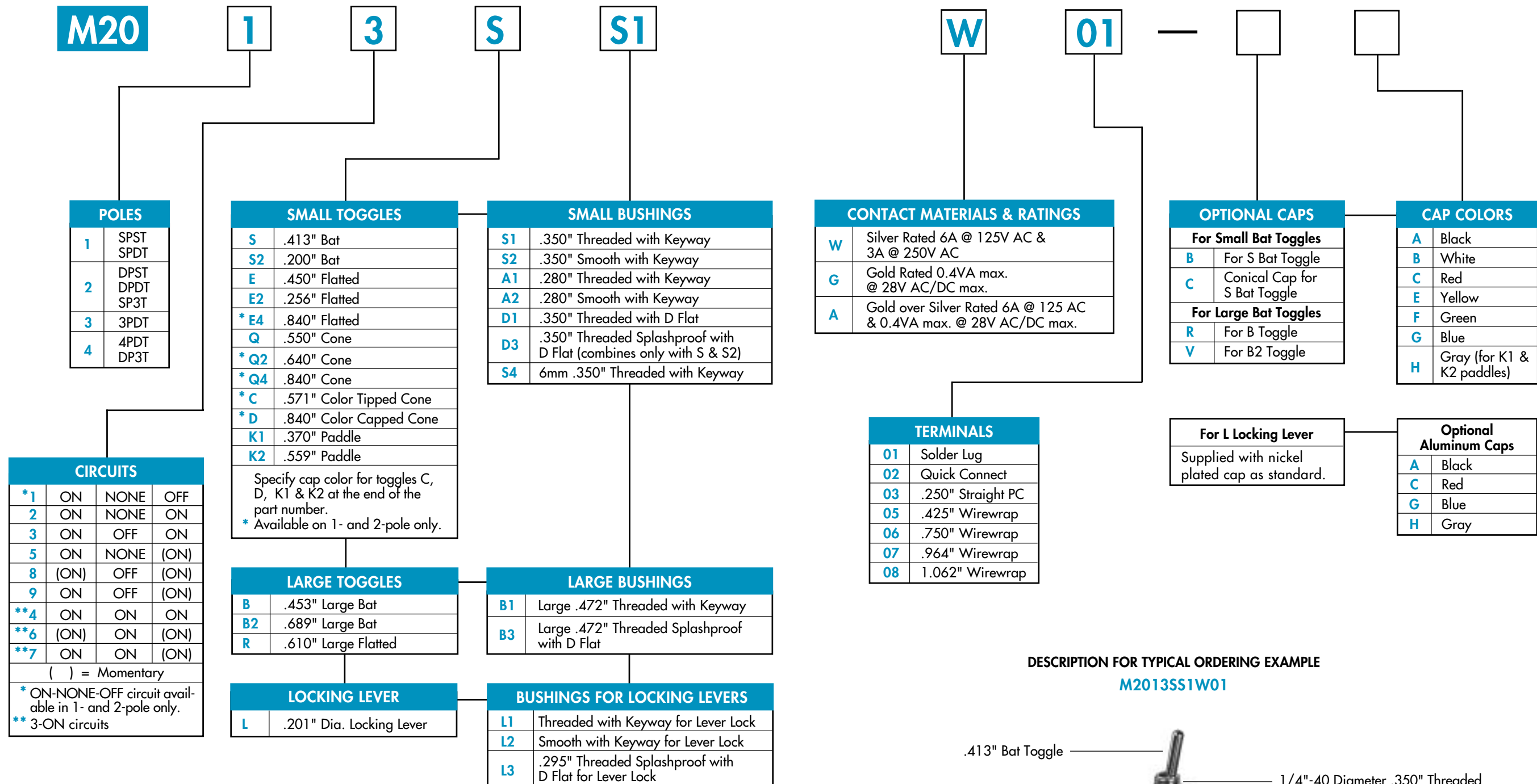
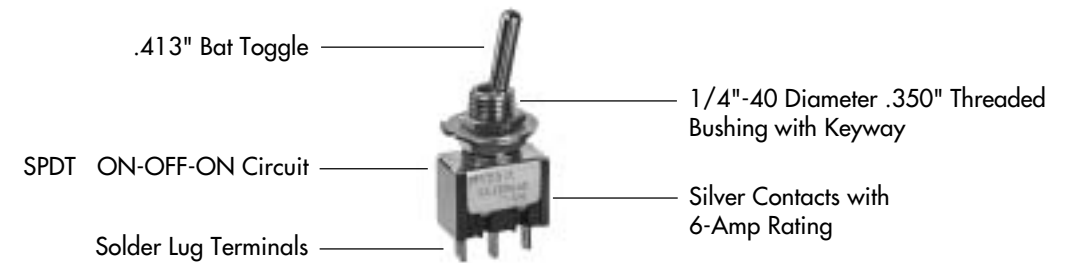


## TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE  
**M2013SS1W01**



**IMPORTANT:**  
Switches are supplied without UL & CSA marking unless specified. Specific models & ratings noted on General Specifications page.

## GENERAL SPECIFICATIONS

### Electrical Capacity (Resistive Load)

- Power Level (code W):** 6A @ 125V AC & 3A @ 250V AC or  
4A @ 30V DC for On-None-On & On-None-Off; 3A @ 30V DC for all other circuits
- Logic Level (code G):** 0.4VA maximum @ 28V AC/DC maximum
- Logic/Power Level (code A):** Combines W & G ratings
- Note: See Supplement Index (page Z1) to find explanation of dual rating and operating range.

### Other Ratings

- Contact Resistance:** 10 milliohms maximum for silver; 20 milliohms maximum for gold
- Insulation Resistance:** 1,000 megohms minimum @ 500V DC
- Dielectric Strength:** 1,000V AC minimum between contacts; 1,500V AC minimum between contacts and case
- Mechanical Life:** 100,000 operations minimum;  
50,000 operations minimum for flat, locking, & splashproof devices
- Electrical Life:** 25,000 operations minimum for silver; 50,000 operations minimum for gold;  
50,000 operations minimum for silver at 3A @ 125V AC
- Nominal Operating Force:** 400 grams for Single Pole                      450 grams for Double Pole  
700 grams for Three Pole                                      800 grams for Four Pole
- Angle of Throw:** 25°

### Materials & Finishes

- Toggle:** Brass with chrome plating
- Bushing:** Brass with nickel plating
- Frame:** Stainless steel
- Case:** Diallyl phthalate resin
- Movable Contactor:** Phosphor bronze with silver or gold plating
- Movable Contacts:** Silver alloy (code W); copper with gold plating over nickel plating (code G); or  
silver alloy with gold plating over nickel plating (code A)
- Stationary Contacts:** Silver with silver plating (code W); copper or brass with gold plating  
over nickel plating (code G); or silver with gold plating over nickel plating (code A)
- Terminals:** Copper or brass with silver plating; or copper or brass with gold plating over nickel

### Environmental Data

- Operating Temp Range:** -30°C through +85°C (-22°F through +185°F)
- Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration:** 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
- Shock:** 50g acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
- Sealing:** D3 bushing option equivalent to IP67







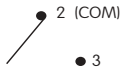

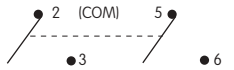

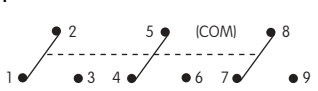

### Installation

- Mounting Torque:** 15kgf/cm (13lb/in) for double nut; 7kgf/cm (6lb/in) for single nut
- Soldering Time & Temperature:** 3 seconds @ 350°C or 5 seconds @ 270°C
- Process Seal:** Not available

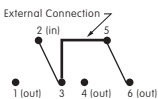
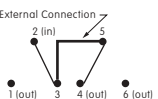
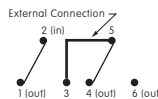
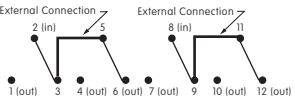
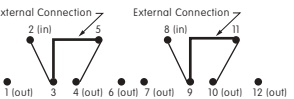
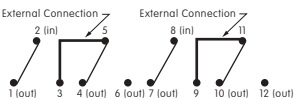
### Standards & Certifications

- Flammability Standards:** UL94V-0 available
- UL Recognized:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or  
0.4A maximum @ 28V DC maximum; UL File No. E44145
- CSA Certified:** All models certified at 6A @ 125V AC or 3A @ 250V AC or  
0.4VA @ 28V maximum; CSA File No. LR23535

