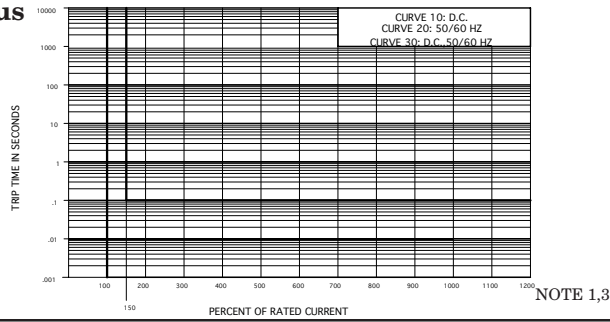
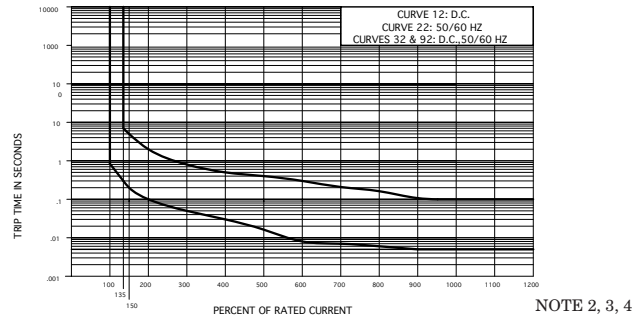


Time Delay Values (M and Q Series) Dual Rated AC/DC

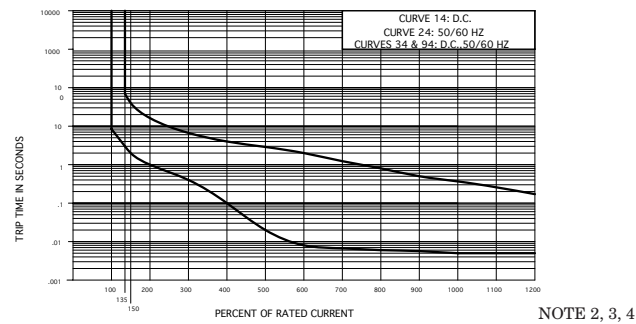
Instantaneous



Short



Medium



		PERCENT OF RATED CURRENT								
TRIP TIME (SECONDS)	DELAY	100%	135%	150%	200%	400%	600%	800%	1000%	1200%
		10, 20 & 30	NO TRIP	MAY TRIP	.100 MAX.	.100 MAX.	.100 MAX.	.100 MAX.	.100 MAX.	.100 MAX.
	12, 22, 32 & 92	NO TRIP	.300 - 7.00	.200 - 5.00	.100 - 2.00	.030 - .500	.008 - .300	.006 - .150	.005 - .100	.005 - .100
	14, 24, 34 & 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 Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve.
- 2 Breakers to hold 100% and must trip at 135% of rated current and greater within the time limits shown in this curve.
- 3 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 capacity on the above standard delays is 12 times rated current based on a 60 Hz, 1/2 cycle 8 ms pulse for delay curves 22, 24, 32 and 34 and is 18 times rated current up to 20 amps; 14 times rated current up to 25 amps based on a 60Hz, 1/2 cycle 8 ms pulse for delay curves 92 and 94.

M-Series – Handle Actuator



The M-Series miniature magnetic circuit breakers are designed for those demanding applications where space, aesthetics and snap-in front panel mounting are important. Available in a choice of rocker actuator styles and colors including the **NEW** 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.

1-2 poles, 0.02 to 25 amps, up to 250 VAC or 65 VDC. Available with a choice of time delays, terminals, actuator styles and colors.

Agency Approvals

Handle and Rocker Actuators:

UL Recognized under the Component Recognition Program as Protectors, Supplementary (Guide QVNU2, File E75596), UL Standard 1077 and Switches, Industrial Control (Guide NRNT2, File E148683), UL Standard 508.

CSA Certified under Class 3215 01, File LR47848. CSA Standard C 22.2 No. 235.

VDE Certified to DIN EN 60934:1994 + A1 1994 (VDE 0642/04.95) as circuit breaker for equipment (GS / CBE) S-type under license No.'s 88881 and 88882. (VDE on rocker style only.)

M-Series – Rocker Actuator



General Specifications

ELECTRICAL

Table A: Lists UL Recognized, and CSA and VDE Certified configurations and performance capabilities as a Component Supplementary Protector. (VDE for rocker style only.)

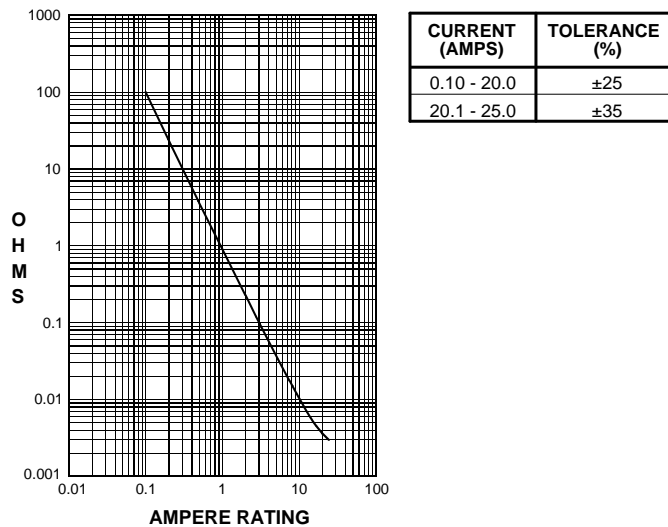
AS A COMPONENT SUPPLEMENTARY PROTECTOR										
CIRCUIT CONFIGURATION	VOLTAGE		CURRENT RATING			BREAKING POLES	INTERRUPTING CAPACITY (AMPS)			
	MATING	FREQUENCY	PHASE	FULL LOAD AMPS [1]	GENERAL PURPOSE AMPS [2]		UL/CSA		VDE	
							W/O BACKUP FUSE	WITH BACKUP FUSE	RATED (W/O BACKUP)	CONDITIONAL (PC1) [5]
SERIES	32	D.C.	-	0.02 - 15	15.1 - 25	1	1000	-	-	-
	50 [3]	D.C.	-	-	0.02 - 7.5	1	1000	-	-	-
	65	D.C.	-	0.02 - 15	15.1 - 25	2	1000	-	-	-
	125	50/60Hz	1	0.02 - 15	15.1 - 25	1	1000	-	500	3000 [5]
	250	50/60Hz	1	0.02 - 12	-	1	1000	-	500	3000 [5]
	250	50/60Hz	1	0.02 - 15	15.1 - 25	2	1000	-	500	3000 [5]
	250 [3]	50/60Hz	1	-	12.1 - 18	1	-	1000 [4]	-	-

General Specifications (cont.)

Table B: Lists UL Recognized and CSA Certified configurations and performance capabilities as an Industrial Control Switch.

AS AN INDUSTRIAL CONTROL SWITCH							
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING			POLES BREAKING
	MAX RATING	FREQUENCY	PHASE	FULL LOAD AMPS ^[1]	GENERAL PURPOSE AMPS ^[2]	TUNGSTEN LAMP LOAD AMPS	
SWITCH ONLY	32	D.C.	-	15	25	-	1
	50 ^[3]	D.C.	-	-	7.5	-	1
	65	D.C.	-	15	25	-	2
	125	50/60Hz	1	15	25	15	1
	250	50/60Hz	1	12	-	-	1
	250	50/60Hz	1	15	25	-	2

Maximum Voltage 125/250 VAC 50/60 Hz, 65 VDC (See Table A)
 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. Other ratings available - consult factory.
 Auxiliary Switch Rating SPDT; 7 Amps - 250VAC, 7 Amps (Res)-28 VDC, 4 Amps (Ind.)-28 VDC (silver contacts), 0.1 Amps -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

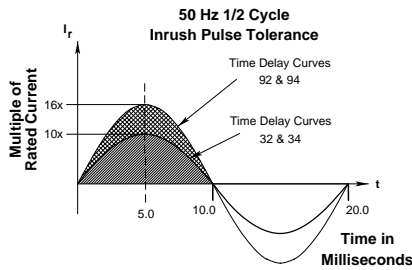
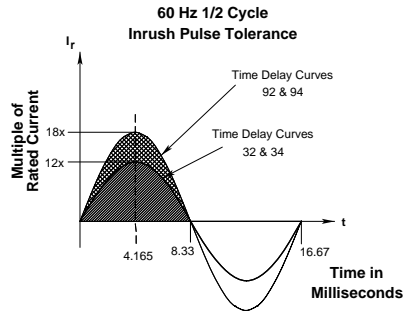


NOTES

- 1 For Motor Load Applications.
- 2 For Non-Motor Load Applications, not VDE certified.
- 3 Available under Special Catalog Number only. (Consult Factory.)
- 4 Requires Branch Circuit backup with a UL listed Type K-5 or RK-5 fuse rated 60 amps maximum.
- 5 Requires backup protection with a thermal magnetic circuit breaker rated 16 amps and having a Type C trip characteristic per EN60898/DIN VDE 0641 (C16A).

General Specifications (cont.)

Pulse Tolerance Curves



MECHANICAL

Endurance
Trip Free

10,000 ON-OFF operations @ 6 per minute with rated Current and Voltage.
All M-Series Handle Type 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.

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, 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.

PHYSICAL

Number of Poles

1 or 2

Internal Circuit Configurations

Series with or without Auxiliary Switch.

Switch Only with or without Auxiliary Switch.

Weight

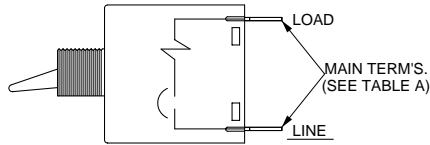
Approximately 30 grams/pole (Approximately 1.07 ounces/pole)

Standard Colors

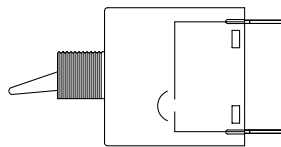
See Ordering Scheme.

Circuit and Terminal Diagrams

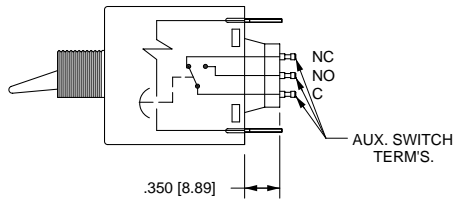
SERIES TRIP



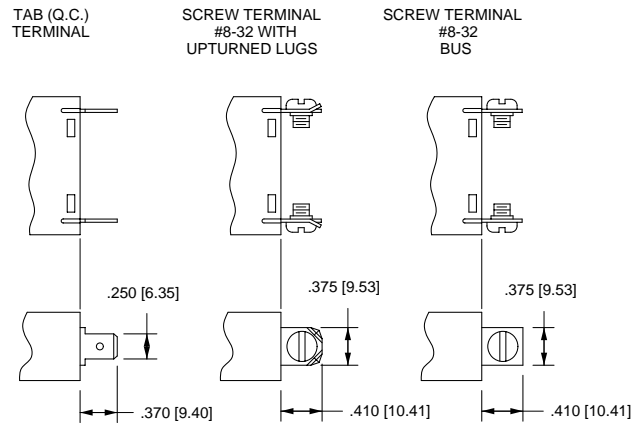
SWITCH ONLY



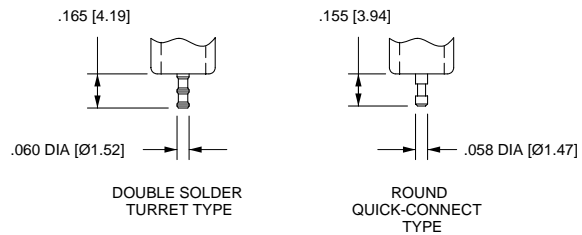
SERIES TRIP W/ AUXILIARY SWITCH



TERMINAL DIMENSIONAL DETAIL



AUXILIARY SWITCH TERMINALS



MULTI-POLE IDENTIFICATION SCHEME

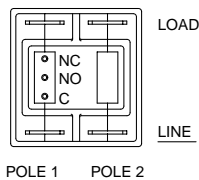


FIG. A

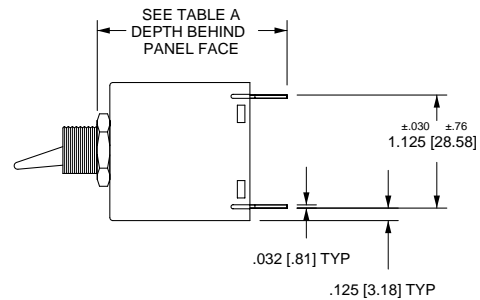


TABLE A		DEPTH BEHIND * PANEL FACE
TERMINAL DESCRIPTION		
MAIN	TAB (Q.C)	1.890 [48.00]
	SCREW (#8-32)	1.930 [49.03]
AUX. ** SWITCH	DOUBLE SOLDER TURRET TYPE	2.035 [51.69]
	ROUND Q.C TYPE	2.025 [51.44]

*DEPTH INCLUDES BEHIND PANEL HEX NUT AS SUPPLIED ON ALL UNITS.

**WHEN CALLED FOR ON MULTI-POLE UNITS, ONLY ONE AUX. SWITCH IS NORMALLY SUPPLIED, MOUNTED AS SHOWN IN FIG. A

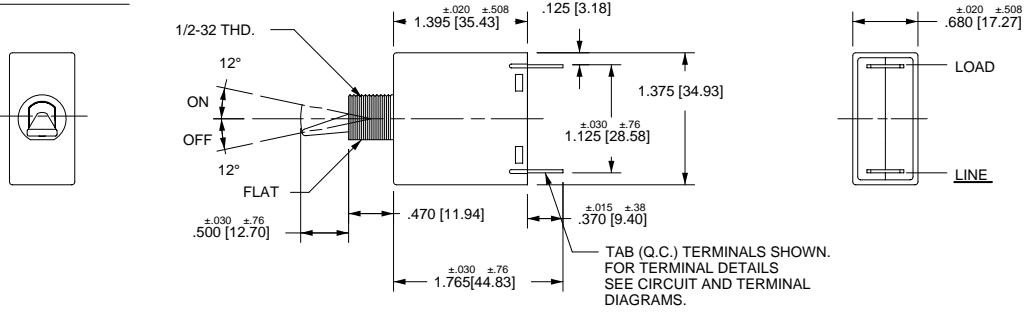
NOTES

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance $\pm .015$ [.38] unless otherwise specified.

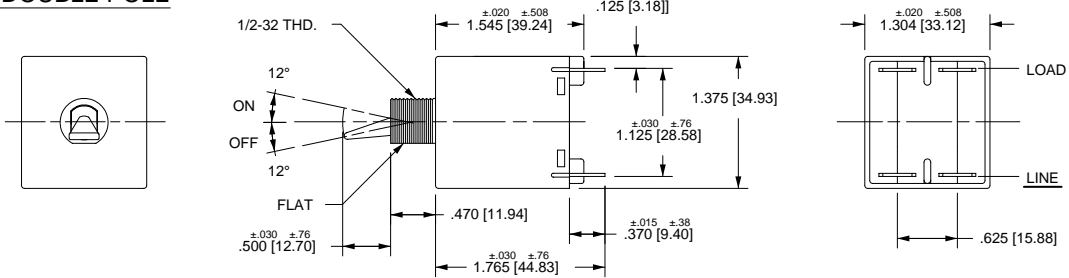
Form and Fit Drawings

PADDLE ACTUATOR STYLE

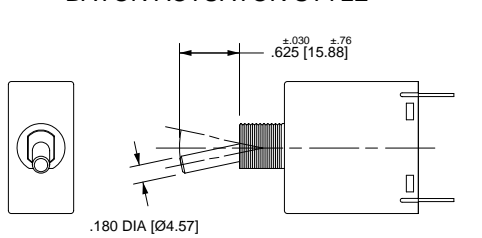
SINGLE POLE



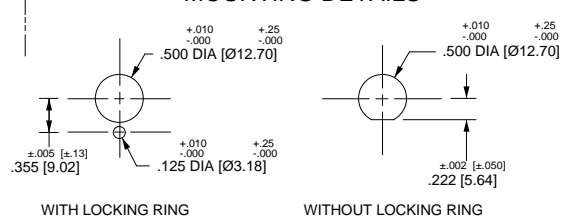
DOUBLE POLE



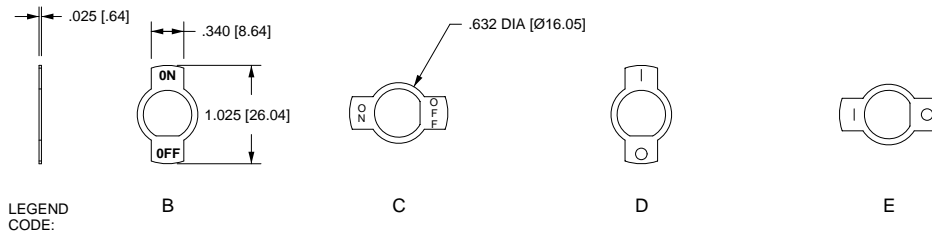
BATON ACTUATOR STYLE



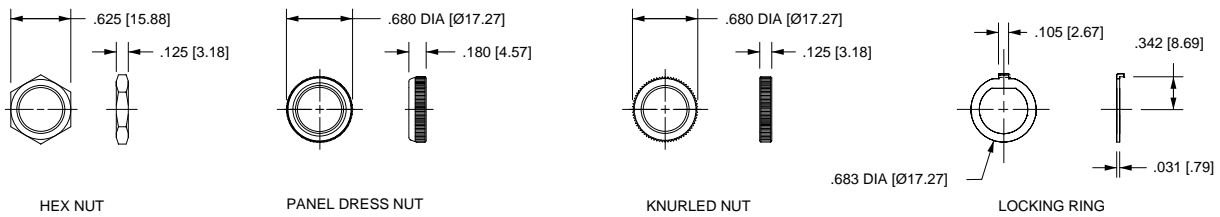
MOUNTING DETAILS



LEGEND PLATES



PANEL HARDWARE

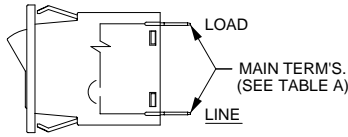


NOTES

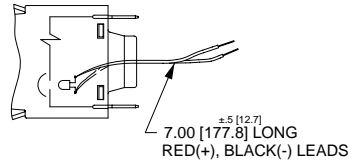
- 1 All dimensions are in inches [millimeters].
- 2 Tolerance $\pm .015$ [.38] unless otherwise specified.

Circuit and Terminal Diagrams

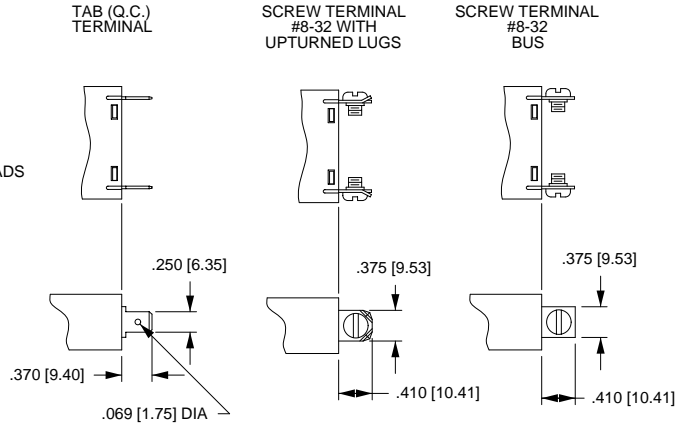
SERIES TRIP



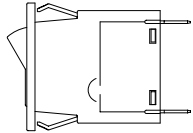
SERIES TRIP W/ ILLUMINATED ROCKER



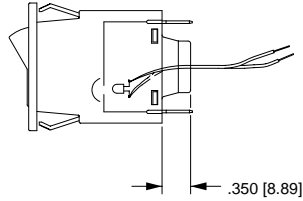
TERMINAL DIMENSIONAL DETAIL



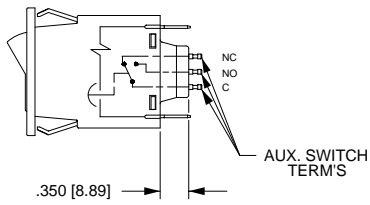
SWITCH ONLY



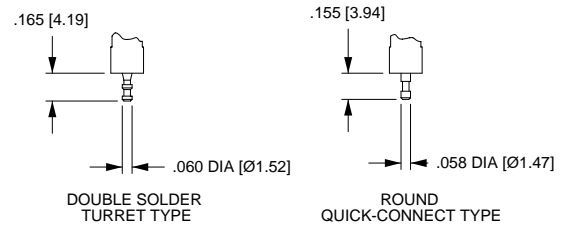
SWITCH ONLY W/ ILLUMINATED ROCKER



SERIES TRIP W/ AUXILIARY SWITCH



AUXILIARY SWITCH TERMINALS



MULTI-POLE IDENTIFICATION SCHEME

VISI-OFF, SINGLE COLOR & ILLUMINATED OPTIONS ONLY

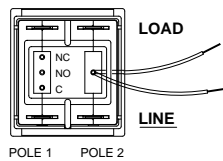


FIG. A

VISI-ON OPTION ONLY

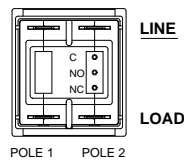


FIG. B

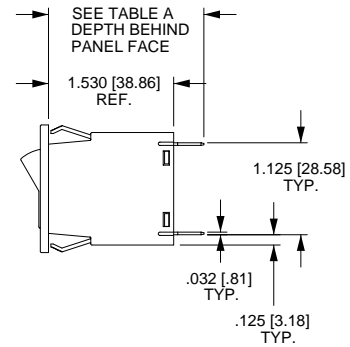


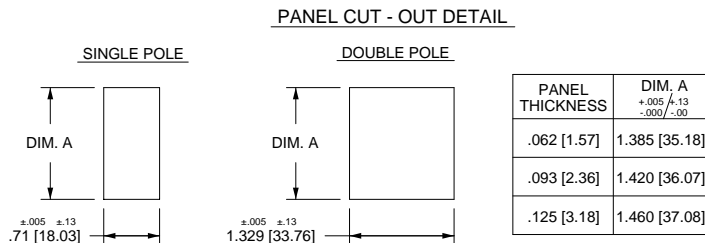
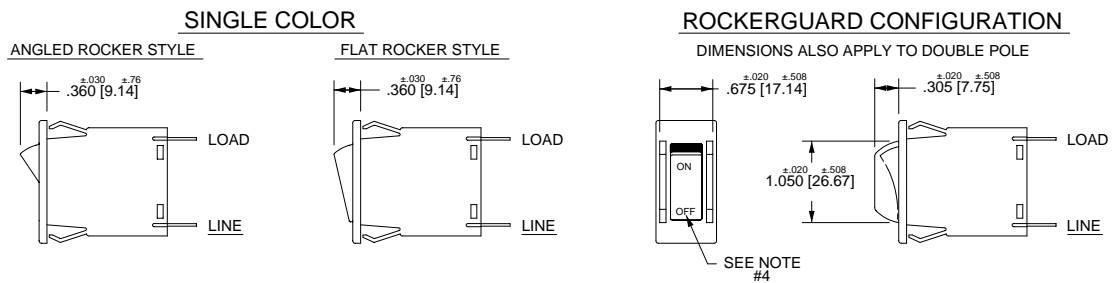
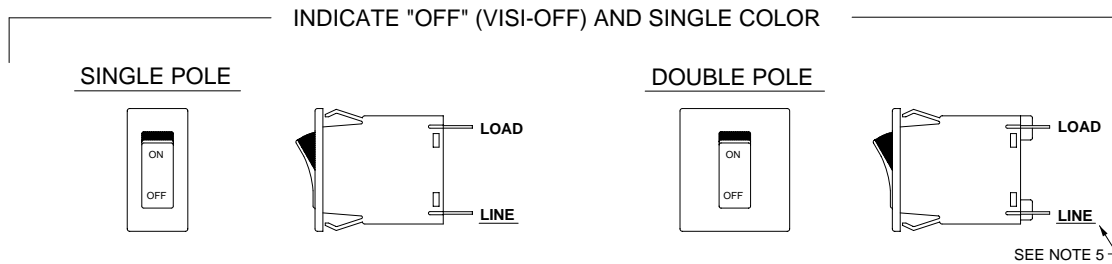
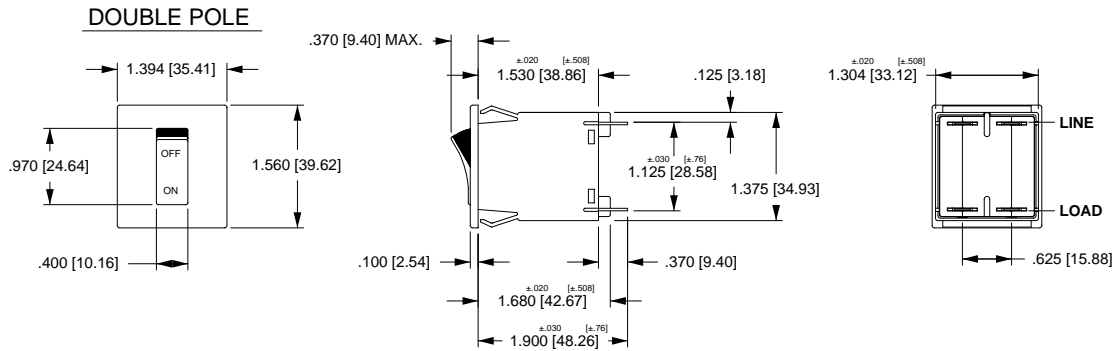
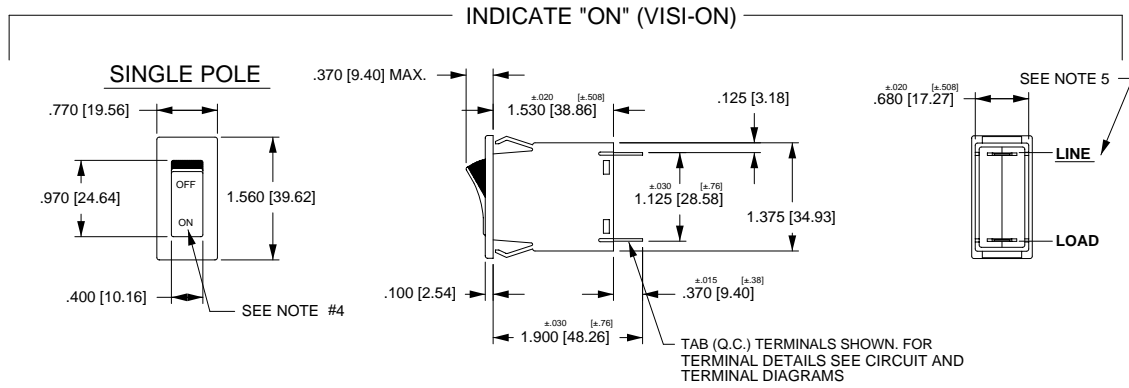
TABLE - A

TERMINAL DESCRIPTION		DEPTH BEHIND PANEL FACE
MAIN	TAB (Q.C.)	1.900 [48.26]
	SCREW (#8-32)	1.940 [49.28]
*AUX. SWITCH	DOUBLE SOLDER TURRET TYPE	2.045 [51.94]
	ROUND Q.C. TYPE	2.035 [51.69]

NOTES

- All dimensions are in inches [millimeters].
- Tolerance $\pm .015$ [.38] unless otherwise specified.

Form and Fit Drawings



NOTES

- 1 All dimensions are in inches [millimeters].
- 2 Tolerance ± 0.10 [.25] unless otherwise specified.
- 3 Dimensions apply to both rocker styles.
- 4 I-O, ON-OFF or dual legends available for vertical or horizontal mounting.
- 5 Notice that circuit breaker line and load terminal orientation on indicate "OFF" is opposite that of indicate "ON".

Supplementary Drawings

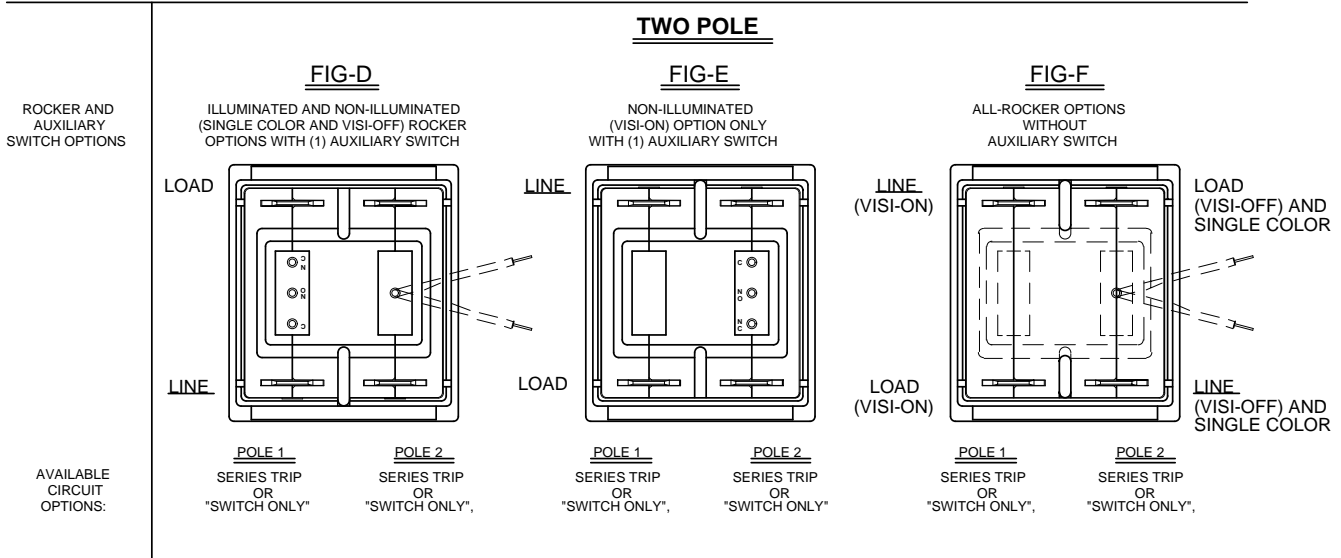
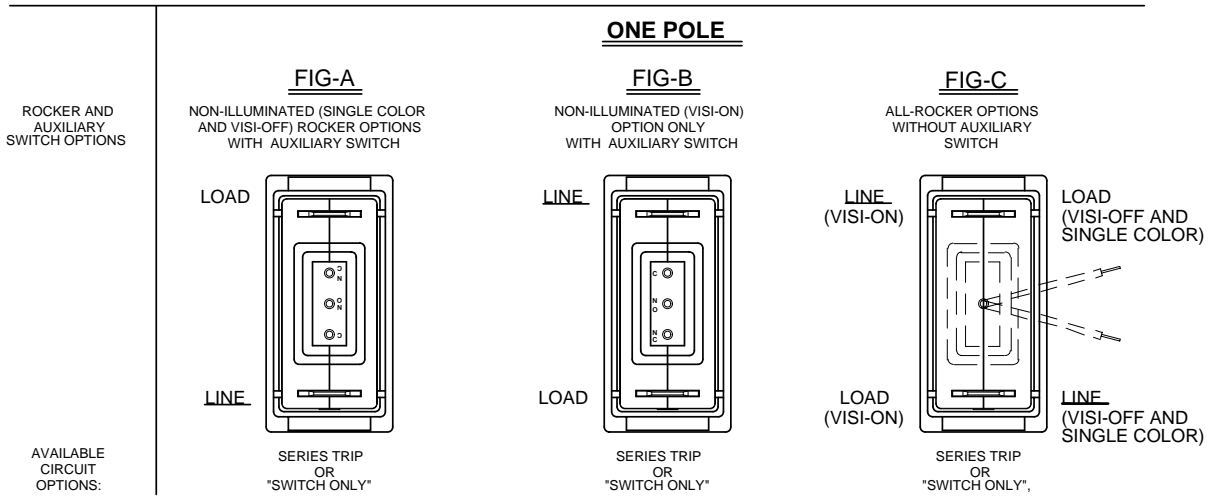
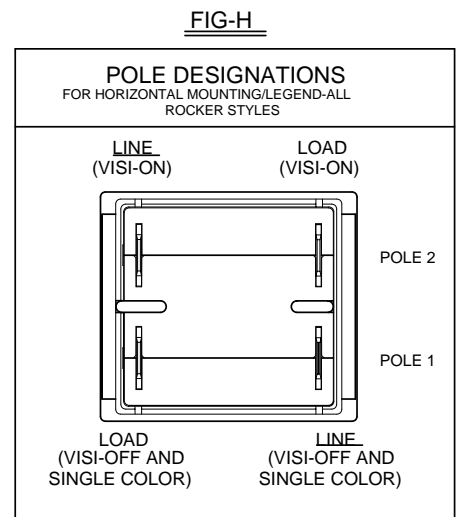


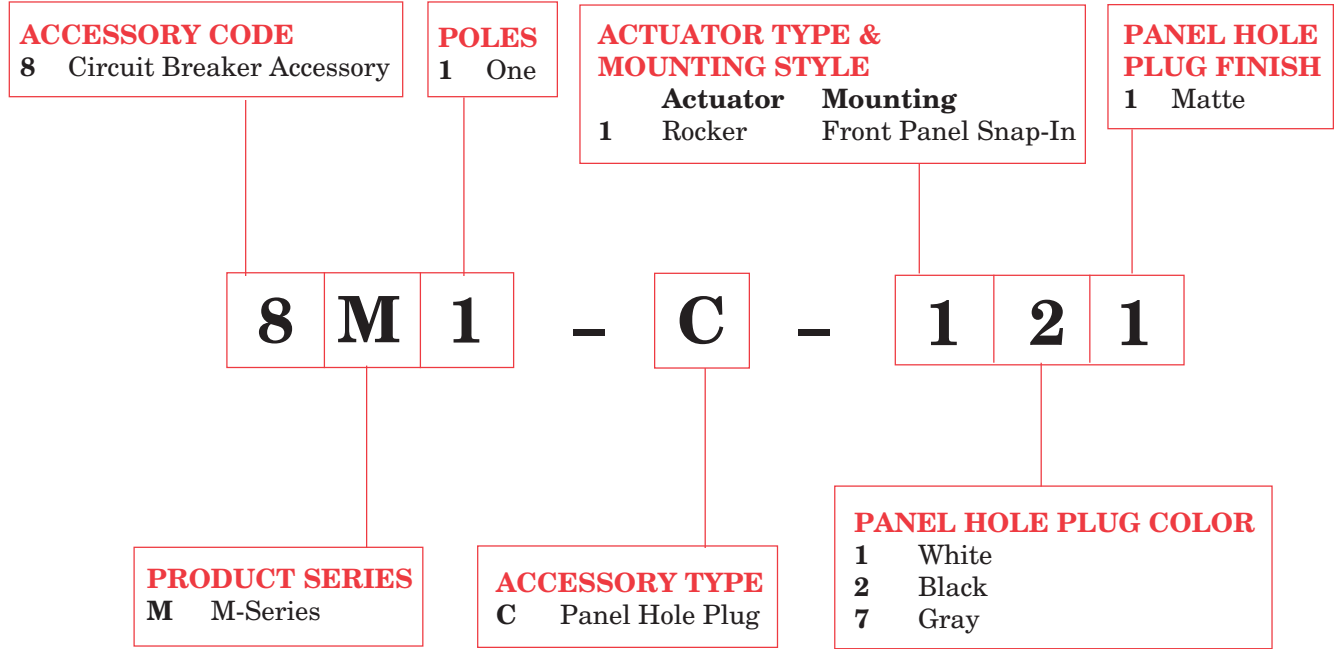
FIG-G

ROCKER STYLE DESCRIPTION
(DUAL LEGEND SHOWN)

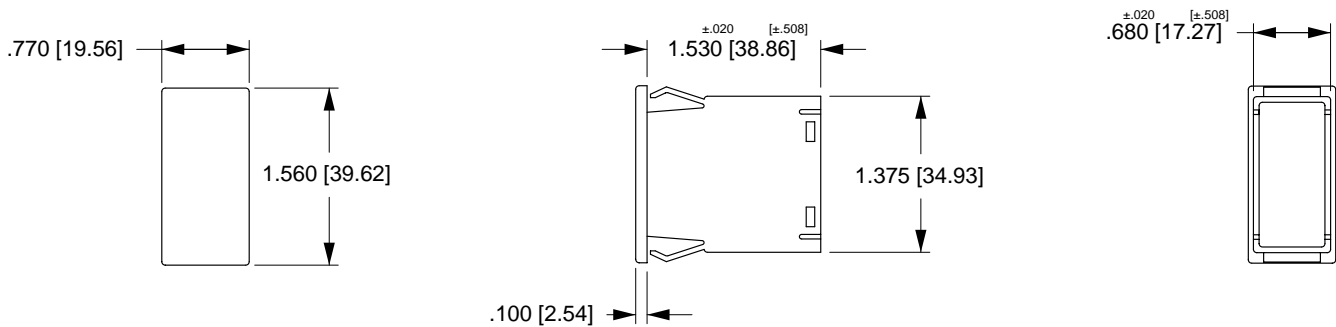
STYLE	INDICATE - "ON" (CODE-D)	INDICATE - "OFF" (CODE-E)	FLAT (CODES-B & G)	ANGLED (CODES-A & F)
VERTICAL				
HORIZONTAL				



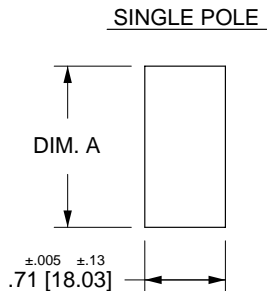
Panel Hole Plug



SINGLE POLE

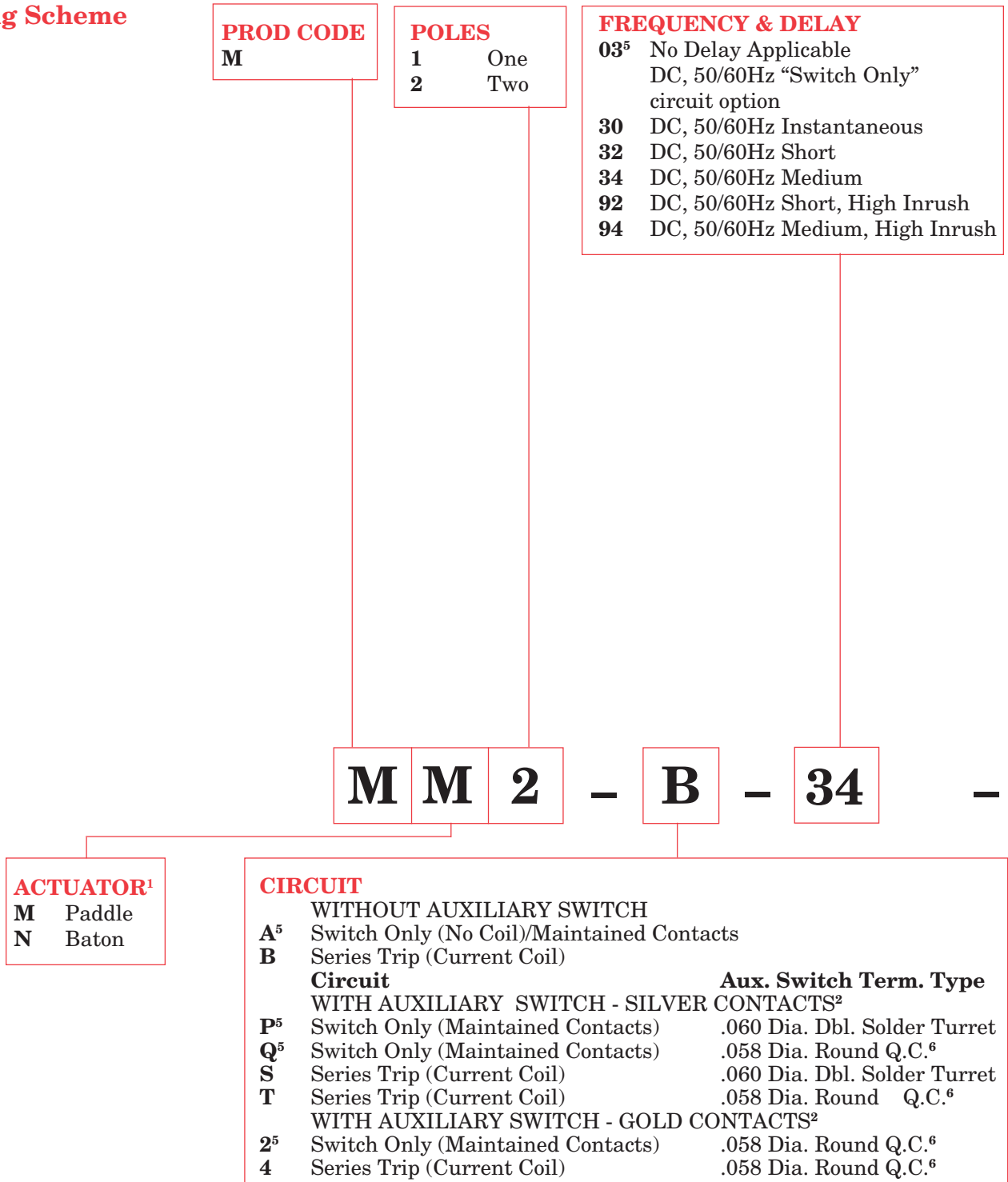


PANEL CUT - OUT DETAIL





PANEL THICKNESS	DIM. A +0.05 / +.13 -0.000 / -.00
.062 [1.57]	1.385 [35.18]
.093 [2.36]	1.420 [36.07]
.125 [3.18]	1.460 [37.08]

Ordering Scheme



NOTES

- 1 Paddle:  Baton:  One handle per unit is provided in center of cover. Unless otherwise specified, all actuator styles have gloss finish.
2. One Auxiliary Switch is supplied when specified. In two pole units, auxiliary switch is mounted in pole 1.
3. This is only a partial listing of the many ratings available. For other ratings, please consult factory.
5. For "Switch Only" (no coil) versions, select Current Rating Code from the following chart (Consult factory for special catalog number.)

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	-	-	-	1
65	DC	-	15	615	25	625	-	-	2
125	50/60 HZ	1	15	615	25	625	15	615	1
250	50/60 HZ	1	12	612	-	622	-	-	1
250	50/60 HZ	1	15	615	25	625	-	-	2

6. Mates with AMP: .058 inch Dia. Pin Receptacles; P/N's 60983-1 (gold plated) and 60983-2 (tin plated).
7. All units have 1 hex nut installed on bushing for use behind panel. Front panel hardware may be selected. If no front panel hardware is desired, select Panel Hardware Type Code 1.

TERMINAL

- 1** Push-On
0.250 Tab (Q.C.)
- 2** Screw 8-32
w/upturned lugs
- 3** Screw 8-32
(Bus Type)

PANEL HARDWARE⁷

- A** No Panel Hardware
- B** Knurled Nut with Bright Nickel Finish
- C** Knurled Nut with Bright Nickel Finish & Locking Ring
- D** Black Knurled Nut
- E** Black Knurled Nut & Locking Ring
- F** Panel Dress Nut with Bright Nickel Finish
- G** Panel Dress Nut with Bright Nickel Finish & Locking Ring
- H** Black Panel Dress Nut
- J** Black Panel Dress Nut & Locking Ring

BUSHING COLOR

- B** Black

620

-

1

-

1

B

B

-

B

-

C

CURRENT COIL RATING³

(amperes)

210	0.100
225	0.250
250	0.500
275	0.750
410	1.000
420	2.000
425	2.500
430	3.000
440	4.000
450	5.000
460	6.000
470	7.000
475	7.500
480	8.000
490	9.000
610	10.000
611	11.000
612	12.000
613	13.000
614	14.000
615	15.000
618	18.000
620	20.000
625	25.000

ACTUATOR COLOR

- 1** White
- 2** Black
- 3** Red
- 4** Green
- 5** Blue
- 6** Yellow
- 8** Orange

LEGEND PLATE

- A** No legend plate
- B** ON-OFF
Vertical
- C** ON-OFF
Horizontal
- D** I-O
Vertical
- E** I-O
Horizontal

