

## A General Specifications

### Electrical Capacity (Resistive Load)

- Power Level (silver):** Maximum rating varies by model number  
**MN12, MN22:** 6A @ 125V AC, 3A @ 250V AC, 4 A @ 30V DC  
**MN13, MN18, MN23:** 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN28:** 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
- Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

### 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:** 50,000 operations minimum  
**Electrical Life:** 25,000 operations minimum for silver at 6A @ 125V AC; 50,000 operations minimum for gold  
**Angle of Throw:** 25°

### Environmental Data

- Operating Temp Range:** -30°C through +85°C (-22°F through +185°F)  
**Sealing:** Waterproofing, achieved with boot at base of lever plus o-rings inside and outside of bushing, meets IP68 of IEC 60529 Standards (dust tight and protection against effects of temporary immersion). See further explanation on page A51.

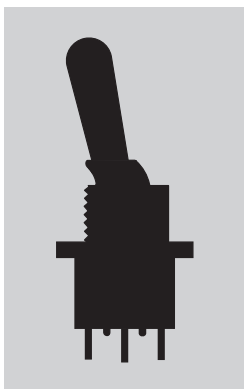
### Processing

- Soldering:** Manual Soldering for Silver: ON-NONE-ON: See Profile B in Supplement section.  
 ON-OFF-ON and (ON)-OFF-(ON): See Profile A in Supplement section.  
 Manual Soldering for Gold, all circuits: See Profile A in Supplement section.  
 Note: Lever must be in OFF (center) position while soldering.

## Distinctive Characteristics

Inner o-ring and external rubber washer seal the switch to achieve IP68 of IEC 60529 Standards (dust tight and water protected for temporary immersion).

Actual Size

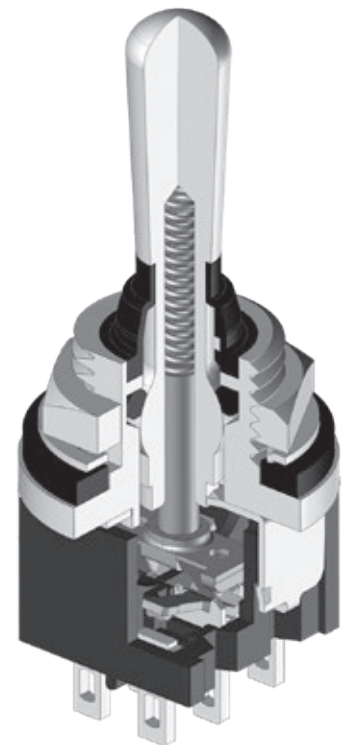


Waterproof boot at base of toggle further ensures protection against wet environments.

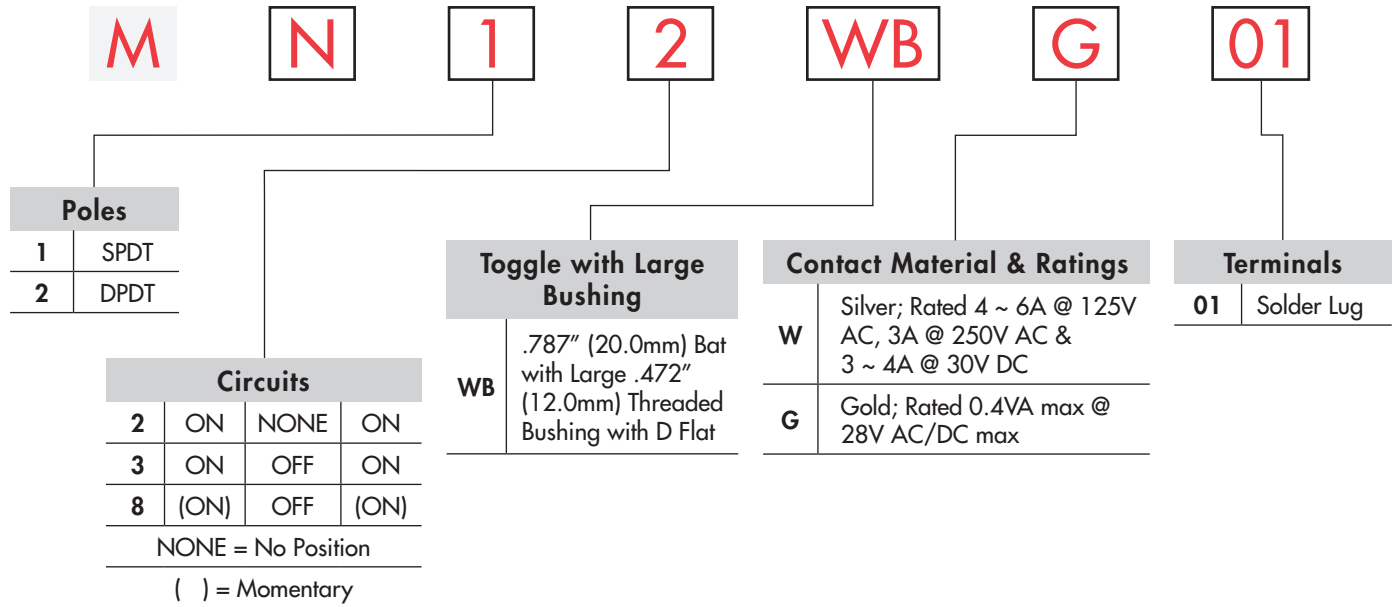
Actuation provides smooth, sturdy tactile feel.

Polished, chrome-plated actuator paired with the waterproof boot not only delivers in terms of sleek design, but also functionality and reliability.

Superb quality and construction design prohibit entry of harmful particles that may otherwise compromise lever operation.

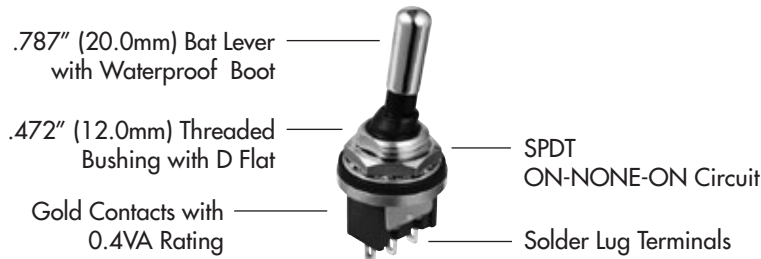


## TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### MN12WBG01

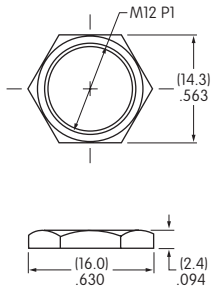


## POLES & CIRCUITS

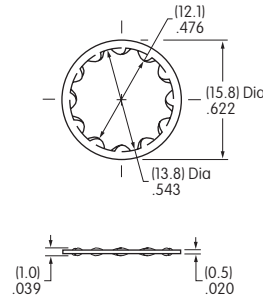
Pole	Model	Toggle Position			Connected Terminals			Throw & Schematics
		Up	Center	Down	Up	Center	Down	
		NONE = No Position ( ) = Momentary						
								Note: Terminal numbers are not actually on the switch.
SP	MN12 MN13 MN18	ON ON (ON)	NONE OFF OFF	ON ON (ON)	2-3	OPEN	2-1	SPDT
DP	MN22 MN23 MN28	ON ON (ON)	NONE OFF OFF	ON ON (ON)	2-3 5-6	OPEN	2-1 5-4	DPDT

## STANDARD HARDWARE

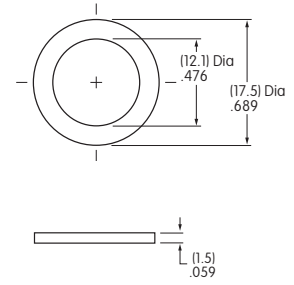
**AT503M Hex Face Nut**  
Brass/Chrome



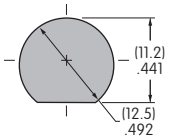
**AT508 Lockwasher**  
Steel with Zinc/Chromate



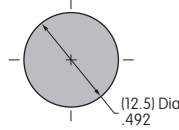
**AT401P O-ring**  
Nitrile Butadiene Rubber



## PANEL CUTOUTS & THICKNESS



Anti-rotation



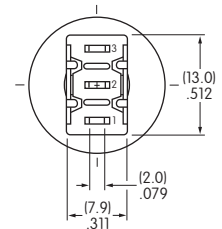
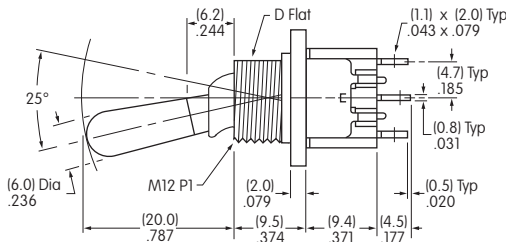
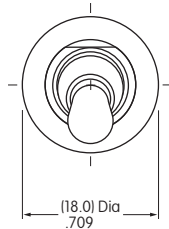
No  
Anti-rotation

Maximum Effective Panel Thickness  
.118" (3.0mm)

## TYPICAL SWITCH DIMENSIONS

**Solder Lug**

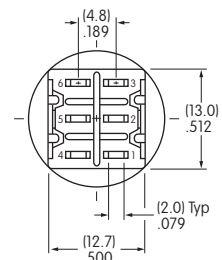
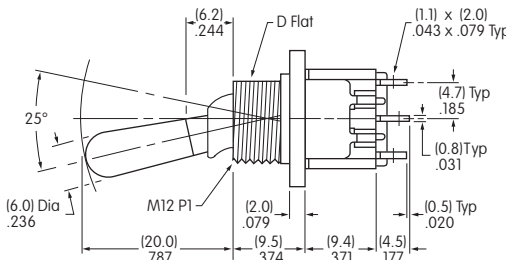
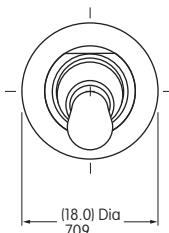
**Single Pole**



**MN12WBG01**

**Solder Lug**

**Double Pole**



**MN22WBG01**

## APPLICATION CONSIDERATIONS

The Dual Seal Waterproof M Toggle is designed as a panel seal switch, and not to be used under water.

### Material Properties

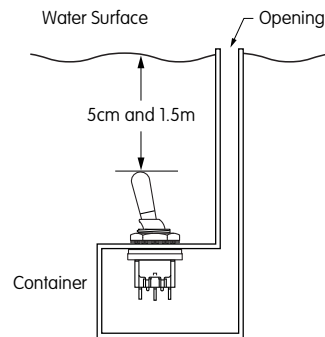
The material for the waterproof boot is silicone rubber. While silicone rubber has excellent heat, cold and weather resistant properties, it has less durability and oil resistance.

The o-rings are made of nitrile butadiene rubber, which excels in durability and oil and chemical resistance. Its performance is less durable with lower weather and ozone resistant characteristics.

Evaluate the products in regard to your application and intended environment with these properties in mind.

### Waterproof Test Conditions

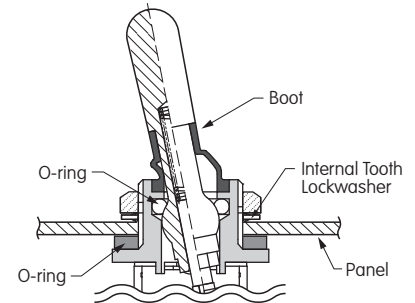
Waterproofing is measured by submersing the switch 5 centimeters from the water surface (see illustration), and opening and closing 50 times at a frequency of 50 – 60 times per minute. The switch is then submersed 1.5 meters from the surface and left in this position for 30 minutes.



Repeat opening and closing same as previous test. The resulting insulation resistance and voltage capacity are both within the rated values, and water has not entered inside the switch or installation panel.

