 1.70	.045 - 1.40	.039 - 1.30	.035 - 1.30
	56	NO TRIP	45.0 - 345	---	19.0 - 170	8.50 - 100	1.24 - 15.0	.410 - 9.00	.256 - 8.00	.210 - 5.50	.198 - 2.90

NOTES
UL489 C-Series Breakers available with Delay Curves 11, 12, 14, 16, 21, 22, 24, 26, 42, 44, 46.
Delay Curves 11,12,14,16,21,22,24,26,42,44,46: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in this curve.
Delay Curves 32,34,36: Breakers to hold 100% and must trip at 135% of rated current and greater within the time limit shown in this curve.
Delay Curves 10,20: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve.
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.
On 50 amp and less current ratings, the minimum inrush pulse tolerance handling capability is 12 times the rated current on standard delays and 25 times the rated current on high inrush delays. These values are based on a 60 Hz 1/2 cycle, 8 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 and transformer loads.

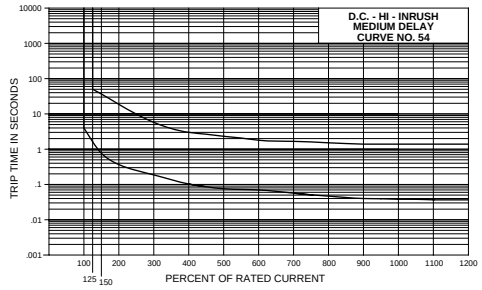
Time Delay Values (A, B, C & D-Series)

HI-INRUSH DC Delay Curves

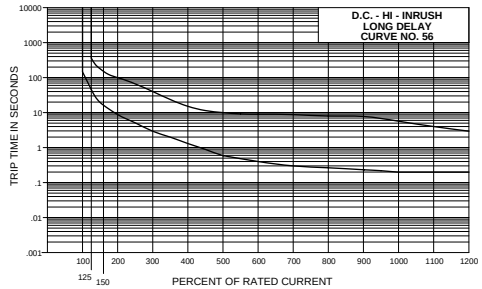
Short



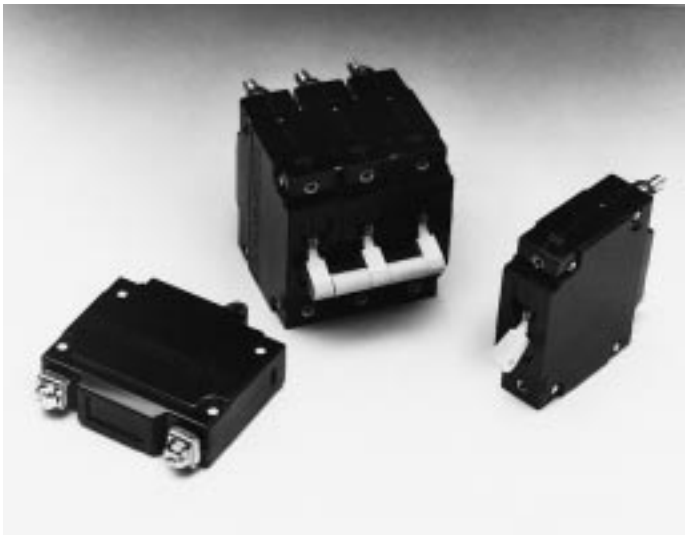
Medium



Long



C-Series – Handle Actuator



Designed for those applications requiring higher amperage and voltage handling capability. Available with American Standard or Metric Threaded Stud terminals, or Saddle Clamp screw terminals. Optional mid-trip handle style actuator allows visual indication of electrical overload with or without alarm feature.

New solid color rocker actuators and unique visi-rocker two color actuators are now available. Visi-rocker can be specified to indicate either the ON or TRIPPED/OFF mode. The exclusive Rockerguard and Push-To-Reset bezel help prevent inadvertent actuation.

The C-Series UL489 circuit breaker is specifically designed for those applications requiring higher amperage and higher voltage handling capacity in a smaller package. These breakers employ a unique arc chute design which results in obtaining these higher interrupting capacities, up to 10,000 amps. New thermoset glass filled polyester half shell construction for increased mechanical & electrical strength; Wiping Contacts - Mechanical linkage with two-step actuation – cleans contacts, provides high, positive contact pressure & longer contact life;

C-Series – Rocker Actuator

1-6 poles, 0.02 - 100 amps, up to 480 VAC or 80 VDC, UL489 up to 240 VAC or 125 VDC, with choice of time delays and actuator colors.

Agency Approvals

UL Recognized under the Component Recognition Program as Protectors, Supplementary (Guide QVNU2, File E75596), UL Standard 1077; Industrial Control Equipment - Motor Controllers, Manual (Guide NLRV2, File E 135367) UL Standard 508; Protectors Supplementary for Marine Electrical and Fuel Systems (Guide PEQZ2, File E 75596) UL Standard 1500 (Ignition Protection), UL LISTED Circuit Breaker, Guide DIVQ, File E 129899, under UL Standard 489
CSA Certified under Class 3215 01, File LR47848, CSA Standard C22.2 No. 235. CSA Certified Circuit Breaker Class 1432 01 File LR 93910 under CSA Standard C22.2 No. 5.1 - M.
TUV Cert. to DIN VDE 0660, Part 101/09.82 under Lic. No. R97164.
VDE Cert. to DIN VDE 0660, Part 101/09.82 under VDE-Reg-Nr. 4006.

C-Series UL489

UL CSA VDE

UL1500 TUV

General Specifications (cont.)

ELECTRICAL

Table A: Lists UL Recognized, CSA, TUV and VDE Certified configurations and performance capabilities as a Component Supplementary Protector.

AS A COMPONENT SUPPLEMENTARY PROTECTOR								
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING		INTERRUPTING CAPACTIY,AMPS		
	MAX RATING (2)	FREQ.	PHASE	FULL LOAD AMPS	GENERAL PURPOSE AMPS	UL / CSA	TUV	VDE
SERIES	65	D.C.	-	-	71.0 - 100	5000 (1)	-	-
	80	D.C.	-	0.02 - 70.0	-	7500 (1)	-	-
	80	D.C.	-	0.10 - 70.0	-	7500 (1)	-	5000 (1)
	125/250	50/60 Hz	1Ø	0.02 - 100	-	5000 (3)	-	-
	125/250	50/60 Hz	1Ø	0.02 - 50.0	-	3000 (1)	-	-
	250	50/60 Hz	1 & 3Ø	0.10 - 30.0	-	5000 (3)	3000 (1)	1500 (1)
	250	50/60 Hz	1 & 3Ø	31.0 - 50.0	-	5000 (3)	2000 (1)	1500 (1)
	250	50/60 Hz	1 & 3Ø	51.0 - 70.0	-	5000 (3)	1000 (1)	-
	250	50/60 Hz	1 & 3Ø	0.02 - 70.0	-	5000 (3)	-	-
	277	50/60 Hz	1Ø	0.02 - 50.0	-	5000 (3)	-	-
	400Y (5)	50/60 Hz	3Ø	0.10 - 50.0	-	-	2000 (1)	-
	415Y (5)	50/60 Hz	3Ø	0.10 - 30.0	-	-	2000 (1)	1500 (1)
	480Y (4)	50/60 Hz	1 & 3Ø	0.02 - 30.0	31.0 - 50.0	5000 (3)	-	-
DUAL COIL	80	D.C.	-	0.02 - 30	-	7500 (3)	-	-
	250	50/60 Hz	3Ø	0.02 - 30	-	5000 (3)	-	-
	277	50/60 Hz	1Ø	0.02 - 30	-	5000 (3)	-	-
SHUNT	80	D.C.	-	0.02 - 50.0	-	7500 (1)	-	-
	80	D.C.	-	0.10 - 50.0	-	7500 (1)	2500 (1)	5000 (1)
	250	50/60 Hz	1 & 3Ø	0.10 - 30.0	-	5000 (3)	3000 (1)	1500 (1)
	250	50/60 Hz	1 & 3Ø	31.0 - 50.0	-	5000 (3)	2000 (1)	1500 (1)
	250	50/60 Hz	3Ø	0.02 - 50.0	-	5000 (3)	-	-
	277	50/60 Hz	1Ø	0.02 - 50.0	-	5000 (3)	-	-
	400Y (5)	50/60 Hz	3Ø	0.10 - 50.0	-	-	2000 (1)	-
	415Y (5)	50/60 Hz	3Ø	0.10 - 30.0	-	-	2000 (1)	1500 (1)
	480Y (4)	50/60 Hz	1 & 3Ø	0.02 - 30.0	31.0 - 50.0	5000 (3)	-	-
RELAY	80	D.C.	-	0.02 - 50.0	-	7500 (1)	-	-
	250	50/60 Hz	3Ø	0.02 - 50.0	-	5000 (3)	-	-
	277	50/60 Hz	1Ø	0.02 - 50.0	-	5000 (3)	-	-
SWITCH ONLY	65	D.C.	-	0.02 - 100	-			
	80	D.C.	-	0.02 - 70.0	-			
	125/250	50/60 Hz	1Ø	0.02 - 100	-			
	250	50/60 Hz	1 & 3Ø	0.02 - 70.0	-			
	277	50/60 Hz	1Ø	0.02 - 50.0	-			
	480Y (4)	50/60 Hz	1 & 3Ø	0.02 - 30.0	31.0 - 50.0			

