General Specifications

Electrical Capacity (Resistive Load)

Power Level (silver): 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 (gold): 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Logic/Power Level (gold over silver): Combines silver & gold ratings
Note: Find additional explanation of dual rating & 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 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
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: Brass with tin 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/s^2) 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: **File No. E44145 - Recognized only when ordered with marking on switch.**
Add "/U" or "/CUL" before dash in part number to order UL recognized switch.
All models recognized at 6A @ 125V AC, 3A @ 250V AC or 0.4VA maximum @ 28V DC maximum.
CSA: **File No. 023535_0_000 - Certified only when ordered with marking on switch.**
Add "/C" before dash in part number to order CSA certified switch.
All models certified at 6A @ 125V AC or 3A @ 250V AC or 0.4VA maximum @ 28V maximum.

Distinctive Characteristics

Antirotation design, standard on noncylindrical levers, mates toggle and bushing; bottom of toggle 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.

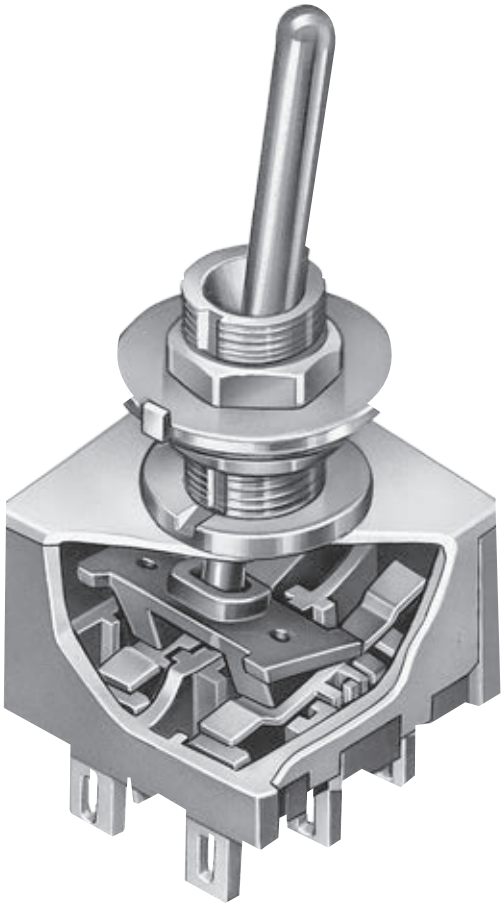
Molded diallyl phthalate case has a UL flammability rating of 94V-0.

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

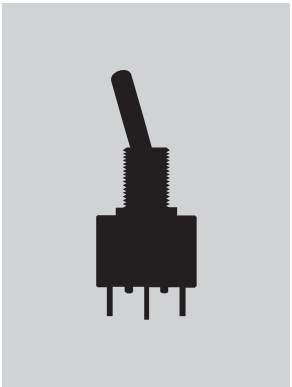
Prominent external insulating barriers increase insulation resistance and dielectric strength.

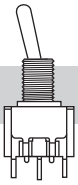
Interlocked actuator block, lever, and interior guide prevent switch failure due to biased lever movement.

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

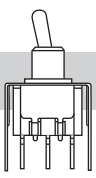


Actual Size

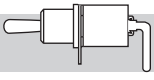




Bushing Mount Page A52



Bracket PC Mount Page A64



Angle PC Mount Page A70

TYPICAL SWITCH

M20 | 1 | 3 | S | S1

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)

( ) = 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
E4	.840" (21.3mm) Flatted
* Q	.550" (14.0mm) Cone
* Q2	.640" (16.26mm) Cone
* Q4	.840" (21.3mm) Cone
* C	.571" (14.5mm) Color Tipped Cone (available in colors A, B & C only)
D	.840" (21.3mm) Color Capped Cone

Specify cap color for toggles C & D at the end of the part number.
* Available on 1- and 2-pole only.

Small Bushings

S1	.350" (8.9mm) Threaded with Keyway
S4	6mm .350" (8.9mm) Threaded with Keyway
S2	.350" (8.9mm) Smooth with Keyway
A1	.280" (7.1mm) Threaded with Keyway
A2	.280" (7.1mm) Smooth with Keyway
D1	.350" (8.9mm) Threaded with D Flat
D4	6mm .350" (8.9mm) Threaded with D Flat
D3	.350" (8.9mm) Threaded Splashproof with D Flat (combines only with S, S2 & S3)
D8	6mm .350" (8.9mm) Threaded Splash-proof with D Flat (combines only with S, S2 & S3)

Large Toggles

B	.453" (11.5mm) Large Bat
B2	.689" (17.5mm) Large Bat
R	.610" (15.5mm) Large Flatted

Large Bushings

B1	Large .472" (12mm) Threaded with Keyway
B3	Large .472" (12mm) Threaded Splashproof with D Flat