### Panel Installation

For panel installation, the internal tooth lockwasher is installed above the panel. The external o-ring mounts below the panel.



### Applications

- Construction Equipment
- Hospitality and Restaurant
- Transportation
- Medical Equipment
- Machine Tooling
- Marine Equipment \*

\* Salt spray tested as per Mil-STD-810G section 509.5.

A  
Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** Maximum rating varies by model number

**MN11, MN12, MN21, MN22:** 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC

**MN13, MN15, MN18, MN19, MN23, MN25:** 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC

**MN28, MN29:** 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC

**MN32, MN42:** 4A @ 125V AC, 2A @ 250V AC, 3A @ 30V DC

**MN33, MN35, MN38, MN39:** 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

**MN43, MN45, MN48, MN49:** 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

**MN24, MN26, MN27, MN44, MN46, MN47:** 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

Recommended minimum voltage/current: 0.1A @ 2V AC/DC

**Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

## 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:** 50,000 operations minimum

**Electrical Life:** 25,000 operations minimum for silver; 50,000 operations minimum for gold

**Angle of Throw:** 25°

## Materials & Finishes

**Toggle:** Brass with chrome plating

**Frame:** Stainless steel

**Bushing:** Brass with nickel plating

**Support Bracket:** Brass with tin plating

**Case:** Diallyl phthalate resin (UL94V-0)

**Movable Contactor:** Phosphor bronze with silver plating or silver/silver alloy with no plating (code W) or phosphor bronze or copper with gold plating (code G)

**Movable Contacts:** Silver alloy (code W); copper with gold plating (code G)

**Stationary Contacts:** Silver alloy with silver plating (code W); copper or brass with gold plating (code G)

**Terminals:** Copper or brass with silver plating; or copper or brass with gold plating

## Environmental Data

**Operating Temperature Range:** -30°C through +85°C (-22°F through +185°F)

**Humidity:** 90 ~ 95% humidity for 240 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:** 500m/s<sup>2</sup> acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

**Sealing:** Splashproof bushing options B3, D3, D8, L3, & L8, which have o-rings inside & outside the bushing, meet IP67 of IEC60529 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

## Processing

**Soldering:** Wave Soldering (PC version) for Gold: See Profile A in Supplement section.

Manual Soldering for Gold: See Profile A in Supplement section.

Wave Soldering (PC version) for Silver: See Profile B in Supplement section.

Manual Soldering for Silver: See Profile B in Supplement section.

Note: Lever must be in OFF (center) position while soldering.

**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

**Flammability Standards:** UL94V-0 for case

**UL:** Contact NKK Switches for UL or CUL marking option requirements.

# Distinctive Characteristics

Antirootation design, standard on noncylindrical levers, mates toggle and bushing; bottom of toggle has two flattened 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 multiple devices and provide added protection to contact points.

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

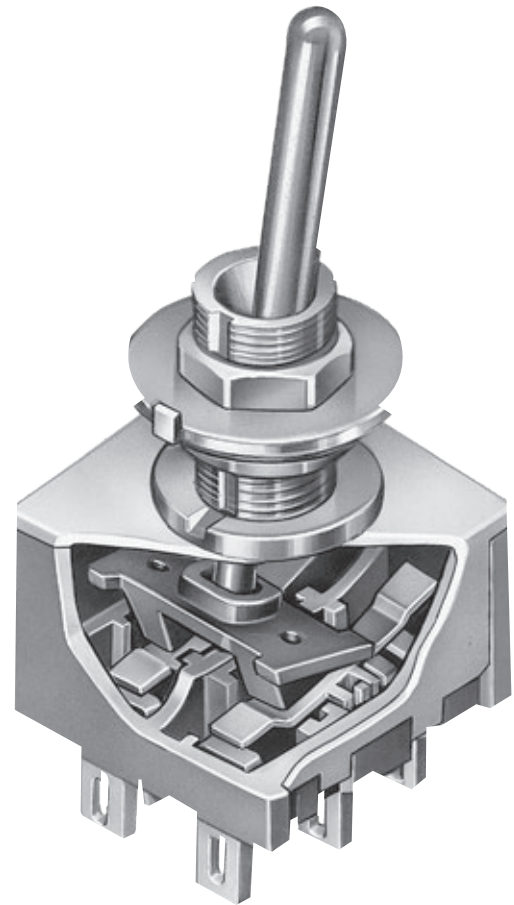
Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Prominent external insulating barriers increase insulation resistance and dielectric strength.

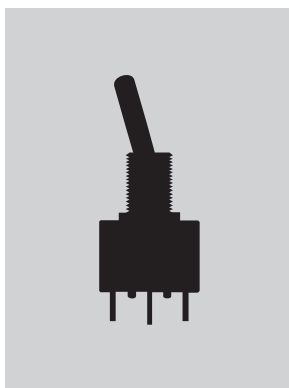
Interlocked actuator block, lever, and interior guide prevent switch failure due to biased lever movement.

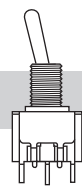
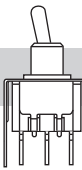
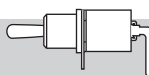
Clinching of frame to case well above base and terminals provides 1,500V dielectric strength.

Special silver alloy contacts with excellent wear resistance and arc resistance maintain high contact stability and long life.



Actual Size



	Bushing Mount	Page A52
	Bracket PC Mount	Page A64
	Angle PC Mount	Page A70

A Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

Toggles  
A

Rockers

Pushbuttons

Programmable Illuminated PB

Keylocks

Rotaries

Slides

Tactiles

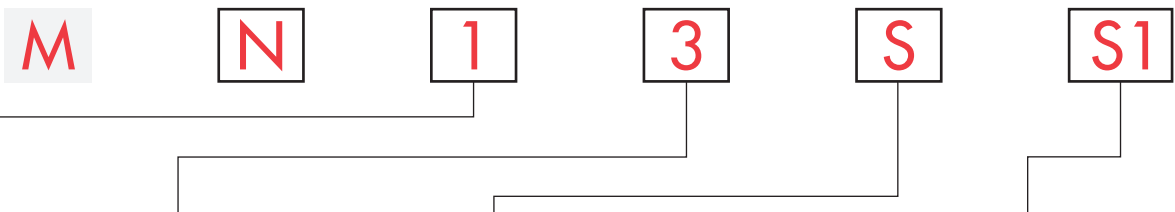
Tilt

Touch

Indicators

Accessories

Supplement



Poles	
1	SPST SPDT
2	DPST DPDT SP3T
3	3PDT
4	4PDT DP3T

Circuits			
* 1	ON	NONE	OFF
2	ON	NONE	ON
3	ON	OFF	ON
5	ON	NONE	(ON)
8	(ON)	OFF	(ON)
9	ON	OFF	(ON)
** 4	ON	ON	ON
** 6	(ON)	ON	(ON)
** 7	ON	ON	(ON)

NONE = No Position

( ) = Momentary

\* ON-NONE-OFF circuit available in 1- and 2-pole only.

\*\* 3-ON circuits

Small Toggles	
S	.413" (10.5mm) Bat
S2	.200" (5.08mm) Bat
S3	.256" (6.5mm) Bat
E	.450" (11.4mm) Flatted
*E2	.256" (6.5mm) Flatted

\*Available on 1- and 2-pole only

Large Toggles	
B	.453" (11.5mm) Large Bat
B2	.689" (17.5mm) Large Bat

Locking Lever	
L	.201" (5.1mm) Dia. Locking Lever

Small Bushings	
*S1	.350" (8.9mm) Threaded with Keyway
**S4	6mm .350" (8.9mm) Threaded with Keyway
***S2	.350" (8.9mm) Smooth with Keyway
****D3	.350" (8.9mm) Threaded Splashproof with D Flat (combines only with S, S2 & S3)
**D8	6mm .350" (8.9mm) Threaded Splashproof with D Flat (combines only with S, S2 & S3)

\* 01 & 06 Terminals Only  
 \*\* 01 & 03 Terminals Only  
 \*\*\* 03 Terminal Only  
 \*\*\*\* 01 Terminal Only

Large Bushings	
**B1	Large .472" (12.0mm) Threaded with Keyway
****B3	Large .472" (12.0mm) Threaded Splashproof with D Flat

\*\* 01 & 03 Terminals Only  
 \*\*\*\* 01 Terminal Only

Bushings For Locking Levers	
*L1	.291" (7.4mm) Threaded with Keyway for Lever Lock
**L4	6mm .291" (7.4mm) Threaded with Keyway for Lever Lock
***L2	Smooth with Keyway for Lever Lock
****L3	.295" (7.5mm) Threaded Splashproof with D Flat for Lever Lock

\* 01 & 06 Terminals Only  
 \*\* 01 & 03 Terminals Only  
 \*\*\* 03 Terminal Only  
 \*\*\*\* 01 Terminal Only

## ORDERING EXAMPLE

Contact Materials & Ratings	
<b>W</b>	Silver; Rated 2 ~ 6A @ 125V AC & 2 ~ 3A @ 250V AC
<b>G</b>	Gold; Rated 0.4VA max @ 28V AC/DC max

Terminals	
<b>*01</b>	Solder Lug
<b>**03</b>	.250" (6.35mm) Straight PC
<b>***06</b>	.750" (19.05mm) Wirewrap

\* Combines with Threaded Bushings Only  
 \*\* Combines with S4, S2, D8, L4 & L2 Bushings Only  
 \*\*\* Combines with S1 Bushing Only

Optional Caps	
<b>For Small Bat Toggles</b>	
<b>B</b>	For S Bat Toggle
<b>C</b>	Conical Cap for S Bat Toggle
<b>For Large Bat Toggles</b>	
<b>R</b>	For B Toggle
<b>V</b>	For B2 Toggle

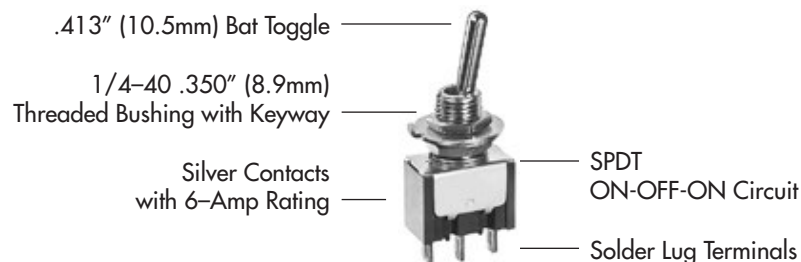
Cap for Locking Lever	
<b>No Code</b>	Nickel Plated Supplied with Switch
<b>A</b>	Black
<b>C</b>	Red
<b>G</b>	Blue

Cap Colors	
<b>A</b>	Black
<b>B</b>	White
<b>C</b>	Red
<b>E</b>	Yellow
<b>F</b>	Green
<b>G</b>	Blue









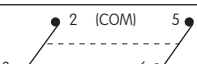

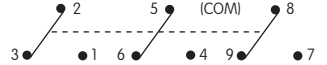

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

## MN13SS1W01



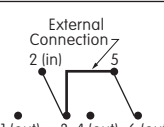
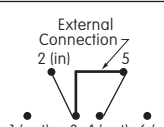
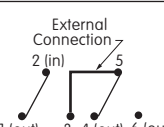
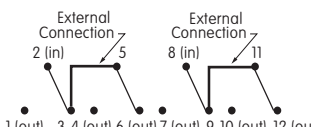
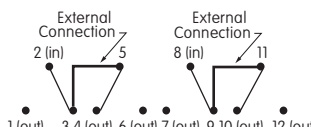
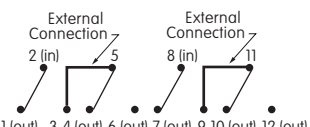


## POLES & CIRCUITS

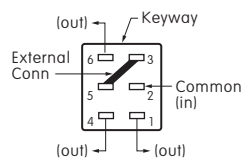
		Toggle Position			Connected Terminals			Throw & Schematics	
		NONE = No Position ( ) = Momentary							
Pole	Model	Down	Center	Up	Down	Center	Up	Note: Terminal numbers are not actually on the switch.	
									