Table B: Lists UL Recognized configurations and performance capabilities as a manual across the line starter.

AS A MANUAL ACROSS THE LINE STARTER					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING AMPS	HORSEPOWER RATINGS MAX.
	MAX RATING	FREQ.	PHASE		
SERIES	277 (1)	50/60 Hz	1Ø	0.02 - 20.0	3 HP
SHUNT					
SWITCH	480Y (2)		3Ø	0.02 - 20.0	5 HP
SERIES	250 (1)	50/60 Hz	1Ø	0.02 - 20.0	3 HP
SHUNT					
SWITCH			3Ø	0.02 - 20.0	5 HP
SERIES	120 (1)	50/60 Hz	1Ø	0.02 - 50.0	3 HP
SHUNT					
SWITCH			3Ø	0.02 - 50.0	7 1/2 HP

NOTES FOR TABLE A

1. Units do not require backup (series) fusing.
2. DC and 1Ø 277 V max ratings are 1 or 2 pole breaking. 3Ø ratings are 3 pole breaking.
3. Requires branch circuit backup with a UL Listed Type K5 or RK5 fuse rated (15A minimum) and no more than four times full load amps not to exceed 125A for 50A or less rating and not to exceed 175A for 51 thru 100A rating.
4. UL Recognized/CSA Certified at 480 volts refers to 3 & 4 pole versions used only in a 3Ø, WYE connected circuit or 2 pole version connected with 2 poles breaking 1Ø and backed up with series fusing as stated above in note (3).
5. TUV Certification at 400 volts, TUV and VDE Certification at 415 volts, refers to 3 & 4 pole versions used only in a 3Ø WYE connected circuit.

NOTES FOR TABLE B

1. Requires branch circuit backup with a UL Listed Type K5 or RK5 fuse rated (15A minimum) and no more than four times full load amps not to exceed 125A for 50A or less rating and not to exceed 175A for 51 thru 100A rating.
2. UL Recognized/CSA Certified at 480 volts refers to 3 & 4 pole versions used only in a 3Ø, WYE connected circuit or 2 pole version connected with 2 poles breaking 1Ø and backed up with series fusing as stated above in note (1).

General Specifications (cont.)

Table C: Lists UL Listed (489), CSA Certified (C22.2 No. 5.1-M) configuration and performance capabilities as a Molded Case Circuit Breaker

AS A LISTED (UL 489) BRANCH CIRCUIT BREAKER (1)					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING AMPS	INTERRUPT CAPACITY AMPS
	MAX RATING	FREQ.	PHASE		
SERIES	80	D.C.	— —	0.10 - 100	10,000
	125	D.C.	— —	0.10 - 50.0	5,000
	120	50/60 Hz	1Ø	0.10 - 70.0	10,000
	240	50/60 Hz	1Ø	0.10 - 20.0	5,000
	120/240	50/60 Hz	1Ø	0.10 - 50.0	5,000

Table D: Lists UL Recognized, CSA Certified configurations and performance capabilities as Protectors, Supplementary for Marine Electrical and Fuel Systems (Guide PEQZ2, File E75596). Ignition Protection per UL Standard 1500. UL Classified Small Craft Electrical Devices, Marine in accordance with ISO 8846 (Guide UZMK, File MQ1515) as Marine Supplementary Protectors.

UL - 1500 (MARINE IGNITION PROTECTED)						
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING		INTERRUPTING CAPACTIY AMPS
	MAX RATING	FREQ.	PHASE	FULL LOAD AMPS	GENERAL PURPOSE AMPS	
SERIES	65	D.C.	-	-	71.0 - 100	1500 (1)
	80	D.C.	-	0.02 - 70.0	-	1500 (1)
	125/250	50/60 Hz	1Ø	0.02 - 100	-	1500 (1)
	250	50/60 Hz	1Ø	0.02 - 70.0	-	1500 (1)

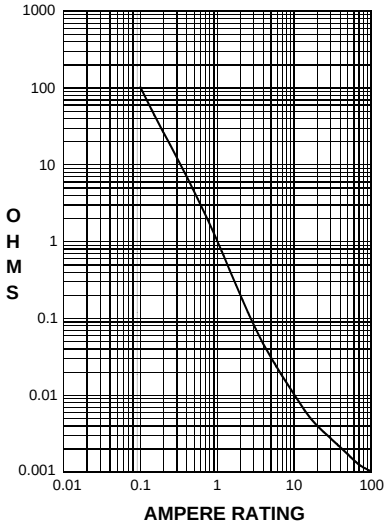
Maximum Voltage	Handle: AC, 480 WYE/277 VAC. (See Table A), 50/60 Hz, 80 VDC Rocker: AC: 240 VAC, 50/60 Hz; 125VDC UL489: AC, 480 WYE/277 VAC. (See Table A), 50/60 Hz, 80 VDC
Current Rating	Standard current coils: 0.100, 0.250, 0.500, 0.750, 1.00, 2.50, 5.00, 7.50, 10.0, 15.0, 25.0, 30.0, 35.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0 and 100 amps. Other ratings available - consult factory.
Standard Voltage Coils	DC - 6V, 12V; AC - 120V; other ratings available, consult factory.
Auxiliary Switch Rating	SPDT; 10.1 amps-250VAC, 5.0 amps-30 VDC,1/4 HP, 125VAC,VDE & TUV 1.0 125 VAC.
Insulation Resistance	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength	UL, CSA: 1960 V 50/60 Hz for one minute between all electrically isolated terminals. C-Series Circuit Breakers comply with the 8mm spacing and 3750V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxiliary circuits per Publications IEC 380, 435, 950, EN 60950 and VDE 0805.

NOTES FOR TABLE C:
1. A 1-5/8 inch minimum spacing must be provided between the Circuit Breaker arc vent and grounded obstructions.

NOTES FOR TABLE D:
1. Units do not require backup (series) fusing.

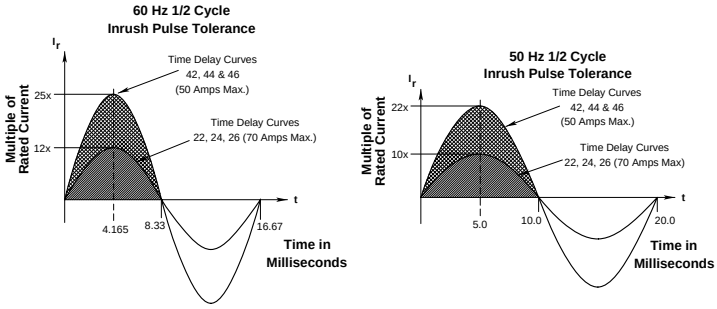
General Specifications (cont.)

