



→ **Product Type**

Miniature Hydraulic / Magnetic Circuit Breaker

→ **Product Series**

M-Series

→ **Description**

[M-Series PDF eLibrary](#) ↓

The M-Series miniature hydraulic/magnetic circuit breakers are designed for those demanding applications where space, aesthetics and snap-in front panel mounting are important. These circuit breakers are available in a choice of rocker actuator

styles and colors, including paddle and baton style handle actuators, push-to-reset and push-pull pushbutton actuators, Visi-Rocker two color actuators as well as non-illuminated or illuminated rocker versions with LED or neon bulbs. The exclusive Rockerguard bezel helps prevent inadvertent actuation. Wiping contact design insures long term reliability. Various styling options allow design flexibility. M Series circuit breakers are offered in 1 & 2 poles, 0.02 to 30 amps, up to 250VAC or 80VDC. They are available with a choice of time delays, terminals, panel hardware, actuator styles, colors, & imprinting.

Series PDF eLibrary	● M-Series Cir. Breaker PDF (3.0 MB) ● Cir. Breaker Time Delays for M-Series (2.3 MB) ● Cir. Breaker Accessories PDF (49.5 KB)
Certifications	UL recognized, CSA, VDE, TUV, UL489A Listed (Telecom)
Number of Poles	1 & 2 poles
Available Delays	Instant, Short, Medium - AC/DC, Hi-Inrush
Maximum Current and Voltage Ratings	0.02-15FLA, 32VDC, 125VAC, 1 pole 15.1-25GPA, 32VDC, 125VAC, 1-pole 0.02-15FLA, 65VDC, 250VAC, 2-pole 15.1-25GPA, 65VDC, 250VAC, 2-pole 0.02-12FLA, 250VAC, 1-pole 0.02-7.5GPA, 50VDC, 1-pole 0.02-30GPA, 65VDC, 80VDC, 1 pole
Maximum Interrupting Capacity	1,000A @ 65VDC, 2-pole 1,000A @ 32VDC, 1-pole 1,000A @ 250VAC, 2-pole 1,000A @ 125VAC, 1-pole 600A @ 80VDC
Auxiliary Switch Ratings	7A @ 250VAC 0.1A @ 125VAC (gold contacts) 7A (Res.) @ 28VDC 4A (Ind.) @ 28VDC 0.25A @ 80VDC
Available Circuits	Series and Switch Only

Actuator Style	Solid Color Angled Rocker Solid Color Flat Rocker Two Color Visi-Rocker Illuminated Angled Rocker Illuminated Flat Rocker Solid Color Paddle Solid Color Baton Solid Color Push-to-Reset Pushbutton Solid Color Push-Pull Pushbutton
Terminal Options	.250 QC Tabs 8-32 Screw w/ Upturned Lugs 8-32 Screw (Bus Type) Push in Stud Terminals
Mounting Method	Snap-in Front Panel
Value Added	Custom colors Non-standard current ratings Panel hole plug available Amp markings for pushbutton actuators and more



The low cost M-Series utilizes the hydraulic magnetic principle which provides accurate and reliable circuit protection even when exposed to extremely hot and/or cold application environments.

Available in a choice of rocker actuator styles and colors, push button, push-pull, paddle, and baton style handle actuators, the Visi-Rocker® two-color actuators as well as non-illuminated or illuminated rocker versions with LED or neon bulbs. The exclusive Rockerguard® bezel helps prevent inadvertent actuation. "Wiping" contact design insures long term reliability. Various styling options allow design flexibility.

Typical applications include power supplies, medical equipment, and telecommunications equipment. In addition, these breakers meet CSA Standard 22.2 No. 100 for the Generator & Welder markets.

Agency Certifications

UL Recognized

UL Standard 1077



Component Recognition Program as Protectors, Supplementary (Guide CCN/QVNU2, File E75596)

CSA Accepted



Component Supplementary Protector under Class 3215 30, File 047848 0 000
CSA Standard C22.2 No. 235

UL Listed

UL Standard 489A



Communications Equipment (Guide CCN/DITT, File E189195)

VDE Certified



EN60934, VDE 0642 under File 10537

TUV Certified



EN60934, under License No. R9671109

Electrical

Table A: Lists UL Recognized and CSA Accepted configurations & performance capabilities as a Component Supplementary Protector.