SP	MN11	ON	NONE	OFF	2-3	OPEN	OPEN	SPST	
	MN12	ON	NONE	ON	2-3	OPEN	2-1	SPDT	
	MN13	ON	OFF	ON					
	MN15	ON	NONE	(ON)					
	MN18	(ON)	OFF	(ON)					
MN19	ON	OFF	(ON)						
DP	MN21	ON	NONE	OFF	2-3 5-6	OPEN	OPEN	DPST	
	MN22	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	DPDT	
	MN23	ON	OFF	ON					
	MN25	ON	NONE	(ON)					
	MN28	(ON)	OFF	(ON)					
MN29	ON	OFF	(ON)						
3P	MN32	ON	NONE	ON	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT	
	MN33	ON	OFF	ON					
	MN35	ON	NONE	(ON)					
	MN38	(ON)	OFF	(ON)					
	MN39	ON	OFF	(ON)					
4P	MN42	ON	NONE	ON	2-3 5-6 8-9 11-12	OPEN	2-1 5-4 8-7 11-10	4PDT	
	MN43	ON	OFF	ON					
	MN45	ON	NONE	(ON)					
	MN48	(ON)	OFF	(ON)					
	MN49	ON	OFF	(ON)					

### For 3 Throw (3-On)

### Connected Terminals & Schematic

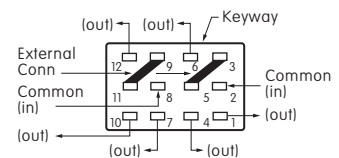
Pole	Model	Down	Center	Up	Down	Center	Up
SP	MN24 MN26 MN27	ON	ON	ON			
		(ON)	ON	(ON)	2-3 5-6	2-3 5-4	2-1 5-4
		ON	ON	(ON)			
DP	MN44 MN46 MN47	ON	ON	ON			
		(ON)	ON	(ON)	2-3 5-6 8-9 11-12	2-3 5-4 8-9 11-10	2-1 5-4 8-7 11-10
		ON	ON	(ON)			

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.

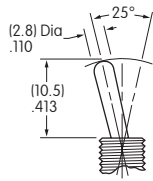
## SMALL TOGGLES

A Toggles

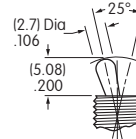
### Important:

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".

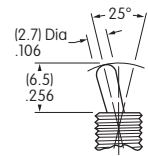
**S** .413" (10.5mm) Bat



**S2** .200" (5.08mm) Bat

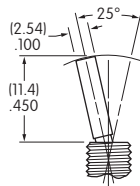
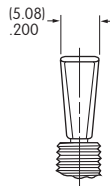


**S3** .256" (6.5mm) Bat

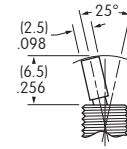
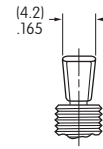


Standard Material & Finish: Brass with Bright Chrome  
Contact factory for optional finishes.

**E** .450" (11.4mm) Flatted

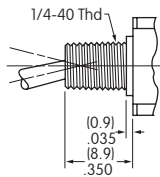
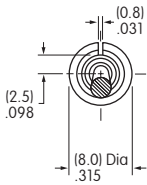


**E2** .256" (6.5mm) Flatted

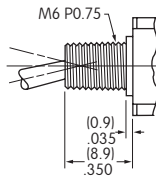
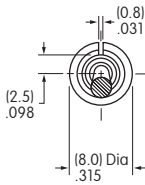


## SMALL BUSHINGS

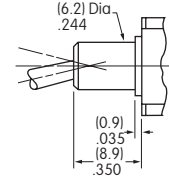
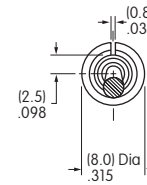
**S1** 1/4-40 .350" (8.9mm) Threaded with Keyway



**S4** 6mm/.350" (8.9mm) Threaded with Keyway



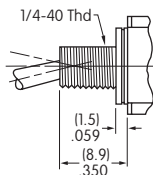
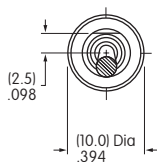
**S2** .350" (8.9mm) Smooth with Keyway



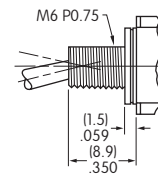
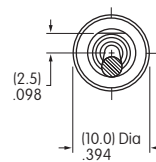
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

**D3** 1/4-40 .350" (8.9mm) Threaded Splashproof with D Flat



**D8** 6mm/.350" (8.9mm) Threaded Splashproof with D Flat



D3 combines only with S, S2 & S3 toggles. Maximum Panel Thickness with Standard Hardware: .193" (4.9mm)

D8 combines only with S, S2 & S3 toggles. Maximum Panel Thickness with Standard Hardware: .193" (4.9mm)

### Standard Hardware Supplied for Small Bushings

Bushing Codes		S1/S4	D3/D8	L1/L4	L3
Hardware and Quantity	Hex Nut	2	1	2	1
	Locking Ring	1	0	1	0
	Lockwasher	1	0	1	0
	O-ring	0	1	0	1

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

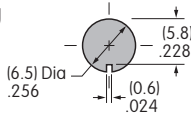
Indicators

Accessories

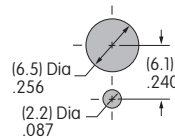
Supplement

Toggles **A**

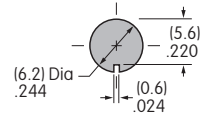
For S1, S2 Bushing with Keyway & for L1 Bushing



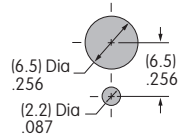
For S1 Bushing with Locking Ring & for L1 Bushing



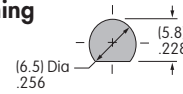
For S4 Bushing with Keyway & for L4 Bushing



For S4 Bushing with Locking Ring & for L4 Bushing



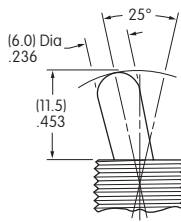
For D3 or D8 Bushing with D Flat & for L3 Bushing



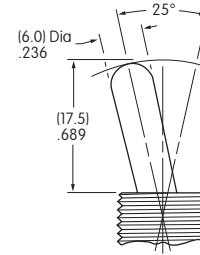
### LARGE TOGGLES

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

**B** .453" (11.5mm) Large Bar



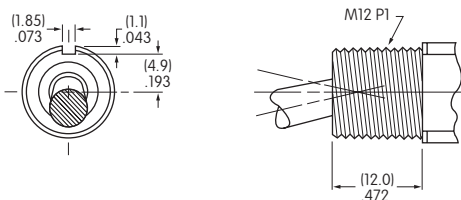
**B2** .689" (17.5mm) Large Bar



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

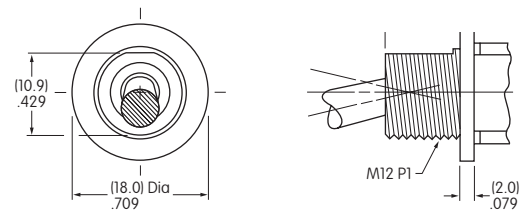
### LARGE BUSHINGS

**B1** Large .472" (12.0mm) Threaded with Keyway



Maximum Panel Thickness with Standard Hardware: .216" (5.5mm)

**B3** Large .472" (12.0mm) Threaded Splashproof with D Flat



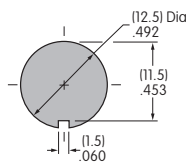
Maximum Panel Thickness with Standard Hardware: .256" (6.5mm)

**Standard Hardware for B1:**  
1 hex face nut AT503M, 1 locking ring AT506M, 1 lockwasher AT508, and 1 hex backup nut AT527M

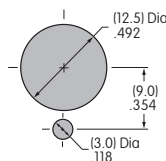
**Standard Hardware for B3:**  
1 hex face nut AT503M and 1 o-ring AT401P

### Panel Cutouts

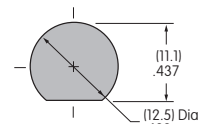
For B1 Bushing with Keyway



For B1 Bushing with Locking Ring



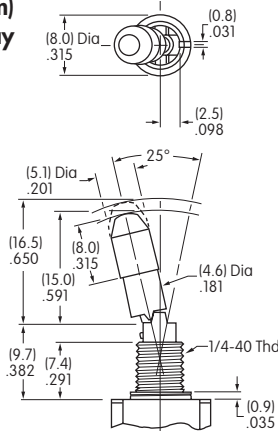
For B3 Bushing with D Flat



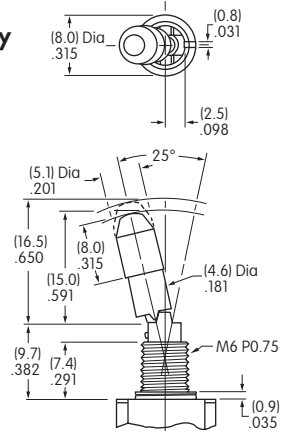
Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## LOCKING LEVER & BUSHINGS

**LL1** 1/4-40 .291" (7.4mm)  
Threaded with Keyway

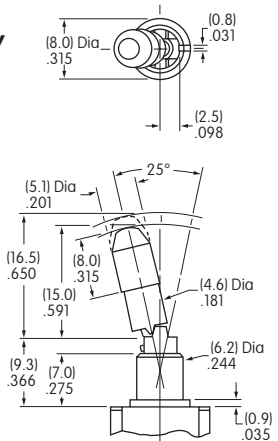


**LL4** 6mm/.291" (7.4mm)  
Threaded with Keyway

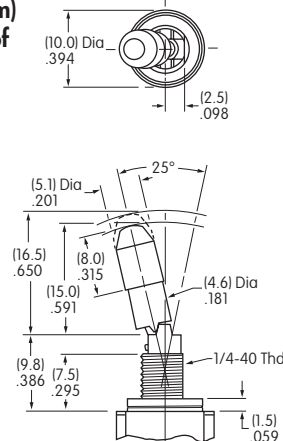


Maximum Panel Thickness with Standard Hardware: .047" (1.2mm)  
Standard Hardware for L1 & L4: 2 hex nuts AT513H or AT513M,  
1 locking ring AT507H or AT507M, and 1 lockwasher AT509

**LL2** Smooth with Keyway



**LL3** 1/4-40 .295" (7.5mm)  
Threaded Splashproof  
with D Flat

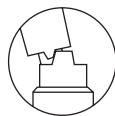


Maximum Panel Thickness with Standard Hardware: .047" (1.2mm)  
Standard Hardware: 1 hex nut AT513H and 1 o-ring AT516

Lever Material & Finish: Brass with Chrome Plating

Locking  
Mechanism

on-none-on



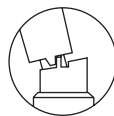
2 positions lock

on-none-(on)



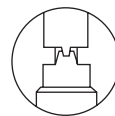
1 position locks

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



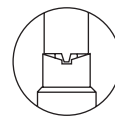
2 positions lock

on-off-on  
on-on-on



3 positions lock

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

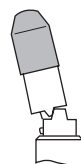


1 position locks

**No Code**

Supplied with Cap AT427

Cap Material:  
Brass with Nickel Plating



Lever

Color Codes for Optional Anodized Aluminum Caps

**A**

Black

**C**

Red

**G**

Blue

## CONTACT MATERIALS & RATINGS

**W**

**Silver  
Power Levels**

**MN11, MN12, MN21, MN22:** 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC  
**MN13, MN15, MN18, MN19, MN23, MN25:** 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN28, MN29:** 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN32, MN42:** 4A @ 125V AC, 2A @ 250V AC, 3A @ 30V DC  
**MN33, MN35, MN38, MN39:** 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC  
**MN43, MN45, MN48, MN49:** 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC  
**MN24, MN26, MN27, MN44, MN46, MN47:** 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

**G**

**Gold**

**Logic Level**

**0.4VA maximum @ 28V AC/DC maximum**

Note: See Supplement section to find complete explanation of operating range.