Resistance, Impedance — Values from Line to Load Terminal - based on Series Trip Circuit Breaker



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	±15
5.1 - 20.0	±25
20.1 - 100	±35

Pulse Tolerance Curves



MECHANICAL

Endurance	10,000 ON-OFF operations @ 6 per minute; with rated current and voltage.
Trip Free	All C-Series circuit breakers will trip on overload, even when actuator is forcibly held in the ON position.
Trip Indication	The operating actuator moves positively to the OFF position when an overload causes the breaker to trip. When mid-trip handle is specified the handle moves to the mid position on electrical trip of the circuit breaker. When mid trip handle with alarm switch is specified the handle moves to the mid position and the alarm switch actuates when the circuit breaker is electrically tripped.

ENVIRONMENTAL

Environmental	Designed and tested in accordance with requirements of specification MIL-C-55629 and MIL-STD- 202 as follows:
Shock	Withstands 100 Gs, 6ms sawtooth while carrying rated current per Method 213, Test
Condition	"I". Instantaneous and ultrashort curves tested @ 90% of rated current.
Vibration	Withstands 0.060" excursion from 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A. Instantaneous and ultrashort curves tested at 90% of rated current.
Moisture Resistance	Method 106D, i.e., ten 24-hour cycles @ +25°C to +65°C, 80-98% RH.
Salt Spray	Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96 hrs).
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

PHYSICAL

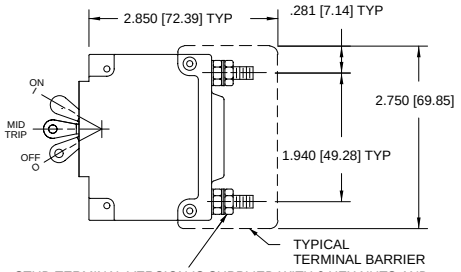
Number of Poles	1-6 poles at 50 amps or less; 1-4 poles at 51 thru 70 Amps; 2 poles Max. 71-100 Amps
	UL489: Handle Type: 1 pole ≤ 100 amps, 2 pole ≤ 50 amps; Rocker Type: 1 pole ≤ 100 amps.
Internal Circuit Configurations	Series (with or without auxiliary switch, mid trip and mid trip with alarm switch) Shunt & Relay with current or voltage trip coils, Dual Coil, Switch Only (with or without aux. switch).
	UL489: Series (with or without auxiliary switch, mid-trip and mid-trip with alarm switch).
Weight	Approximately grams/pole (Approximately ounces/pole)
Standard Colors	Housing: Black; Actuator: See Ordering Scheme

Circuit and Terminal Diagrams

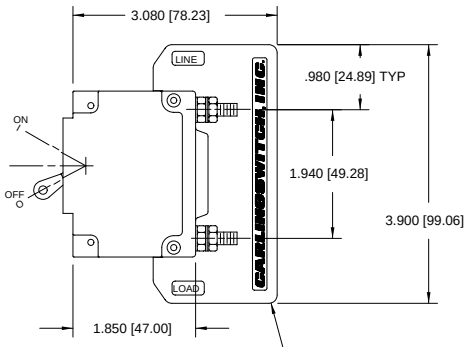
TERMINAL			RATING (AMPS)		
DESCRIPTION	CODE	DIMENSIONAL DETAIL	25	50	100
#10-32 STUD	1	.625[15.880] .165[4.190]	■		
M5 STUD	4	.630[16.000] .215[5.460]	■	■	
#1/4-20 STUD	3	.675[17.150] .235[5.970]	■	■	■
M6 STUD	6	.669[17.000] .265[6.710]	■	■	■
#10-32 SCREW	2	+.015 +.38 .150 [3.810]	■	■	
.250 DOUBLE Q.C.	7	.400[10.160] .821 [20.830] .250 [6.350] .173 [4.394] .320 [8.130]	■		

ADDITIONAL TERMINAL OPTIONS		
DESCRIPTION	DIMENSIONAL DETAIL	
CLIP TERMINALS	.437 DIA [Ø11.10] COMPONENT DIA. 7/16" CLIP .644 [16.36] .901 [22.89]	.250 DIA [Ø6.35] COMPONENT DIA. 1/4" CLIP .281 [7.14] .401 [10.18] .566 [14.38] .375 [9.53]
PUSH-IN STUD	.960 [24.38] .558 [14.17] CENTER LINE OF PUSH-IN STUD CONTACT AREA	PUSH-IN STUD MATING HOLE +.002 -.000 +.050 -.000 .311 DIA [Ø7.90]

HANDLE POSITION VS. AUX/ALARM SWITCH MODE				
	STANDARD C/B		MID TRIP C/B	
CIRCUIT BREAKER MODE	HANDLE POSITION	AUX. SWITCH MODE	HANDLE POSITION	AUX. SWITCH MODE
OFF	30° OFF O	NC NO C	30° OFF O	NC NO C
ON	ON 30°	NC NO C	ON 30°	NC NO C
ELECTRICAL TRIP	OFF O 30°	NC NO C	90°	NC NO C

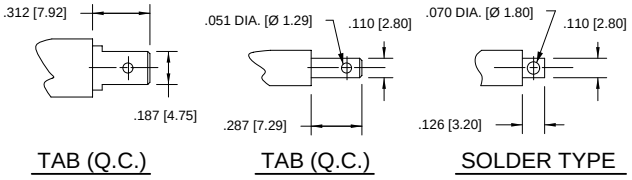


STUD TERMINAL VERSION IS SUPPLIED WITH 2 HEX NUTS AND FLAT WASHERS/TERMINAL. SCREW TERMINAL VERSION IS SUPPLIED WITH #10-32 SCREW, FLAT WASHER AND SADDLE CLAMP/TERMINAL. THE SADDLE CLAMP IS FOR DIRECT WIRE CONNECTION USE. DISCARD SADDLE CLAMP IF WIRE TERMINAL LUG IS USED



SPECIAL TERMINAL BARRIER REQUIRED FOR U.L. 489 LISTED CIRCUIT BREAKERS WITH 120/240 VAC RATINGS

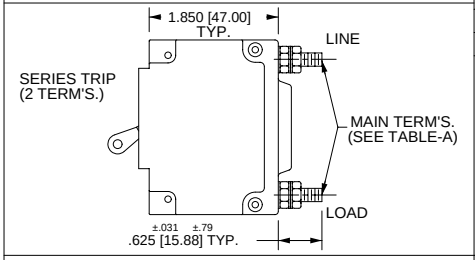
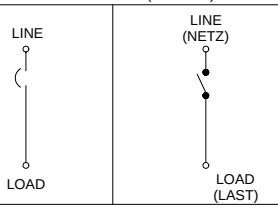
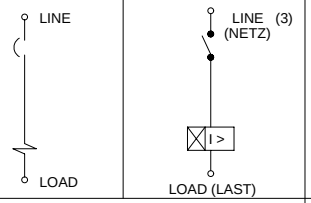
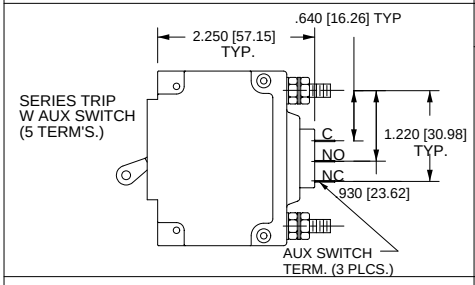
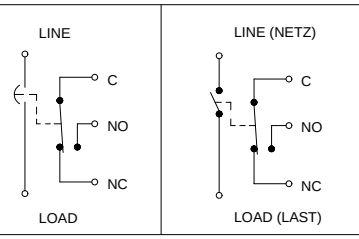
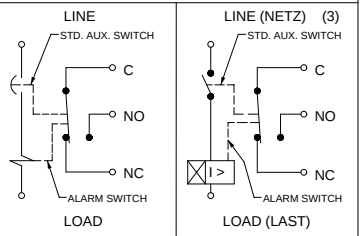
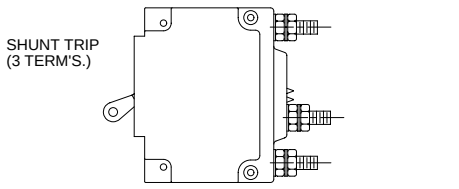
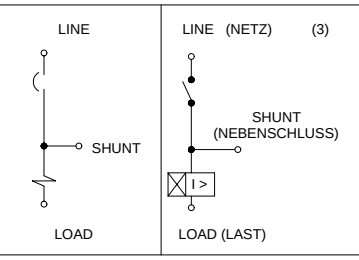
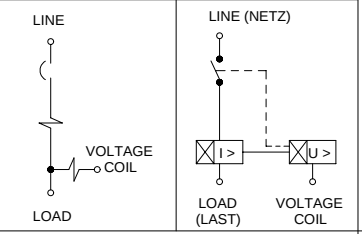
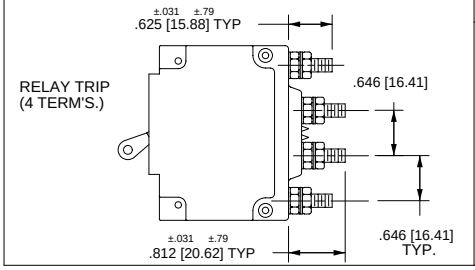
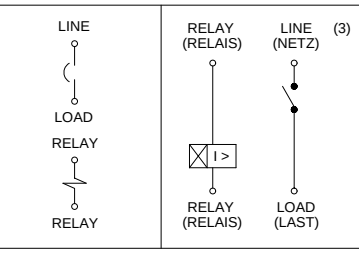
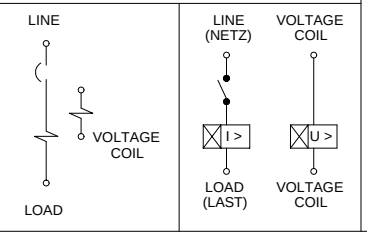
AUXILIARY / ALARM SWITCH TERMINAL DETAIL [3]