M-SERIES TABLE A: COMPONENT SUPPLEMENTARY PROTECTORS										
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING		POLES BREAKING	SHORT CIRCUIT CAPACITY (AMPS)		APPLICATION CODES	
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	GENERAL PURPOSE AMPS		U / CSA		UL	CSA
							WITH BACKUP FUSE	WITHOUT BACKUP FUSE		
SERIES	32	DC	---	0.02 - 15	—	1	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
				---	15.1 - 25	1	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
	50 ²	DC	---	0.02 - 7.5	—	1	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
	65	DC	---	0.02 - 15	—	2	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
				---	15.1 - 25	2	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
	65 ^{1,2}	DC	---	0.02 - 15	—	1	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
				---	15.1 - 30	1	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
	65	DC	---	0.02 - 15	—	2	5000 ³	—	TC1,2, OL1, C1	TC1,2, OL1,C1
				---	15.1 - 25	2	5000 ³	—	TC1,2, OL0, C1	TC1,2, OL0, C1
	80 ¹	DC	---	0.02 - 15	—	1	---	600	TC1,2, OL1, U1	TC1,2, OL1, U1
				---	15.1 - 30	1	---	600	TC1,2, OL0, U1	TC1,2, OL0, U1
	125	50 / 60	1	0.02 - 15	—	1	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
				---	15.1 - 30	1	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
				1 - 30	—	1	---	360	TC1,OL1,U2	TC3, OL1, U3
	250	50 / 60	1	0.02 - 12	—	1	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
	250 ²	50 / 60	1	---	12.1 - 18	1	1000 ⁴	—	TC1,2, OL0, C1	TC1,2, OL0, C1
				0.02 - 15	—	2	---	1000	TC1,2, OL1, U1	TC1,2, OL1, U1
	250	50 / 60	1	---	15.1 - 30	2	---	1000	TC1,2, OL0, U1	TC1,2, OL0, U1
				1 - 30	—	1	---	360	TC1,OL1,U2	TC3, OL1, U3

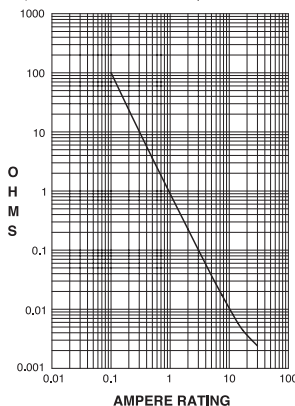
NOTES FOR TABLE A

- 1 Polarity Sensitive
- 2 Available only with Special Catalog Number. Consult Factory.
- 3 Requires Branch Circuit Backup with a UL Listed type K-5 or RK-5 fuse rated 30 Amps maximum
- 4 Requires Branch Circuit Backup with a UL Listed type K-5 or RK-5 fuse rated 60 Amps maximum

Electrical

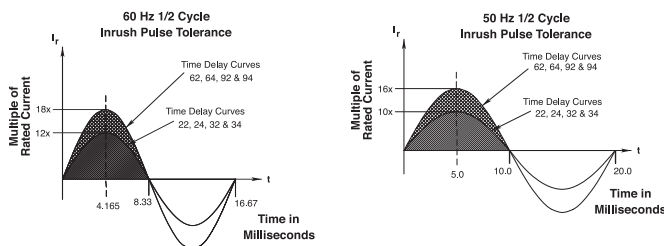
Maximum Voltage	125/250 VAC 50/60 Hz, 80 VDC (See Rating Tables.)
Current Ratings	Standard current coils: 0.100, 0.250, 0.500, 0.750, 1.00 thru 15.0 in 1 amp increments, 18.0, 20.0, 25.0, 30.0. Other ratings available - see Ordering Scheme.
Auxiliary Switch Rating	SPDT; 7A 250VAC, 7A (Res) 28VDC, 4A (Ind.) 28VDC, 0.25A 80VDC (Res) (silver contacts), 0.1A 125VAC (gold contacts).
Insulation Resistance	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength	UL, CSA 1500V, 50/60 Hz for one minute between all electrically isolated terminals. M-Series Circuit Breakers comply with the 8mm spacing and 3750 V 50/60Hz dielectric requirements from hazardous voltage to operator accessible surfaces, per Publications IEC 380, 435, 950, EN 60950 and VDE 0805.
Resistance, Impedance	Values from Line to Load Terminal - based on Series Trip Circuit Breaker.

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



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 20.0	25%
20.1 - 30.0	35%

Pulse Tolerance Curves



Mechanical

Endurance	10,000 ON-OFF operations @ 6 per minute with rated Current and Voltage.
Trip Free	All M-Series Circuit Breakers will trip on overload, even when actuator is forcibly held in the ON position.
Trip Indication	The actuator moves positively to the OFF position when an overload causes the circuit breaker to trip.