**Gold over Silver**

**Power Level  
or Logic Level**

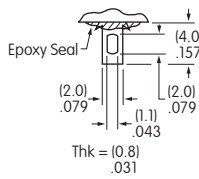
**See above for ratings**

Note: Gold over silver is available as a custom option. This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

## TERMINALS

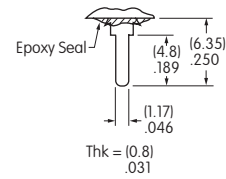
**01**

**Solder Lug**

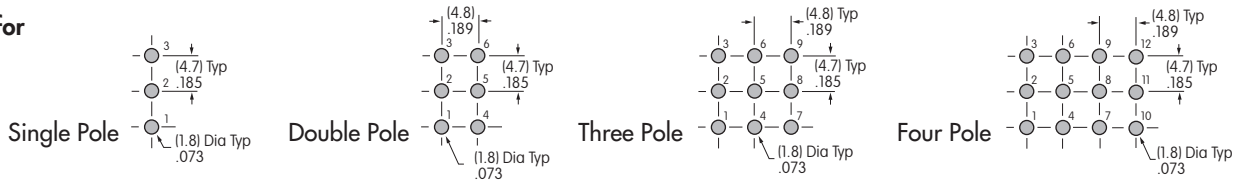


**03**

**.250" (6.35mm)  
Straight PC**

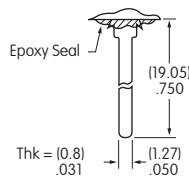


**Footprints for  
Straight PC  
Terminals**



**06**

**.750" (19.05mm)  
Wirewrap or Extended PC**



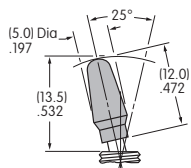
If using as extended PC terminal, refer to the footprints above.

## OPTIONAL CAPS & CAP COLORS

**B**

**\* AT415 Lever Cap  
for S Bat Toggle**

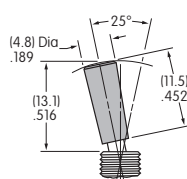
Material: Polyethylene



**C**

**\* AT444 Conical Cap  
for S Bat Toggle**

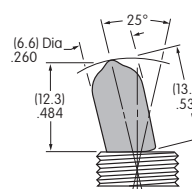
Material: Polyethylene



**R**

**AT434 Lever Cap  
for B Toggle**

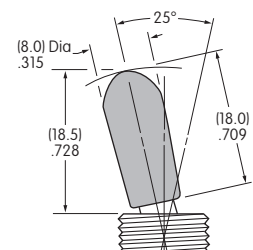
Material: Polyvinyl Chloride



**V**

**AT406 Lever Cap  
for B2 Toggle**

Material: Polyvinyl Chloride



\* AT415 and AT444 for use with S toggles only, not S2 or S3 toggles.

**Cap Colors  
Available:**

**A**

Black

**B**

White

**C**

Red

**E**

Yellow

**F**

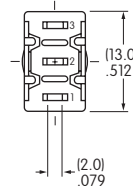
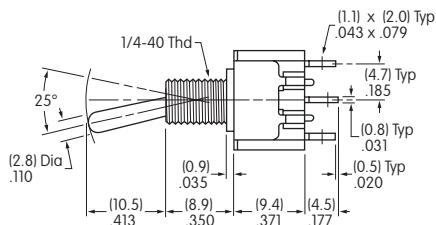
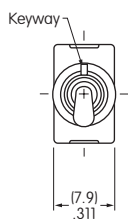
Green

**G**

Blue

## TYPICAL SWITCH DIMENSIONS

### Single Pole



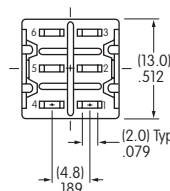
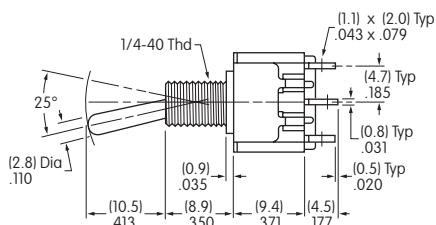
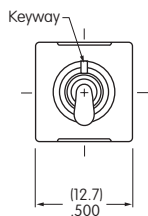
### Solder Lug



MN11 model does not have terminal 1.

**MN12SS1W01**

### Double Pole



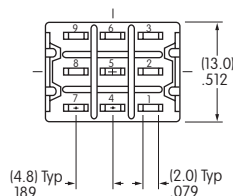
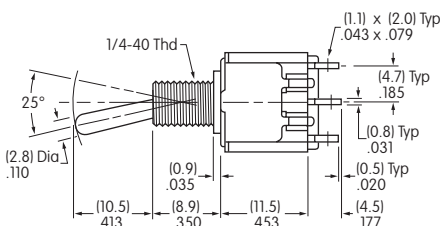
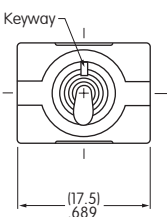
### Solder Lug



MN21 model does not have terminals 1 & 4.

**MN22SS1W01**

### Three Pole

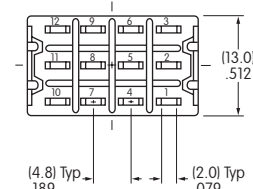
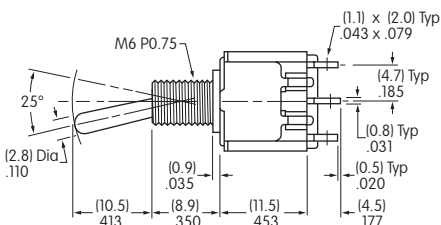
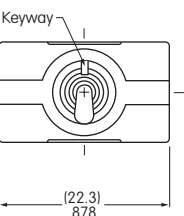


### Solder Lug



**MN32SS1W01**

### Four Pole



### Solder Lug



**MN42SS4W01**

A Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

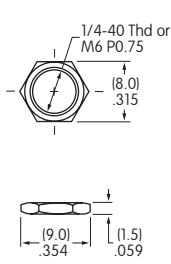
Indicators

Accessories

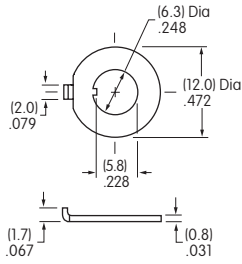
Supplement

## STANDARD HARDWARE FOR SMALL & LARGE BUSHINGS

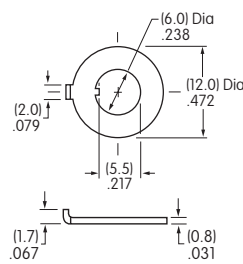
**AT513H for Inch**  
**AT513M for Metric**  
**Hex Nut**  
Brass/Nickel



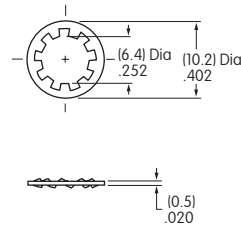
**AT507H for Inch**  
**Locking Ring**  
Steel with Zinc/Chromate



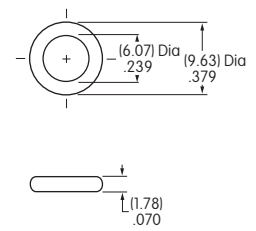
**AT507M for Metric**  
**Locking Ring**  
Steel with Zinc/Chromate



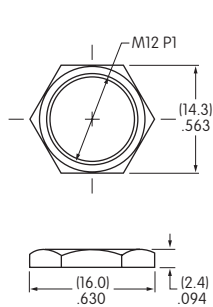
**AT509**  
**Lockwasher**  
Steel with Zinc/Chromate  
(not supplied with splashproof models)



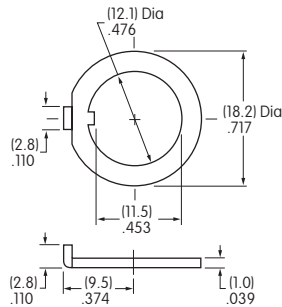
**AT516**  
**O-ring for Splashproof Models**  
Nitrile Butadiene Rubber



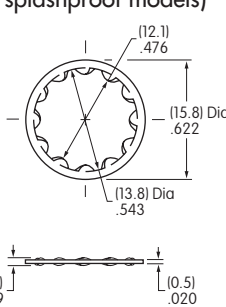
**AT503M**  
**Hex Face Nut**  
Brass/Chrome



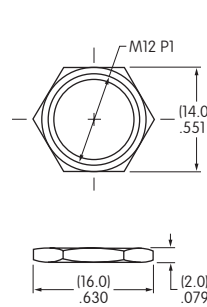
**AT506M**  
**Locking Ring**  
Steel with Zinc/Chromate



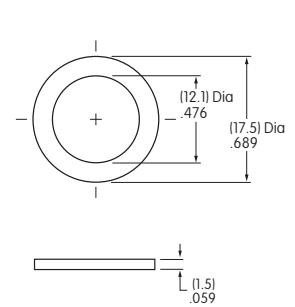
**AT508**  
**Lockwasher**  
Steel with Zinc/Chromate  
(not supplied with splashproof models)



**AT527M**  
**Hex Nut**  
Steel with Nickel Plating



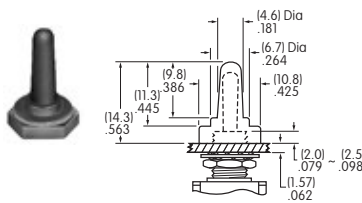
**AT401P**  
**O-ring for Splashproof Models**  
Nitrile butadiene rubber



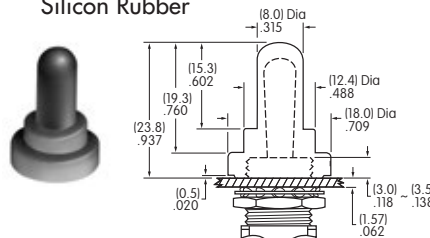
## OPTIONAL SPLASHPROOF BOOTS

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

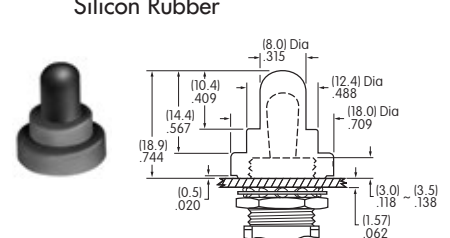
**AT428 (M-metric H-Inch)**  
**.445" (11.3mm)**  
**Boot for S Toggle**  
Silicon Rubber



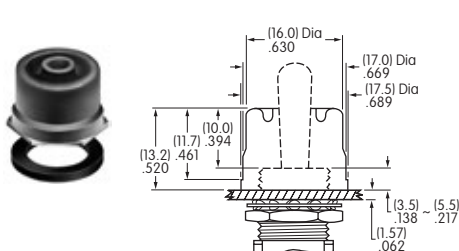
**AT402**  
**.760" (19.3mm)**  
**Boot for B2 Toggle**  
Silicon Rubber



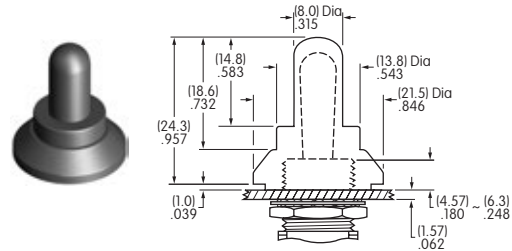
**AT402S**  
**.567" (14.4mm)**  
**Boot for B Toggle**  
Silicon Rubber