TAB (Q.C.) TAB (Q.C.) SOLDER TYPE

NOTES
1. All dimensions are in inches [mm].
2. Tolerance ± .020 [.51] unless otherwise specified. Tolerance on stud lengths is ± .031 [±.79] unless otherwise specified.
3. When mid-trip circuit breaker is specified, the handle moves to the mid-position upon electrical trip of the circuit breaker. When mid-trip with alarm switch is specified, the handle moves to the mid-position and the alarm switch actuates upon electrical trip of the circuit breaker.
4. Schematic shown represents current trip circuit.

Circuit and Terminal Diagrams

CIRCUIT BREAKER PROFILE	CIRCUIT SCHEMATIC	CIRCUIT CODE	AUX SWITCH CODE	CIRCUIT SCHEMATIC	CIRCUIT CODE	AUX SWITCH CODE
	ANSI / IEC			ANSI / IEC		
	SWITCH ONLY (NO COIL)			SERIES TRIP		
		A	O		B C	O
	SWITCH ONLY (NO COIL) WITH AUXILIARY SWITCH			SERIES TRIP WITH AUXILIARY / ALARM SWITCH		
		A	2 3 4		B C	2 3 4
	SHUNT TRIP			DUAL COIL; SERIES TRIP CURRENT COIL, SHUNT TRIP VOLTAGE COIL		
		D E	0		H	0
	RELAY TRIP			DUAL COIL; SERIES TRIP CURRENT COIL, RELAY TRIP VOLTAGE COIL		
		F G	0		K	0

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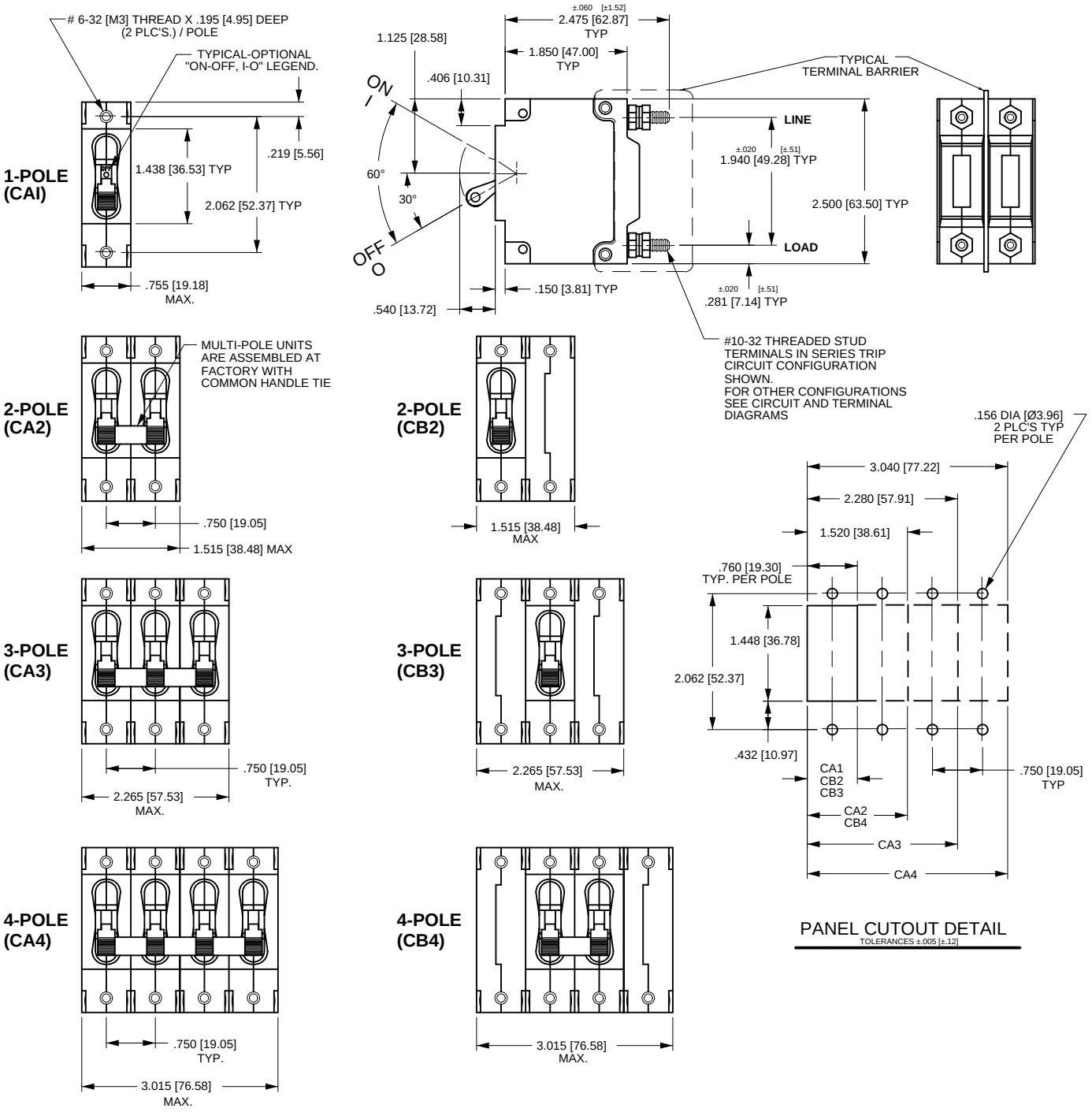
TIGHTENING TORQUE SPECIFICATIONS	
THREAD SIZE	TORQUE
#6-32 [M3] MOUNTING INSERTS	7-9 IN-LBS
#10-32 & M5 THD STUDS	15-20 IN-LBS
#10-32 THD SCREW	15-20 IN-LBS
#1/4-20 & M6 THD STUDS	30-35 IN-LBS

NOTES
1. All dimensions are in inches [mm].
2. Tolerance ± .020 [.51] unless otherwise specified.
3. Schematic shown represents current trip circuit.

