M-Series Circuit Breaker

The M-Series is a low cost, miniature hydraulic/magnetic circuit breakers ideally designed for demanding applications requiring space saving features, aesthetics and snap-in front panel mounting.

Its newest design features a compact, space saving, vertically mounted parallel pole configuration, which is UL489A listed up to 50 amps and is well suited for telecommunication equipment fitting in one rack unit. Furthermore, it features two uniquely designed terminals that provide the highest level of balanced circuit protection.

In addition, these circuit breakers feature various styling options allowing for design flexibility. They are available in choices 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 and wiping contact design insures long-term reliability. The M-Series circuit breakers are available in 1 & 2 poles or parallel poles, 0.02 to 50 amps, up to 250VAC or 80VDC with choices of time delays, terminals, panel hardware, actuator styles, colors, and imprinting.

Features:
- Parallel pole configuration well suited for one rack unit
- Compact design

Applications:
- Communication equipment
- Vehicles
- Marine
- Generators
- Power supplies
- Medical equipment
**Electrical**

Maximum Voltage 125/250 VAC 50/60 Hz, 80 VDC

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.

**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

Series with or without Auxiliary Switch.

Switch Only with or without Auxiliary Switch.

Weight Approximately 30 grams/pole (Approximately 1.07 ounces/pole) See Ordering Scheme.

**Environmental**

Designed in accordance with requirements of specification MIL PRF-55629 & MIL-STD-202G 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.

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

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

<table>
<thead>
<tr>
<th>M-SERIES TABLE A: COMPONENT SUPPLEMENTARY PROTECTORS</th>
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</thead>
<tbody>
<tr>
<td>VOLTAGE</td>
<td>CURRENT RATING</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>MAX. RATING</td>
<td>FREQUENCY</td>
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</tr>
<tr>
<td>32</td>
<td>DC</td>
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<tr>
<td>50</td>
<td>DC</td>
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<td>DC</td>
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<td>80</td>
<td>DC</td>
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<td>125</td>
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<td>250</td>
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<td>250</td>
<td>50 / 60</td>
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<td></td>
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</tr>
</tbody>
</table>

**Table A Notes:**
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 backup protection with a thermal magnetic circuit breaker rated 32 amps and having a Type C trip characteristic per EN60898/DIN VDE 0641 (C32A) for ratings greater than 15amps, and a thermal magnetic circuit breaker rated 16 amps and having a Type C trip characteristic per EN60898/DIN VDE 0641 (C16A) for ratings 15 amps and less.

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

<table>
<thead>
<tr>
<th>M-SERIES TABLE B: COMPONENT SUPPLEMENTARY PROTECTORS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE</td>
<td>CURRENT RATING</td>
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<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>MAX. RATING</td>
<td>FREQUENCY</td>
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<tr>
<td>---</td>
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<tr>
<td>32</td>
<td>DC</td>
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<td>50</td>
<td>DC</td>
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<td></td>
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</tr>
</tbody>
</table>

**Table B Notes:**
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 backup protection with a thermal magnetic circuit breaker rated 32 amps and having a Type C trip characteristic per EN60898/DIN VDE 0641 (C32A) for ratings greater than 15amps, and a thermal magnetic circuit breaker rated 16 amps and having a Type C trip characteristic per EN60898/DIN VDE 0641 (C16A) for ratings 15 amps and less.
Electrical Tables

Table C: Lists UL489A Listed and TUV Certified configurations and performance capabilities for use in Communications Equipment.

<table>
<thead>
<tr>
<th>CIRCUIT CONFIGURATION</th>
<th>VOLTAGE</th>
<th>CURRENT RATING</th>
<th>POLES BREAKING</th>
<th>INTERRUPTING CAPACITY (AMPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAX. RATING</td>
<td>FREQ.</td>
<td>GENERAL PURPOSE AMPS</td>
<td>WITHOUT BACKUP FUSE</td>
</tr>
<tr>
<td>SERIES</td>
<td>80</td>
<td>DC</td>
<td>0.02 - 30</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>DC</td>
<td>0.02 - 30</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>DC</td>
<td>0.10 - 25</td>
<td>1</td>
</tr>
</tbody>
</table>

Table C Notes:
1. Available only with Special Catalog Number

Table D: Lists UL489A Listed configurations and performance capabilities for use in Communications Equipment.