Locking Lever

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

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
L8	6mm .295" (7.5mm) Threaded Splash-proof with D Flat for Lever Lock

IMPORTANT:

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

ORDERING EXAMPLE

W 01 — □ □

Contact Materials & Ratings

W	Silver; Rated 6A @ 125V AC & 3A @ 250V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max
A	Gold over Silver; Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max

Terminals

01	Solder Lug
02	Quick Connect
03	.250" (6.35mm) Straight PC
05	.425" (10.8mm) Wirewrap
06	.750" (19.05mm) Wirewrap
07	.964" (24.5mm) Wirewrap
08	1.062" (27.0mm) Wirewrap

Optional Caps

For Small Bat Toggles	
B	For S Bat Toggle
C	Conical Cap for S Bat Toggle
For Large Bat Toggles	
R	For B Toggle
V	For B2 Toggle

Cap for Locking Lever

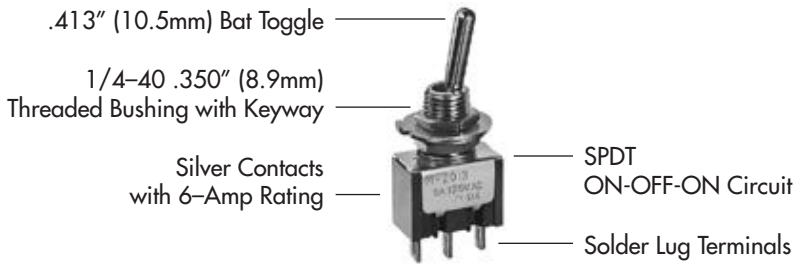
No Code	Nickel Plated Supplied with Switch
A	Black
C	Red
G	Blue

Cap Colors

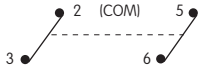
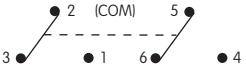
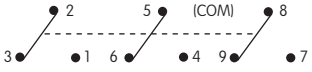
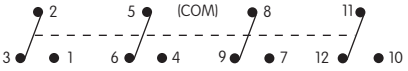
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2013SS1W01

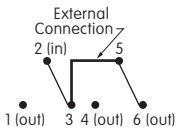
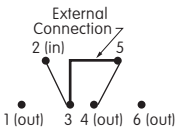
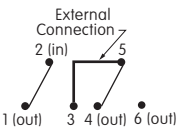
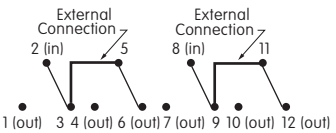
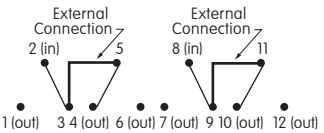
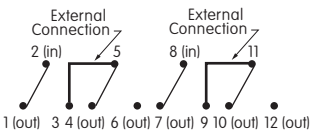


POLES & CIRCUITS

Pole	Model	Toggle Position ( ) = Momentary: Down (Keyway)	Center	Up	Connected Terminals: Down (Keyway)	Center	Up	Throw & Schematics
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 

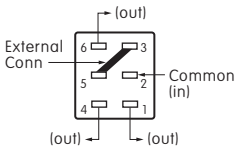
For 3 Throw (3-On)

Connected Terminals & Schematic

Pole	Model	Down	Center	Up	Down	Center	Up
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

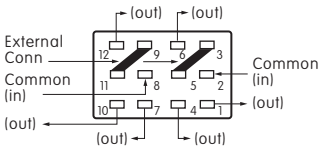
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

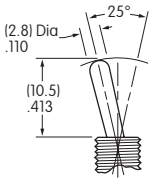
External connection must be made during field installation.



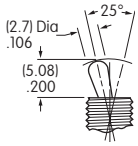
SMALL TOGGLES

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".

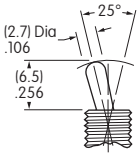
S .413" (10.5mm) Bat



S2 .200" (5.08mm) Bat

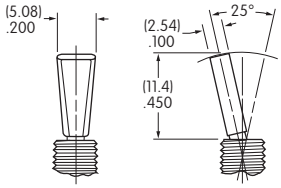


S3 .256" (6.5mm) Bat

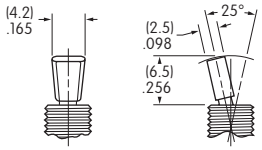


Standard Material & Finish: Brass with Bright Chrome
Contact factory for optional finishes.