Form and Fit Drawings



NOTES
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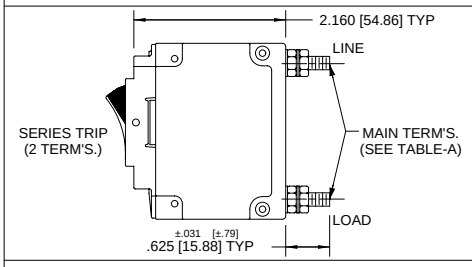
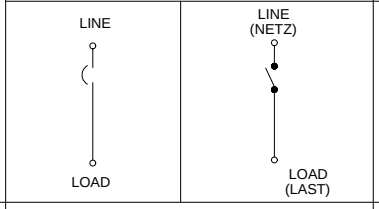
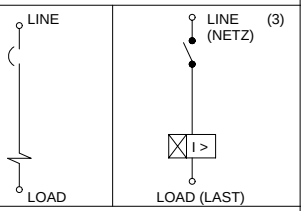
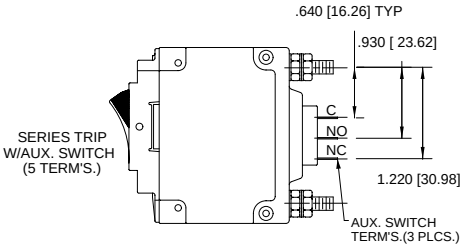
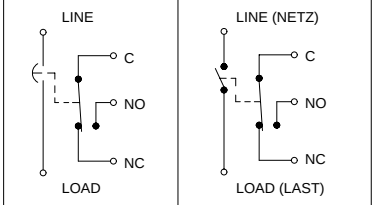
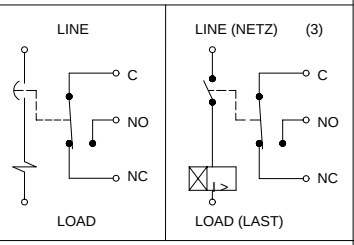
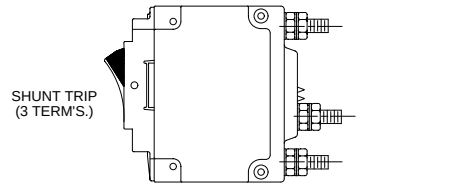
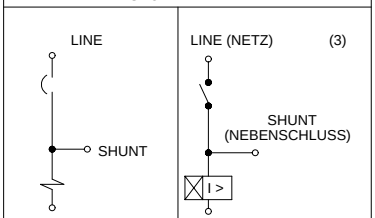
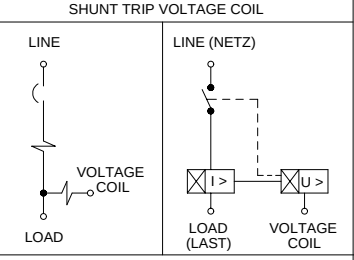
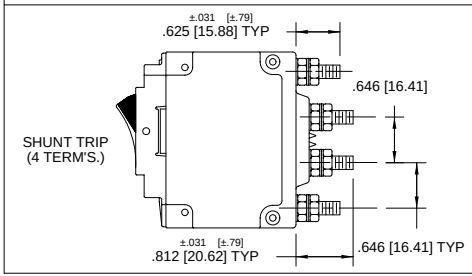
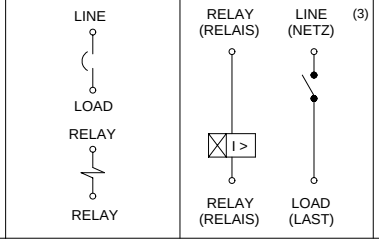
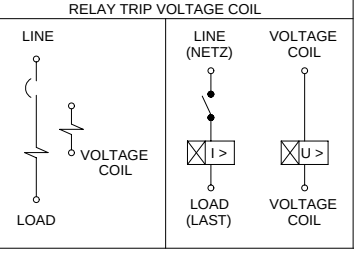
2. Tolerance ± .020 [.51] unless otherwise specified.
3. Schematic shown represents current trip circuit.

Circuit & Terminal Diagrams

CIRCUIT BREAKER PROFILE	CIRCUIT SCHEMATIC	CIRCUIT CODE	AUX SWITCH CODE	CIRCUIT SCHEMATIC	CIRCUIT CODE	AUX SWITCH CODE
	ANSI / IEC — SWITCH ONLY (NO COIL)			SWITCH TRIP		
		A	0		B C	0
	SWITCH ONLY (NO COIL) WITH AUXILIARY SWITCH 	A	2 3 4	SERIES TRIP WITH AUXILIARY SWITCH 	B C	2 3 4
	SHUNT TRIP 	D E	0	DUAL COIL; SERIES TRIP CURRENT COIL, SHUNT TRIP VOLTAGE COIL 	H	0
	RELAY TRIP 	F G	0	DUAL COIL; SERIES TRIP CURRENT COIL, RELAY TRIP VOLTAGE COIL 	K	0

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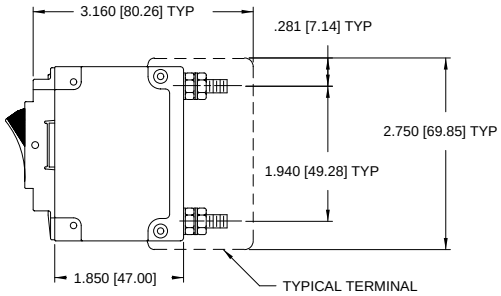
#10-32 THD SCREW	15-20 IN-LBS
#1/4-20 & M6 THD STUDS	30-35 IN-LBS

NOTES
1. All dimensions are in inches [mm].
2. Tolerance ± .020 [.51] unless otherwise specified.

Circuit & Terminal Diagrams

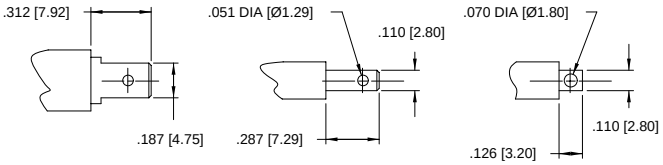
TERMINAL			
DESCRIPTION	CODE	DIMENSIONAL DETAIL	RATING (AMPS) 25 / 50 / 100
#10-32 STUD	1	.625 [15.880] .165 [4.190]	■
M5 STUD	4	.630 [16.000] .215 [5.460]	■
#1/4-20 STUD	3	.675 [17.15] .235 [5.970]	■ ■
M6 STUD	6	.669 [17.000] .264 [6.710]	■ ■
#10-32 SCREW	2	±.015 ±.38 .150 [3.810]	■
.250 DOUBLE Q.C.	7	.400 [10.160] .820 [20.830] .250 [6.350] .173 [4.390] .320 [8.130]	■



STUD TERMINAL VERSION IS SUPPLIED WITH 2 HEX NUTS AND FLAT WASHERS / TERMINAL. SCREW TERMINAL VERSION IS SUPPLIED WITH #10-32 SCREW, FLAT WASHER AND SADDLE CLAMP / TERMINAL. THE SADDLE CLAMP IS FOR DIRECT WIRE CONNECTION USE. DISCARD SADDLE CLAMP IF WIRE TERMINAL LUG IS USED

ADDITIONAL TERMINAL OPTIONS	
DESCRIPTION	DIMENSIONAL DETAIL
CLIP TERMINALS	.437 DIA [Ø11.10] COMPONENT DIA. 7/16" CLIP .644 [16.36] .901 [22.89] .250 DIA [Ø6.35] COMPONENT DIA. 1/4" CLIP .281 [7.14] .401 [10.18] .566 [14.38] .375 [9.53]
PUSH-IN STUD	.960 [24.38] .558 [14.17] CENTER LINE OF PUSH-IN STUD CONTACT AREA PUSH-IN STUD MATING HOLE +.002 -.000 +.050 -.000 .311 DIA [Ø7.90]

