

Distinctive Characteristics

Antirotation design, standard on noncylindrical levers, mates toggle and bushing; bottom of toggles has two flatted sides which fit into a complementary opening inside bushing.

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

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

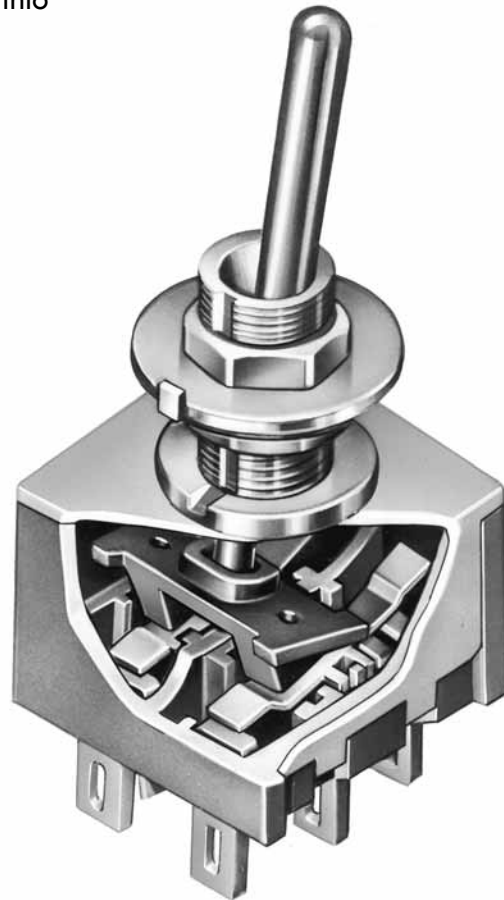
High insulating barriers increase isolation of circuits in multipole devices and provide added protection to contact points.

Molded diallyl phthalate case has a UL flammability rating of 94V-0.

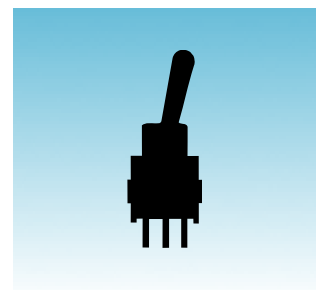
Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Prominent external insulating barriers increase insulation resistance and dielectric strength. Interlocked actuator block, lever, and interior guide prevent switch failure due to biased lever movement.

Clinching of frame to case well above base and terminals provides 1,500V dielectric strength.



Actual Size



General Specifications

Electrical Capacity (Resistive Load)

- Power Level (code W):** 6A @ 125V AC & 3A @ 250V AC
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
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
- Logic/Power Level (code A):** Combines W & G ratings
Note: See Supplement Index (page Z2) to find explanation of dual rating & 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 for 1 minute minimum;
1,500V AC minimum between contacts and case for 1 minute minimum
- 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
- Case:** Diallyl phthalate resin (UL94V-0)
- Movable Contactor:** Phosphor bronze with silver or gold plating
- Movable Contacts:** Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
- Stationary Contacts:** Silver with silver plating (code W); copper or brass with gold plating (code G);
or silver with gold plating (code A)
- Terminals:** Copper or brass with silver plating; or copper or brass with gold plating
- Frame:** Stainless steel
- Support Bracket:** Steel with tin-lead plating

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 (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
- Sealing:** Panel seal bushing options B3 & D3 meet IP67 of IEC529 Standards.