Physical

Number of Poles	1 or 2
Internal Circuit Configurations	Series with or without Auxiliary Switch. Switch Only with or without Auxiliary Switch.
Weight	Approximately 30 grams/pole (Approximately 1.07 ounces/pole)
Standard Colors	See Ordering Scheme.

Environmental

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

Shock	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Cond. I. Instantaneous curves tested at 80% 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 curves tested at 80% 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
Chemical Resistance	Only the outside surfaces of the case and the handles may be cleaned with detergents or alcohol. Organic (hydrocarbon based) solvents are not recommended because they attack plastics. Caution should be taken when solvents are used to clean and remove flux from terminals. Lubricants should not be introduced into the handle/bushing openings.

M	G	2	B	34	620	1	H	C	6	7	C
1 Series	2 Actuator	3 Poles	4 Circuit	5 Frequency & Delay	6 Current Rating	7 Terminal	8 Illumination	9 Actuator Color	10 Legend	11 Bezel Color	12 Agency Approval

1 SERIES**M****2 ACTUATOR ¹****Non-Illuminated
single color****A** Angled
B Flat**Two Color
Visi-Rocker****D** Indicate ON
E Indicate OFF**Illuminated
single color****F** Angled
G Flat

ROCKER STYLE DESCRIPTION (DUAL LEGEND SHOWN)				
STYLE	INDICATE "ON" (ON/OFF)	INDICATE "OFF" (ON/OFF)	FLAT (ON/OFF & 1)	ANGLED (ON/OFF & 1)
VERTICAL				
	LINE	LINE	LINE	LINE
HORIZONTAL				
	LINE	LINE	LINE	LINE

3 POLES**1** One **2** Two**4 CIRCUIT ²****without Auxiliary Switch****A** Switch Only (No Coil), Maintained Contacts
B Series Trip (Current)**with Auxiliary Switch, Silver Contacts**

P^{3,4} Switch Only, Maintained Contacts	.060 Dia, Round Solder Turret
Q^{3,4} Switch Only, Maintained Contacts	.058 Dia, Round Q.C.
R^{3,16} Switch Only, Maintained Contacts	.080 Dia x .020 Flat Q.C.
S³ Series Trip (Current)	.060 Dia, Round Solder Turret
T^{3,4} Series Trip (Current)	.058 Dia, Round Q.C.
U^{3,16} Series Trip, Maintained Contacts	.080 Dia x .020 Flat Q.C.
with Auxiliary Switch, Gold Contacts	
2^{3,4} Switch Only, Maintained Contacts	.058 Dia, Round Q.C.
3^{3,16} Switch Only, Maintained Contacts	.080 Dia x .020 Flat Q.C.
4^{3,4} Series Trip (Current)	.058 Dia, Round Q.C.
5^{3,16} Series Trip, Maintained Contacts	.080 Dia x .020 Flat Q.C.

Terminal Type:**5 FREQUENCY & DELAY**

03 DC 50/60Hz, Switch Only	32 DC, 50/60Hz Short
10 DC Instantaneous	34 DC, 50/60Hz Medium
12 DC Short	62 50/60Hz Short, Hi-Inrush
14 DC Medium	64 50/60Hz Medium, Hi-Inrush
20 50/60Hz Instantaneous	72 DC, Short, Hi-Inrush
22 50/60Hz Short	74 DC, Medium, Hi-Inrush
24 50/60Hz Medium	92 DC, 50/60Hz Short, Hi-Inrush
30 DC, 50/60Hz Instantaneous	94 DC, 50/60Hz, Medium, Hi-Inrush

6 CURRENT RATING (AMPERES)¹⁰

020 0.020	225 0.250	420 2.000	710 10.500
025 0.025	230 0.300	522 2.250	611 11.000
030 0.030	235 0.350	425 2.500	711 11.500
035 0.035	240 0.400	527 2.750	612 12.000
040 0.040	245 0.450	430 3.000	712 12.500
045 0.045	250 0.500	435 3.500	613 13.000
050 0.050	255 0.550	440 4.000	614 14.000
055 0.055	260 0.600	445 4.500	615 15.000
060 0.060	265 0.650	450 5.000	616 16.000
065 0.065	270 0.700	455 5.500	617 17.000
070 0.070	275 0.750	460 6.000	717 17.500
075 0.075	280 0.800	465 6.500	618 18.000
080 0.080	285 0.850	470 7.000	619 19.000
085 0.085	290 0.900	475 7.500	620 20.000
090 0.090	295 0.950	480 8.000	622 22.000
095 0.095	410 1.000	485 8.500	624 24.000
210 0.100	512 1.250	490 9.000	625 25.000
215 0.150	415 1.500	495 9.500	630¹² 30.000
220 0.200	517 1.750	610 10.000	