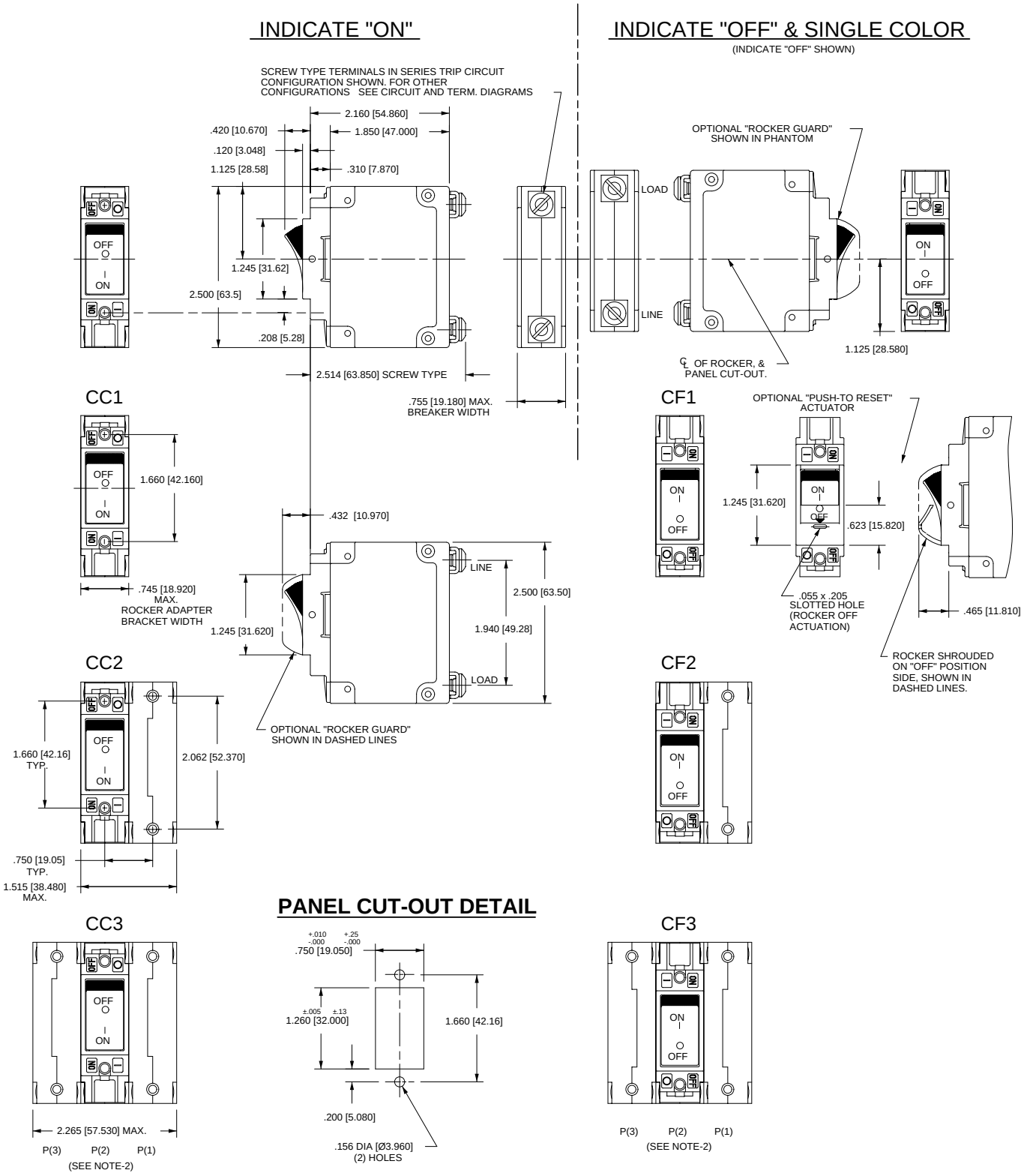
AUXILIARY / ALARM SWITCH TERMINAL DETAIL [3]



TAB (Q.C.) .187 | TAB (Q.C.) .110 | SOLDER TYPE

NOTES
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified. Tolerance on stud lengths is ± .031 [±.79] unless otherwise specified.
3 Available on Series Trip and Switch Only circuits when called for on multi-pole units; only one aux. switch is normally supplied, as viewed in multi-pole identification scheme.

Form & Fit Drawings



NOTES
All dimensions are in inches [millimeters].
Tolerance ±.010 [.25] unless otherwise specified.
1 Dimensions apply to all variations shown. Notice that circuit breaker line & load terminal orientation on indicate "OFF" is opposite of indicate "ON".
2 For pole orientation with horizontal legend rotate front view clockwise 90°.

Ordering Scheme

PROD CODE
C

POLES[2]
1 One
2 Two
3 Three
4 Four
5 Five
6 Six

AUXILIARY/ALARM SWITCH[4]
0 w/o Aux Switch
2 S.P.D.T., 0.110 Q.C. Term.
3 S.P.D.T., 0.139 Solder Lug
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)
8 S.P.S.T., (N.O.) 0.187 Q.C. Term.

C A 3 – B 0 – 10 –

ACTUATOR
A[1a] Handle, one per pole
B[1b] Handle, one per multipole unit
S[1c] Mid-Trip Handle, one per pole
T[1c] Mid-Trip Handle and Alarm Switch (Handle, one per pole)

CIRCUIT
A[3] Switch Only (No Coil)
B Series Trip (Current)
C Series Trip (Voltage)
D Shunt Trip (Current)
E Shunt Trip (Voltage)
F Relay Trip (Current)
G Relay Trip (Voltage)

DUAL COIL AVAILABLE CONSULT FACTORY

FREQUENCY AND DELAY
03 DC, 50/60Hz When Delay is not applicable, i.e. Switch Only circuit option.
10[5a] DC Instantaneous
11 DC Ultra Short
12 DC Short
14 DC Medium
16 DC Long
20[5a] 50/60Hz Instantaneous
21 50/60Hz Ultra Short
22 50/60Hz Short
24 50/60Hz Medium
26 50/60Hz Long
32 DC, 50/60Hz Short
34 DC, 50/60Hz Medium
36 DC, 50/60Hz Long
42[5b] 50/60Hz Short, Hi-Inrush
44[5b] 50/60Hz Medium, Hi-Inrush
46[5b] 50/60Hz Long, Hi-Inrush
52[5b] DC, Short,Hi-Inrush
54[5b] DC,Medium, Hi-Inrush
56[5b] DC, Long, Hi-Inrush

– COIL RATING[6] –

SELECT ONE

CURRENT COIL	AMPERES
210	0.100
225	0.250
250	0.500
275	0.750
410	1.000
425	2.500
450	5.000
475	7.500
610	10.000
615	15.000
620	20.000
625	25.000
630	30.000
635	35.000
640	40.000
650	50.000
660[7]	60.000
670[7]	70.000
680[7]	80.000
690[7]	90.000
810[7]	100.000

VOLTAGE COIL[5a]	RATING	MIN. TRIP VOLTS
A06	6 DC	5 DC
A12	12 DC	10 DC
K20	120 AC	65 AC

ACTUATOR COLOR[9]

	COLOR	LEGEND
1	White	Dual (Black)
2	Black	Dual (White)
3	Red	Dual (White)
6	Yellow	Dual (Black)

AGENCY APPROVAL

A	W/O Approval
C	UL Recognized CSA Certified
D[10]	UL Recognized CSA & VDE Certified
E[10]	UL Recognized CSA & TUV Certified
I	UL 1500 Ignition Protected UL Recognized CSA Certified

450 – 1 2 1 – C

TERMINAL[8a]

1	10-32 THD. Stud, .625 long
2	10-32 Screw with washer and saddle clamp
3	1/4-20 THD. Stud, .675 long
4	M5 THD. Stud, 16mm long
6	M6 THD. Stud, 17mm long
7[8b]	0.250 Inch Double Quick Connect

MOUNTING/BARRIERS/VOLTAGE

	MOUNTING INSERT	BARRIERS	VOLTAGE
1	6-32 x 0.195 inches	none	<300
A	6-32 X 0.195 inches	yes	<300
C	6-32 x 0.195 inches	mandatory	≥300
2	ISO M3 x 5mm	none	<300
B	ISO M3 x 5mm	yes	<300
D	ISO M3 x 5mm	mandatory	≥300