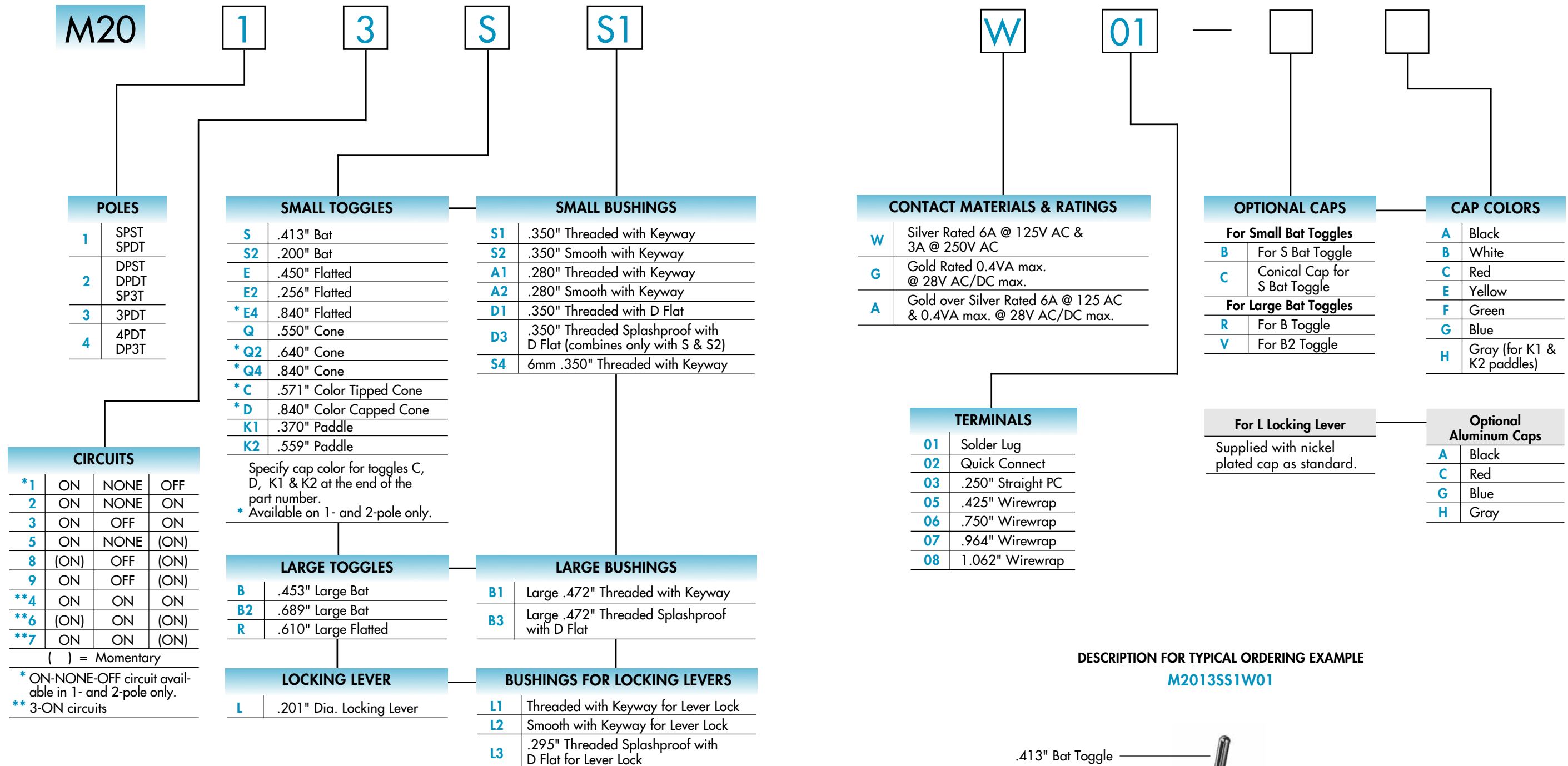
Installation

- Mounting Torque:** 3.0Nm (26.55 lb•in) double nut for large bushing;
1.5Nm (13 lb•in) double nut & 0.7Nm (6 lb•in) single nut for all other bushings
- Soldering Time & Temperature:** 3 seconds @ 350°C or 5 seconds @ 270°C
- Process Seal:** Not available