7 TERMINAL ¹⁰

1 Push-On 0.250 Tab (Q.C.)	A¹⁴ Push-In Stud
2¹³ Screw 8-32 w/upturned lugs	P¹⁵ Printed Circuit Board
3¹³ Screw 8-32 (Bus Type)	

8 ROCKER ILLUMINATION**Non-illuminated****Neon ⁵**
without resistor, 120VAC/250VAC**LED ^{7,8}**
without resistor
with resistor, 4-8 VDC
with resistor, 9-16 VDC

A		
Neon	Green Glow ^s	
B	C	
Red	Green	Amber
D	G	K
E	H	L
F	J	M

9 ACTUATOR & LEGEND COLOR**Solid Color**

1 White	Actuator	Legend
2 Black		Black
3 Red		White
4 Green		White
5 Blue		White
6 Yellow		Black
7 Gray		Black
8 Orange		Black

Visi-Rocker⁶

Visi & Legend (remainder of rocker same color as bezel)

1 White	
2 Black	
3 Red	
4 Green	
5 Blue	
6 Yellow	
7 Gray	
8 Orange	

Illuminated ⁸

A Clear	Actuator	Legend
B Red Transparent		White
C Green Transparent		White
D Amber Transparent		White
E Smoke Gray Transparent		White
F White Translucent		Black

10 LEGEND¹¹

1 No Legend	5 I - O Horizontal
2 ON - OFF Vertical	6 Dual Vertical
3 ON - OFF Horizontal	7 Dual Horizontal
4 I - O Vertical	

11 BEZEL COLOR / STYLE⁹

Color	without Rockerguard	with Rockerguard
White	A	1
Black	B	2
Gray	G	7

12 AGENCY APPROVAL¹⁰

C UL Recognized & CSA Accepted
D VDE Certified, UL Recognized & CSA Accepted
E TUV Certified, UL Recognized & CSA Accepted

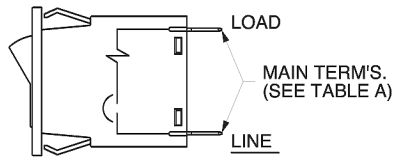
Notes:

- One actuator is located in the center of each multi-pole breaker.
- For Switch Only circuits, select Current Coil Rating from the following chart:

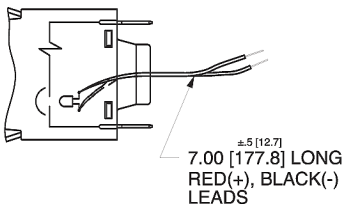
VOLTAGE			FULL LOAD AMP RATING		GENERAL PURPOSE AMP RATING		TUNGSTEN LAMP RATING		POLES BREAKING
MAX. RATING	FREQUENCY	PHASE	MAX. AMPS	CHOOSE CURRENT COIL RATING CODE:	MAX. AMPS	CHOOSE CURRENT COIL RATING CODE:	MAX. AMPS	CHOOSE CURRENT COIL RATING CODE:	
32	DC	-	15	615	25	625	-	-	1
50	DC	-	-	-	7.5	Consult Factory	-	-	1
65	DC	-	15	615	25	625	-	-	2
125	50/60HZ	1	15	615	25	625	15	615	1
250	50/60HZ	1	12	612	-	-	-	-	1
250	50/60HZ	1	15	615	25	625	-	-	2

- One Auxiliary Switch is supplied per breaker. On two-pole breakers, standard Auxiliary Switch mounting is in pole one. Auxiliary Switch option limited to Series Trip & Switch Only circuits, & is not available in single pole illuminated breakers, or Back Connected Screw or Push-in Stud terminals. Mates with AMP .058" diameter pin receptacles: 60983-1 (gold plated) & 60983-2 (tin plated).
- For neon bulb applications at 120VAC @ 47K, 1/4 WATT and for 250VAC applications @ 150K, 1/4 WATT, external resistors must be supplied by customer.
- On Visi-Rocker breakers, Visi portion of rocker cannot be the same color as the bezel.
- For LED (DC or rectified AC) applications, LED is mounted in the center of the rocker actuator with electrical characteristics: 100 millicandela at 20mA; Maximum power dissipation = 75mW at 25°C; Maximum forward current = 25mA; Typical forward voltage = 2.1V at 20mA; Typical reverse current = 100uA at 3V. Customer supplies the proper external resistor limiting current to these values.
- Rocker color for LED's and green neon lamp must be clear, smoke gray, white translucent or match color of LED or neon lamp.
- Other colors available. Consult factory.
- TUV and VDE Certified to 25 amps. UL Recognized and CSA Accepted to 30 amps. Screw Terminals or Push-in Stud recommended above 20 amps.
- TUV or VDE Certified must have I-O or Dual Legends. Legend required on Visi-Rocker breakers.
- 30 amp rating not available with delay's 30, 32, 34, 92 or 94.
- Screw Terminals are VDE certified only with use of ring terminal attached to wire.
- Terminal code A available with circuit codes A & B only.
- Printed circuit board available with UL recognized approval only.
- Auxiliary switch (flat Q.C.) available with UL recognized approvals only.