### POLES & CIRCUITS

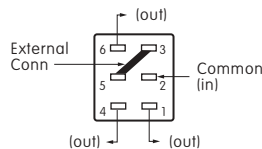
		Toggle Position ( ) = Momentary			Connected Terminals			Throw & Schematics
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch. * Reverse circuits available upon request.
SP	M2011	ON	NONE	OFF	2-3	OPEN	OPEN	SPST 
SP	M2012 M2013 M2015* M2018 M2019*	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3	OPEN	2-1	SPDT 
DP	M2021	ON	NONE	OFF	2-3 5-6	OPEN	OPEN	DPST 
DP	M2022 M2023 M2025* M2028 M2029*	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6	OPEN	2-1 5-4	DPDT 
3P	M2032 M2033 M2035 M2038 M2039	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT 
4P	M2042 M2043 M2045 M2048 M2049	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9 11-12	OPEN	2-1 5-4 8-7 11-10	4PDT 

### For 3 Throw (3-On)

Pole	Model	Down	Center	Up	Connected Terminals & Schematics
SP	M2024 M2026 M2027	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6  2-3 5-4  2-1 5-4
DP	M2044 M2046 M2047	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6 8-9 11-12  2-3 5-4 8-9 11-10  2-1 5-4 8-7 11-10

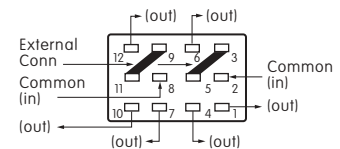
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

External connection must be made during field installation.



### SMALL TOGGLES

**Important:**

Toggle length changes based on bushing selected. All illustrations are shown with .350" long bushing. When using a .280" long bushing, toggle length increases .070".

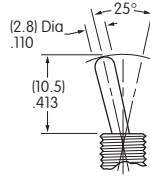
**Standard Material & Finish:**

Brass with Bright Chrome

**Optional Finishes:**

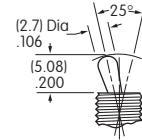
Contact factory for satin chrome or black.

**S** .413" Bat

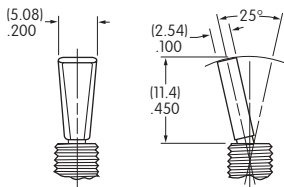


Optional caps on page B13

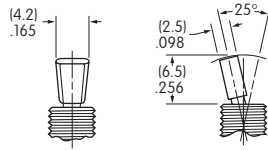
**S2** .200" Bat



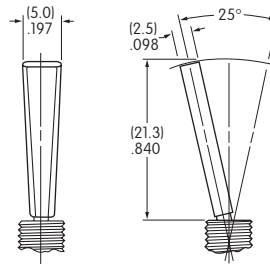
**E** .450" Flatted



**E2** .256" Flatted

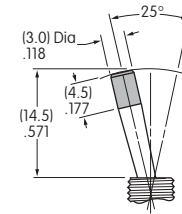


**E4** .840" Flatted



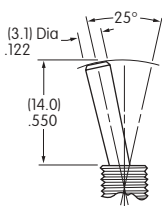
Only Available in 1- & 2-Pole

**C** .571" Color Tipped Cone  
Supplied with Cap AT445  
Polycarbonate

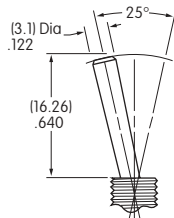


Only Available in 1- & 2-Pole

**Q** .550" Cone

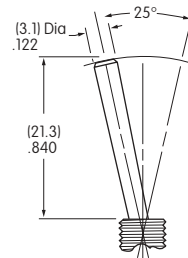


**Q2** .640" Cone



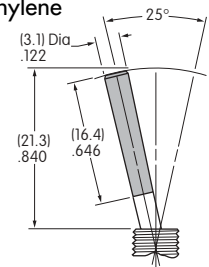
Only Available in 1- & 2-Pole

**Q4** .840" Cone



Only Available in 1- & 2-Pole

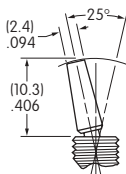
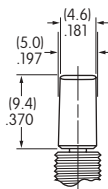
**D** .840" Color Capped Cone  
Supplied with Cap AT460  
Polyethylene