<table>
<thead>
<tr>
<th>CIRCUIT CONFIGURATION</th>
<th>VOLTAGE</th>
<th>CURRENT RATING</th>
<th>POLES BREAKING</th>
<th>INTERRUPTING CAPACITY (AMPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAX. RATING</td>
<td>FREQ.</td>
<td>GENERAL PURPOSE AMPS</td>
<td>WITHOUT BACKUP FUSE</td>
</tr>
<tr>
<td>SERIES</td>
<td>80</td>
<td>DC</td>
<td>31-50</td>
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<tr>
<td></td>
<td>65</td>
<td>DC</td>
<td>31-50</td>
<td>2</td>
</tr>
</tbody>
</table>

Table D Notes:
1. Available only with Special Catalog Number

Agency Certifications

UL Recognized
UL Standard 1077
Component Recognition Program as Protectors, Supplementary (Guide CCN/QVNU2, File E75596)

UL Listed
UL Standard 489A
Communications Equipment (Guide CCN/DITT, File E189195)

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

VDE Certified
EN60934, VDE 0642 under File 10537

TUV Certified
EN60934, under License No. R9671109
### M-Series Parallel Pole Rocker - Ordering Scheme

**M E 2 - P - D2 - 650 - 5 - A 1 2 - B - T**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SERIES</td>
<td>M</td>
</tr>
<tr>
<td>2 ACTUATOR</td>
<td></td>
</tr>
<tr>
<td>Single Color Rocker</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Two Color Visi-Rocker</td>
<td>D</td>
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<tr>
<td></td>
<td>E</td>
</tr>
<tr>
<td>Single Color Translucent Rocker</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>G</td>
</tr>
<tr>
<td>3 POLES</td>
<td>Two</td>
</tr>
<tr>
<td>4 CIRCUIT/AUXILIARY SWITCH</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Q</td>
</tr>
<tr>
<td></td>
<td>R</td>
</tr>
<tr>
<td>5 FREQUENCY &amp; TIME DELAY</td>
<td>D2</td>
</tr>
<tr>
<td></td>
<td>D4</td>
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<tr>
<td>6 CURRENT RATING (AMPERES)</td>
<td>CODE</td>
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<tr>
<td></td>
<td>631</td>
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<td>650</td>
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<tr>
<td>7 TERMINAL</td>
<td>A</td>
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<td>5</td>
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<tr>
<td>8 ILLUMINATION</td>
<td>Non-Illuminated</td>
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<tr>
<td>9 ACTUATOR COLOR &amp; LEGEND</td>
<td>Actuator Visi</td>
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<tr>
<td></td>
<td>1</td>
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<td>7</td>
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<td></td>
<td>8</td>
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<tr>
<td>10 LEGEND</td>
<td>2</td>
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<td>3</td>
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<td>6</td>
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<tr>
<td>11 BEZEL COLOR</td>
<td>A</td>
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<td>B</td>
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<td></td>
<td>7</td>
</tr>
<tr>
<td>12 AGENCY APPROVAL</td>
<td>T</td>
</tr>
</tbody>
</table>

Notes:
1. Reminder of Rocker same color as Visi
2. Aux Switch only available with screw terminals
# M-Series Parallel Pole - Handle / Push Button - Ordering Scheme

<table>
<thead>
<tr>
<th>1 SERIES</th>
<th>2 ACTUATOR</th>
<th>3 POLES</th>
<th>4 CIRCUIT/AUXILIARY SWITCH</th>
<th>5 FREQUENCY &amp; TIME DELAY</th>
<th>6 CURRENT RATING (AMPERES)</th>
<th>7 TERMINAL</th>
<th>8 ACTUATOR COLOR &amp; LEGEND</th>
<th>9 FRONT PANEL HARDWARE</th>
<th>10 LEGEND PLATE / BUTTON MARKING</th>
<th>11 BUSHING COLOR</th>
<th>12 AGENCY APPROVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>M</td>
<td>2</td>
<td>P</td>
<td>D2</td>
<td>650</td>
<td>5</td>
<td>1</td>
<td>B</td>
<td></td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

## 1 SERIES
- **M**

## 2 ACTUATOR
- **M** Paddle
- **T** Push-Pull

## 3 POLES
- **2** Two

## 4 CIRCUIT/AUXILIARY SWITCH
- **P** Series Trip Current (Parallel Pole) with Auxiliary Switch, Silver Contacts
- **Q** Series Trip Current (Parallel Pole) with Auxiliary Switch, Gold Contacts

## 5 FREQUENCY & TIME DELAY
- **D2** DC Short
- **D4** DC Medium

## 6 CURRENT RATING (AMPERES)
- **631** 31.000
- **635** 35.000
- **640** 40.000
- **645** 45.000
- **650** 50.000

## 7 TERMINAL
- **A** Push in Stud
- **5** 10-32 Screw (Bus Type)

## 8 ACTUATOR COLOR & LEGEND
- **Handle**
  - **1** White
  - **2** Black
  - **3** Red
  - **4** Green
  - **5** Blue
  - **6** Yellow
  - **7** Gray
  - **8** Orange
- **Push Button**
  - **A** White
  - **B** Black
  - **C** Red
  - **D** Green
  - **E** Blue
  - **F** Yellow
  - **G** Gray
  - **H** Orange