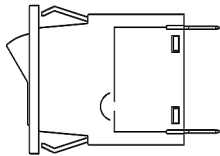
SERIES TRIP



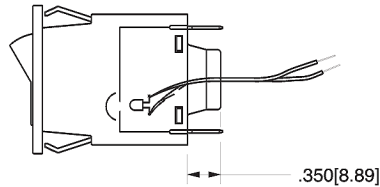
SERIES TRIP W/ ILLUMINATED ROCKER



SWITCH ONLY



SWITCH ONLY W/ ILLUMINATED ROCKER



SERIES TRIP W/ AUXILIARY SWITCH

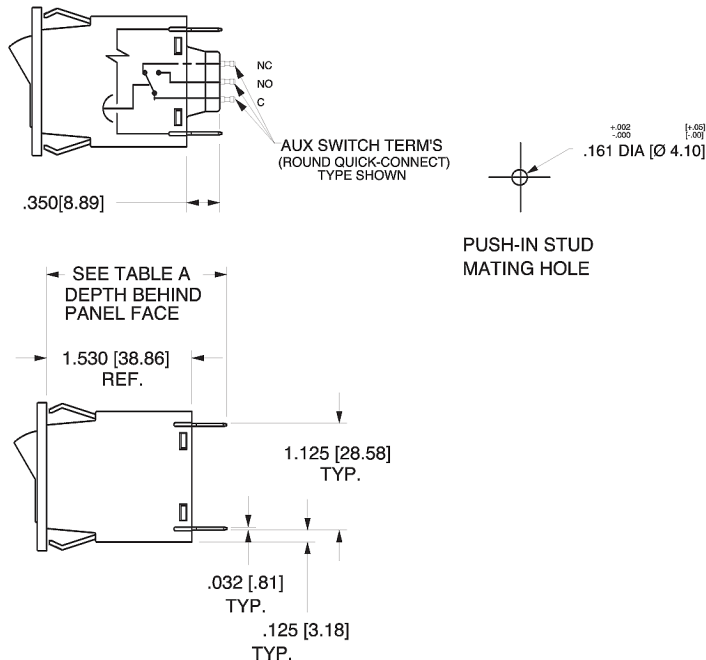


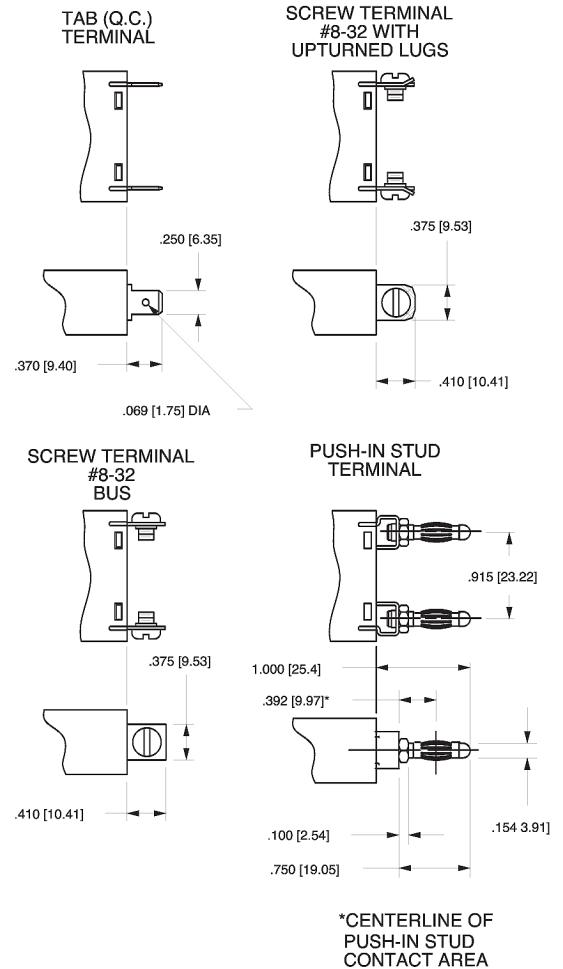
TABLE - A

TERMINAL DESCRIPTION		DEPTH BEHIND PANEL FACE
MAIN	TAB (Q.C.)	1.900 [48.26]
	SCREW (#8-32)**	1.940 [49.28]
	PUSH-IN STUD	2.530 [64.26]
*AUX. SWITCH	DOUBLE SOLDER TURRET TYPE	2.045 [51.94]
	ROUND Q.C. TYPE	2.035 [51.69]
	FLAT QUICK CONNECT	2.139 [54.33]
	FLAT SOLDER LUG	2.022 [51.36]