Only Available in 1- & 2-Pole

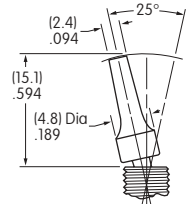
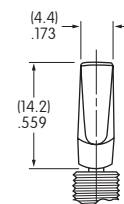
**K1** .370" Paddle  
Supplied with Cap AT467

Nylon



**K2** .559" Paddle  
Supplied with Cap AT468

Nylon



Cap Colors Available:



Black



White



Red



Yellow



Green



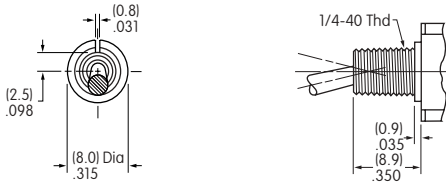
Blue



Gray  
(For K1 & K2 only)

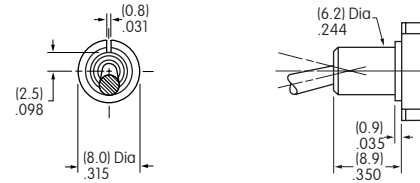
### SMALL BUSHINGS

**S1** 1/4-40  
.350" Threaded with Keyway

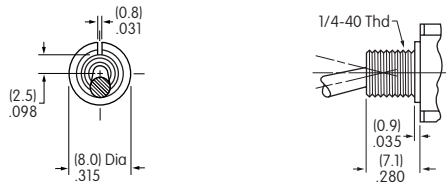


Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

**S2** .350" Smooth with Keyway

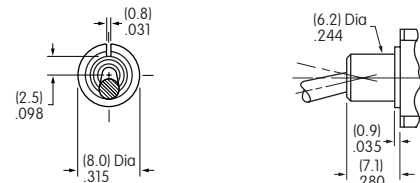


**A1** .280" Threaded  
with Keyway



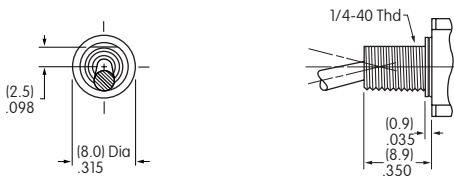
When using this bushing, toggle length is increased by .070".  
Max. Panel Thickness w/Standard Hardware: 0.8mm (.031")

**A2** .280" Smooth  
with Keyway



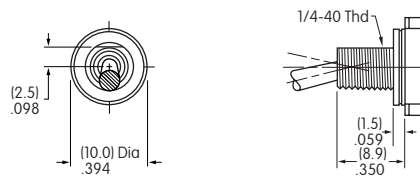
When using this bushing, toggle length is increased by .070".

**D1** .350" Threaded with D Flat



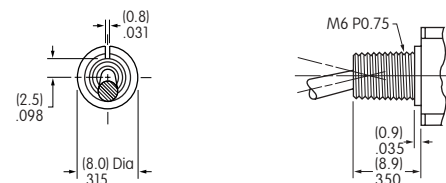
Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

**D3** .350" Threaded Splashproof  
with D Flat



D3 combines only with S & S2 toggles.  
Max. Panel Thickness w/Standard Hardware: 4.9mm (.193")

**S4** 6mm  
.350" Threaded with Keyway



Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

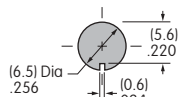
#### Standard Hardware Supplied for Small Bushings

		Bushing Codes	S1	A1	D1	D3	S4	L1	L3
Hardware and Quantity	Hex Nut		2	2	2	1	2	2	1
	Locking Ring		1	1	0	0	1	1	0
	Lockwasher		1	1	1	0	1	1	0
	O-ring		0	0	0	1	0	0	1

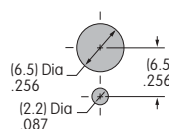
Dimensions for standard hardware are shown on page B15.

#### Panel Cutouts

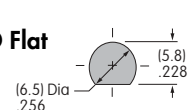
For S1, S2, A1, A2,  
or S4 Bushing  
with Keyway  
& for L1 Bushing



For S1, A1, or  
S4 Bushing  
with Locking Ring  
& for L1 Bushing



For D1 or D3  
Bushings with D Flat  
& for  
L3 Bushing



A variety of optional hardware and accessories is illustrated on page B15.