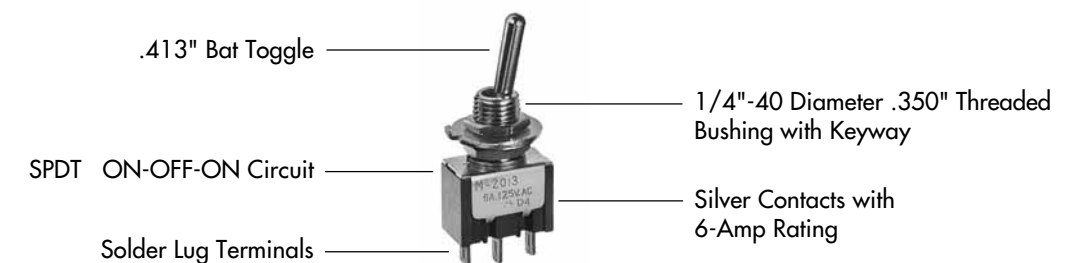
Standards & Certifications

- Flammability Standards:** UL94V-0 for case
- UL Recognized:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or
0.4VA maximum @ 28V DC maximum; UL File No. WOYR2.E44145;
add "/U" to end of part number to order UL mark on switch.
- CSA Certified:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or
0.4VA maximum @ 28V maximum; CSA File No. 023535-0-000;
add "/C" to end of part number to order CSA mark on switch.

TYPICAL SWITCH ORDERING EXAMPLE











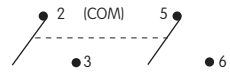
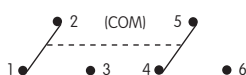

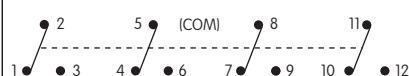
DESCRIPTION FOR TYPICAL ORDERING EXAMPLE
M2013SS1W01



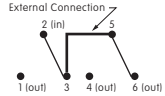
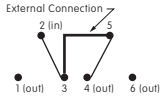
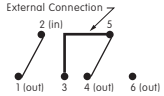
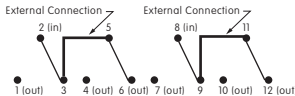
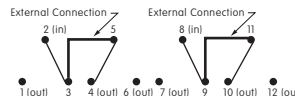
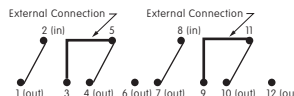
IMPORTANT:

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

POLES & CIRCUITS

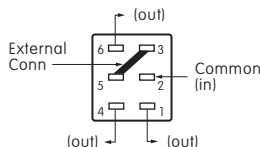
Pole	Model	Toggle Position () = Momentary			Connected Terminals			Throw & Schematics Note: Terminal numbers are not actually on the switch. * Reverse circuits available upon request.
		Down 	Center 	Up 	Down 	Center 	Up 	
SP	M2011	ON	NONE	OFF	2-3	OPEN	OPEN	SPST 
SP	M2012 M2013 M2015* M2018 M2019*	ON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

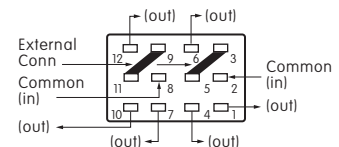
The SP3T model utilizes a double pole base.

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:

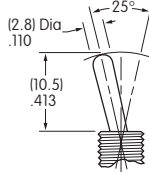
Toggle length changes based on bushing selected. All illustrations are shown with .350" long bushing. When using a .280" long bushing, toggle length increases .070".

Standard Material & Finish:

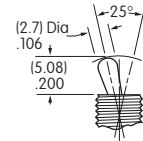
Brass with Bright Chrome

Contact factory for optional finishes.

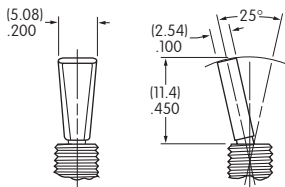
S .413" Bat



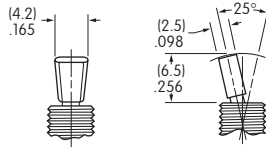
S2 .200" Bat



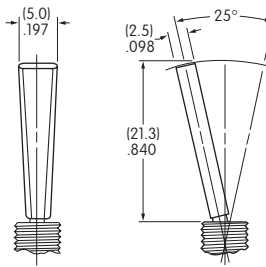
E .450" Flatted



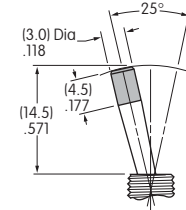
E2 .256" Flatted



E4 .840" Flatted



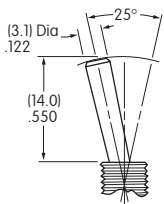
C .571" Color Tipped Cone
Supplied with Cap AT445
Polycarbonate



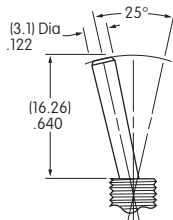
Only Available in 1- & 2-Pole

Only Available in 1- & 2-Pole

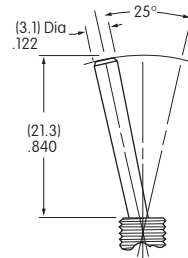
Q .550" Cone



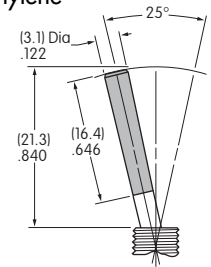
Q2 .640" Cone



Q4 .840" Cone



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



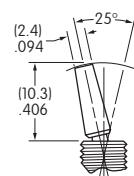
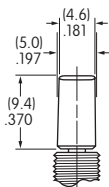
Only Available in 1- & 2-Pole

Only Available in 1- & 2-Pole

Only Available in 1- & 2-Pole

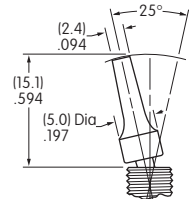
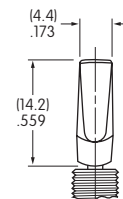
K1 .370" Paddle
Supplied with Cap AT467

Polyamide



K2 .559" Paddle
Supplied with Cap AT468

Polyamide



Cap Colors Available:

A Black

B White

C Red

E Yellow

F Green

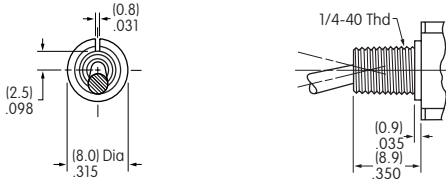
G Blue

H Gray

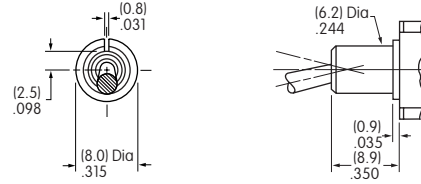
(For K1 & K2 only)

SMALL BUSHINGS

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

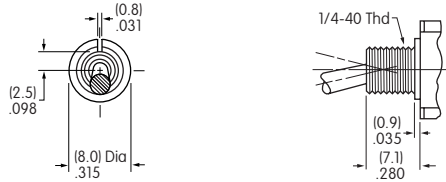


S2 .350" Smooth with Keyway

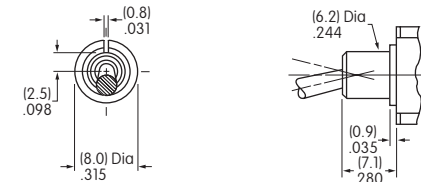


Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

A1 .280" Threaded with Keyway



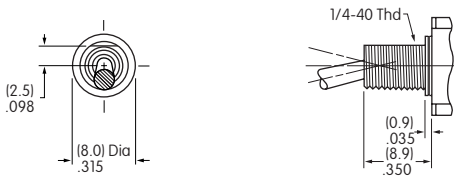
A2 .280" Smooth with Keyway



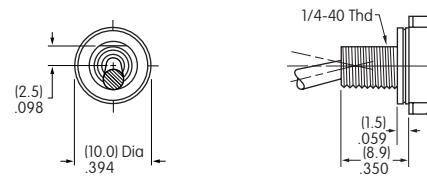
When using this bushing, toggle length is increased by .070".
Max. Panel Thickness w/Standard Hardware: 0.8mm (.031")

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

D1 .350" Threaded with D Flat



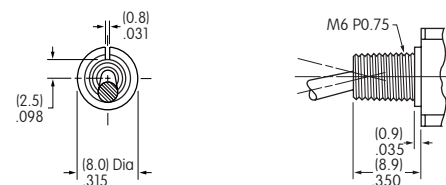
D3 .350" Threaded Splashproof with D Flat



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

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

S4 6mm
.350" Threaded with Keyway



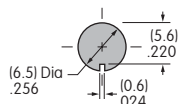
Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

Standard Hardware Supplied for Small Bushings

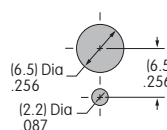
		Bushing Codes						
		S1	A1	D1	D3	S4	L1	L3
Hardware and Quantity	Hex Nut	2	2	2	1	2	2	1
	Locking Ring	1	1	0	0	1	1	0
	Lockwasher	1	1	1	0	1	1	0
	O-ring	0	0	0	1	0	0	1

Panel Cutouts

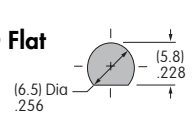
For S1, S2, A1, A2, or S4 Bushing with Keyway & for L1 Bushing



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



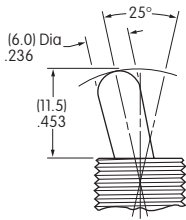
For D1 or D3 Bushing with D Flat & for L3 Bushing



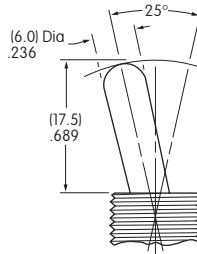
LARGE TOGGLES

Toggle & Bushing Combinations: These toggles combine with the 12mm bushings B1 & B3.

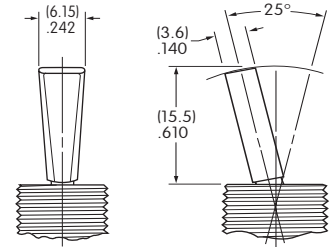
B .453" Large Bat



B2 .689" Large Bat



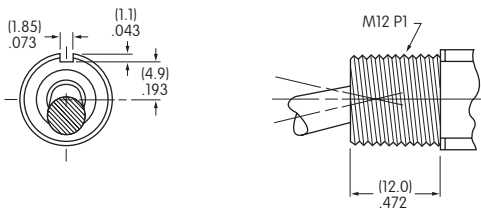
R .610 Large Flatted



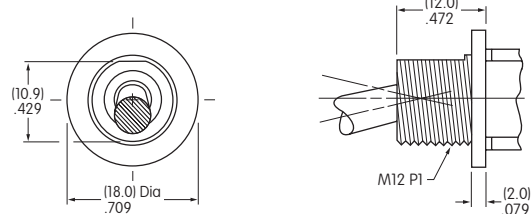
Standard Material & Finish: Brass with Bright Chrome
Optional Finishes: Contact factory for satin chrome or black.

LARGE BUSHINGS

B1 Large .472" Threaded with Keyway



B3 Large .472" Threaded Splashproof with D Flat



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

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

Standard Hardware for B1:

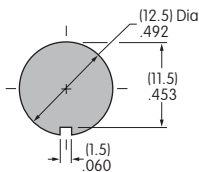
1 hex face nut AT503M, 1 locking ring AT506M,
 1 lockwasher AT508, and 1 hex backup nut AT527M

Standard Hardware for B3:

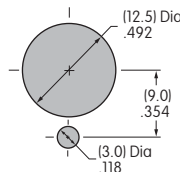
1 hex face nut AT503M
 and 1 o-ring AT537

Panel Cutouts

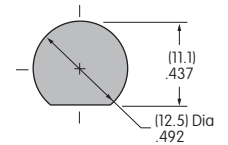
For B1 Bushing with Keyway



For B1 Bushing with Locking Ring

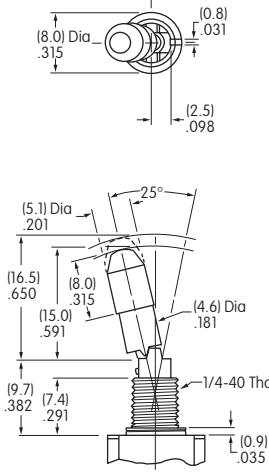


For B3 Bushing with D Flat



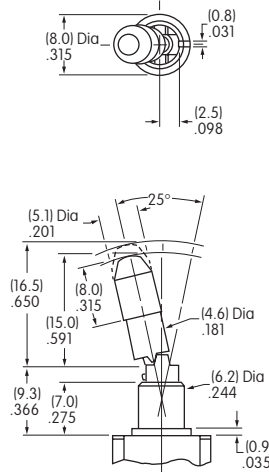
LOCKING LEVER & BUSHINGS

LL1 Threaded with Keyway

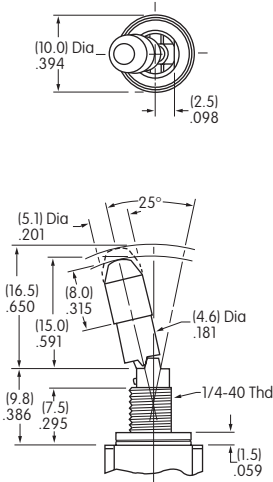


Max. Panel Thickness
w/Standard Hardware: 1.2mm (.047")

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

on-none-on



2 positions lock

on-none-(on)



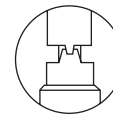
1 position locks

on-off-(on)
on-on-(on)



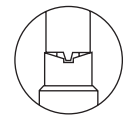
2 positions lock

on-off-on
on-on-on

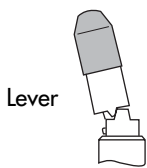


3 positions lock

(on)-off-(on)
(on)-on-(on)



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 Z2) to find complete explanation of operating range.

A Gold over Silver

Power Level
or Logic Level

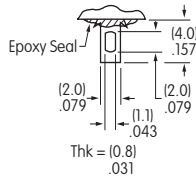
6A @ 125V AC
or 0.4VA maximum @ 28V AC/DC maximum

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 Z2) to find complete explanation of dual rating and operating range.

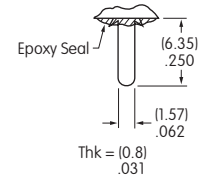
TERMINALS

01 Solder Lug

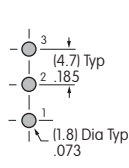
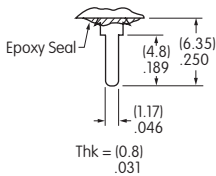
The .043" X .079" oblong hole accommodates 1 solid 18-gauge wire or 2 solid or stranded 20-gauge wires.



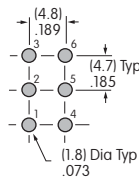
02 .062" Wide Quick Connect



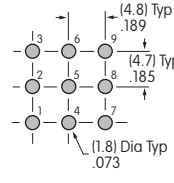
03 .250" Straight PC



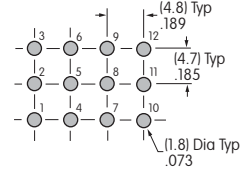
Single Pole



Double Pole



Three Pole



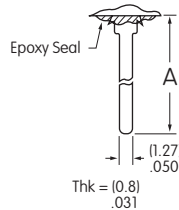
Four Pole

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



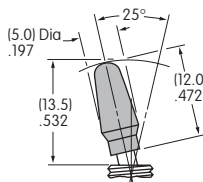
If using as extended PC terminal, refer to the above footprints.

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

OPTIONAL CAPS & CAP COLORS

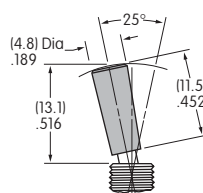
B AT415 for S Bat Toggle

Material: Polyethylene



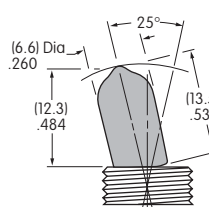
C AT444 Conical Cap for S Bat Toggle

Material: Polyethylene



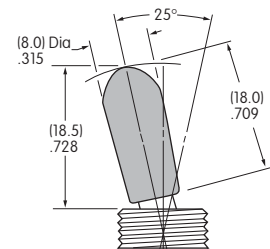
R AT434 for B Toggle

Material: Vinyl Chloride



V AT406 for B2 Toggle

Material: Vinyl Chloride



Cap Colors Available:



Black



White



Red



Yellow



Green

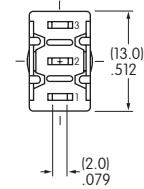
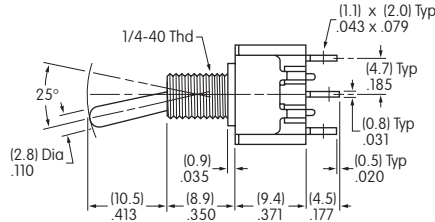
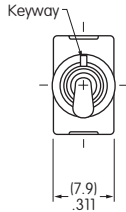


Blue

TYPICAL SWITCH DIMENSIONS

Solder Lug

Single Pole

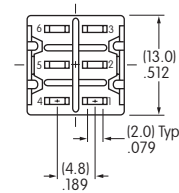
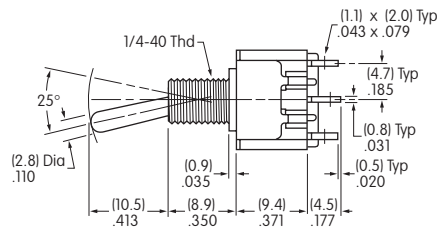
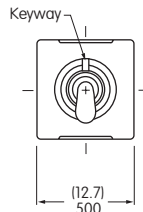


M2012SS1W01

M2011 model does not have terminal 1.

Solder Lug

Double Pole

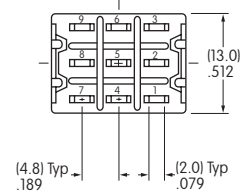
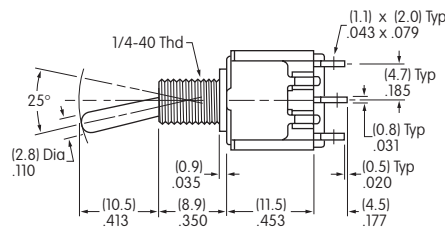
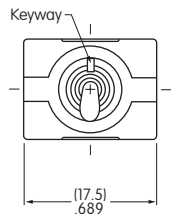


M2022SS1W01

M2021 model does not have terminals 1 & 4.

Solder Lug

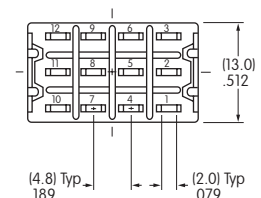
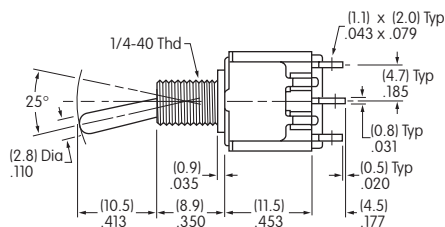
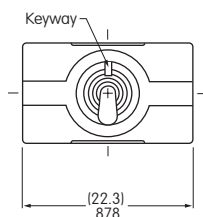
Three Pole



M2032SS1W01

Solder Lug

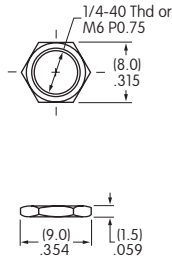
Four Pole



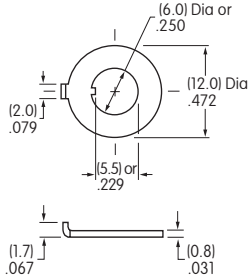
M2042SS1W01

STANDARD HARDWARE FOR SMALL & LARGE BUSHINGS

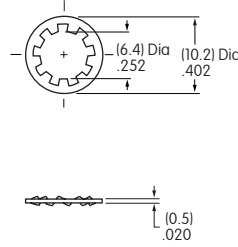
AT513H for Inch
AT513M for Metric
Hex Nut
Nickel/Brass