## 9 FRONT PANEL HARDWARE
- **Handle**
  - **A** No outer Panel Hardware
  - **B** Knurled Nut, Bright Nickel
  - **C** Knurled Nut, Bright Nickel w/Locking Ring
  - **D** Knurled Nut, Black
  - **E** Knurled Nut, Black w/Locking Ring
  - **F** Panel Dress, Bright Nickel
  - **G** Panel Dress, Bright Nickel w/Locking Ring
  - **H** Panel Dress, Black
  - **J** Panel Dress, Black w/Locking Ring
- **Push Button**
  - **1** No outer Panel Hardware
  - **2** Knurled Nut, Bright Nickel

## 10 LEGEND PLATE / BUTTON MARKING
- **Handle Actuator Legend Plate**
  - **B** ON - OFF Vertical
  - **C** ON - OFF Horizontal
- **Push-Pull Actuator Legend Plate**
  - **2** Rated Amps Horizontal
  - **3** Rated Amps Line Side Down
  - **4** Rated Amps Line Side Up

## 11 BUSHING COLOR
- **B** Black

## 12 AGENCY APPROVAL
- **T** UL 489A Listed

**Notes:**
1. Aux Switch only available with screw terminals
Notes:
1. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE ±.010 [.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".
M-Series Parallel Pole - Form & Fit Drawings

- PADDLE ACTUATOR STYLE -

1/2-32 THD. 12°
ON
12°
OFF
FLAT
.500 [12.70]

WITH LOCKING RING

WITHOUT LOCKING RING

- MOUNTING DETAILS -

LEGEND PLATES

0.25 [.64] 0.340 [8.64] 0.632 DIA [Ø16.05]

LEGEND CODE:

A B C

PANEL HARDWARE

625 [15.88] .680 DIA [Ø17.27] .180 [4.57]

HEX NUT

PANEL DRESS NUT

680 DIA [Ø17.27] .125 [3.18] .015 [0.38]

KNURLED NUT

LOCKING RING

- PUSH-PULL ACTUATOR STYLE -

3/8" 8-32 THD. .400 [10.16] ±.002 ±.05

ACTUATOR COLOR VISIBLE IN OFF POSITION ONLY

.500 [12.70] OFF (SHOWN) .280 [7.11] ON

MOUNTING DETAILS

.494 [12.55] .098 [2.49]

HEX NUT

SNAP-IN BUSHING

.534 [13.56]

PUSH-PULL, PUSH TO RESET

.625 [15.87] DIA

.435 [11.05] DIA

.534 [13.56]

PANEL DRESS NUT

BUTTON MARKING ORIENTATION

MARKING CODE: 2 3 4

.110QC AUXILIARY SWITCH TERMINALS

- NOTES -

1. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE ±.010 [.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".
2 ACTUATOR

Handle
M Padle
N Baton

Push Button
T Push-Pull
U Push To Reset

Push Button w/ Snap-In Mounting
V Push-Pull
W Push To Reset

4 CIRCUIT

without Auxiliary Switch
A Switch Only (no coil), Maintained Contacts
B Series Trip (Current)

with Auxiliary Switch, Silver Contacts
T Terminal Type
M Series Trip (Current) Aux Switch
P1 Switch Only, Maintained Contacts
Q1 Switch Only, Maintained Contacts
Q1L1 Switch Only, Maintained Contacts
S1 Series Trip (Current)
T1 Series Trip (Current)
T1L1 Series Trip, Maintained Contacts

with Auxiliary Switch, Gold Contacts

2M1 Switch Only, Maintained Contacts
3M1 Switch Only, Maintained Contacts
4M1 Series Trip (Current)
5M1 Series Trip, Maintained Contacts
9 Series Trip, Aux Switch

5 FREQUENCY & DELAY

03 DC 50/60Hz, Switch Only
10 DC Instantaneous
12 DC Short
14 DC Medium
20 50/60Hz Instantaneous
22 50/60Hz Short
24 50/60Hz Medium
30 DC, 50/60Hz Instantaneous

8 TERMINAL

1 Push-On 0.250 Tab (O.C.)
2 Screw 8-32 w/turned lug
3 Screw 8-32 (Bus Type)

8 ACTUATOR COLOR & LEGEND

Gloss Hande
Push-Button
Actuator Color

2 A
3 B
4 C
5 D
6 E
7 F
8 H

9 FRONT PANEL HARDWARE

Handle
Push-Button

1 No outer Panel Hardware
2 Rated Amps Horizontal
3 Rated Amps Line Side Down
4 Rated Amps Line Side Up

10 LEGEND PLATE / BUTTON MARKING

Handle Actuator Legend Plate (Actuator Styles M & N)
A No Legend Plate
B ON- OFF Vertical
C ON- OFF Horizontal
D I- O Vertical
E I- O Horizontal

Push-Pull Actuator Button Cap (Actuator Styles T & V)
1 No Marking
2 Rated Amps Horizontal
3 Rated Amps Line Side Down
4 Rated Amps Line Side Up