### LARGE TOGGLES

#### Toggle & Bushing Combinations:

These toggles combine with the 12mm bushings B1 & B3.

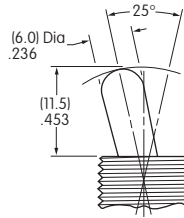
#### Standard Material & Finish:

Brass with Bright Chrome

#### Optional Finishes:

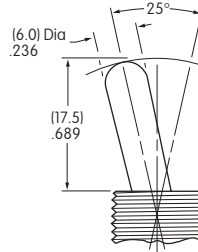
Contact factory for satin chrome or black.

#### **B** .453" Large Bat



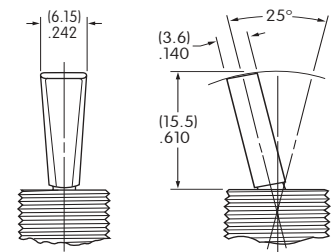
Optional cap on page B13

#### **B2** .689" Large Bat



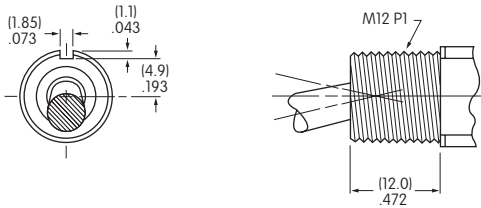
Optional cap on page B13

#### **R** .610 Large Flatted



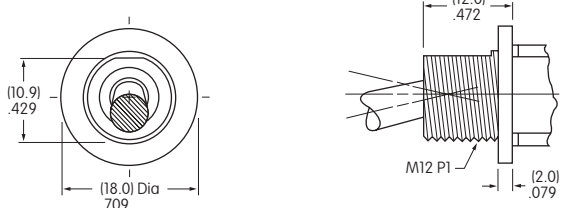
### LARGE BUSHINGS

#### **B1** Large .472" Threaded with Keyway



Max. Panel Thickness w/Standard Hardware: 5.5mm (.216")

#### **B3** Large .472" Threaded Splashproof with D Flat



Max. Panel Thickness w/Standard Hardware: 6.5mm (.256")

#### Standard Hardware for B1:

1 hex face nut AT503M, 1 locking ring AT506M, 1 lockwasher AT508, and 1 hex backup nut AT527M.

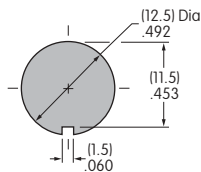
#### Standard Hardware for B3:

1 hex face nut AT503M and 1 o-ring AT537.

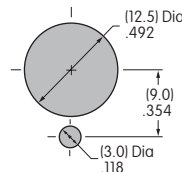
Standard and optional hardware are illustrated on page B15.

### Panel Cutouts

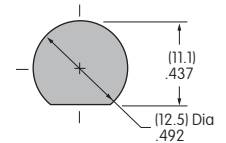
#### For B1 Bushing with Keyway



#### For B1 Bushing with Locking Ring

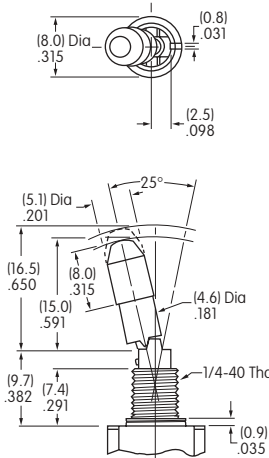


#### For B3 Bushing with D Flat



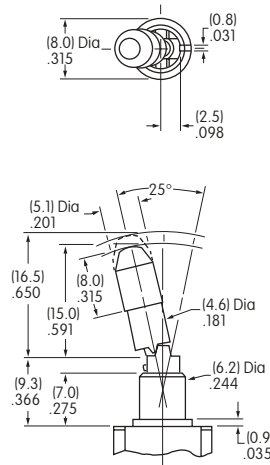
### LOCKING LEVER & BUSHINGS

#### LL1 Threaded with Keyway

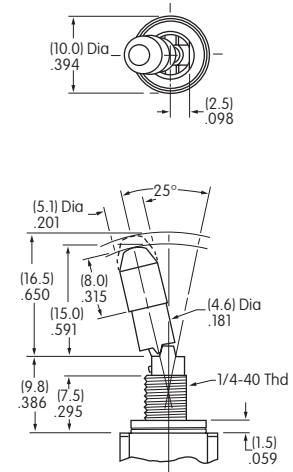


Max. Panel Thickness  
w/Standard Hardware: 1.2mm (.047")

#### LL2 Smooth with Keyway



#### LL3 .295" Threaded Splashproof with D Flat



Max. Panel Thickness  
w/Standard Hardware: 1.2mm (.047")

Lever Material & Finish: Brass with Chrome Plating

#### Locking Mechanism



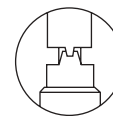
2 positions lock



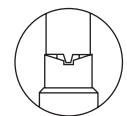
1 position locks



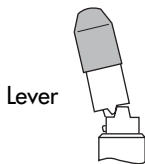
2 positions lock



3 positions lock



1 position locks



Supplied with  
Cap AT427

Cap Material:  
Brass with Nickel  
Plating

#### Color Codes for Optional Anodized Aluminum Caps

**A**

Black

**C**

Red

**G**

Blue

**H**

Gray  
(natural  
aluminum)

### CONTACT MATERIALS & RATINGS

**W** Silver over Silver **Power Level** 6A @ 125V AC & 3A @ 250V AC

**G** Gold over Brass or Copper **Logic Level** 0.4VA maximum @ 28V AC/DC maximum  
Note: See Supplement Index (page Z1) to find complete explanation of operating range.

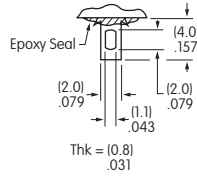
**A** Gold over Silver **Power Level or Logic Level** 6A @ 125V AC or 0.4VA maximum @ 28V AC/DC maximum

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 Index (page Z1) to find complete explanation of dual rating and operating range.

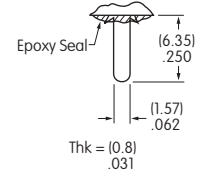
### TERMINALS

#### 01 Solder Lug

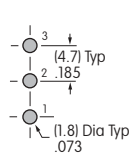
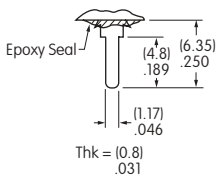
The .043" X .079" oblong hole accommodates 1 solid 18-gauge wire or 2 solid or stranded 20-gauge wires.



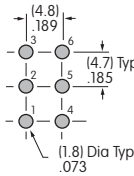
#### 02 .062" Wide Quick Connect



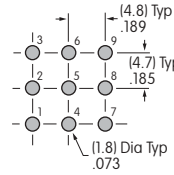
#### 03 .250" Straight PC



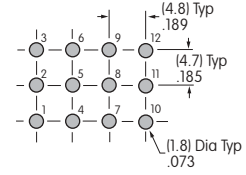
Single Pole



Double Pole



Three Pole



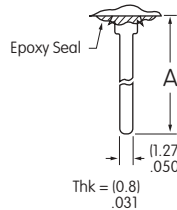
Four Pole

#### 05 .425" (10.8mm) Wirewrap or Extended PC

#### 06 .750" (19.05mm) Wirewrap or Extended PC

#### 07 .964" (24.5mm) Wirewrap or Extended PC

#### 08 1.062" (27.0mm) Wirewrap or Extended PC



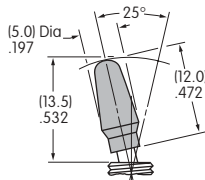
If using as extended PC terminal, refer to the above footprints.