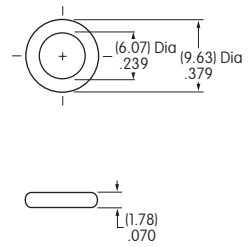
AT507H for Inch
AT507M for Metric
Locking Ring
Steel with Chromate/Zinc



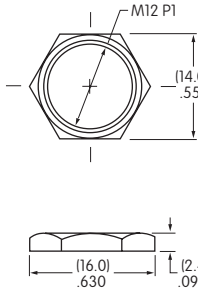
AT509
Lockwasher
Steel with Chromate/Zinc
(not supplied with splashproof models)



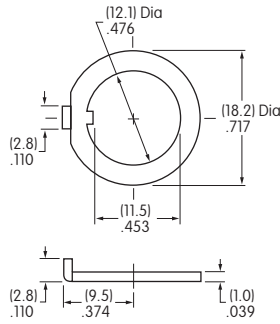
AT516
O-ring for Splashproof Models
Nitrile Butadiene Rubber



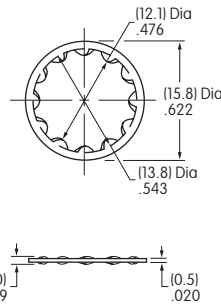
AT503M
Hex Face Nut
Chrome/Brass



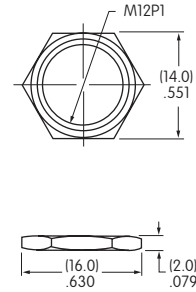
AT506M
Locking Ring
Steel with Chromate/Zinc



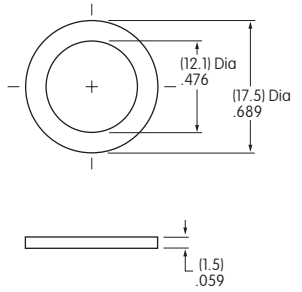
AT508
Lockwasher
Steel with Chromate/Zinc
(Not supplied with splashproof models)



AT527M
Hex Nut
Nickel/Steel



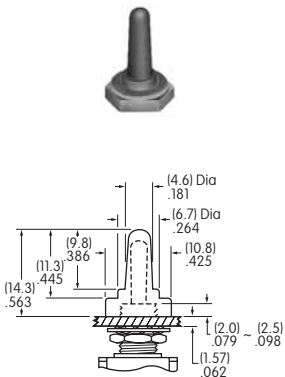
AT401P
O-ring for Splashproof Models
Natural Rubber



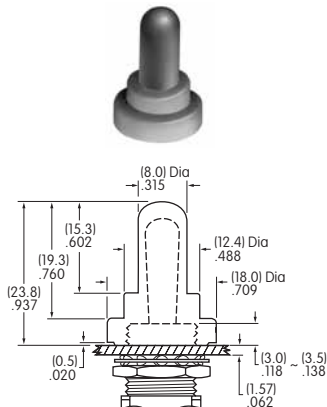
OPTIONAL SPLASHPROOF BOOTS

Various optional nuts and ON-OFF plates are available; dimensions are shown in the Accessories & Hardware section; see page Y3.

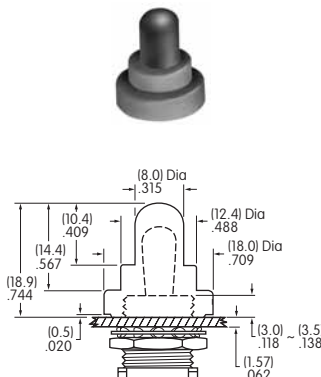
AT428 (M-metric H-Inch)
.445" Boot
for S Toggle
Silicone Rubber



AT402
.760" Boot
for B2 Toggle
Silicone Rubber



AT402S
.567" Boot
for B Toggle
Silicone Rubber



AT401
.461" Boot
for B2 Toggle
Nitrile Butadiene Rubber