**AT401A/H/S**  
**.461" (11.7mm)**  
**Boot, Nut and O-ring for B2 Toggle**  
More details in Accessories section

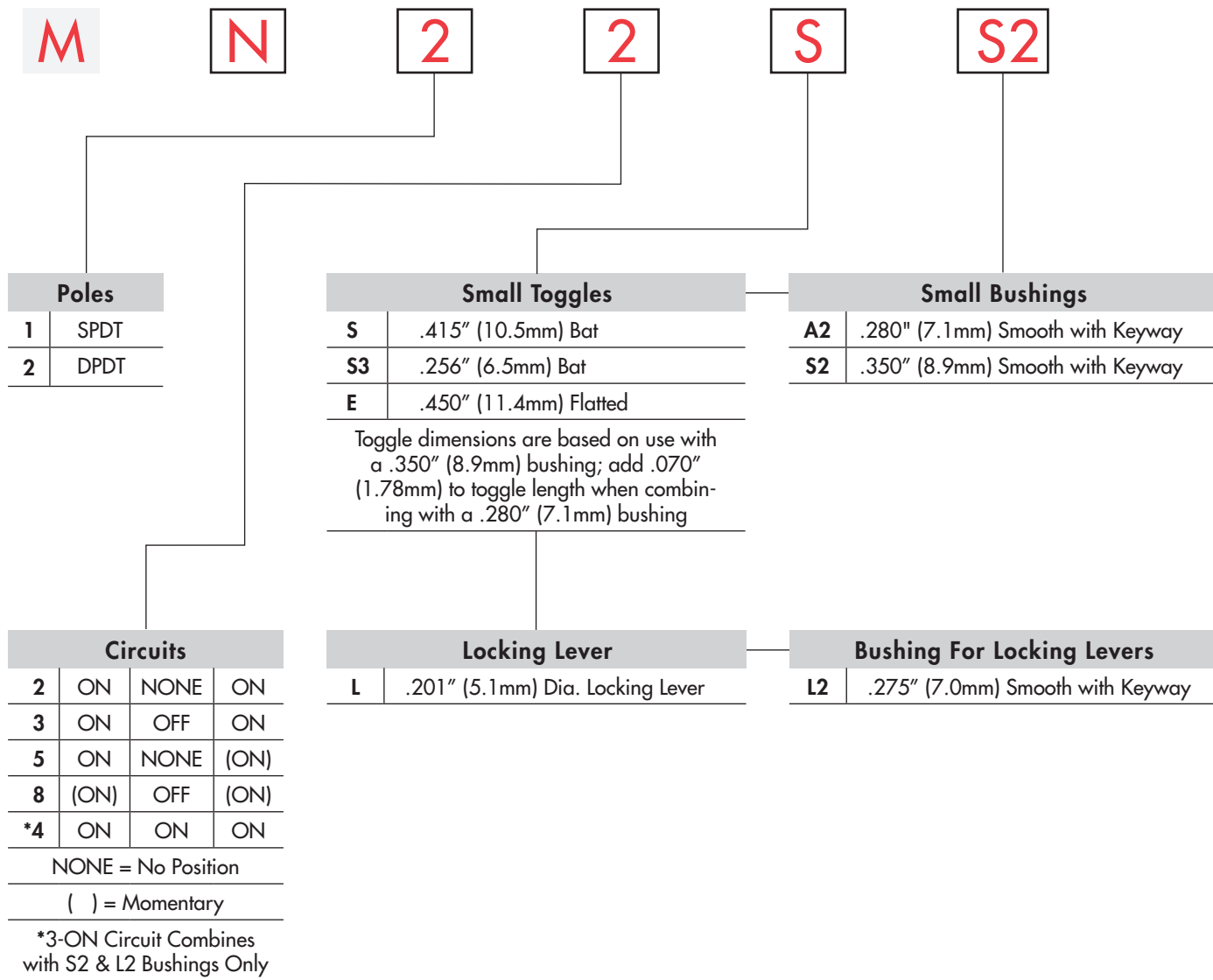


**AT4181**  
**.732" (18.6mm)**  
**Boot, Nut and O-ring for B2 Toggle**  
More details in Accessories section









## ORDERING EXAMPLE

Contact Materials & Ratings	
<b>W</b>	Silver; Rated 2 ~ 6A @ 125V AC & 2 ~ 3A @ 250V AC
<b>G</b>	Gold; Rated 0.4VA max @ 28V AC/DC max

Optional Caps	
<b>B</b>	For S Bat Toggle
<b>C</b>	Conical Cap for S Bat Toggle

Cap Colors	
<b>A</b>	Black
<b>B</b>	White
<b>C</b>	Red
<b>E</b>	Yellow
<b>F</b>	Green
<b>G</b>	Blue

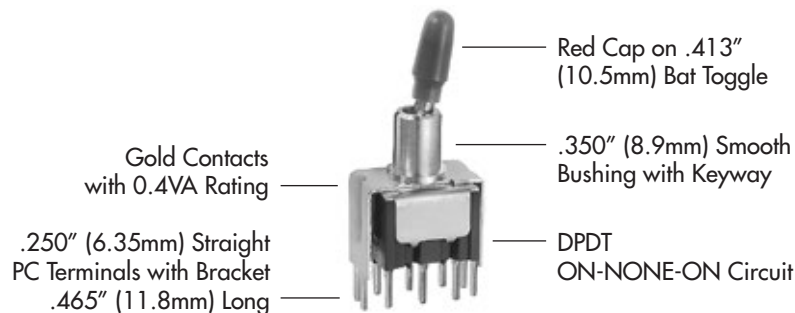
Cap for Locking Lever	
<b>No Code</b>	Nickel Plated Supplied with Switch
<b>A</b>	Black
<b>C</b>	Red
<b>G</b>	Blue

Terminals	
<b>13</b>	.250" (6.35mm) Straight PC with .465" (11.8mm) Bracket

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**MN22SS2G13-BC**



## POLES & CIRCUITS

		Toggle Position			Connected Terminals			Throw & Schematics
		NONE = No Position ( ) = Momentary						
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch.
SP	MN12 MN13 MN15 MN18	ON ON ON (ON)	NONE OFF NONE OFF	ON ON (ON) (ON)	2-3	OPEN	2-1	SPDT 
DP	MN22 MN23 MN25 MN28	ON ON ON (ON)	NONE OFF NONE OFF	ON ON (ON) (ON)	2-3 5-6	OPEN	2-1 5-4	DPDT 

### For 3 Throw (3-On)

Pole	Model	Connected Terminals & Schematics			External Connection
		Down	Center	Up	
SP	MN24	ON  2-3 5-6	ON  2-3 5-4	ON  2-1 5-4	<p>The SP3T model utilizes a double pole base.</p> <p>External connection must be made during field installation.</p>

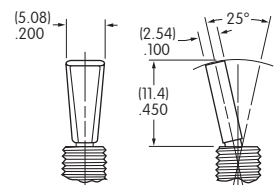
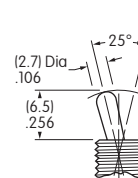
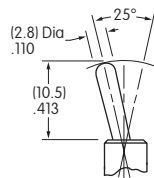
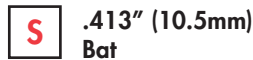
## SMALL TOGGLES

### Important:

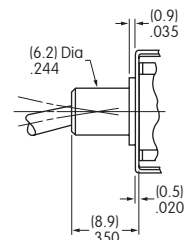
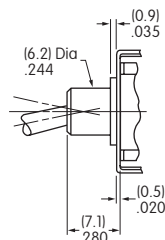
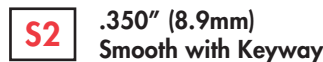
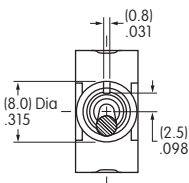
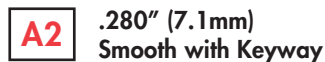
Toggle length changes based on bushing selected. All illustrations are shown with .350" (8.9mm) long bushing. When using a .280" (7.1mm) long bushing, toggle length increases .070" (1.78mm).

### Standard Material & Finish:

Brass with Bright Chrome  
Contact factory for optional finishes.



## SMALL BUSHINGS

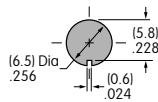


When using this bushing, toggle length is increased by .070" (1.78mm).

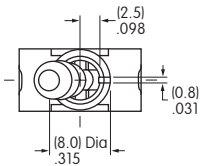
Toggles  
A  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

For A2 and S2 Bushings with Keyway

### Panel Cutout



### LL2 Smooth with Keyway



### Locking Mechanism

on-none-on



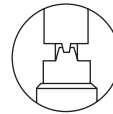
2 positions lock

on-none-(on)



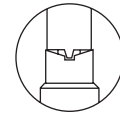
1 position locks

on-off-on

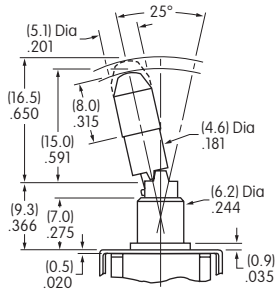


3 positions lock

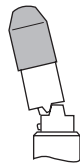
(on)-off-(on)



1 position locks



No Code



### Cap for Locking Lever

Supplied with Cap AT427  
Material & Finish:

Brass with Nickel Plating

### Lever Material & Finish:

Brass with Chrome Plating

### Color Codes for Optional Anodized Aluminum Caps

**A** Black

**C** Red

**G** Blue

## CONTACT MATERIALS & RATINGS

### W Silver Power Levels

**MN12, MN22:** 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC  
**MN13, MN15, MN18, MN23, MN25:** 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN28:** 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN24:** 2A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

### G Gold

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: See Supplement section to find complete explanation of operating range.

Gold over Silver

Power Level or Logic Level

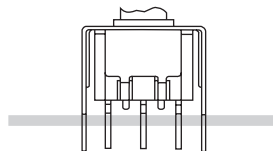
See above for each rating

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

## TERMINALS

### Straight PC Mount with Bracket

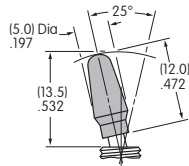
**13** .250" (6.35mm) Terminal with  
.465" (11.8mm) Bracket



PCB footprints are on the following Typical Switch Dimension page.

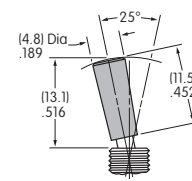
### OPTIONAL CAPS & CAP COLORS

**B** \* AT415  
for S Bat Toggle



Material:  
Polyethylene

**C** \* AT444  
Conical Cap for  
S Bat Toggle



Material:  
Polyethylene

\* AT415 and AT444 for use with S toggles only, not S3 toggles.