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

### OPTIONAL CAPS & CAP COLORS

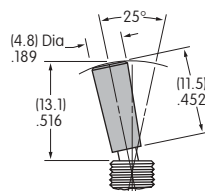
#### B AT415 for S Bat Toggle

Material: Polyethylene



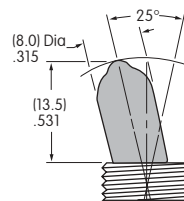
#### C AT444 Conical Cap for S Bat Toggle

Material: Polyethylene



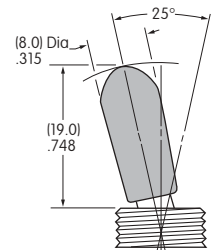
#### R AT434 for B Toggle

Material: Vinyl Chloride



#### V AT406 for B2 Toggle

Material: Vinyl Chloride



Cap Colors Available:



Black



White



Red



Yellow



Green

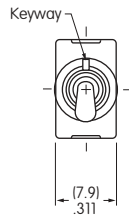


Blue

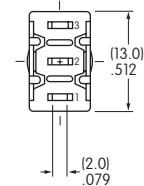
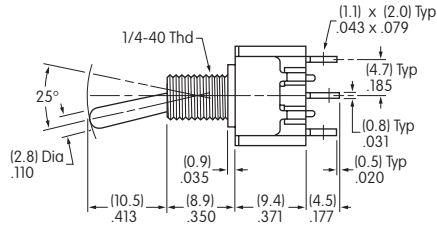


## TYPICAL SWITCH DIMENSIONS

### Solder Lug



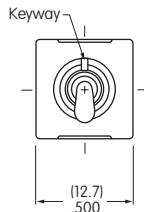
### Single Pole



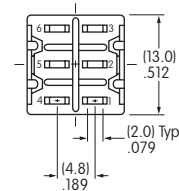
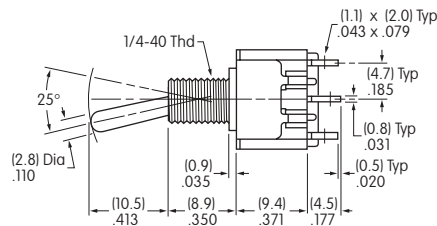
M2012SS1W01

M2011 model does not have terminal 1.

### Solder Lug



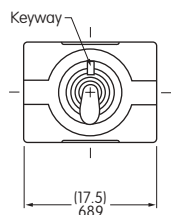
### Double Pole



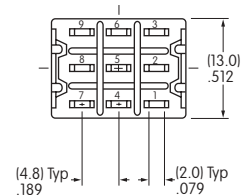
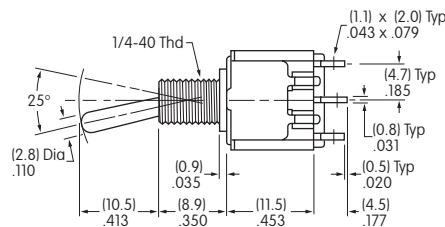
M2022SS1W01

M2021 model does not have terminals 1 & 4.

### Solder Lug

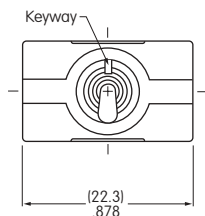


### Three Pole

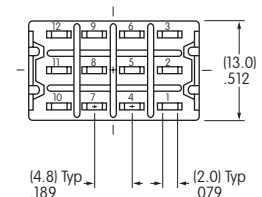
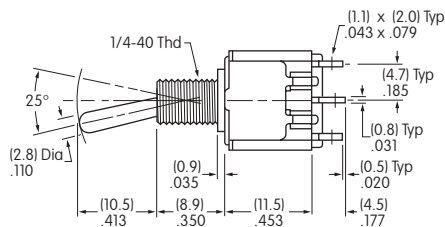


M2032SS1W01

### Solder Lug



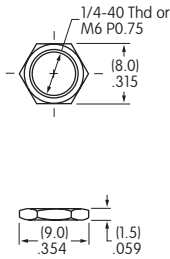
### Four Pole



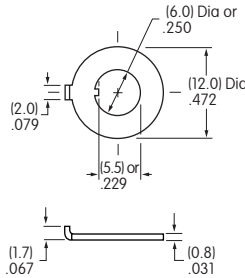
M2042SS1W01

### STANDARD HARDWARE FOR SMALL & LARGE BUSHINGS

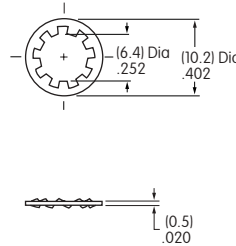
**AT513H for Inch**  
**AT513M for Metric**  
**Hex Nut**  
 Nickel/Brass



