

# General Specifications

## Electrical Capacity (Resistive Load)

|                                              |                                                                                           |
|----------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Power Level (silver):</b>                 | 3A @ 125V AC                                                                              |
| <b>Logic Level (gold):</b>                   | 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)            |
| <b>Logic/Power Level: (gold over silver)</b> | Combines silver & gold ratings                                                            |
|                                              | Note: Find additional explanation of dual rating & operating range in Supplement section. |

## Other Ratings

|                                 |                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Contact Resistance:</b>      | 20 milliohms maximum for silver; 30 milliohms maximum for gold                                                             |
| <b>Insulation Resistance:</b>   | 1,000 megohms minimum @ 500V DC                                                                                            |
| <b>Dielectric Strength:</b>     | 1,000V AC minimum between contacts for 1 minute minimum;<br>1,500V AC minimum between contacts & case for 1 minute minimum |
| <b>Mechanical Life:</b>         | 200,000 operations minimum                                                                                                 |
| <b>Electrical Life:</b>         | 25,000 operations minimum for silver; 100,000 operations minimum for gold                                                  |
| <b>Nominal Operating Force:</b> | Single pole 2.45N; double pole 3.92N                                                                                       |
| <b>Travel</b>                   | Pretravel .024" (0.6mm); Overtravel .016" (0.4mm); Total Travel .039" (1.0mm)                                              |

## Materials & Finishes

|                             |                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Plunger:</b>             | Brass with nickel plating                                                                                                   |
| <b>Bushing:</b>             | Brass with nickel plating                                                                                                   |
| <b>Frame:</b>               | Stainless steel                                                                                                             |
| <b>Case:</b>                | Polybutylene terephthalate (PBT) (UL94V-0)                                                                                  |
| <b>Base:</b>                | Diallyl phthalate resin (UL94V-0)                                                                                           |
| <b>Movable Contactor:</b>   | Phosphor bronze with silver or gold plating                                                                                 |
| <b>Movable Contacts:</b>    | Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)                        |
| <b>Stationary Contacts:</b> | Silver alloy with silver plating (code W); copper or brass with gold plating (code G); or silver with gold plating (code A) |
| <b>Terminals:</b>           | Copper or brass with silver plating; copper or brass with gold plating                                                      |

## Environmental Data

|                              |                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating Temp Range:</b> | -30°C through +85°C (-22°F through +185°F)                                                                                                   |
| <b>Humidity:</b>             | 90 ~ 95% humidity for 96 hours @ 40°C (104°F)                                                                                                |
| <b>Vibration:</b>            | 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours |
| <b>Shock:</b>                | 50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 3 shocks in each direction)                               |

## Installation

|                                |                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mounting Torque:</b>        | 1.5Nm (13.0 lb•in) for double nut; 0.7Nm (6.0 lb•in) for single nut                                                                       |
| <b>Cap Installation Force:</b> | 80.0N (18.0 lbf) maximum downward force on actuator                                                                                       |
| <b>Soldering:</b>              | Wave Soldering (PC version): See Profile B in Supplement section.<br>Manual Soldering: See Profile B in Supplement section.               |
| <b>Cleaning:</b>               | These devices are not process sealed. Hand clean locally using alcohol based solution. See Cleaning Specifications in Supplement section. |

## Standards & Certifications

|                                |                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flammability Standards:</b> | UL94V-0 case & base                                                                                                                                                                                                                                                                                                     |
| <b>UL:</b>                     | <b>File No. E44145 - Recognized only when ordered with marking on switch.</b><br>Add "/U" or "/CUL" before dash in part number to order UL recognized switch.<br>All single and double pole models recognized at 3A @ 125V AC or 0.4VA max. @ 28V DC max.                                                               |
| <b>CSA:</b>                    | <b>File No. 023535_0_000 - Certified only when ordered with marking on switch.</b><br>Add "/C" before dash in part number to order CSA certified switch.<br>Single pole models with PC, solder lug, or Wirewrap terminals & double pole with PC or Wirewrap terminals certified at 3A @ 125V AC or 0.4VA @ 28V maximum. |

## Distinctive Characteristics

Snap-acting mechanism gives smooth actuation, short stroke, light touch, and audible feedback. This mechanism also provides long mechanical life.

High torque bushing construction prevents rotation or separation from frame during installation.

Antijamming design protects contacts from damage due to excessive downward force on the actuator.

Compatible companions with M series toggles. Body, bushing, and footprint dimensions ideal for mounting MB2400 pushbuttons and M toggles next to one another.

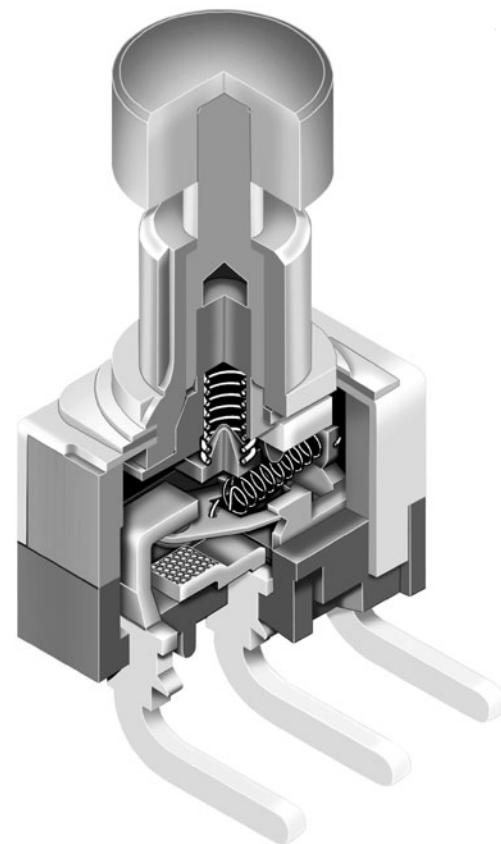
Stainless steel frame resists corrosion.

Longer center solder lug terminal simplifies wiring and soldering.

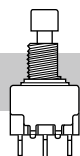
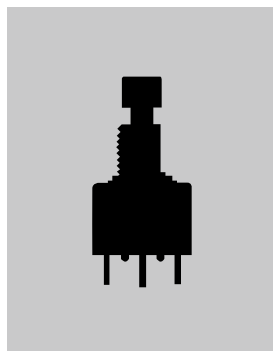
Silver contacts of specially composed alloy for hardness.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Prominent external insulating barriers increase insulation resistance and dielectric strength.

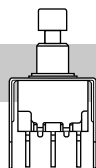


Actual Size



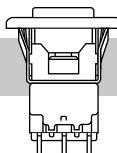
Bushing Mount

Page C98



Bracket PC Mount

Page C102



Snap-in Mount

Page C108

### TYPICAL SWITCH ORDERING EXAMPLE

**MB24**

**11**

**E1**

**W**

**01**

**F**

**A**

#### Poles & Circuits

|           |      |    |      |
|-----------|------|----|------|
| <b>11</b> | SPDT | ON | (ON) |
| <b>61</b> | DPDT | ON | (ON) |

( ) = Momentary

#### Contact Materials & Ratings

|          |                                                                          |
|----------|--------------------------------------------------------------------------|
| <b>W</b> | Silver<br>Rated 3A @ 125V AC                                             |
| <b>G</b> | Gold<br>Rated 0.4VA max @<br>28V AC/DC max                               |
| <b>A</b> | Gold over Silver<br>Rated 3A @ 125V AC<br>& 0.4VA max @ 28V<br>AC/DC max |

#### Caps

|          |                           |
|----------|---------------------------|
| <b>F</b> | .201" (5.1mm)<br>Diameter |
| <b>H</b> | .295" (7.5mm)<br>Diameter |

#### Bushings

|           |                                        |
|-----------|----------------------------------------|
| <b>E1</b> | .285" (7.24mm)<br>Threaded with D Flat |
| <b>E2</b> | .285" (7.24mm)<br>Smooth with D Flat   |
| <b>A1</b> | .280" (7.1mm)<br>Threaded with Keyway  |
| <b>A2</b> | .280" (7.1mm)<br>Smooth with Keyway    |
| <b>S1</b> | .350" (8.9mm)<br>Threaded with Keyway  |
| <b>S2</b> | .350" (8.9mm)<br>Smooth with Keyway    |

#### Terminals

|           |                            |
|-----------|----------------------------|
| <b>01</b> | Solder Lug *               |
| <b>03</b> | .250" (6.35mm) Straight PC |
| <b>05</b> | .425" (10.8mm) Wirewrap    |
| <b>06</b> | .750" (19.05mm) Wirewrap   |
| <b>07</b> | .964" (24.5mm) Wirewrap    |

#### Cap Colors

|          |       |
|----------|-------|
| <b>A</b> | Black |
| <b>B</b> | White |
| <b>C</b> | Red   |

\* Wire harness & cable assemblies offered only in Americas

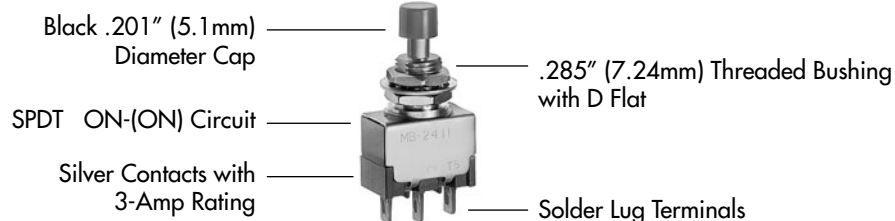
#### IMPORTANT:



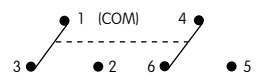
Switches are supplied without UL, cULus & CSA marking unless specified. **UL, cULus & CSA recognized only when ordered with marking on the switch.** Specific models, ratings, & ordering instructions are noted on General Specifications page.

#### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**MB2411E1W01-FA**



## POLES & CIRCUITS

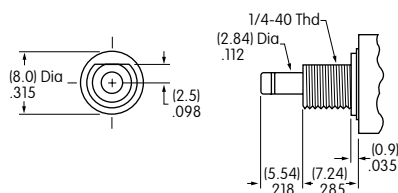
| Pole | Model  | Plunger Position<br>( ) = Momentary                                                         |                                                                                           | Connected Terminals                                                                          |                                                                                           | Throw & Switch Schematics                                                                   |
|------|--------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|      |        | Normal<br> | Down<br> | Normal<br>  | Down<br> |                                                                                             |
| SP   | MB2411 | ON<br>     | (ON)                                                                                      | 1-3<br>     | 1-2                                                                                       | SPDT<br> |
| DP   | MB2461 | ON                                                                                          | (ON)                                                                                      | 1-3 4-6<br> | 1-2 4-5                                                                                   | DPDT<br> |

Note: Terminal numbers are not actually on the switch.

## BUSHINGS

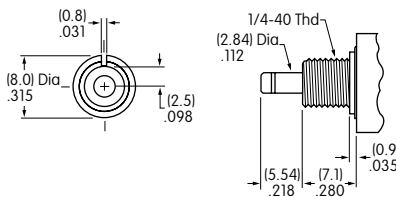
Note: Plunger selection is not required for MB2400 pushbuttons. The plunger can be used with or without a cap.

### E1 .285" (7.24mm) Threaded with D Flat



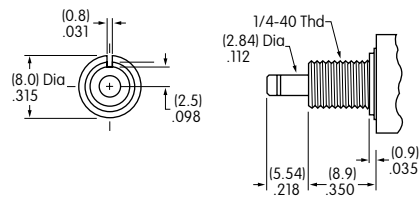
Maximum Panel Thickness with  
Standard Hardware: .068" (1.74mm)

### A1 .280" (7.1mm) Threaded with Keyway



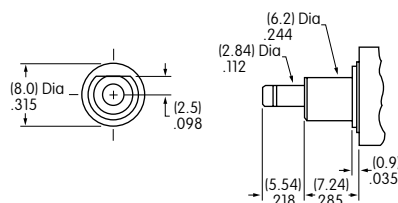
Maximum Panel Thickness with  
Standard Hardware: .068" (1.74mm)

### S1 .350" (8.9mm) Threaded with Keyway

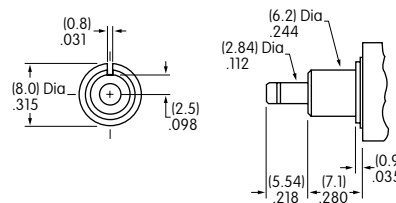


Maximum Panel Thickness with  
Standard Hardware: .134" (3.40mm)

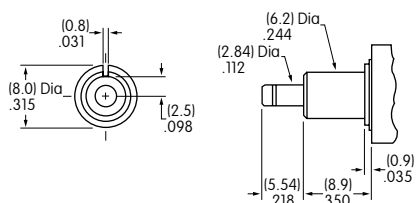
### E2 .285" (7.24mm) Smooth with D Flat



### A2 .280" (7.1mm) Smooth with Keyway

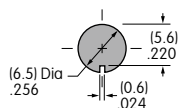


### S2 .350" (8.9mm) Smooth with Keyway

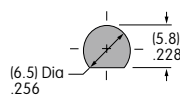


## Panel Cutouts

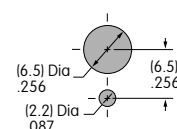
For A1, A2, S1, or S2 Bushing  
with Keyway



For E1 or E2 Bushing  
with D Flat



With  
Optional Locking Ring



Standard hardware includes 2 hex nuts & 1 lockwasher.  
Hardware is illustrated following the Typical Switch Dimension drawings.

### CONTACT MATERIALS & RATINGS

**W**

Silver over Silver

Power Level

3A @ 125V AC

**G**

Gold over Brass or Copper

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

**A**

Gold over Silver

 Power Level  
or Logic Level

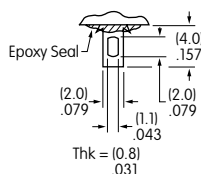
 3A @ 125V AC  
or 0.4VA maximum @ 28V AC/DC maximum

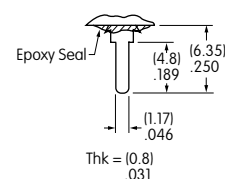
Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.

### TERMINALS

**01**

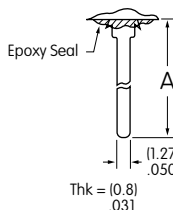
Solder Lug


**03**

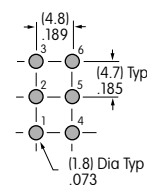
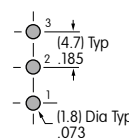
 .250" (6.35mm)  
Straight PC


Wirewrap or Extended PC

**05**

 .425"  
(10.8mm)

**06**

 .750"  
(19.05mm)

 Refer to footprints if using  
as extended PC terminal.

**07**

 .964"  
(24.5mm)

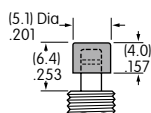
 Dimension A = terminal  
lengths as shown beside  
the code boxes at left.

Single Pole

Double Pole

### CAPS & CAP COLORS

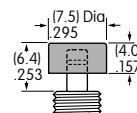
**F**

 AT475  
.201" (5.1mm)  
Diameter Cap


Material: Polyamide

Finish: Glossy


**H**

 AT496  
.295" (7.5mm)  
Diameter Cap


Material: Polyamide

Finish: Glossy


 Cap Colors  
Available:

**A**

Black

**B**

White

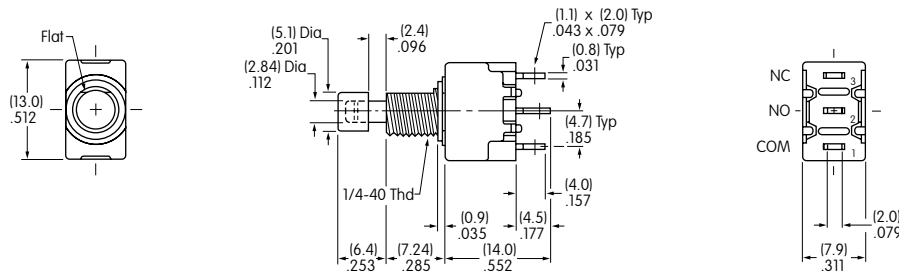
**C**

Red

## TYPICAL SWITCH DIMENSIONS

### Single Pole

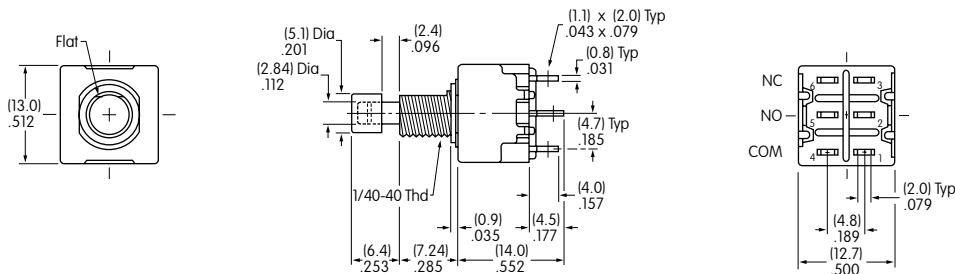
### Solder Lug



MB2411E1W01-FA

### Double Pole

### Solder Lug



MB2461E1W01-FA

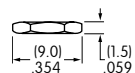
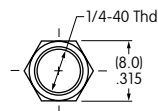
## HARDWARE

### Standard Hardware

#### AT513H Inch Threaded Hexagon Nut

2 included with each switch

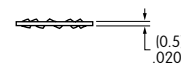
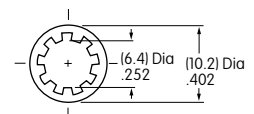
Material:  
Brass with Nickel Plating



#### AT509 Lockwasher

1 included with each switch

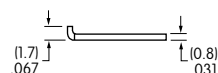
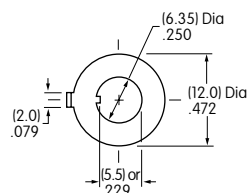
Material:  
Steel with Zinc/Chromate



### Optional Hardware

#### AT507H Locking Ring for A1 or S1 Bushing

Material:  
Steel with Zinc/Chromate



#### AT515 Locking Ring for E1 Bushing

Material:  
Steel with Zinc/Chromate