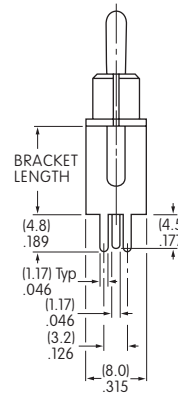
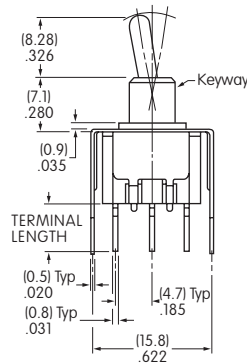
Cap Colors Available:

- A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue

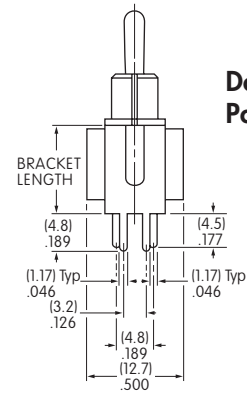
### TYPICAL SWITCH DIMENSIONS

#### Straight PC • Bracket

**MN12S3A2G13**

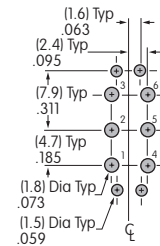
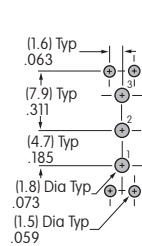


Single Pole



Double Pole

Terminal Code:	Terminal Length:	Bracket Length:
<b>13</b>	.250" (6.35mm)	.465" (11.8mm)





Toggles  
A

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

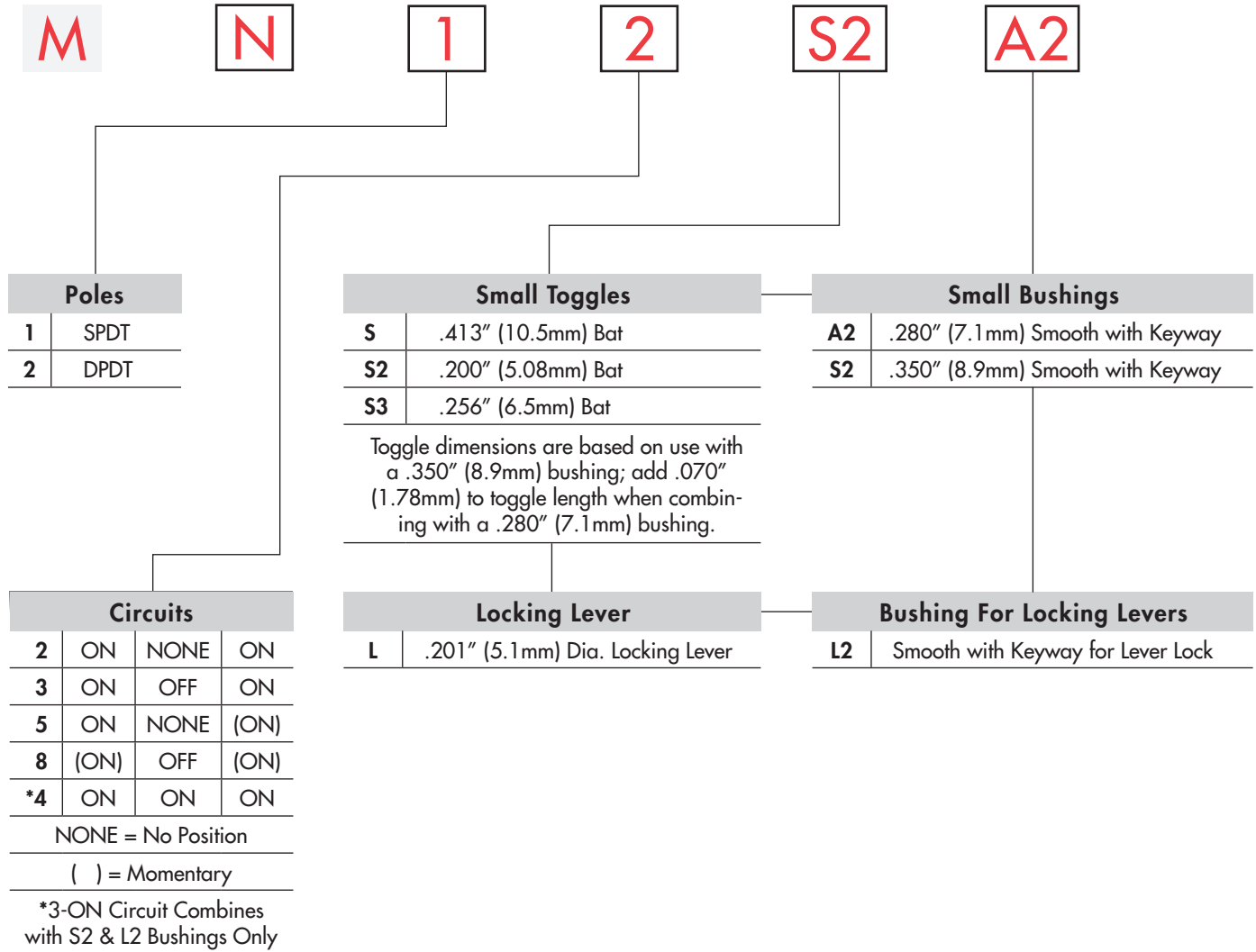
Tilt

Touch

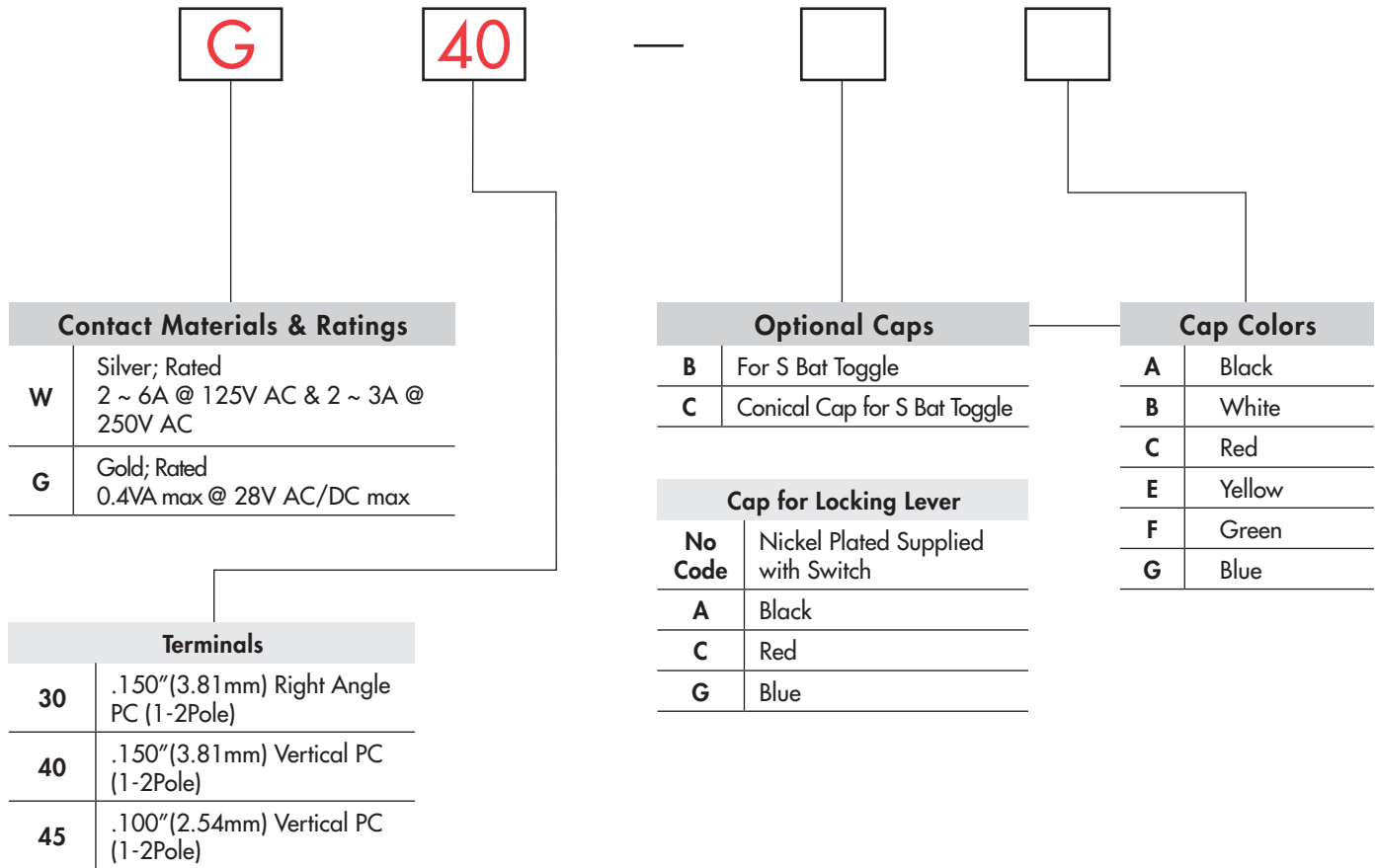
Indicators

Accessories

Supplement

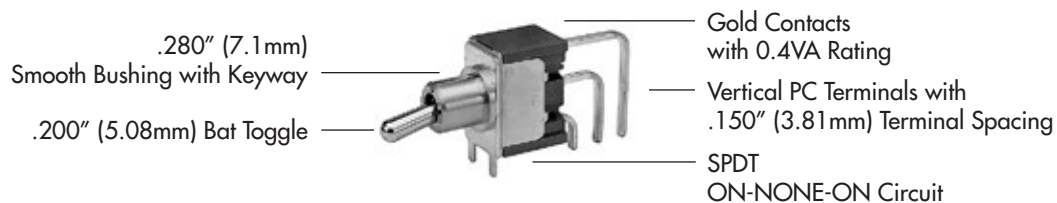


## ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

### MN12S2A2G40





## POLES & CIRCUITS

Pole	Model	Toggle Position			Connected Terminals			Throw & Schematics
		Down	Center	Up	Down	Center	Up	
		NONE = No Position ( ) = Momentary						
								Note: Terminal numbers are not actually on the switch. *Reverse circuits available for vertical mount SP & DP upon request.
SP	MN12 *MN13 MN15 *MN18	ON	NONE	ON	2-3	OPEN	2-1	
DP	MN22 *MN23 MN25 *MN28	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	

### For 3 Throw (3-On)

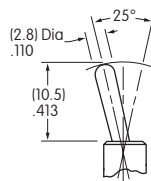
Pole	Model	Connected Terminals & Schematics			External Connection
		Down	Center	Up	
SP	MN24	ON 2-3 5-6	ON 2-3 5-4	ON 2-1 5-4	The SP3T model utilizes a double pole base.  External connection must be made during field installation.

## SMALL TOGGLES

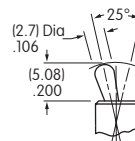
### Important:

Toggle length changes based on bushing selected. All illustrations are shown with .350" (8.9mm) long bushing. When using a .280" (7.1mm) long bushing, toggle length increases .070" (1.78mm).

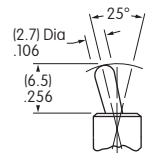
**S** .413" (10.5mm) Bat



**S2** .200" (5.08mm) Bat



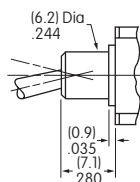
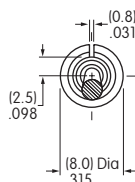
**S3** .256" (6.5mm) Bat



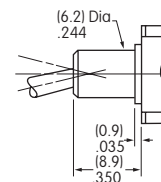
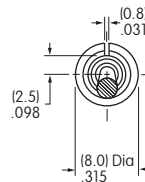
Standard Material & Finish: Brass with Bright Chrome  
Contact factory for optical finishes.

## SMALL BUSHINGS

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



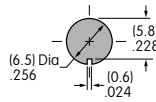
**S2** .350" (8.9mm) Smooth with Keyway



When using this bushing, toggle length is increased by .070" (1.78mm).