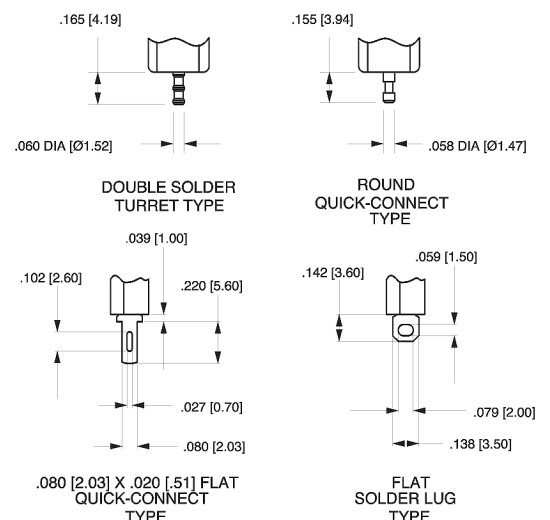
* AUX. SWITCH IS NOT AVAILABLE ON SINGLE POLE ILLUMINATED UNITS. WHEN CALLED FOR ON MULTI-POLE UNITS, ONLY ONE AUX. SWITCH IS NORMALLY SUPPLIED, MOUNTED AS SHOWN ON CLA-8003.

** RECOMMENDED TIGHTENING TORQUE 12-15 IN LBS [1.4-2.7 NM]

TERMINAL DIMENSIONAL DETAIL

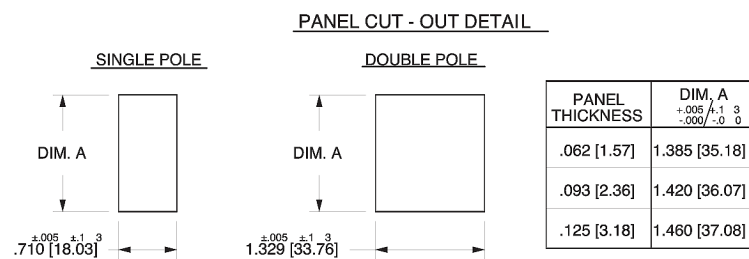