NOTES

1a. Actuator Option A: Multipole units are assembled at factory with common handle tie.
1b. Actuator Option B: Handle location as viewed from front of panel:
2 pole - left pole; 3 pole - center pole; 4 pole - two handles at center poles; 5 pole - three handles at center poles;
6 pole - four handles at center poles.
1c. Handle moves to Mid-Position only upon electrical trip of circuit breaker. Actuator Code S available with Circuit Codes B,C,D,E,F and G. When Actuator Code T is specified, handle moves to Mid Position and Alarm Switch actuates only upon electrical trip of circuit breaker, available with Circuit Codes B & C only.
2. Standard multipole units have all poles identical except when specifying auxiliary switch - (see Note 4 and Fig. A) and/or mixed poles (consult factory).
3 30 amps and less, select Current Rating Code 630. For 31-50 amps, select Current Rating Code 650. For 51-70 amps, select Current Rating Code 670. For 71-100amps, select Current Rating Code 810.
4. Auxiliary switch available on Series Trip and Switch Only circuits. On multipole units, only one auxiliary switch is normally supplied, mounted in extreme right pole per Fig. A.
5a. Voltage coils not rated for continuous duty. Available only with Delay Codes 10 and 20.
5b. Available to 50 amp maximum and Circuit Codes B & D only.
6. For other voltage or current ratings consult factory.
7. Current rating Codes 660 thru 810 are available with Circuit Codes A & B only. Current ratings 60 thru 70 are available up to 4 poles maximum. Ratings 71 thru 100 are available up to 2 poles maximum, and with Frequency and Delay Codes 10 thru 14, 20 thru 24 and 30 thru 34 only.
8a. Terminal Codes 1 & 2 are available to 50 amps maximum. Terminal Code 3 available to 100 amps maximum and is required on all ratings greater than 50 amps.
8b. Terminal Code 7 available to 25 amps only.
9. Standard actuator colors are black and white. DUAL = I - O /ON-OFF combination.
10. Consult factory for TUV and VDE Certified versions.
11. 2, 3 and 4 pole versions only. (See specifications page.)

Ordering Scheme

PROD CODE
C

POLES
1 One
2[2] Two
3[2] Three

AUXILIARY SWITCH[4]
0 w/o Aux Switch
2 S.P.D.T., 0.110 Q.C. Term.
3 S.P.D.T., 0.139 Solder Lug
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)
8 S.P.S.T., 0.187 Q.C. Term.

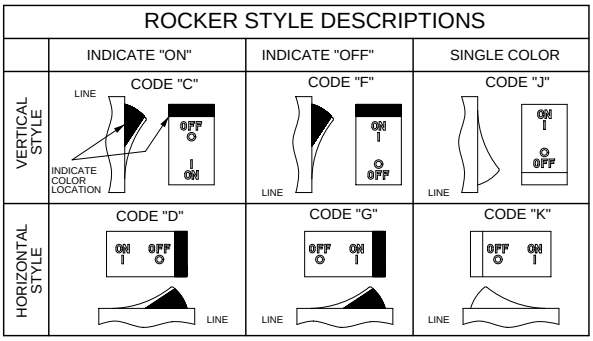


FIG. A

C F 1 – B 0 – 24 –

ACTUATOR[1]
VISI-ROCKER
C Indicate ON;Vertical Legend
D Indicate ON;Horizontal Legend
F Indicate OFF;Vertical Legend
G Indicate OFF;Horizontal Legend
SINGLE COLOR ROCKER
J Vertical Legend
K Horizontal Legend
PUSH-TO-RESET (VISI-ROCKER)
N Indicate OFF;Vertical Legend
O Indicate OFF;Horizontal Legend
PUSH-TO-RESET (SINGLE COLOR ROCKER)
R Vertical Legend
U Horizontal Legend

CIRCUIT
A[3] Switch Only (No Coil)
B Series Trip (Current)
C Series Trip (Voltage)
D Shunt Trip (Current)
E Shunt Trip (Voltage)
F Relay Trip (Current)
G Relay Trip (Voltage)

DUAL COIL AVAILABLE; CONSULT FACTORY.

FREQUENCY AND DELAY
03 DC 50/60 Hz. When delay is not applicable, i.e. switch only circuit option.
10[5a] DC Instantaneous
11 DC Ultra Short
12 DC Short
14 DC Medium
16 DC Long
20[5a] 50/60Hz Instantaneous
21 50/60Hz Ultra Short
22 50/60Hz Short
24 50/60Hz Medium
26 50/60Hz Long
32 DC, 50/60Hz Short
34 DC, 50/60Hz Medium
36 DC, 50/60Hz Long
42[5b] 50/60Hz Short (Hi-Inrush)
44[5b] 50/60Hz Medium (Hi-Inrush)
46[5b] 50/60Hz Long (Hi-Inrush)
52[5b] DC Short, Hi-Inrush
54[5b] DC Medium, Hi-Inrush
56[5b] DC Long, Hi-Inrush

COIL RATING[6]

SELECT ONE

CURRENT COIL

	AMPERES
210	0.100
225	0.250
250	0.500
275	0.750
410	1.000
425	2.500
450	5.000
475	7.500
610	10.000
615	15.000
620	20.000
625	25.000
630	30.000
635	35.000
640	40.000
650	50.000
660[7]	60.000
670[7]	70.000
680[7]	80.000
690[7]	90.000
810[7]	100.000

VOLTAGE COIL[5a]

	RATED VOLTS	MIN. TRIP VOLTS
A06	6 DC	5 DC
A12	12 DC	10 DC
K20	120 AC	65 AC

ACTUATOR STYLE & COLOR

VISI-ROCKER [1, 9a, 9b]

	VISI-COLOR	LEGEND
1	White	Dual (Black)
3	Red	Dual (White)
4	Green	Dual (Black)

SINGLE COLOR ROCKER[1, 9b]

	ROCKER	LEGEND
2	Black	Dual (White)
3	Red	Dual (White)
4	Green	Dual (White)
5	Blue	Dual (White)
6	Yellow	Dual (Black)
7	Gray	Dual (Black)
8	Orange	Dual (Black)

AGENCY APPROVAL

A	W/O Approval
C	UL Recognized CSA Certified
D	UL Recognized CSA & VDE Certified

650 – 1 3 1 – C

TERMINAL[8a]

1	10-32 THD. Stud, .625 long
2	10-32 Screw
3	1/4-20 THD. Stud, .675 long
4	M5 x THD. Stud, 16mm long
6	M6 x THD Stud 17mm long
7[8b]	0.250 Inch Double Quick Connect

MOUNTING/BARRIERS/VOLTAGE

	INSERTS	BEZEL	BARRIER	VOLTAGE
1	6-32 X 0.195 inches	Standard	None	<300
A[9c]	6-32 X 0.195 inches	Rockerguard	None	<300
B[9c]	6-32 X 0.195 inches	Push-to-reset	None	<300
2	6-32 X 0.195 inches	Standard	Yes	<300
C[9c]	6-32 X 0.195 inches	Rockerguard	Yes	<300
D[9c]	6-32 X 0.195 inches	Push-to-reset	Yes	<300
3	6-32 X 0.195 inches	Standard	Mandatory	≥300
E[9c]	6-32 X 0.195 inches	Rockerguard	Mandatory	≥300
F[9c]	6-32 X 0.195 inches	Push-to-reset	Mandatory	≥300
4	ISO M3 x 5mm deep	Standard	None	<300
G[9c]	ISO M3 x 5mm deep	Rockerguard	None	<300
H[9c]	ISO M3 x 5mm deep	Push-to-reset	None	<300
5	ISO M3 x 5mm deep	Standard	Yes	<300
J[9c]	ISO M3 x 5mm deep	Rockerguard	Yes	<300
K[9c]	ISO M3 x 5mm deep	Push-to-reset	Yes	<300
6	ISO M3 x 5mm deep	Standard	Mandatory	≥300
L[9c]	ISO M3 x 5mm deep	Rockerguard	Mandatory	≥300
M[9c]	ISO M3 x 5mm deep	Push-to-reset	Mandatory	≥300

NOTES

1. For description of Rocker styles and Legend positions, refer to Fig. B. Push-To-Reset actuators have OFF portion of rocker shrouded.
2. Multipole units have one rocker per unit. Rocker location as viewed from front panel as follows: 2 pole unit - left pole.; 3 pole unit - center pole. Standard multipole units have all poles identical except when specifying Auxiliary/Alarm note 4 and figure A) mixed poles. (Consult factory.)
3. 30 amps and less, select current rating code 630; for 31-50 amps, select current rating code 650; 51-70 amps, select current rating code 670; 71-100 amps, select current rating code 810.
4. Auxiliary switch available on Series Trip and Switch Only circuits. On multipole units, only one auxiliary switch is normally supplied, mounted in extreme right pole per figure A.