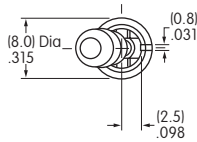
For A2 or S2 Bushing with Keyway

### Panel Cutout



## LOCKING LEVER & BUSHING

**LL2** Smooth with Keyway



### Locking Mechanism

on-none-on



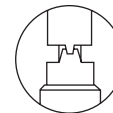
2 positions lock

on-none-(on)



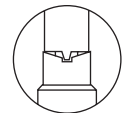
1 position locks

on-off-on

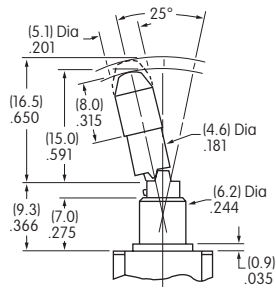


3 positions lock

(on)-off-(on)



1 position locks



**No Code**

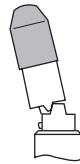
### Cap for Locking Lever

Supplied with Cap AT427  
Material & Finish:

Brass with Nickel Plating

Lever Material & Finish:

Brass with Chrome Plating



### Color Codes for Optional Anodized Aluminum Caps

**A**

Black

**C**

Red

**G**

Blue

## CONTACT MATERIALS & RATINGS

**W** Silver  
Power Levels

**MN12, MN22:** 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC  
**MN13, MN15, MN18, MN23, MN25:** 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN28:** 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC  
**MN24:** 2A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

**G** Gold

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: See Supplement section to find complete explanation of operating range.

Gold over Silver

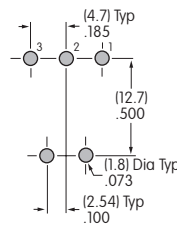
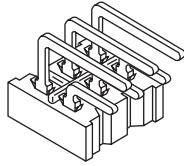
Power Level  
or Logic Level

See above for each ratings

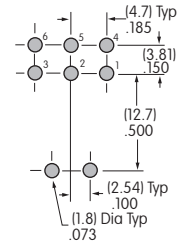
Note: This dual rated toggle is available as a custom option and suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

## TERMINALS

**30** .150" (3.81mm)  
Right Angle PC (1-2 Pole)

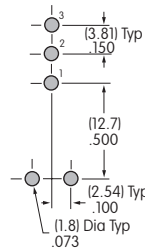
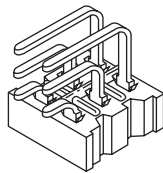


Single Pole

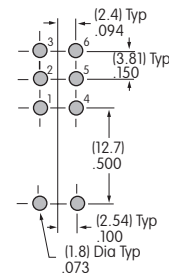


Double Pole

**40** .150" (3.81mm)  
Vertical PC (1-2 Pole)

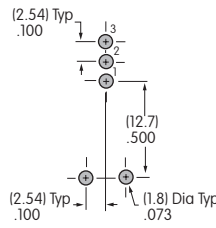
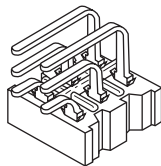


Single Pole

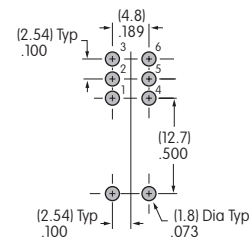


Double Pole

**45** .100" (2.54mm)  
Vertical PC (1-2 Pole)



Single Pole



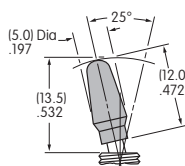
Double Pole

Terminal dimensions are shown on the Typical Switch Dimensions pages which follow.

## OPTIONAL CAPS & CAP COLORS

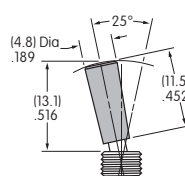
**B** \* AT415  
for S Bat Toggle

Material:  
Polyethylene



**C** \* AT444  
Conical Cap for S Bat Toggle

Material:  
Polyethylene



Colors Available

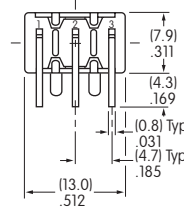
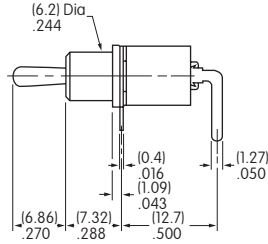
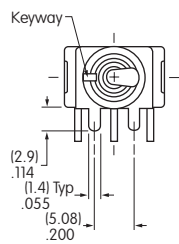
- |                |                 |
|----------------|-----------------|
| <b>A</b> Black | <b>E</b> Yellow |
| <b>B</b> White | <b>F</b> Green  |
| <b>C</b> Red   | <b>G</b> Blue   |

\* AT415 and AT444 for use with S toggles only, not S2 or S3 toggles.

## TYPICAL SWITCH DIMENSIONS

### Single Pole

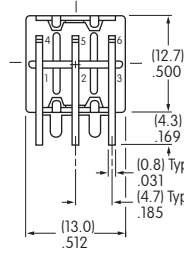
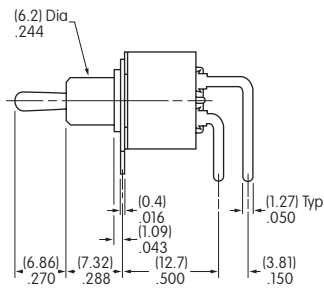
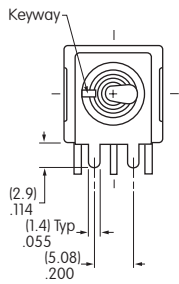
### .150" (3.81mm) Right Angle PC



**MN12S2A2W30**

### Double Pole

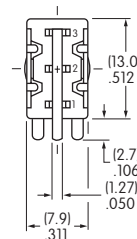
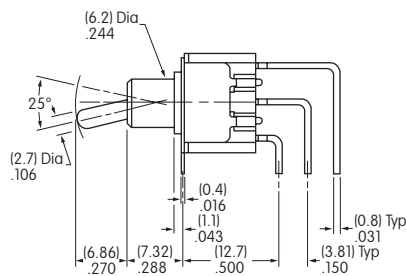
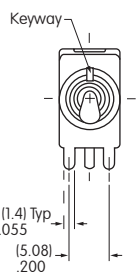
### .150" (3.81mm) Right Angle PC



**MN22S2A2G30**

### Single Pole

### .150" (3.81mm) Vertical PC

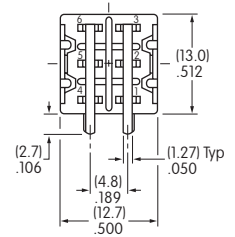
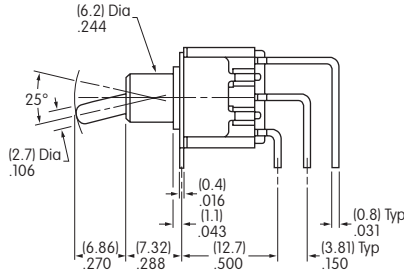
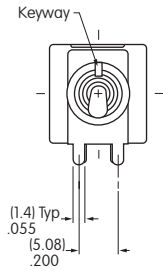


**MN12S2A2G40**

## TYPICAL SWITCH DIMENSIONS

### .150" (3.81mm) Vertical PC

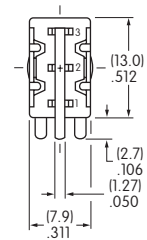
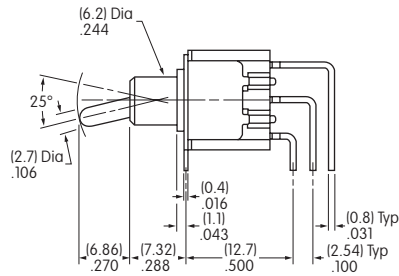
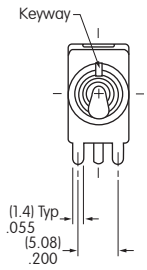
### Double Pole



**MN22S2A2G40**

### .100" (2.54mm) Vertical PC

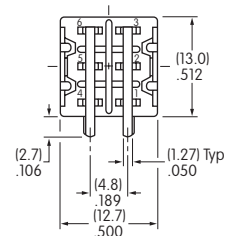
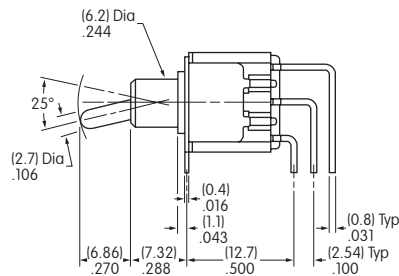
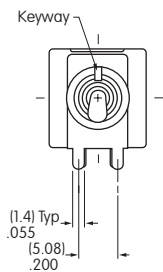
### Single Pole



**MN12S2A2G45**

### .100" (2.54mm) Vertical PC

### Double Pole



**MN22S2A2G45**



# General Specifications

A  
Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 6A @ 125V AC or 3A @ 250V AC or 3A @ 30V DC  
**Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum  
 (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)  
 Note: Find additional explanation of operating range in Supplement section.

## 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 & case for 1 minute minimum  
**Mechanical Life:** 50,000 operations minimum  
**Electrical Life:** 25,000 operations minimum  
**Nominal Operating Force:**

	On-to-On Position	Off-to-On Position
Single Pole	3.19N	3.92N
Double Pole	4.41N	7.06N

**Angle of Throw:** 20°

## Materials & Finishes

**Bushing:** Brass with nickel plating  
**Housing:** Stainless steel  
**Mounting Bracket:** Steel with tin plating  
**Movable Contacts:** Silver alloy or copper alloy with gold plating  
**Stationary Contacts:** Silver alloy with silver plating or copper or brass with gold plating  
**Lamp Contacts:** Phosphor bronze  
**Base:** Diallyl phthalate resin (UL94V-0)  
**Switch Terminals:** Brass or copper with silver or gold plating  
**Lamp Terminals:** Brass or copper with silver or gold plating

## Environmental Data

**Operating Temp Range:** -10°C through +55°C (+14°F through +131°F)  
**Humidity:** 90 ~ 95% humidity for 240 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:** 500 m/s<sup>2</sup> acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Mounting Torque:** 1.47Nm (13 lb•in) for double nut; .67Nm (6 lb•in) for single nut  
**Soldering Time & Temp:** Wave Soldering (PC version): See Profile B in Supplement section.  
 Manual Soldering: See Profile B in Supplement section.  
 Note: Lever must be in center position while soldering.  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

**Flammability Standards:** UL94V-0 base

# Distinctive Characteristics

Industry's first LED illumination at tip of toggle switches.

Single color LEDs of red, yellow, and green, plus bicolor red/green, to meet varied design requirements.

LEDs can operate independently from or synchronously with switching operation.

Antijamming feature to protect contacts from damage due to excessive downward force on the toggle.

High torque bushing prevents the bushing from rotating or separating from the metal frame during installation.

Stainless steel frame resists corrosion.

Silver contacts are of specially composed alloy for hardness.

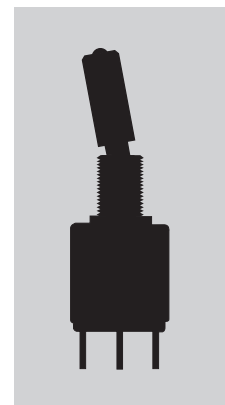
High insulating barriers protect against crossover in double pole devices.

Terminals are molded in and epoxy sealed to lock out flux, dust, and other contaminants.

1,500V dielectric strength between switch contacts and case is accomplished by clinching the frame away from the terminals.