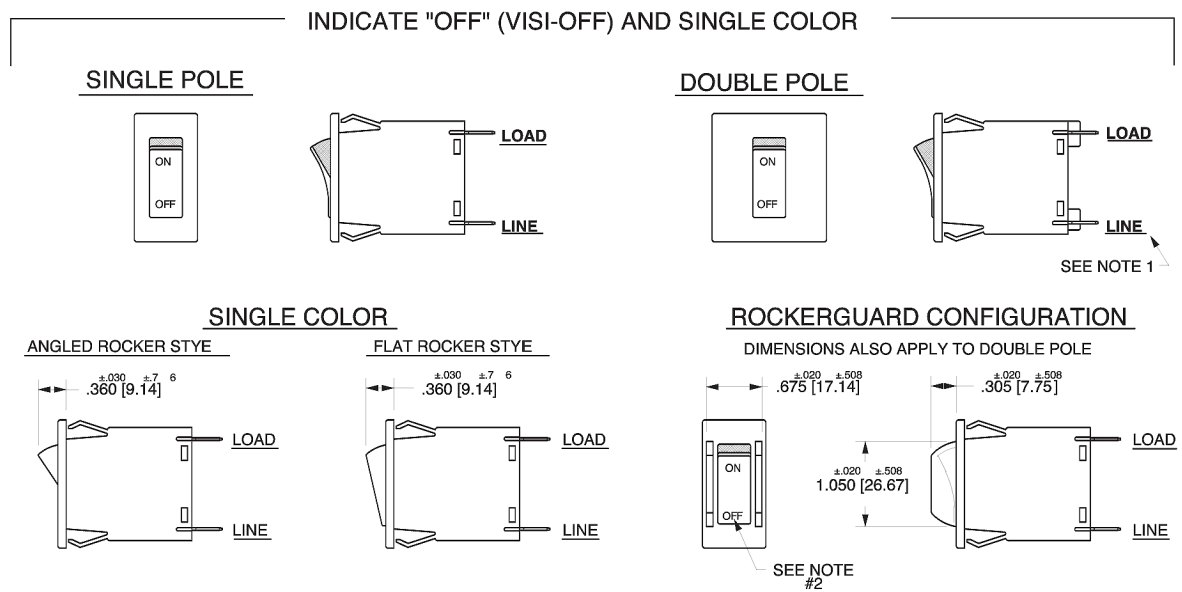
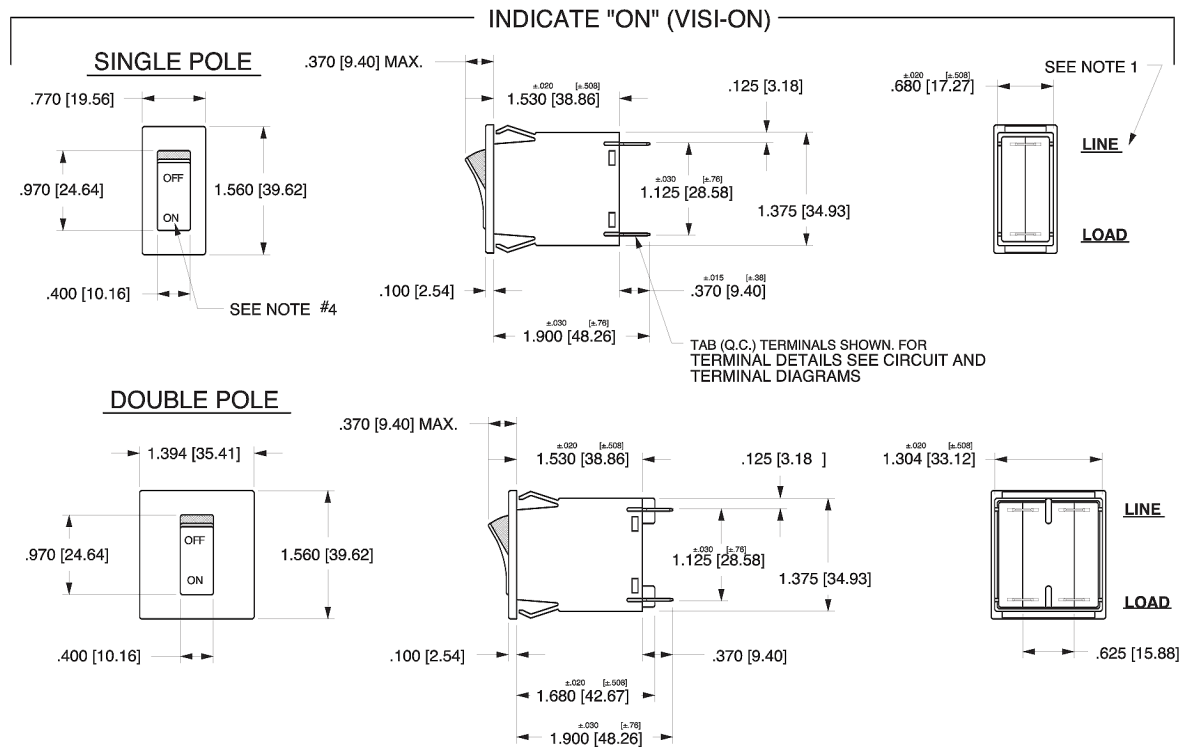


AUXILIARY SWITCH TERMINALS



Notes:

- All dimensions are in inches [millimeters].
- Tolerance $\pm .020$ [.51] unless otherwise specified.
- Schematic shown represents current trip circuit.

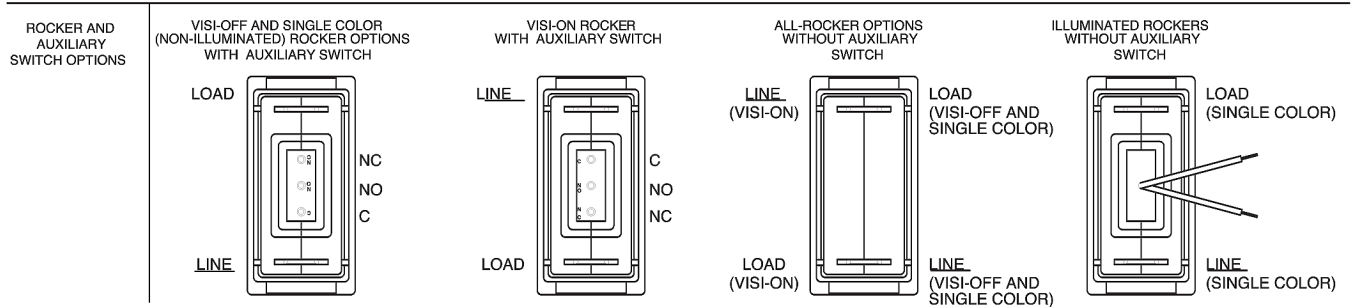


Notes:

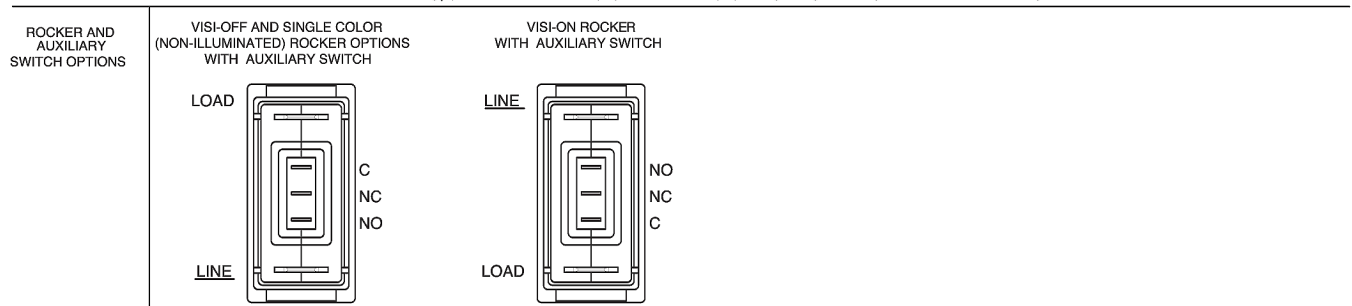
- 1 Dimensions apply to all variations shown. Notice that circuit breaker line & load terminal orientation on indicate OFF is opposite of indicate ON.
- 2 I-O, ON-OFF or dual legends available for vertical or horizontal mounting. For pole orientation with horizontal legend, rotate front view clockwise 90°.
- 3 All dimensions are in inches [millimeters].
- 4 Tolerance ± 0.20 [5.1] unless otherwise specified.

ONE POLE

SINGLE POLE / ROCKER BREAKERS SHOWN WITH DOUBLE SOLDER TURRET AND ROUND QC AUX.SWITCH TERMINALS

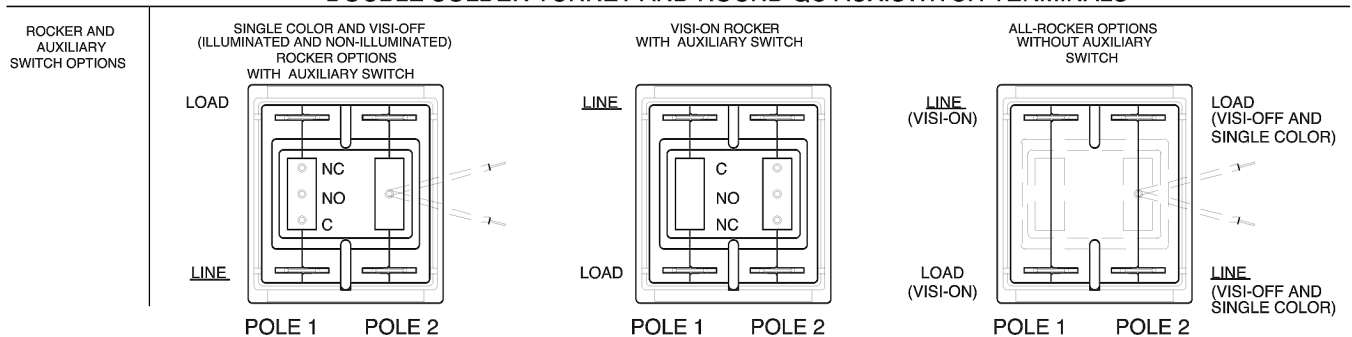


SINGLE POLE / ROCKER BREAKERS SHOWN WITH FLAT QC AND FLAT SOLDER LUG AUX.SWITCH TERMINALS



TWO POLE

DOUBLE POLE / ROCKER BREAKERS SHOWN WITH DOUBLE SOLDER TURRET AND ROUND QC AUX.SWITCH TERMINALS



DOUBLE POLE / ROCKER BREAKERS SHOWN WITH FLAT QC AND FLAT SOLDER LUG AUX.SWITCH TERMINALS