5a. Voltage coils not rated for continuous duty. Available only with Delay Codes 10 and 20.

5b. Available to 50 amp maximum and circuit codes B and D only.

6. For other Voltage and Current ratings, consult factory.
7. Current Rating Codes 660 thru 810 are available with Circuit Codes A and B only. Current Ratings 60 thru 70 are available up to 3 poles maximum. Ratings 71 thru 100 are available up to 2 poles maximum, and with Frequency and Delay Codes 10 thru 14, 20 thru 24 and 30 thru 34 only.

8a. Terminal Codes 1, 2 and 4 are available to 50 amps maximum. Terminal Codes 3 and 6 are available to 100 amps maximum and are required on all ratings greater than 50 amps.

8b. Terminal Code 7 available to 25 amps max.

9a. Color shown is Visi and Legend Color with remainder of Rocker black.

5b. Dual Markings = I - O /ON-OFF combination.

9c. OFF legend on Push-To-Reset Bezel/Shroud is white when ordering single color rocker types. When ordering visi-rocker types the legend matches the visi color. Rockerguard available with actuator codes C thru K. Push-To-Reset available with actuator codes N, O, R, U.

Ordering Scheme

PROD CODE
C

POLES[2a]
1 One
2[2b] Two
3[2b, 2c] Three

AUXILIARY SWITCH[3]
0 w/o Aux Switch
2 S.P.D.T., 0.110 Q.C. Term.
3 S.P.D.T., 0.139 Solder Lug
4 S.P.D.T., 0.110 Q.C. Term. (Gold Contacts)
8 S.P.S.T., 0.187 Q.C. Term.

C A 1 – B 0 – 24 –

ACTUATOR
HANDLE, ONE PER POLE
A[1a] Handle
S[1b] Mid-Trip
T[1b] Mid-Trip and Alarm Switch
VISI-ROCKER
C[1c] Indicate ON, Vertical Legend
D[1c] Indicate ON, Horizontal Legend
F[1c] Indicate OFF, Vertical Legend
G[1c] Indicate OFF, Horizontal Legend
SINGLE COLOR ROCKER
J[1c] Vertical Legend
K[1c] Horizontal Legend

CIRCUIT
B Series Trip (Current)

FREQUENCY AND DELAY
11 DC Ultra Short
12 DC Short
14 DC Medium
16 DC Long
21 50/60Hz Ultra Short
22 50/60Hz Short
24 50/60Hz Medium
26 50/60Hz Long
42[4] 50/60Hz Short (Hi-Inrush)
44[4] 50/60Hz Medium (Hi-Inrush)
46[4] 50/60Hz Long (Hi-Inrush)

NOTES
1a. Actuator Option A: Multipole units are assembled at factory with common handle tie.
1b. Handle moves to Mid-Position only upon electrical trip of circuit breaker. when Actuator Code S is specified. When Actuator Code T is specified, handle moves to Mid-Position and Alarm Switch actuates only upon electrical trip of circuit breaker.
1c. For description of Rocker styles and Legend positions, refer to Fig. A. Rocker actuated circuit breakers are available as single pole only.
2a. Rocker Actuated circuit breakers are available as a single pole only.
2b. 2 and 3 pole circuit breakers required for 120/240 VAC (maximum application rating code C.) applications, have all poles identical except when specifying Auxiliary/Alarm switch which is normally supplied in extreme right pole per Fig. B. These units are available with one Handle per pole only & terminal Barrier is mandatory.
2c. Third pole is for 120/240 VAC applications requiring Neutral Disconnect. The third pole has the same construction as poles 1 & 2.
3. Auxiliary/Alarm switch with independent Circuit i.e. separate from Breaker Circuit, only available with Circuit Breakers rated 50 amps maximum at 80 VDC, 125 VDC and 120 VAC. Auxiliary/Alarm Switch with Dependent Circuit, i.e. same as Breaker Circuit, is supplied from factory with Common Terminal of Auxiliary/Alarm Switch connected to Line Terminal on 120/240 and 240 VAC Ratings. Circuit Breakers rated 120 VAC 50 AMPS maximum, can be supplied with Auxiliary/Alarm Switch Common Terminal connected to Breaker Line Terminal. Consult factory for special Catalog Number.
4. Available to 50 amp maximum with circuit codes B and D only.
5a. Terminal Codes 1 & 2 are available to 50 amps maximum. Terminal Code 3 available to 100 amps maximum and is required on all ratings greater than 50 amps.
5b. Color shown is Visi and Legend Color with remainder of Rocker black.
5c. Dual Markings = I - O /ON-OFF combination.
6. For other current ratings, consult factory.
7. Refer to Table A for agency approved voltage and current ratings.

CURRENT RATING[6]

	AMPERES
210	0.100
225	0.250
250	0.500
275	0.750
410	1.000
425	2.500
450	5.000
475	7.500
610	10.000
615	15.000
620	20.000
625	25.000
630	30.000
635	35.000
640	40.000
650	50.000
660	60.000
670	70.000
680	80.000
690	90.000
695	95.000
810	100.000

ACTUATOR STYLE & COLOR

HANDLE[5c]

	HANDLE	LEGEND
1	White	Dual (Black)
2	Black	Dual (White)
3	Red	Dual (White)
6	Yellow	Dual (Black)

VISI-ROCKER[1c, 5b, 5c]

	VISI-COLOR	LEGEND
1	White	Dual (White)
3	Red	Dual (Red)
4	Green	Dual (Green)

SINGLE COLOR ROCKER[1c, 5c]

	ROCKER	LEGEND
2	Black	Dual (White)
3	Red	Dual (White)
4	Green	Dual (White)
5	Blue	Dual (White)
6	Yellow	Dual (Black)
7	Gray	Dual (Black)
8	Orange	Dual (Black)

MAXIMUM APP. RATING

B	125 DC
C[2b]	120/240 AC
D[2b]	240 AC
K	120 AC
M	80 DC

620 – 1 2 1 – K G

TERMINAL[5a]

1	10-32 THD. Stud, .625 long
2	10-32 Screw
3	1/4-20 THD. Stud, .675 long

MOUNTING/BARRIERS/VOLTAGE

	MOUNTING INSERT	ACTUATOR
1	6-32 x 0.195 inches	Handle
2	ISO M3 x 5mm	Handle
A	6-32 X 0.195 inches	Rocker w/ standard bezel
D	ISO M3 x 5mm	Rocker with Rockerguard
C	ISO M3 x 5mm	Rocker w/ standard bezel
B	6-32 x 0.195 inches	Rocker with Rockerguard

AGENCY APPROVAL[7]

A	W/O Approval
G	UL489 Listed CSA Certified

ROCKER STYLE DESCRIPTIONS

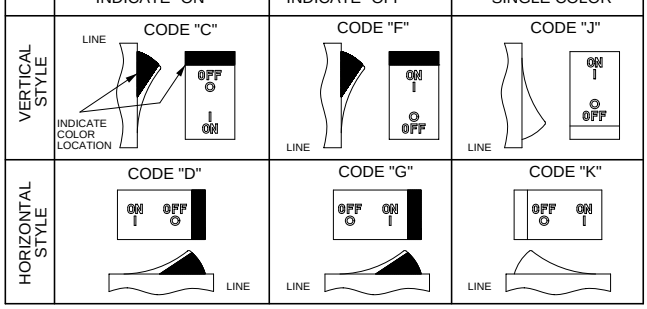


FIG. A