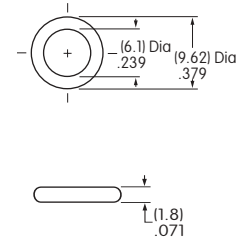
**AT507H for Inch**  
**AT507M for Metric**  
**Locking Ring**  
 Steel with Chromate/Zinc



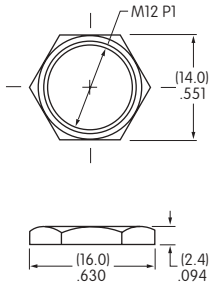
**AT509**  
**Lockwasher**  
 Steel with Chromate/Zinc  
 (not supplied with splashproof models)



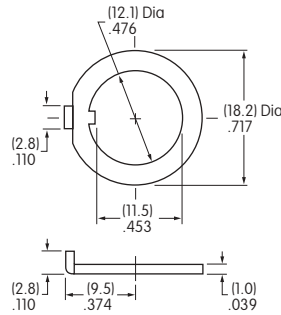
**AT516**  
**O-ring for Splashproof Models**  
 Nitrile Butadiene Rubber



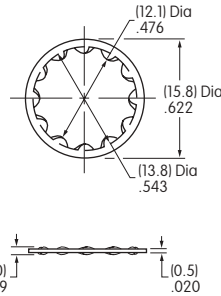
**AT503M**  
**Hex Face Nut**  
 Tin/Brass



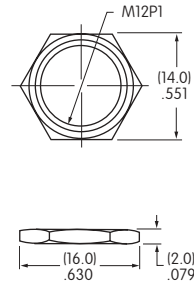
**AT506M**  
**Locking Ring**  
 Steel with Chromate/Zinc



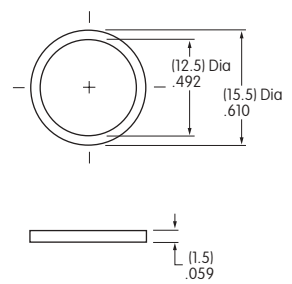
**AT508**  
**Lockwasher**  
 Steel with Chromate/Zinc  
 (Not supplied with splashproof models)



**AT527M**  
**Hex Nut**  
 Nickel/Steel



**AT537**  
**O-ring for Splashproof Models**  
 Nitrile Butadiene Rubber

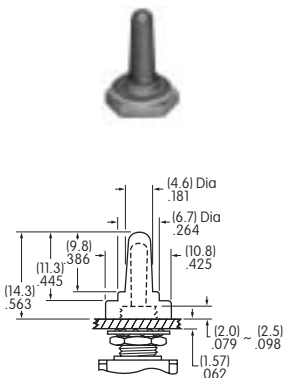


See pages B10 and B11 for the standard hardware supplied with the switch you select.

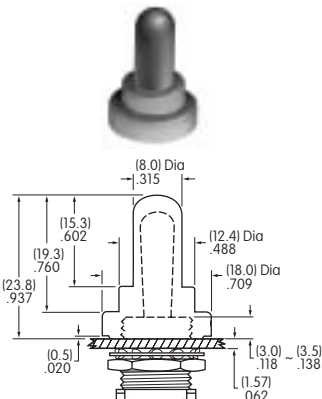
### OPTIONAL SPLASHPROOF BOOTS

Various optional nuts and ON-OFF plates are available; dimensions are shown in the hardware section; see page Z1.

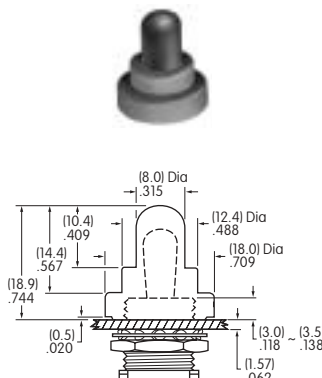
**AT428 (M-metric H-Inch)**  
**.445" Boot**  
**for S Toggle**  
 Silicone Rubber



**AT402**  
**.760" Boot**  
**for B2 Toggle**  
 Silicone Rubber



**AT402C**  
**.567" Boot**  
**for B Toggle**  
 Silicone Rubber



**AT401**  
**.461" Boot**  
**for B2 Toggle**  
 Nitrile Butadiene Rubber