11 BUSHING COLOR

B Black

12 AGENCY APPROVAL

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

Notes:
1 One actuator is located in the center of each multi-pole breaker. Actuator codes V & W limited to single pole breakers only.
2 Switch Only circuits are not available with Push-To-Reset actuators. For Switch Only circuits, select Current Coil Rating from the above chart.
3 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 and Switch Only circuits.
4 Not available with back connect screw or push-in stud terminals.
5 Mates with AMP 0.058” diameter pin receptacles including 60983-1 (gold plated) and 60983-2 (tin plated).
6 Actuator color is only visible in the OFF position on Push-Pull actuators.
7 All units except snap-in mounting have one hex nut installed on bushing for use behind the panel.
8 Other colors available. Consult factory.
9 TUV and VDE Certification above 15 amps is for 2-pole only and is limited to a max. of 20 amps. Screw Terminal or Push-In Stud recommended above 20 amps.
10 Screw Terminals are VDE certified only with use of ring terminal attached to wire.
11 Terminal code A available with circuit codes A & B only.
12 Printed circuit board available with UL recognized approval only.
13 Auxiliary switch (flat QC) available with UL recognized approvals only.
### M-Series Handle/Pushbutton UL489A/UL Recognized – Ordering Scheme

#### 1 SERIES

**M**

- **B** Series Trip
- **14** DC Instantaneous
- **620** DC Short

#### 2 ACTUATOR

<table>
<thead>
<tr>
<th>Handle</th>
<th>Push Button</th>
<th>Push Button w/ Snap-In Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Paddle</td>
<td>N Baton</td>
</tr>
<tr>
<td>T</td>
<td>Push-Pull</td>
<td>U# Push To Reset</td>
</tr>
<tr>
<td>V</td>
<td>Push-Pull</td>
<td>W# Push To Reset</td>
</tr>
</tbody>
</table>

#### 3 POLES

| 1  | One |

#### 4 CIRCUIT

<table>
<thead>
<tr>
<th>B</th>
<th>Series Trip (Current)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Series Trip (Current)</td>
</tr>
<tr>
<td>S#</td>
<td>Series Trip (Current)</td>
</tr>
<tr>
<td>T#</td>
<td>Series Trip (Current)</td>
</tr>
<tr>
<td>U#</td>
<td>Series Trip, Maintained Contacts</td>
</tr>
<tr>
<td>G#</td>
<td>Series Trip, Maintained Contacts</td>
</tr>
<tr>
<td>9</td>
<td>Series Trip (Current)</td>
</tr>
</tbody>
</table>

#### 5 FREQUENCY & DELAY

- **10** DC Instantaneous
- **12** DC Short

#### 6 CURRENT RATING (AMPERES)

<table>
<thead>
<tr>
<th>Code</th>
<th>Ampères</th>
</tr>
</thead>
<tbody>
<tr>
<td>020</td>
<td>0.020</td>
</tr>
<tr>
<td>025</td>
<td>0.250</td>
</tr>
<tr>
<td>030</td>
<td>0.300</td>
</tr>
<tr>
<td>035</td>
<td>0.350</td>
</tr>
<tr>
<td>040</td>
<td>0.400</td>
</tr>
<tr>
<td>045</td>
<td>0.450</td>
</tr>
<tr>
<td>050</td>
<td>0.500</td>
</tr>
<tr>
<td>055</td>
<td>0.550</td>
</tr>
<tr>
<td>060</td>
<td>0.600</td>
</tr>
<tr>
<td>065</td>
<td>0.650</td>
</tr>
<tr>
<td>070</td>
<td>0.700</td>
</tr>
<tr>
<td>075</td>
<td>0.750</td>
</tr>
<tr>
<td>080</td>
<td>0.800</td>
</tr>
<tr>
<td>085</td>
<td>0.850</td>
</tr>
<tr>
<td>090</td>
<td>0.900</td>
</tr>
<tr>
<td>095</td>
<td>1.000</td>
</tr>
<tr>
<td>100</td>
<td>1.250</td>
</tr>
<tr>
<td>105</td>
<td>1.500</td>
</tr>
<tr>
<td>110</td>
<td>1.750</td>
</tr>
<tr>
<td>120</td>
<td>2.000</td>
</tr>
<tr>
<td>130</td>
<td>2.250</td>
</tr>
<tr>
<td>140</td>
<td>2.500</td>
</tr>
<tr>
<td>150</td>
<td>3.000</td>
</tr>
<tr>
<td>160</td>
<td>3.500</td>
</tr>
<tr>
<td>170</td>
<td>4.000</td>
</tr>
<tr>
<td>180</td>
<td>4.500</td>
</tr>
<tr>
<td>190</td>
<td>5.000</td>
</tr>
<tr>
<td>200</td>
<td>5.500</td>
</tr>
<tr>
<td>210</td>
<td>6.000</td>
</tr>
<tr>
<td>220</td>
<td>6.500</td>
</tr>
</tbody>
</table>

#### 7 TERMINAL

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

#### 8 ACTUATOR COLOR & LEGEND

<table>
<thead>
<tr>
<th>Gloss Handle</th>
<th>Push-Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>White</td>
</tr>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>D</td>
<td>Green</td>
</tr>
<tr>
<td>E</td>
<td>Blue</td>
</tr>
<tr>
<td>F</td>
<td>Yellow</td>
</tr>
<tr>
<td>G</td>
<td>Orange</td>
</tr>
</tbody>
</table>

#### 9 FRONT PANEL HARDWARE

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Front Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No Legend Plate</td>
</tr>
<tr>
<td>B</td>
<td>ON - OFF Vertical</td>
</tr>
<tr>
<td>C</td>
<td>ON - OFF Horizontal</td>
</tr>
<tr>
<td>D</td>
<td>I - O Vertical</td>
</tr>
<tr>
<td>E</td>
<td>I - O Horizontal</td>
</tr>
</tbody>
</table>

#### 10 LEGEND PLATE / BUTTON MARKING

<table>
<thead>
<tr>
<th>Legend Plate</th>
<th>Handle</th>
<th>Push-Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No Legend Plate</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Rated Amps Horizontal</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Rated Amps Line Side Down</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Rated Amps Line Side Up</td>
<td></td>
</tr>
</tbody>
</table>

#### 11 BUSHING COLOR

<table>
<thead>
<tr>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
</tr>
<tr>
<td>Black</td>
</tr>
</tbody>
</table>

#### 12 AGENCY APPROVAL

<table>
<thead>
<tr>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
</tr>
<tr>
<td>UL489A Listed, TUV Certified</td>
</tr>
<tr>
<td>M</td>
</tr>
<tr>
<td>UL Recognized, CSA Accepted</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>UL Recognized, TUV Certified</td>
</tr>
<tr>
<td>T</td>
</tr>
<tr>
<td>UL489A Listed</td>
</tr>
</tbody>
</table>

---

**Notes:**

1. One actuator is located in the center of each multi-pole breaker. Actuator codes V & W limited to single pole breakers only.
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 and Switch Only circuits.
3. Not available with Back Connected Screw or Push-In Stud terminals.
4. Screw terminals or Push-In Stud recommended above 20 amps.
5. Actuator color is only visible in OFF position on Push-Pull actuators.
6. All units have one hex nut installed on bushing for use behind the panel.
7. Other colors available. Consult factory.
8. Not available with UL489A Listed breakers.
9. TUV certified to 25 amps. UL Recognized, CSA Accepted and UL Listed to 30 amps.
10. Terminal code A available with circuit codes A & B only.
11. Printed circuit board available with UL recognized approval only.
12. Auxiliary switch (flat Q.C.) available with UL recognized approvals only.
### M-Series Handle – Circuit & Terminal Diagrams

#### SERIES TRIP

- **SWITCH ONLY**
- **SERIES TRIP W/ AUXILIARY SWITCH**

#### TERMINAL DIMENSIONAL DETAIL

- **TAB (O.C.) TERMINAL**
- **SCREW TERMINAL #8-32 WITH UPTURNED LUGS**
- **SCREW TERMINAL #8-32 BUS**
- **PUSH-IN STUD TERMINAL**

#### TABLE A

<table>
<thead>
<tr>
<th>TERMINAL DESCRIPTION</th>
<th>DEPTH BEHIND PANEL FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td></td>
</tr>
<tr>
<td>TAB (O.C.)</td>
<td>1.660 [44.69]</td>
</tr>
<tr>
<td>SCREW (#4-40)</td>
<td>1.630 [41.56]</td>
</tr>
<tr>
<td>PUSH-IN STUD</td>
<td>1.520 [38.62]</td>
</tr>
<tr>
<td>FLAT SOLDER LUG</td>
<td>1.910 [48.27]</td>
</tr>
</tbody>
</table>

| AUX. ** SWITCH**      |                          |
| DOUBLE SOLDER TURRET TYPE | 0.093 [2.36]          |
| ROUND QC TYPE        | 0.055 [1.40]            |
| FLAT QUICK CONNECT   | 0.125 [3.18]            |

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

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

### MULTI-POLE IDENTIFICATION SCHEME

- **SOLDER TURRET AND ROUND QC AUX SWITCH TERMINALS**
- **FLAT QC AND SOLDER LUG AUX SWITCH TERMINALS**

#### Notes:
1. All dimensions are in inches [millimeters].
**M-Series Handle – PC Terminal Diagrams**

**Handle Type Shown Without Aux. Switch**

**Notes:**
1. All dimensions are in inches [millimeters].
2. Tolerance ±0.020 [0.51] unless otherwise specified.

**Handle Type Shown With Aux. Switch**

**Table A**

<table>
<thead>
<tr>
<th>Terminal Description</th>
<th>Depth Behind Panel Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN PRINTED CIRCUIT BOARD</td>
<td>1.057 [26.93]</td>
</tr>
<tr>
<td>AUX PRINTED CIRCUIT BOARD</td>
<td>2.449 [62.10]</td>
</tr>
</tbody>
</table>

*Depth includes behind panel hex nut as supplied on all units.*
**Notes:**

1. All dimensions are in inches [millimeters].
M-Series Pushbutton – Circuit & Terminal Diagrams

**Notes:**

1. All dimensions are in inches [millimeters].
2. Tolerance ±0.020 [0.51] unless otherwise specified.

---

**TABLE A**

<table>
<thead>
<tr>
<th>TERMINAL DESCRIPTION</th>
<th>DEPTH BEHIND PANEL FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td></td>
</tr>
<tr>
<td>TAB (Q.C.)</td>
<td>1.062 [27.00]</td>
</tr>
<tr>
<td>SCREW (M-32)</td>
<td>1.000 [25.40]</td>
</tr>
<tr>
<td>PUSH-IN STUD</td>
<td>2.032 [51.60]</td>
</tr>
<tr>
<td>AUX. ** SWITCH**</td>
<td></td>
</tr>
<tr>
<td>DOUBLE SOLDER TURRET TYPE</td>
<td>2.057 [52.19]</td>
</tr>
<tr>
<td>ROUND QUICK CONNECT</td>
<td>2.037 [51.61]</td>
</tr>
<tr>
<td>FLAT QUICK CONNECT</td>
<td>2.033 [51.60]</td>
</tr>
<tr>
<td>FLAT SOLDER LUG</td>
<td>2.074 [52.69]</td>
</tr>
</tbody>
</table>

*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.**

---

**MULTI-POLE IDENTIFICATION SCHEME**

<table>
<thead>
<tr>
<th>SOLDER TURRET AND ROUND QC AUX SWITCH TERMINALS</th>
<th>FLAT QC AND SOLDER LUG AUX SWITCH TERMINALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLE 1</td>
<td>POLE 1</td>
</tr>
<tr>
<td>POLE 2</td>
<td>POLE 2</td>
</tr>
<tr>
<td>LOAD</td>
<td>LOAD</td>
</tr>
<tr>
<td>LINE</td>
<td>LINE</td>
</tr>
</tbody>
</table>
**Notes:**

1. All dimensions are in inches [millimeters].
2. Tolerance +0.20 [0.51] unless otherwise specified.
3. Available with Push-Pull or Push-to-Reset Actuators.
M-Series Push-Pull – PC Terminal Drawings

PUSH-PULLTYPE SHOWN WITHOUT AUX. SWITCH

PUSH-PULL TYPE SHOWN WITH AUX. SWITCH

Notes:
1. All dimensions are in inches [millimeters].
2. Tolerance ±.020 [0.51] unless otherwise specified.

TABLE A

<table>
<thead>
<tr>
<th>TERMINAL DESCRIPTION</th>
<th>DEPTH BEHIND PANEL FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>2.219 [56.4]</td>
</tr>
<tr>
<td>AUX SWITCH</td>
<td>2.511 [63.7]</td>
</tr>
</tbody>
</table>

*DEPTH INCLUDES BEHIND PANEL, HEX NUT AS SUPPLIED ON ALL UNITS
M-Series Rocker UL Recognized – Ordering Scheme

1 SERIES

2 ACTUATOR

Non-Illuminated

<table>
<thead>
<tr>
<th>Single Color</th>
<th>Two Color</th>
<th>Illuminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Angled</td>
<td>B</td>
</tr>
</tbody>
</table>

7 TERMINAL

1 | Push-On 0.250 Tab (Q.C.) | A | Push-In Stud |
2 | Screw 8-32 w/terminal lugs | D | Printed Circuit Board |
3 | Screw 8-32 (Bus Type) | G |

8 ROCKER ILLUMINATION

Non-Illuminated

A

Neon

LED

with resistor, 120VAC/250VAC

without resistor

B

C

D

E

F

G

H

I

J

K

L

M

with resistor, 4-8 VDC

with resistor, 9-16 VDC

Amber

White

Black

Orange

Green

Red

Blue

Yellow

Gray

Visi-Rocker

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 |

9 ACTUATOR & LEGEND COLOR

Solid Color | Actuator
---|---
A | Legend
White | Black
Black | White
Red | White
Green | White
Blue | White
Yellow | Black
Black | Black
Orange | Black

Visi-Rocker

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

A

B

C

D

E

F

G

H

I

J

K

L

M

Legend

Clear |
Red Transparent |
Green Transparent |
Amber Transparent |
Smoke Grey Transparent |
White Translucent |
Black

10 LEGEND

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

11 BEZEL COLOR / STYLE

Color | without Rockerguard | with Rockerguard
---|---|---
White | A | 1
Black | B |
Gray | G |

12 AGENCY APPROVAL

D | UL Recognized & CSA Accepted
E | VDE Certified, UL Recognized & CSA Accepted
TUV Certified, UL Recognized & CSA Accepted
M A 1 - B 14 - 620 - 1 - A 1 6 - 2 - J

1 SERIES

M

2 ACTUATOR1

Non-Illuminated

Single Color

A Angled

Flat

Two Color

E Indicate ON

B Indicate OFF

Visi-Rocker

G Flat

Illuminated

F Angled

3 POLES

1 One

4 CIRCUIT2

without Auxiliary Switch

B Series Trip (Current)

with Auxiliary Switch, Silver Contacts

M Series Trip (Current) Aux Switch

T Series Trip (Current) Aux Switch

with Auxiliary Switch, Gold Contacts

M Series Trip (Current) Aux Switch

5 FREQUENCY & DELAY

14 DC Medium

12 DC Short

6 CURRENT RATING (AMPERES)3

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 6.000 618 18.000

075 0.075 280 0.800 465 6.500 620 20.000

080 0.080 285 0.850 470 7.000 622 22.000

085 0.085 290 0.900 475 7.500 624 24.000

090 0.090 295 0.950 480 8.000 625 25.000

095 0.095 300 1.000 485 8.500 630 30.000

100 0.100 305 1.250 490 9.000

110 0.110 310 1.500 495 9.500

120 0.200 517 1.750 610 10.000

Notes:

1 One actuator is located in the center of each multi-pole breaker.

2 Auxiliary Switch is supplied per breaker. Auxiliary Switch option limited to Series Trip & Switch Only circuits, and is not available in single pole illuminated breakers, or with Black Connected Screw or Push-In Stud terminals.

3 Mates with AMP .085" diameter pin receptacles: 60883-1 (gold plated) & 60883-1 (tin plated).

4 For neon bulb applications at 120VAC @ 25K, 1/4 WATT and for 250VAC applications @ 120K, 1/4 WATT, external resistors must be supplied by customer.

5 For LED (DC or rectified AC) applications, LED is mounted in the center of the rocker actuator with electrical characteristics as follows: 100 milliamperes at 20mA; Maximum power dissipation = 75mW at 25°C; Maximum forward current = 25mA; Typical forward voltage = 2.1V at 20mA; Typical reverse current = 100µA at 5V. Customer supplies the proper external resistor limiting current to these values.

6 Visi-Rocker breakers, Visi portion of rocker cannot be the same color as the bezel.

7 Rocker color for LED's and green neon lamp must be clear, smoke gray, white translucent or match color of LED or neon lamp.

8 Other colors available. Consult factory.

9 TUV Certified to 25 amps. UL Recognized, CSA Accepted and UL489A Listed to 30 amps. Screw Terminals recommended above 20 amps.

10 UL489A Listed must have ON-OFF or Dual legends. TUV Certified approvals must have I-O Dual legends.

11 Terminal code A available with circuit codes A & B only.

12 Printed circuit board available with UL recognized approval only.

13 Auxiliary switch (flat Q.C.) available with UL recognized approvals only.

7 TERMINAL3

1 Push-On 0.250 Tab (O.C.)

7 Screw 8-32 w/upturned lugs

3 Screw 8-32 (Bus Type)

8 ILLUMINATION

Non-Illuminated

Neon

LED4

without resistor, 120VAC/250VAC

B C

Red

Green

Amber

with resistor, 4-8 VDC

D G K

with resistor, 9-16 VDC

E H L

F J M

9 ACTUATOR & LEGEND COLOR

Solid Color

Actuator

Legend

A Clear

Orange

Yellow

Grey

White

B Red

Blue

Black

Gray

C Transparent

White

Orange

Black

D Amber Transparent

White

Yellow

Black

E Smoke Grey Transparent

White

Red

Black

F White Translucent

Black

10 LEGEND10

1 No Legend (Single Color or Illuminated Options Only)

2 ON-OFF Vertical

3 ON-OFF Horizontal

4 I-O Vertical

5 I-O Horizontal

6 Dual Vertical

7 Dual Horizontal

11 BEZEL COLOR / STYLE8

Color

without Rockerguard with Rockerguard

White

A

Black

B

Gray

G

12 AGENCY APPROVAL8

J UL489A Listed & TUV Certified

M UL Recognized & CSA Accepted

N TUV Certified, UL Recognized & CSA Accepted

T UL489A Listed

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Email: sales@carlingtech.com • www.carlingtech.com
Notes:
1. All dimensions are in inches [millimeters].
3. 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 [0.51] unless otherwise specified.
ONE POLE
SINGLE POLE / ROCKER BREAKERS SHOWN WITH DOUBLE SOLDER TURRET AND ROUND QC AUX.SWITCH TERMINALS

<table>
<thead>
<tr>
<th>ROCKER AND AUXILIARY SWITCH OPTIONS</th>
<th>VISOR-OFF AND SINGLE COLOR (NON-ILLUMINATED) ROCKER OPTIONS WITH AUXILIARY SWITCH</th>
<th>VISION ROCKER WITH AUXILIARY SWITCH</th>
<th>ALL-ROCKER OPTIONS WITHOUT AUXILIARY SWITCH</th>
<th>ILLUMINATED ROCKERS WITHOUT AUXILIARY SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD</td>
<td>LOAD</td>
<td>LOAD (VIS-ON)</td>
<td>LOAD (VIS-ON)</td>
<td>LOAD (SINGLE COLOR)</td>
</tr>
<tr>
<td>LINE</td>
<td>LINE</td>
<td>LINE (SINGLE COLOR)</td>
<td>LINE (SINGLE COLOR)</td>
<td>LINE (SINGLE COLOR)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ROCKER AND AUXILIARY SWITCH OPTIONS</th>
<th>VISOR-OFF AND SINGLE COLOR (NON-ILLUMINATED) ROCKER OPTIONS WITH AUXILIARY SWITCH</th>
<th>VISION ROCKER WITH AUXILIARY SWITCH</th>
<th>110 QC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD</td>
<td>LOAD</td>
<td>LOAD</td>
<td>7 WSG</td>
</tr>
<tr>
<td>LINE</td>
<td>LINE</td>
<td>LINE</td>
<td>8.15 W</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ROCKER AND AUXILIARY SWITCH OPTIONS</th>
<th>SINGLE COLOR AND VISOR-OFF (ILLUMINATED AND NON-ILLUMINATED) ROCKER OPTIONS WITH AUXILIARY SWITCH</th>
<th>VISION ROCKER WITH AUXILIARY SWITCH</th>
<th>ALL-ROCKER OPTIONS WITHOUT AUXILIARY SWITCH</th>
<th>ILLUMINATED ROCKERS WITHOUT AUXILIARY SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD</td>
<td>LOAD</td>
<td>LOAD (VIS-ON)</td>
<td>LOAD (VIS-ON)</td>
<td>LOAD (VIS-ON)</td>
</tr>
<tr>
<td>LINE</td>
<td>LINE</td>
<td>LINE (VIS-ON)</td>
<td>LINE (VIS-ON)</td>
<td>LINE (VIS-ON)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ROCKER AND AUXILIARY SWITCH OPTIONS</th>
<th>SINGLE COLOR AND VISOR-OFF (ILLUMINATED AND NON-ILLUMINATED) ROCKER OPTIONS WITH AUXILIARY SWITCH</th>
<th>VISION ROCKER WITH AUXILIARY SWITCH</th>
<th>POLE DESIGNATIONS FOR HORIZONTAL MOUNTING (END-ALL ROCKER STYLES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD</td>
<td>LOAD</td>
<td>LOAD (VIS-ON)</td>
<td>POLE 1</td>
</tr>
<tr>
<td>LINE</td>
<td>LINE</td>
<td>LINE (VIS-ON)</td>
<td>POLE 2</td>
</tr>
</tbody>
</table>

60 Johnson Avenue • Plainville, CT 06062 • Phone: (860) 793–9281 • Fax: (860) 793–9231
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### M-Series Circuit Breaker - Time Delay Curve

#### Dual Rated AC/DC

**Notes:**

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

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**M-Series Time Delay Values**

<table>
<thead>
<tr>
<th>TRIP TIME (SECONDS)</th>
<th>DELAY CURVES</th>
<th>100%</th>
<th>135%</th>
<th>200%</th>
<th>400%</th>
<th>600%</th>
<th>800%</th>
<th>1000%</th>
<th>1200%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10, 20, 30</td>
<td>No Trip</td>
<td>1000</td>
<td>.100 Max</td>
<td>.100 Max</td>
<td>.100 Max</td>
<td>.100 Max</td>
<td>.100 Max</td>
<td>.100 Max</td>
<td>.100 Max</td>
</tr>
<tr>
<td>12, 22, 32, 62, 72, 92</td>
<td>No Trip</td>
<td>.200 - 7.00</td>
<td>.200 - 5.00</td>
<td>.100 - 2.00</td>
<td>.030 - .500</td>
<td>.008 - .300</td>
<td>.006 - .150</td>
<td>.005 - .100</td>
<td>.005 - .100</td>
</tr>
<tr>
<td>14, 24, 34, 64, 74, 94</td>
<td>No Trip</td>
<td>3.00 - 70.0</td>
<td>2.00 - 40.0</td>
<td>1.00 - 15.0</td>
<td>.100 - .400</td>
<td>.008 - 2.00</td>
<td>.006 - .600</td>
<td>.005 - .350</td>
<td>.005 - .160</td>
</tr>
</tbody>
</table>

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**Graphs:**

1. **Instantaneous**
   - Graph showing the response of the circuit breaker under instantaneous conditions.
2. **Short**
   - Graph showing the response of the circuit breaker under short delay conditions.
3. **Short D2**
   - Graph showing the response of the circuit breaker under short D2 delay conditions.
4. **Medium**
   - Graph showing the response of the circuit breaker under medium delay conditions.
5. **Medium D4**
   - Graph showing the response of the circuit breaker under medium D4 delay conditions.