Actual Size



A

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

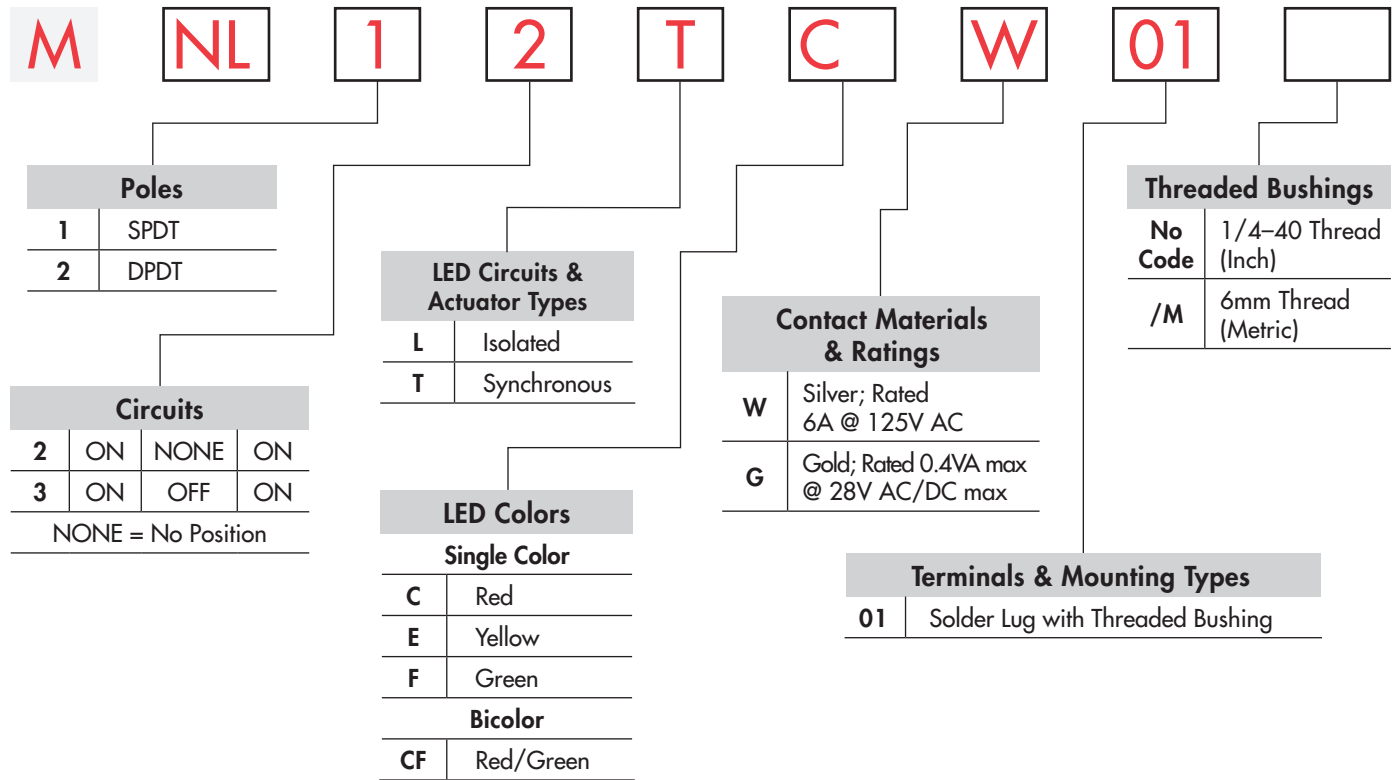
Indicators

Accessories

Supplement

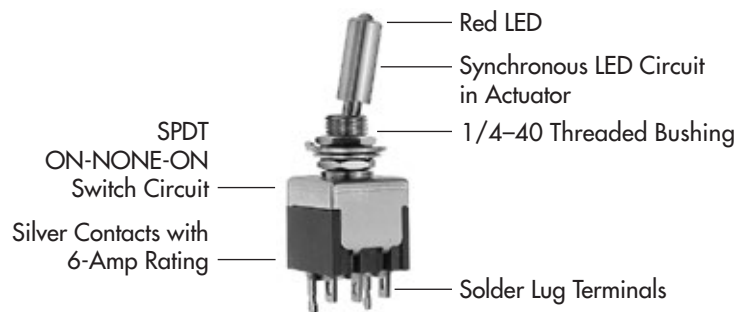


### TYPICAL SWITCH ORDERING EXAMPLE




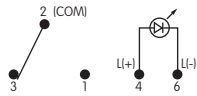
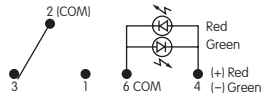
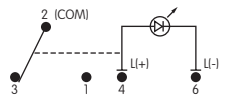
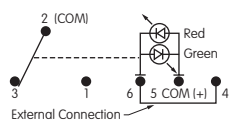


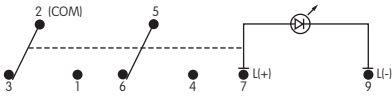
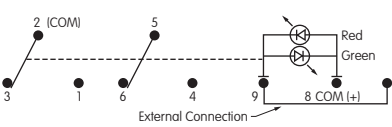


### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**MNL12TCW01**



## POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Toggle Position & Terminal Numbers NONE = No Position			Schematics
		Down 	Center 	Up 	
<b>MNL12</b> Connected Power Terminals	<b>SPDT</b>	ON 2-3	NONE NONE	ON 2-1	<p>Notes: Terminal numbers are not actually on the switch. LEDs require an external power source.</p> <p>Isolated Single Color LED </p> <p>Isolated Bicolor LED </p>
<b>LED Circuit</b>	<b>Isolated LEDs</b> (see schematics) Connected LED Terminals	ON 4-6	NONE NONE	ON 4-6	
	<b>Synchronous Single Color LED</b> Connected LED Terminals	ON 4-6	NONE NONE	OFF OPEN	
	<b>Synchronous Bicolor LED</b> Connected LED Terminals	Red 5-6	NONE NONE	Green 5-4	
<b>MNL13</b> Connected Power Terminals	<b>SPDT</b>	ON 2-3	OFF OPEN	ON 2-1	<p>Synchronous Single Color LED </p> <p>Synchronous Bicolor LED </p>
<b>LED Circuit</b>	<b>Isolated LEDs</b> (see schematics) Connected LED Terminals	ON 4-6	ON 4-6	ON 4-6	
	<b>Synchronous Single Color LED</b> Connected LED Terminals	ON 4-6	OFF OPEN	ON 4-6	
	<b>Synchronous Bicolor LED</b> Connected LED Terminals	Red 5-6	OFF OPEN	Green 5-4	
<b>MNL22</b> Connected Power Terminals	<b>DPDT</b>	ON 2-3 5-6	NONE NONE	ON 2-1 5-4	<p>Isolated Single Color LED </p> <p>Isolated Bicolor LED </p>
<b>LED Circuit</b>	<b>Isolated LEDs</b> (see schematics) Connected LED Terminals	ON 7-9	NONE NONE	ON 7-9	
	<b>Synchronous Single Color LED</b> Connected LED Terminals	ON 7-9	NONE NONE	OFF OPEN	
	<b>Synchronous Bicolor LED</b> Connected LED Terminals	Red 8-9	NONE NONE	Green 8-7	
<b>MNL23</b> Connected Power Terminals	<b>DPDT</b>	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	<p>Synchronous Single Color LED </p> <p>Synchronous Bicolor LED </p>
<b>LED Circuit</b>	<b>Isolated LEDs</b> (see schematics) Connected LED Terminals	ON 7-9	ON 7-9	ON 7-9	
	<b>Synchronous Single Color LED</b> Connected LED Terminals	ON 7-9	OFF OPEN	ON 7-9	
	<b>Synchronous Bicolor LED</b> Connected LED Terminals	Red 8-9	OFF OPEN	Green 8-7	

A  
Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section.

The LED is an integral part of the switch and not available separately.  Bicolor LED is translucent white when unlit.		Single Color			Bicolor	
	Color	<b>C</b> Red	<b>E</b> Yellow	<b>F</b> Green	<b>CF</b> Red/Green	Units
Maximum Forward Current	$I_{FM}$	30	30	30	25	mA
Typical Forward Current	$I_F$	20	20	20	10	mA
Forward Voltage	$V_F$	2.2	2.1	2.2	1.7/2.0	V
Maximum Reverse Voltage	$V_{RM}$	4	4	4	—	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.38	0.38	0.38	0.33/0.33	mA/°C
Ambient Temperature Range		-10° ~ +55°C				

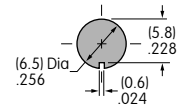
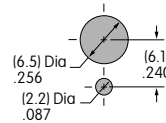
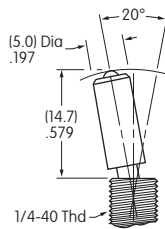
## LED CIRCUIT, TOGGLE, & MOUNTING TYPE COMBINATIONS

**L** Toggle with Isolated LED Circuit

**T** Toggle with Synchronous LED Circuit

Finish: Brushed aluminum

Standard Hardware: 2 AT513H Hex Nuts, 1 AT507H Locking Ring, 1 AT509 Lockwasher Standard & optional hardware details in Accessories & Hardware section.



Threaded Bushing combines with Terminal code 01.

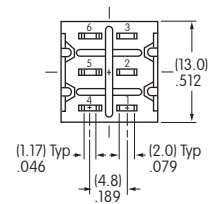
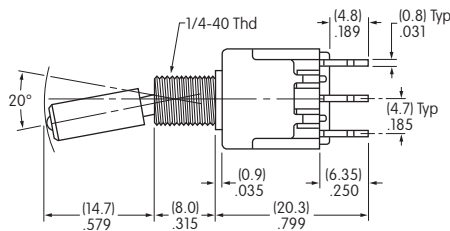
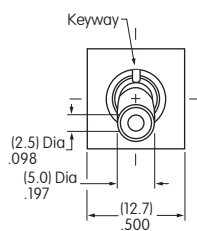
Max. Panel Thickness with Standard Hardware .102" (2.6mm)

Max. Panel Thickness without Locking Ring .134" (3.4mm)

## TYPICAL SWITCH DIMENSIONS

Solder Lug

Single Pole



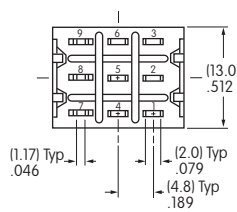
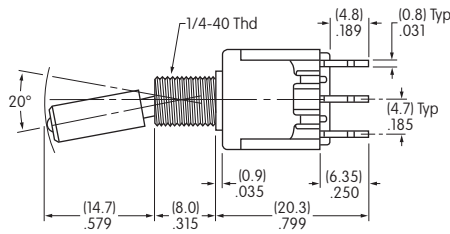
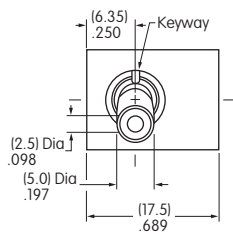
**MNL12TCFW01**

Single color LED switch does not have terminal 5.

## TYPICAL SWITCH DIMENSIONS

### Double Pole

### Solder Lug



Single color LED switch does not have terminal 8.

**MNL22TCFW01**

## CONTACT MATERIALS & RATINGS

**W**

Silver

Power Level

6A @ 125V AC & 3A @ 250V AC

**G**

Gold

Logic Level

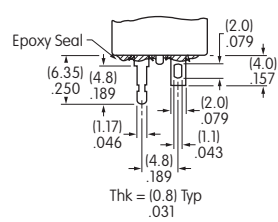
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

## TERMINALS

**01**

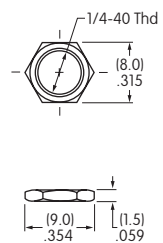
Solder Lug with Turret LED Terminal



## STANDARD MOUNTING HARDWARE

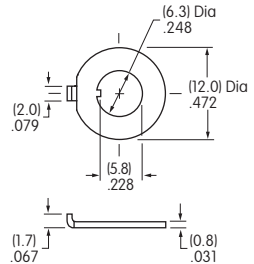
**AT513H Hexagon Nut**  
(2 per switch)

Material:  
Brass with nickel plating



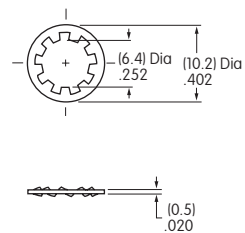
**AT507H Locking Ring**  
(1 per switch)

Material:  
Steel with chromate over zinc



**AT509 Lockwasher**  
(1 per switch)

Material:  
Steel with chromate over zinc



**Optional Hardware:** Knurled nuts, dress nuts, and ON-OFF plates are available; see details in Accessories & Hardware section.

- A Toggles
- Rockers
- Pushbuttons
- Illuminated PB
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement