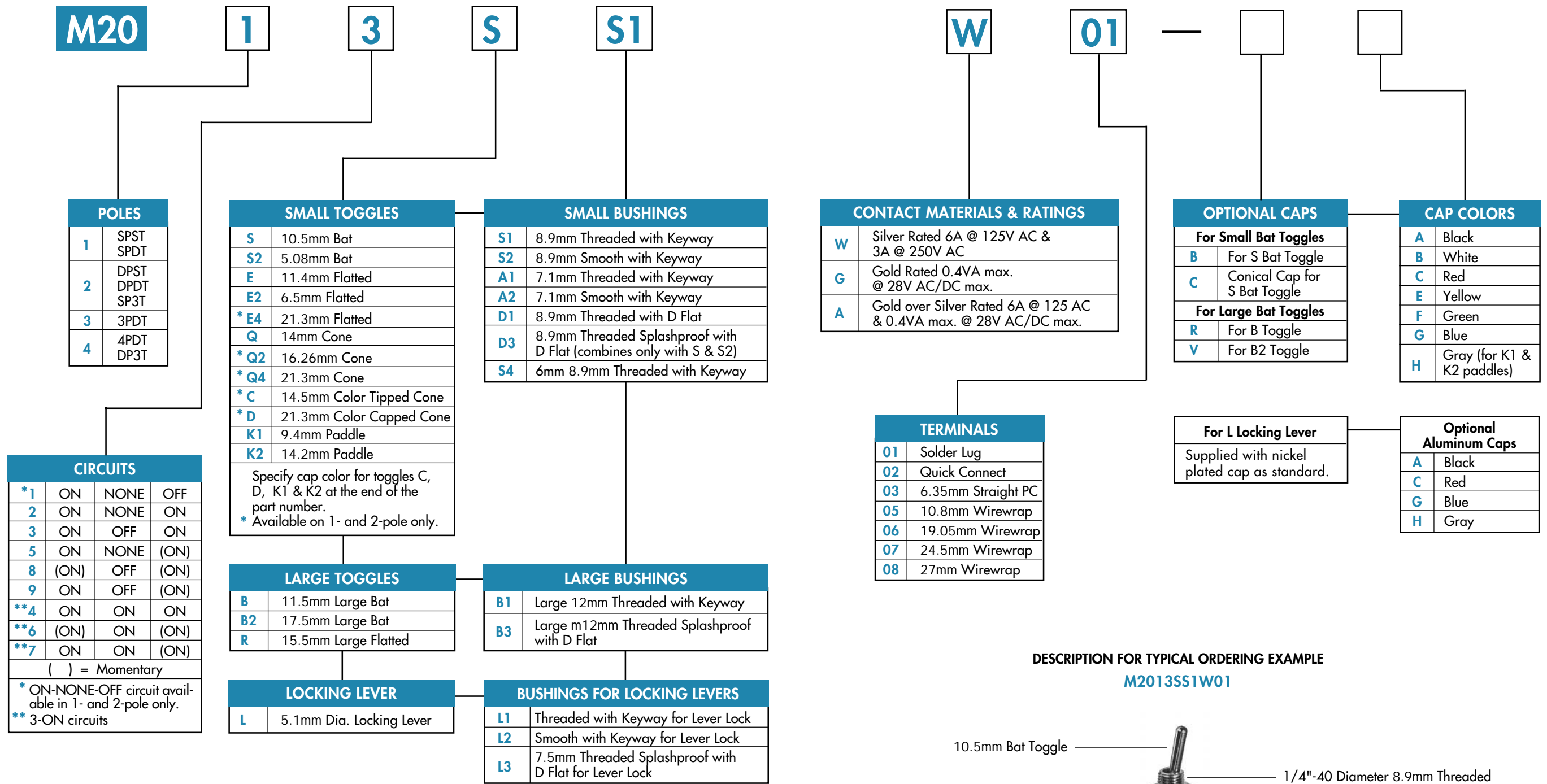
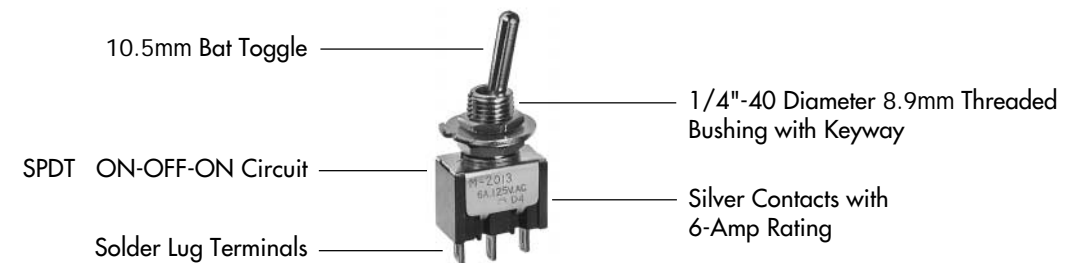


## TYPICAL SWITCH ORDERING EXAMPLE



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](#) 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  
0.4VA maximum @ 28V AC/DC maximum; UL File No. E44145








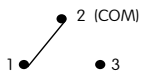
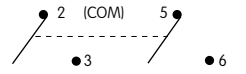
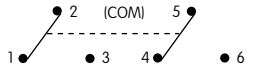
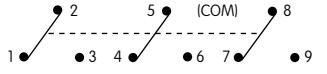
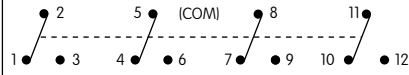
**CSA Certified:** All models certified at 6A @ 125V AC or 3A @ 250V AC or  
0.4VA maximum @ 28V AC/DC maximum; CSA File No. LR23535



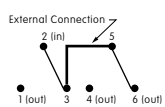
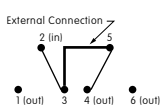
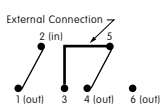
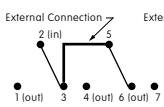
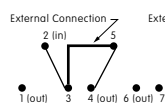
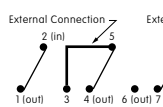
# Series M

## Miniature Toggle Switches

### POLES & CIRCUITS

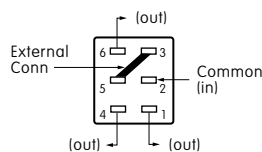
		Toggle Position ( ) = Momentary			Connected Terminals			Throw & Schematics
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch. * Reverse circuits available upon request.
SP	M2011	ON	NONE	OFF	2-3	OPEN	OPEN	SPST 
SP	M2012 M2013 M2015* M2018 M2019*	ON ON 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

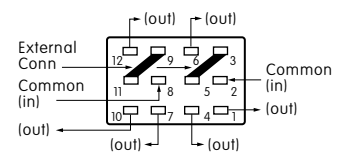
The SP3T model utilizes a double pole base.

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".

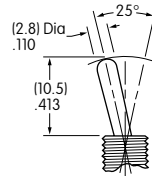
**Standard Material & Finish:**

Brass with Bright Chrome

**Optional Finishes:**

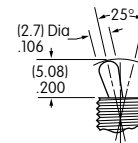
Contact factory for satin chrome or black.

**S** 10.5mm Bat

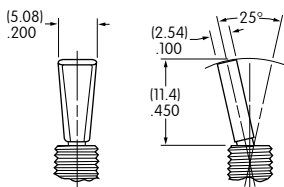


Optional caps

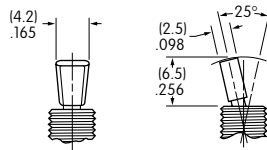
**S2** 5.08mm Bat



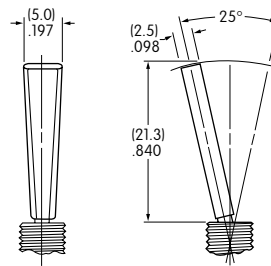
**E** 11.4mm Flatted



**E2** 6.5mm Flatted



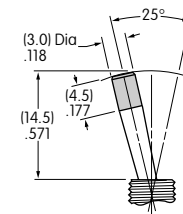
**E4** 21.3mm Flatted



Only Available in 1- & 2-Pole

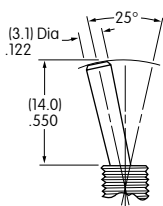
**C** 14.5mm Color Tipped Cone  
Supplied with Cap AT445

Polycarbonate

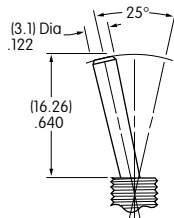


Only Available in 1- & 2-Pole

**Q** 14mm Cone

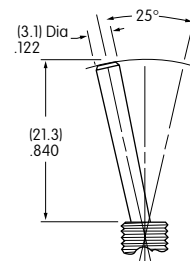


**Q2** 16.26 Cone



Only Available in 1- & 2-Pole

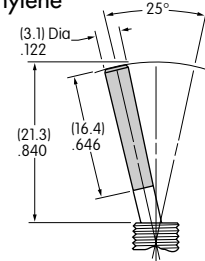
**Q4** 21.3mm Cone



Only Available in 1- & 2-Pole

**D** 21.3mm Color Capped Cone  
Supplied with Cap AT460

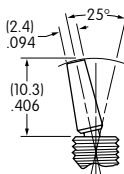
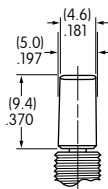
Polyethylene



Only Available in 1- & 2-Pole

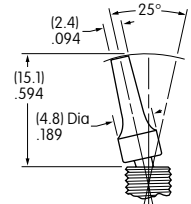
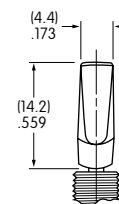
**K1** 9.4mm Paddle  
Supplied with Cap AT467

Nylon



**K2** 14.2mm Paddle  
Supplied with Cap AT468

Nylon



Cap Colors Available:



Black



White



Red



Yellow



Green



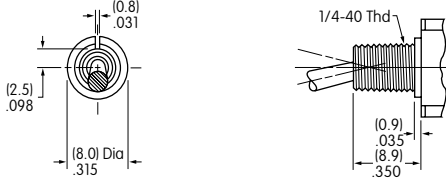
Blue



Gray  
(For K1 & K2 only)

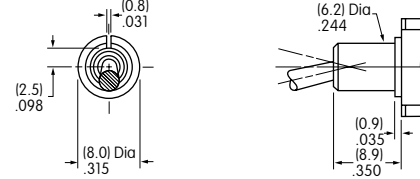
## SMALL BUSHINGS

**S1** 1/4-40  
8.9mm Threaded with Keyway

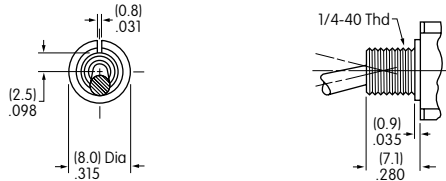


Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

**S2** 8.9mm Smooth with Keyway

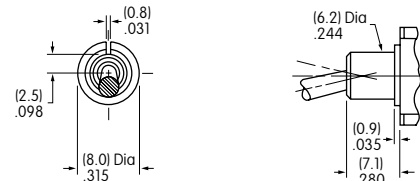


**A1** 7.1mm Threaded  
with Keyway



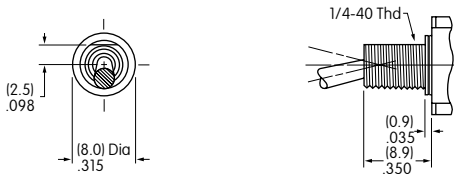
When using this bushing, toggle length is increased by 1.78mm.  
Max. Panel Thickness w/Standard Hardware: 0.8mm (.031")

**A2** 7.1mm Smooth  
with Keyway



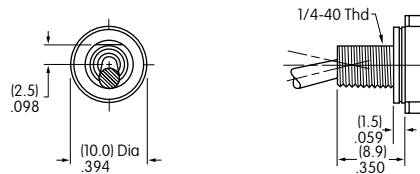
When using this bushing, toggle length is increased by 1.78mm.

**D1** 8.9mm Threaded with D Fla



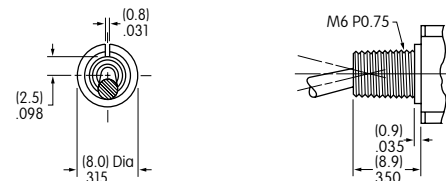
Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

**D3** 8.9mm Threaded Splashproof  
with D Flat



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

**S4** 6mm  
8.9mm Threaded with Keyway



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

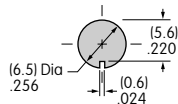
### Standard Hardware Supplied for Small Bushings

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

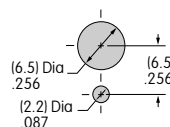
Dimensions for standard hardware

### Panel Cutouts

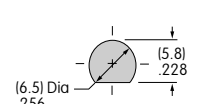
For S1, S2, A1, A2,  
or S4 Bushing  
with Keyway



For S1, A1, or  
S4 Bushing  
with Locking Ring



For D1 or  
D3 Bushing  
with D Flat



### Optional hardware and accessories

### LARGE TOGGLES

#### Toggle & Bushing Combinations:

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

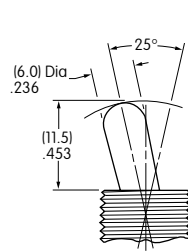
#### Standard Material & Finish:

Brass with Bright Chrome

#### Optional Finishes:

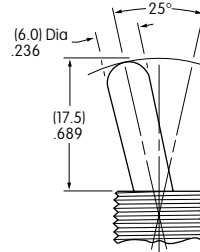
Contact factory for satin chrome or black.

#### **B** 11.5mm Large Bat



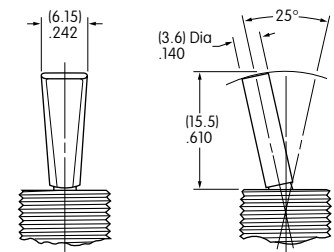
Optional cap

#### **B2** 17.5mm Large Bat



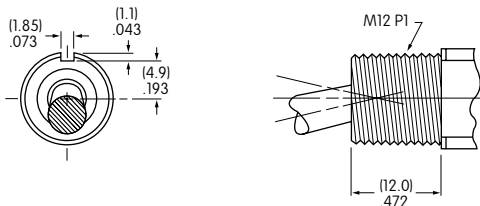
Optional cap

#### **R** 15.5mm Large Flatted



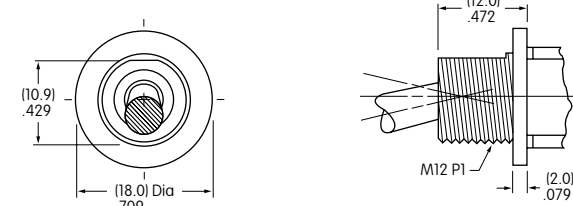
### LARGE BUSHINGS

#### **B1** Large 12mm Threaded with Keyway



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

#### **B3** Large 12mm 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.

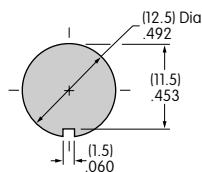
#### Standard Hardware for B3:

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

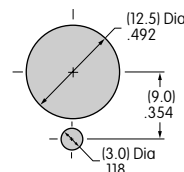
Standard and optional hardware

### Panel Cutouts

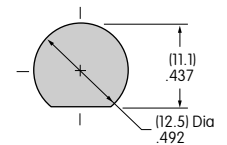
#### For B1 Bushing with Keyway



#### For B1 Bushing with Locking Ring

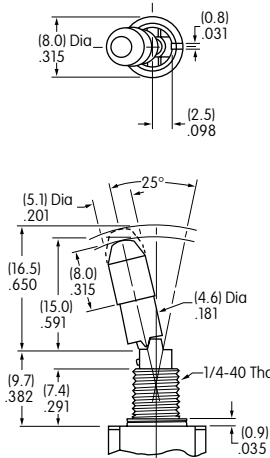


#### For B3 Bushing with D Flat



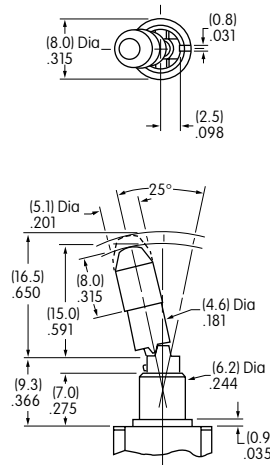
## LOCKING LEVER & BUSHINGS

### LL1 Threaded with Keyway

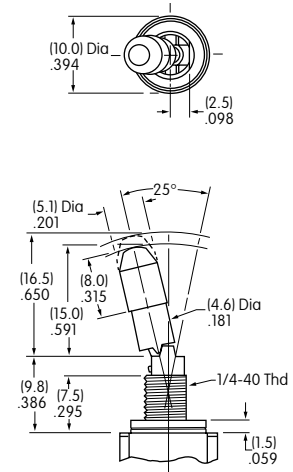


Max. Panel Thickness  
w/Standard Hardware: 1.2mm (.047")

### LL2 Smooth with Keyway



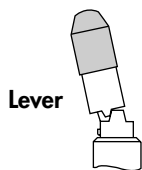
### LL3 7.5mm Threaded Splashproof with D Flat



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

Lever Material & Finish: Brass with Chrome Plating

Locking Mechanism	on-none-on	on-none-(on)	on-off-(on) on-on-(on)	on-off-on on-on-on	(on)-off-(on) (on)-on-(on)
	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

<b>A</b>	Black	<b>C</b>	Red	<b>G</b>	Blue	<b>H</b>	Gray (natural aluminum)
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## CONTACT MATERIALS & RATINGS

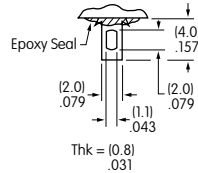
<b>W</b>	Silver over Silver	Power Level	6A @ 125V AC & 3A @ 250V AC
<b>G</b>	Gold over Brass or Copper	Logic Level	0.4VA maximum @ 28V AC/DC maximum
Note: See <a href="#">Supplement Index</a> to find complete explanation of operating range.			
<b>A</b>	Gold over Silver	Power Level or Logic Level	6A @ 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](#) to find complete explanation of dual rating and operating range.

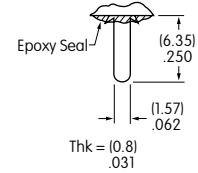
### TERMINALS

#### 01 Solder Lug

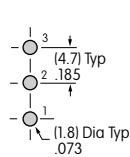
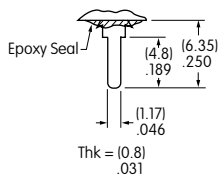
The 1.1mm x 2mm oblong hole accommodates 1 solid 18-gauge wire or 2 solid or stranded 20-gauge wires.



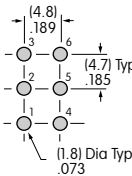
#### 02 1.57mm Wide Quick Connect



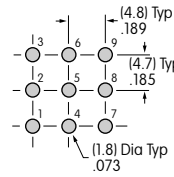
#### 03 6.35mm Straight PC



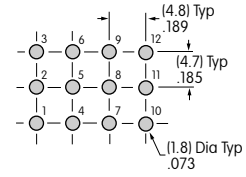
Single Pole



Double Pole



Three Pole



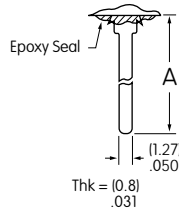
Four Pole

#### 05 10.8mm / .425" Wirewrap or Extended PC

#### 06 19.05mm / .750" Wirewrap or Extended PC

#### 07 24.5mm / .964" Wirewrap or Extended PC

#### 08 27.0mm / 1.062" Wirewrap or Extended PC



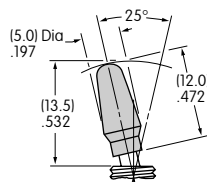
If using as extended PC terminal, refer to the above footprints.

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

### OPTIONAL CAPS & CAP COLORS

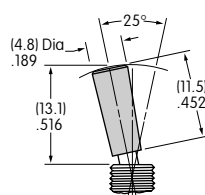
#### B AT415 for S Bat Toggle

Material: Polyethylene



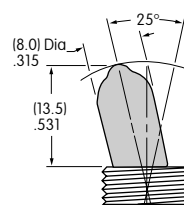
#### C AT444 Conical Cap for S Bat Toggle

Material: Polyethylene



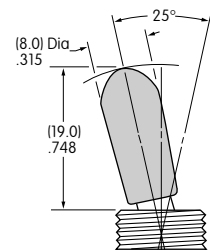
#### R AT434 for B Toggle

Material: Vinyl Chloride



#### V AT406 for B2 Toggle

Material: Vinyl Chloride



Cap Colors Available:



Black



White



Red



Yellow



Green



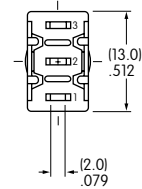
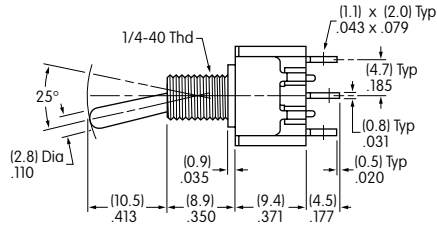
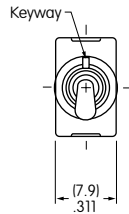
Blue



## TYPICAL SWITCH DIMENSIONS

### Solder Lug

### Single Pole

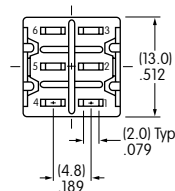
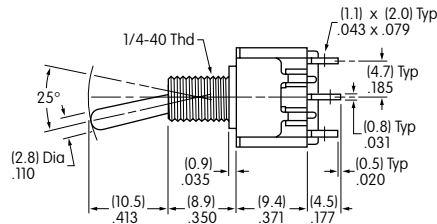
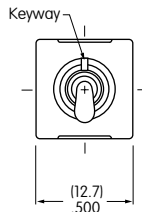


M2012SS1W01

M2011 model does not have terminal 1.

### Solder Lug

### Double Pole

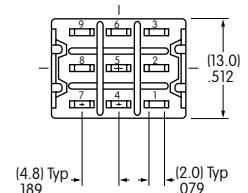
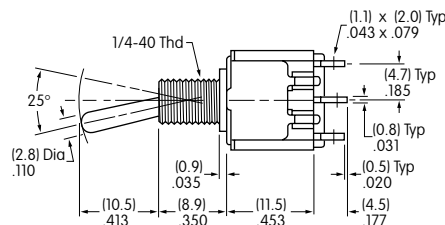
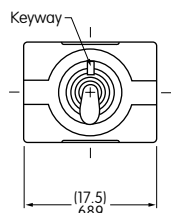


M2022SS1W01

M2021 model does not have terminals 1 & 4.

### Solder Lug

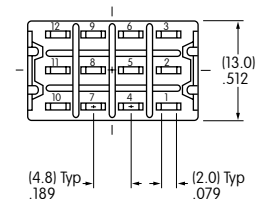
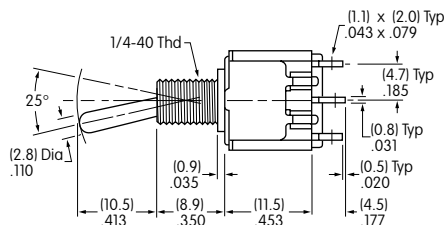
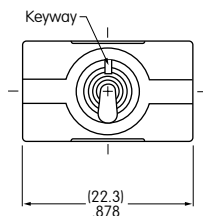
### Three Pole



M2032SS1W01

### Solder Lug

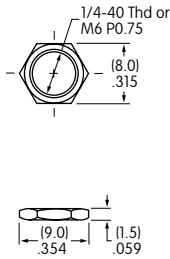
### Four Pole



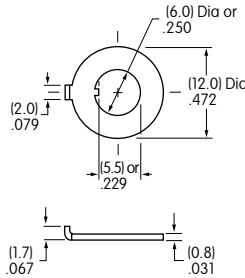
M2042SS1W01

## STANDARD HARDWARE FOR SMALL & LARGE BUSHINGS

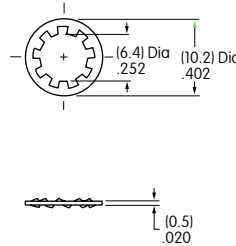
**AT513M for Metric**  
**AT513H for Inch**  
**Hex Nut**  
 Nickel/Brass



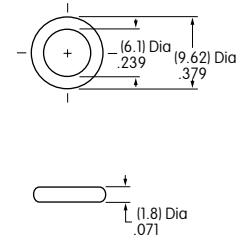
**AT507M for Metric**  
**AT507H for Inch**  
**Locking Ring**  
 Steel with Chromate/Zinc



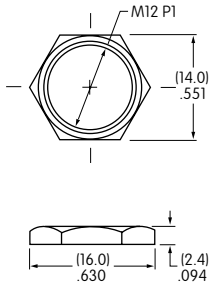
**AT509**  
**Lockwasher**  
 Steel with Chromate/Zinc  
 (not supplied with splashproof models)



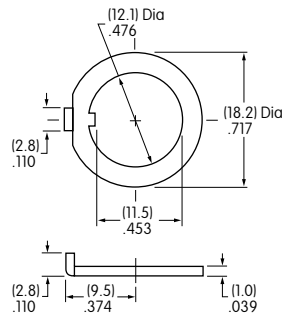
**AT516**  
**O-ring for Splashproof Models**  
 Nitrile Butadiene Rubber



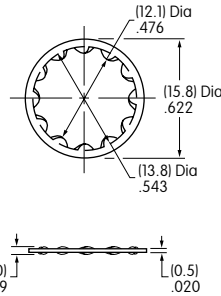
**AT503M**  
**Hex Face Nut**  
 Tin/Brass



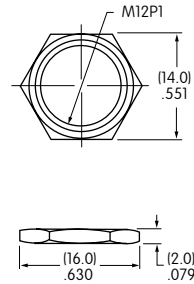
**AT506M**  
**Locking Ring**  
 Steel with Chromate/Zinc



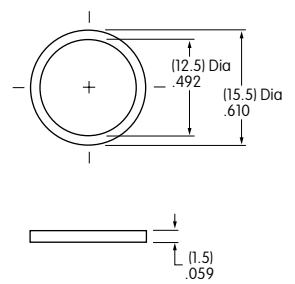
**AT508**  
**Lockwasher**  
 Steel with Chromate/Zinc  
 (Not supplied with splashproof models)



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



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

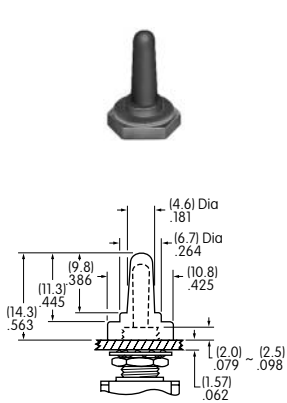


Standard hardware supplied with the switch you select.

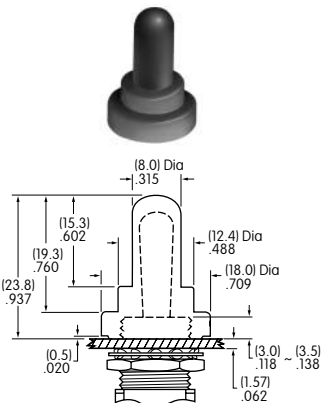
## OPTIONAL SPLASHPROOF BOOTS

Various optional nuts and ON-OFF plates are available; dimensions are shown in the [hardware section](#).

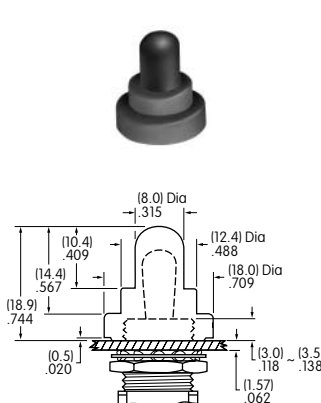
**AT428 (M-metric H-Inch)**  
**11.3mm Boot**  
**for S Toggle**  
 Silicone Rubber



**AT402**  
**19.3mm Boot**  
**for B2 Toggle**  
 Silicone Rubber



**AT402C**  
**14.4mm Boot**  
**for B Toggle**  
 Silicone Rubber



**AT401**  
**11.7mm Boot**  
**for B2 Toggle**  
 Nitrile Butadiene Rubber