AGENCY APPROVAL

- A** W/O Approval
- B** UL Recognized
- C** UL Recognized;
CSA Certified

Ordering Scheme

PROD CODE
M

POLES
1 One
2 Two

FREQUENCY & DELAY
03⁸ No Delay Applicable
 DC, 50/60Hz "Switch Only" circuit option
30 DC, 50/60Hz Instant
32 DC, 50/60Hz Short
34 DC, 50/60Hz Medium
92 DC, 50/60Hz Short, High Inrush
94 DC, 50/60Hz Medium, High Inrush

Figure G

ROCKER STYLE DESCRIPTION (DUAL LEGEND SHOWN)				
STYLE	INDICATE - "ON" (CODE-D)	INDICATE - "OFF" (CODE-E)	FLAT (CODES-B & G)	ANGLED (CODES-A & F)
VERTICAL				
HORIZONTAL				

M G 2 - B - 34 -

ACTUATOR¹

NON-ILLUMINATED ROCKER
SINGLE COLOR

A Angled
B Flat

VISI-ROCKER

D Indicate ON
E Indicate OFF

ILLUMINATED ROCKER

F Angled
G Flat

CIRCUIT

WITHOUT AUXILIARY SWITCH

A⁸ Switch Only (No Coil)/Maintained Contacts
B Series Trip (Current Coil)

Circuit

WITH AUXILIARY SWITCH - SILVER CONTACTS²

	Aux. Switch Term. Type
P ⁸ Switch Only (Maintained Contacts)	.060 Dia. Dbl. Solder Turret
Q ⁸ Switch Only (Maintained Contacts)	.058 Dia. Round Q.C. ⁹
S Series Trip (Current Coil)	.060 Dia. Dbl. Solder Turret
T Series Trip (Current Coil)	.058 Dia. Round Q.C. ⁹

WITH AUXILIARY SWITCH - GOLD CONTACTS²

2 ⁸ Switch Only (Maintained Contacts)	.058 Dia. Round Q.C. ⁹
4 Series Trip (Current Coil)	.058 Dia. Round Q.C. ⁹

NOTES

- Angled Rocker Style: Flat Rocker Style: Visi-Rocker Style:
One rocker per unit is provided in center of bezel. Unless otherwise specified, all rocker styles have matte finish.
- Auxiliary Switch is not available on single pole illuminated styles.
- This is only a partial listing of the many amp ratings available. For other ratings, please consult factory.
- For neon bulb applications at 120VAC, a 47K, 1/4 WATT, external resistor must be supplied by customer. For 250 VAC applications, a 150K 1/4 WATT, external resistor must be supplied by customer.
- For LED (DC or rectified AC) applications the LED is supplied mounted in the center of the rocker actuator with electrical characteristics as follows: 100 millicandela at 20 mA; Maximum power dissipation = 75 mW at 25°C; Typical forward voltage = 2.1V at 20mA; Typical reverse current = 100 uA at 3V; Note: Customer is required to supply the proper external resistor limiting current to above values.
- When visi-rocker is specified, the visi portion of the rocker can not be the same color as the bezel. The remainder of the rocker, however, will be the same color as the bezel. A legend is mandatory on all visi-rockers.
- If legend not desired, choose Rocker Legend Type Code 1.
- For "switch only" (no coil) version, select Current Coil Rating Code from table B from page 16.
- Mates with AMP. .058 inch Dia. Pin Receptacles; P/N's 61983-1 (gold plated) and 61986-1 (tin plated).
- Rocker color for LED's and green neon lamp must be clear, smoke gray, white translucent, or match color of LED or lamp.
- Dual = I-O / ON-OFF combination.
- Screw Terminals are VDE certified only with use of ring terminal attached to wire.
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- Consult factory for VDE certified constructions.

TERMINAL
1 Push-On
 0.250 Tab (Q.C.)
2¹² Screw 8-32
 w/upturned lugs
3¹² Screw 8-32
 (Bus Type)

ROCKER & LEGEND COLORS
ILLUMINATED ROCKER¹⁰
 ROCKER LEGEND⁷
A Clear White
B Red Transparent White
C Green Transparent White
D Amber Transparent White
E Smoke Gray Transparent White
F White Translucent Black

NON-ILLUMINATED ROCKER
SINGLE COLOR
 ROCKER LEGEND⁷
1 White Black
2 Black White
3 Red White
8 Orange Black

VISI-ROCKER
VISI⁶ & LEGEND ROCKER⁶
1 White [Remainder
2 Black [of rocker
3 Red [same color
4 Green [as bezel]

BEZEL COLOR/STYLE⁶
WITHOUT ROCKERGUARD
A White
B Black
G Gray
WITH ROCKERGUARD
1 White
2 Black
7 Gray

620 - 1 - H C 6 - 7 - C

CURRENT COIL RATING³
 (amperes)
210 0.100
225 0.250
250 0.500
275 0.750
410 1.000
420 2.000
425 2.500
430 3.000
440 4.000
450 5.000
460 6.000
470 7.000
475 7.500
480 8.000
490 9.000
610 10.000
611 11.000
612 12.000
613 13.000
614 14.000
615 15.000
618 18.000
620 20.000
625 25.000

ROCKER ILLUMINATION
A NON-ILLUMINATED
 (single color & Visi-Rocker
 options only)
B⁴ Neon (w/o resistor)
 120VAC/250VAC
C^{4,10} Green Glow Neon
 (w/o resistor)
 120VAC/250VAC
D^{5,10} Red LED (w/o resistor)
E¹⁰ Red LED (w/ resistor)
 4-8 VDC
F¹⁰ Red LED (w/ resistor)
 9-16 VDC
G^{5,10} Green LED (w/o resistor)
H¹⁰ Green LED (w/ resistor)
 4-8 VDC
J¹⁰ Green LED (w/ resistor)
 9-16 VDC
K^{5,10} Amber LED (w/o resistor)
L¹⁰ Amber LED (w/ resistor)
 4-8 VDC
M¹⁰ Amber LED (w/ resistor)
 9-16 VDC

ROCKER LEGEND¹¹
1 No legend
 (Single color or
 illuminated
 rocker options
 only)
2 ON-OFF
 Vertical
3 ON-OFF
 Horizontal
4 I-O
 Vertical
5 I-O
 Horizontal
6 Dual
 Vertical
7 Dual
 Horizontal

AGENCY APPROVAL¹³
A W/O Approval
B UL Recognized
C UL Recognized;
 CSA Certified
D UL Recognized;
 CSA and VDE
 Certified