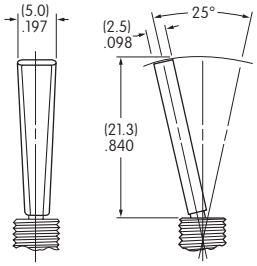
E .450" (11.4mm) Flatted



E2 .256" (6.5mm) Flatted



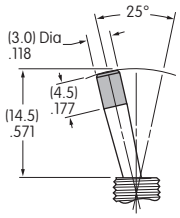
E4 .840" (21.3mm) Flatted



Only Available in 1- & 2-Pole

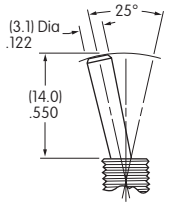
C .571" (14.5mm) Color Tipped Cone Supplied with Cap AT445

Colors: A B C
Material: Polycarbonate

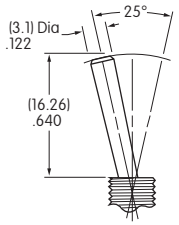


Only Available in 1- & 2-Pole

Q .550" (14.0mm) Cone

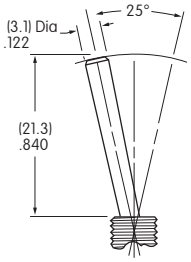


Q2 .640" (16.26mm) Cone



Only Available in 1- & 2-Pole

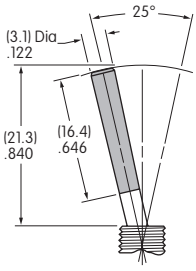
Q4 .840" (21.3mm) Cone



Only Available in 1- & 2-Pole

D .840" (21.3mm) Color Capped Cone Supplied with Cap AT460

Colors: A B C E F G
Material: Polyethylene



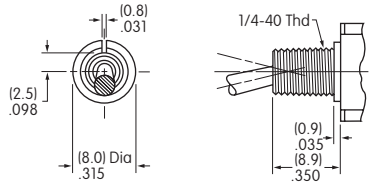
Only Available in 1- & 2-Pole

Cap Colors Available:

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

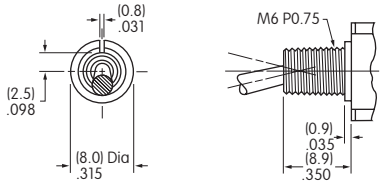
SMALL BUSHINGS

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



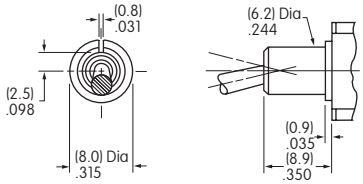
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

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

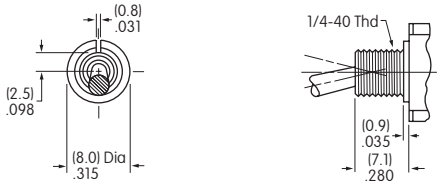


Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

S2 .350" (8.9mm) Smooth with Keyway

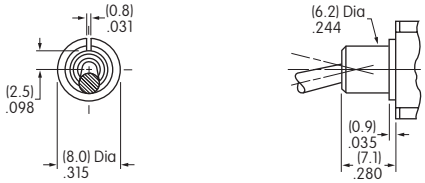


A1 1/4-40 .280" (7.1mm) Threaded with Keyway



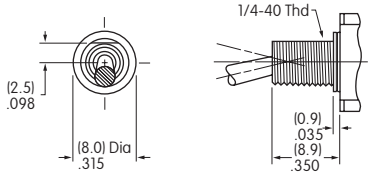
When using this bushing, toggle length is increased by .070". Maximum Panel Thickness with Standard Hardware: .031" (0.8mm)

A2 .280" (7.1mm) Smooth with Keyway



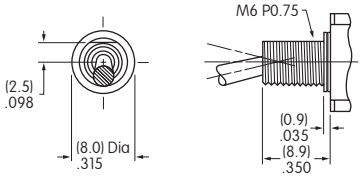
When using this bushing, toggle length is increased by .070".

D1 1/4-40 .350" (8.9mm) Threaded with D Flat



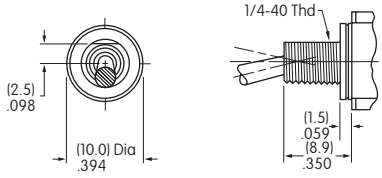
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

D4 6mm/.350" (8.9mm) Threaded with D Flat



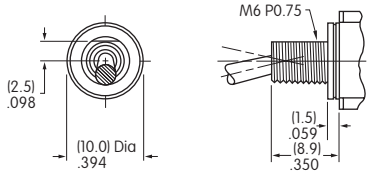
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

D3 1/4-40 .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 6mm/.350" (8.9mm) Threaded Splashproof with D Flat

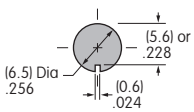


D8 combines only with S, S2 & S3 toggles. Maximum Panel Thickness with Standard Hardware: .193" (4.9mm)

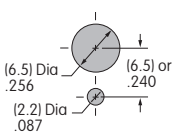
Standard Hardware Supplied for Small Bushings

	Bushing Codes	S1/S4	A1	D1/D4	D3/D8	L1/L4	L3/L8
Hardware and Quantity	Hex Nut	2	2	2	1	2	1
	Locking Ring	1	1	0	0	1	0
	Lockwasher	1	1	1	0	1	0
	O-ring	0	0	0	1	0	1

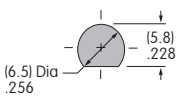
For S1, S2, A1, A2 or S4 Bushing with Keyway & for L1 or L4 Bushing



For S1, A1 or S4 Bushing with Locking Ring & for L1 or L4 Bushing



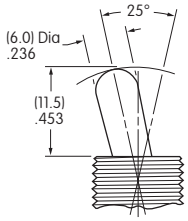
For D1, D4, D3 or D8 Bushing with D Flat & for L3 or L8 Bushing



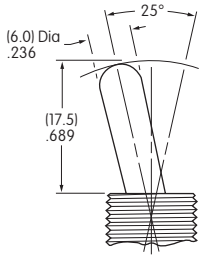
LARGE TOGGLES

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

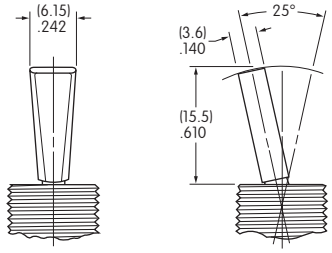
B **.453" (11.5mm) Large Bat**



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



R **.610" (15.5mm) Large Flatted**

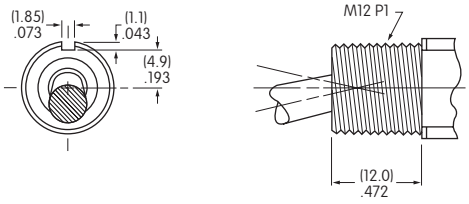


Standard Material & Finish: Brass with Bright Chrome

Optional Finishes: Contact factory for satin chrome or black.

LARGE BUSHINGS

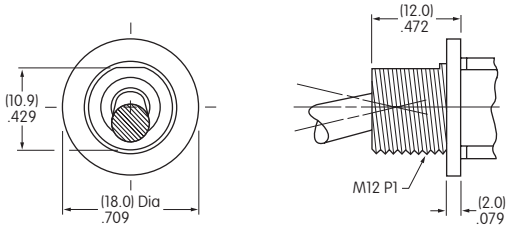
B1 **Large .472" (12.0mm) Threaded with Keyway**



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

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

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

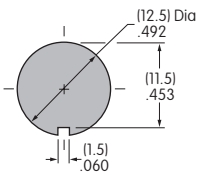


Maximum Panel Thickness with Standard Hardware: .256" (6.5mm)

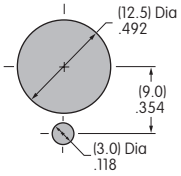
Standard Hardware for B3:
1 hex face nut AT503M and 1 o-ring AT401P

Panel Cutouts

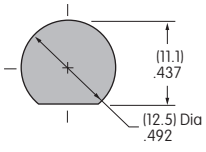
For B1 Bushing with Keyway



For B1 Bushing with Locking Ring

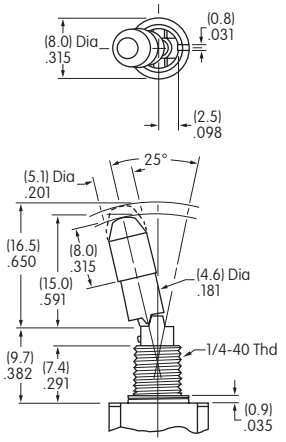


For B3 Bushing with D Flat

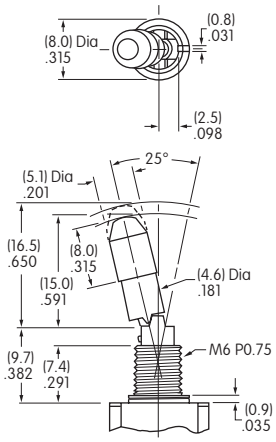


LOCKING LEVER & BUSHINGS

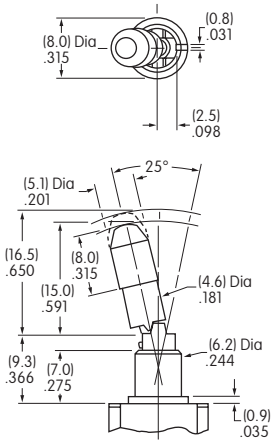
LL1 **1/4-40 .291" (7.4mm) Threaded with Keyway**



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

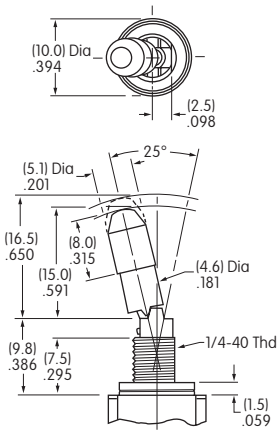


LL2 **Smooth with Keyway**

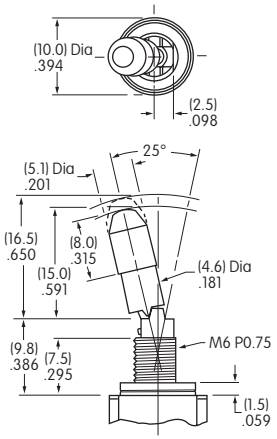


Maximum Panel Thickness with Standard Hardware: .047" (1.2mm)
Standard Hardware for L1 & L4: 2 hex nuts AT513H or AT513M,
1 locking ring AT507H or AT507M, and 1 lockwasher AT509

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



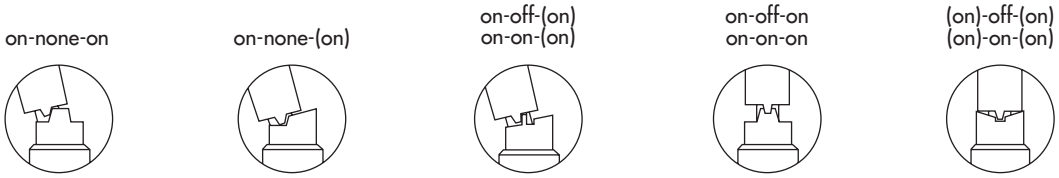
LL8 **6mm/.295" (7.5mm) Threaded Splashproof with D Flat**



Maximum Panel Thickness with Standard Hardware: .047" (1.2mm)
Standard Hardware for L3 and L8: 1 hex nut AT513H or AT513M and 1 o-ring AT516

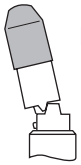
Lever Material & Finish: Brass with Chrome Plating

Locking Mechanism



No Code **Supplied with Cap AT427**

Cap Material:
Brass with Nickel Plating



Color Codes for Optional Anodized Aluminum Caps

A Black C Red G Blue

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**

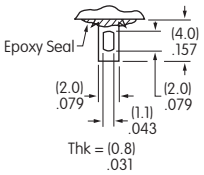
Note: See Supplement section to find complete explanation of operating range.

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

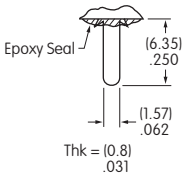
Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

TERMINALS

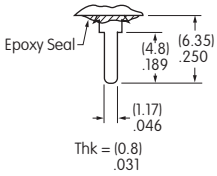
01 **Solder Lug**

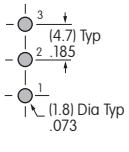


02 **.062" (1.57mm) Wide Quick Connect**

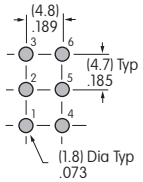


03 **.250" (6.35mm) Straight PC**

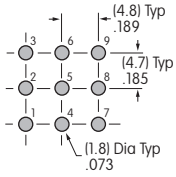




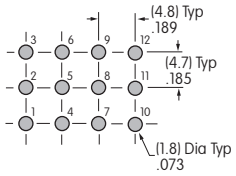
Single Pole



Double Pole



Three Pole



Four Pole

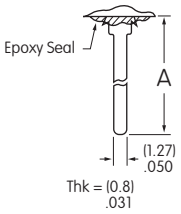
05 **.425" (10.8mm) Wirewrap or Extended PC**

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.

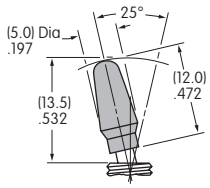


Dimension A = terminal lengths as shown beside the terminal codes at the left.

OPTIONAL CAPS & CAP COLORS

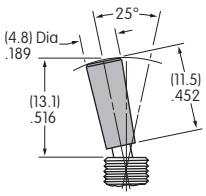
B *** AT415 Lever Cap for S Bat Toggle**

Material: Polyethylene



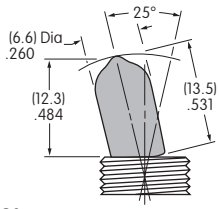
C *** AT444 Conical Cap for S Bat Toggle**

Material: Polyethylene



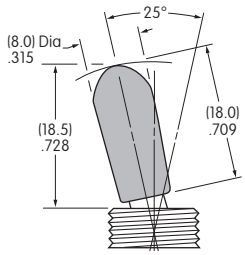
R **AT434 Lever Cap for B Toggle**

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.

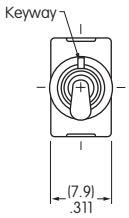
Cap Colors Available: **A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue

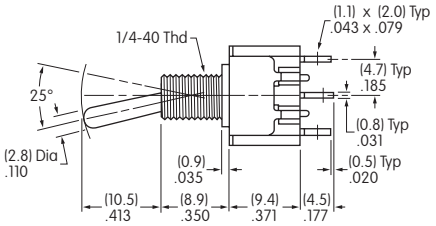
TYPICAL SWITCH DIMENSIONS

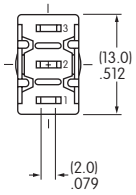
Solder Lug

Single Pole









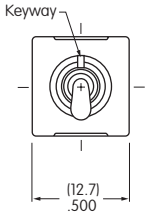
M2012SS1W01

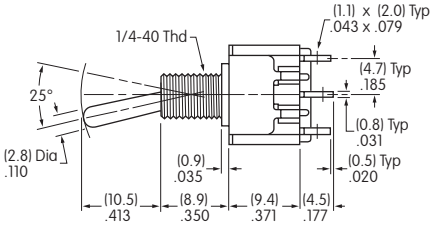
M2011 model does not have terminal 1.

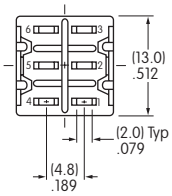
Solder Lug

Double Pole









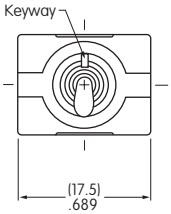
M2022SS1W01

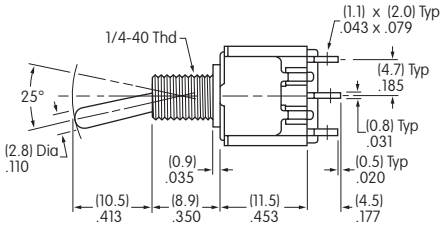
M2021 model does not have terminals 1 & 4.

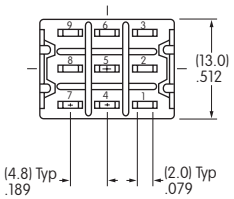
Solder Lug

Three Pole







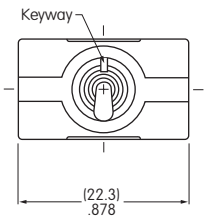


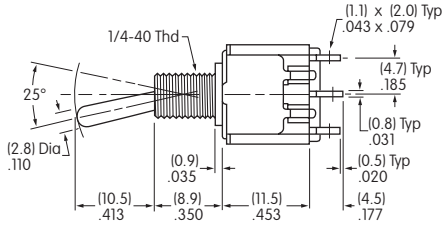
M2032SS1W01

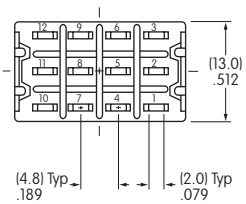
Solder Lug

Four Pole





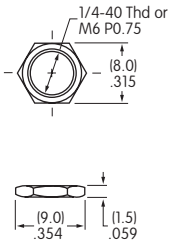




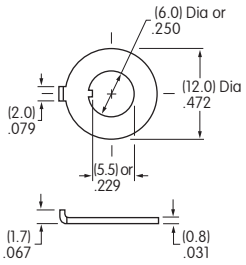
M2042SS1W01

STANDARD HARDWARE FOR SMALL & LARGE BUSHINGS

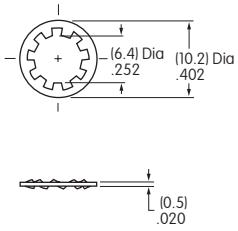
AT513H for Inch
AT513M for Metric
Hex Nut
Brass/Nickel



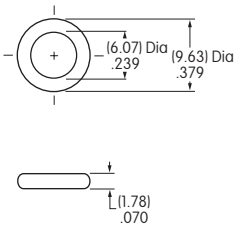
AT507H for Inch
AT507M for Metric
Locking Ring
Steel with Zinc/Chromate



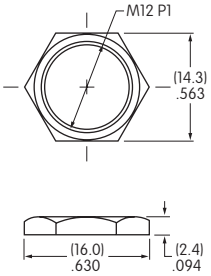
AT509
Lockwasher
Steel with Zinc/Chromate
(not supplied with splashproof models)



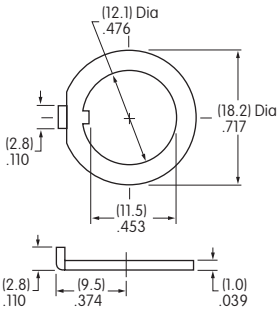
AT516
O-ring for
Splashproof Models
Nitrile Butadiene Rubber



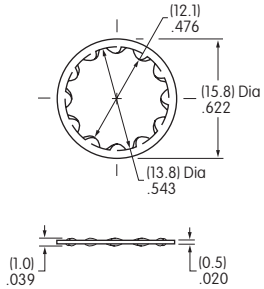
AT503M
Hex Face Nut
Brass/Chrome



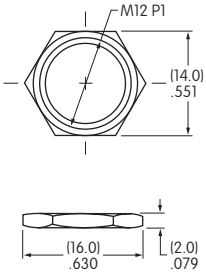
AT506M
Locking Ring
Steel with Zinc/Chromate



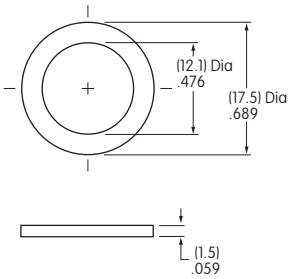
AT508
Lockwasher
Steel with Zinc/Chromate
(not supplied with splashproof models)



AT527M
Hex Nut
Steel with
Nickel Plating



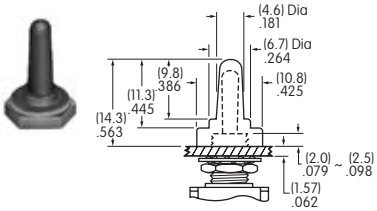
AT401P
O-ring for Splashproof Models
Nitrile butadiene rubber



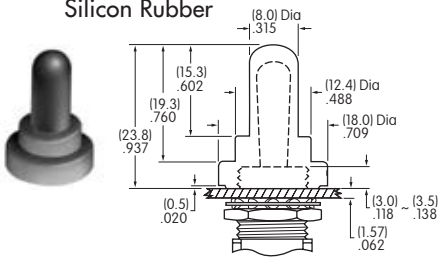
OPTIONAL SPLASHPROOF BOOTS

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

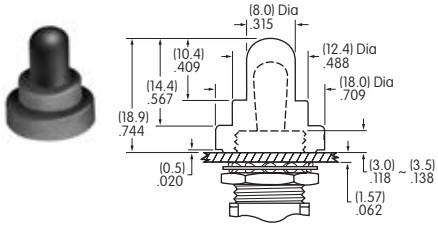
AT428 (M-metric H-Inch)
.445" (11.3mm)
Boot for S Toggle
Silicon Rubber



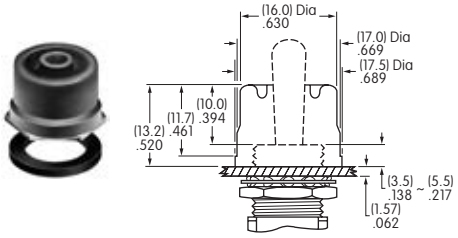
AT402
.760" (19.3mm)
Boot for B2 Toggle
Silicon Rubber



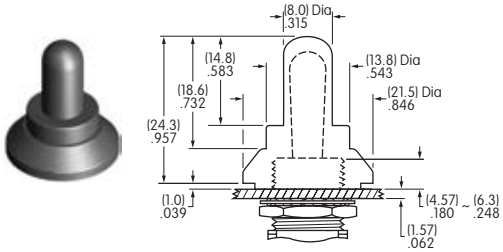
AT402S
.567" (14.4mm)
Boot for B Toggle
Silicon Rubber



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



TYPICAL SWITCH

M20 — 2 — 2 — S — S2

Poles

1	SPDT
2	DPDT SP3T

Circuits

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)

( ) = Momentary

*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
E4	.840″ (21.3mm) Flatted
Q	.550″ (14.0mm) Cone
Q2	.640″ (16.26mm) Cone
Q4	.840″ (21.3mm) Cone

Toggle dimensions are based on use with a .350″ (8.9mm) bushing; add .070″ (1.78mm) to toggle length when combining with a .280″ (7.1mm) bushing

Small Bushings

A2	.280″ (7.1mm) Smooth with Keyway
S2	.350″ (8.9mm) Smooth with Keyway
A1	.280″ (7.1mm) Threaded with Keyway
S1	.350″ (8.9mm) Threaded with Keyway

Deduct bracket thickness of .020″ (0.51mm) from above dimensions

Locking Lever

L	.201″ (5.1mm) Dia. Locking Lever

Bushing For Locking Levers

L2	Smooth with Keyway for Lever Lock

Standard Toggle & Bushing Combinations:

SS2 & S2A2

IMPORTANT:

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

ORDERING EXAMPLE

G — 13 — B — C

Contact Materials & Ratings

W	Silver; Rated 6A @ 125V AC & 3A @ 250V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max
A	Gold over Silver; Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max

Terminals

	With Bracket
13	.250″ (6.35mm) Straight PC with .465″ (11.8mm) Bracket
15	.425″ (10.8mm) Straight PC with .630″ (16.0mm) Bracket
17	.964″ (24.5mm) Straight PC with 1.150″ (29.2mm) Bracket
	With Reinforced Bracket
23	.250″ (6.35mm) Straight PC with .465″ (11.8mm) Bracket
25	.425″ (10.8mm) Straight PC with .630″ (16.0mm) Bracket
26	.750″ (19.05mm) Straight PC with .953″ (24.2mm) Bracket

Optional Caps

B	For S Bat Toggle
C	Conical Cap for S Bat Toggle

Cap for Locking Lever

No Code	Nickel Plated Supplied with Switch
A	Black
C	Red
G	Blue

Cap Colors

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

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2022SS2G13-BC



Red Cap on .413″ (10.5mm) Bat Toggle

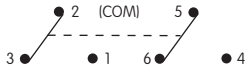
.350″ (8.9mm) Smooth Bushing with Keyway

DPDT ON-NONE-ON Circuit

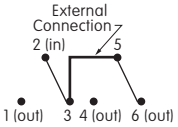
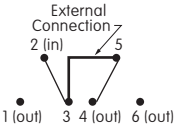
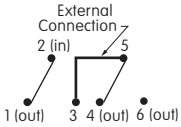
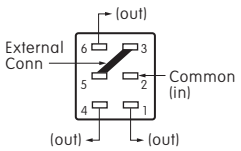
Gold Contacts with 0.4VA Rating

.250″ (6.35mm) Straight PC Terminals with Bracket .465″ (11.8mm) Long

POLES & CIRCUITS

Pole	Model	Toggle Position ( ) = Momentary: Down	Center	Up	Connected Terminals: Down	Center	Up	Throw & Schematics
		Keyway			Keyway			Note: Terminal numbers are not actually on the switch.
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	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 

For 3 Throw (3-On)

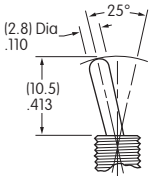
Pole	Model	Connected Terminals & Schematics: Down	Center	Up	External Connection
SP	M2024 M2026 M2027	ON (ON) ON	ON ON ON	ON (ON) (ON)	**The SP3T model utilizes a double pole base.**
					External connection must be made during field installation. 
		2-3 5-6	2-3 5-4	2-1 5-4	

SMALL TOGGLES

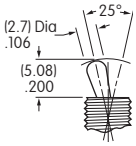
Important:
Toggle length changes based on bushing selected. All illustrations are shown with .350" (8.9mm) long bushing. When using a .280" (7.1mm) long bushing, toggle length increases .070" (1.78mm).

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

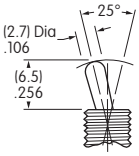
S .413" (10.5mm) Bat



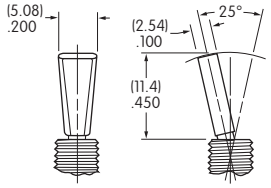
S2 .200" (5.08mm) Bat



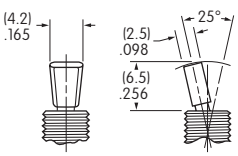
S3 .256" (6.5mm) Bat



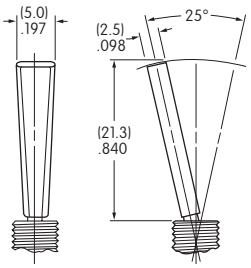
E .450" (11.4mm) Flatted



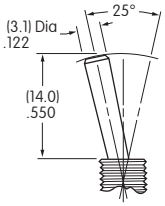
E2 .256" (6.5mm) Flatted



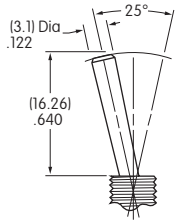
E4 .840" (21.3mm) Flatted



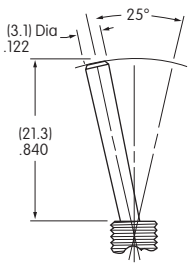
Q .550" (14.0mm) Cone



Q2 .640" (16.26mm) Cone

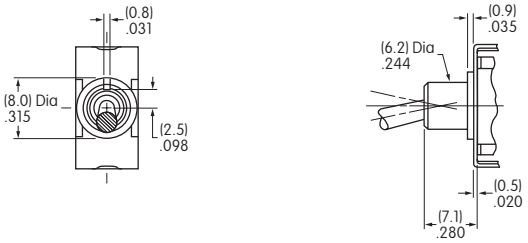


Q4 .840" (21.3mm) Cone



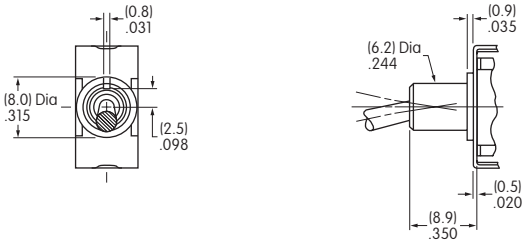
SMALL BUSHINGS

A2 .280" (7.1mm) Smooth with Keyway

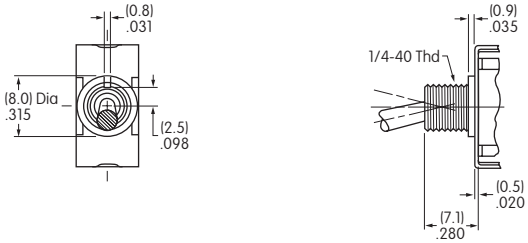


When using this bushing, toggle length is increased by .070" (1.78mm).

S2 .350" (8.9mm) Smooth with Keyway

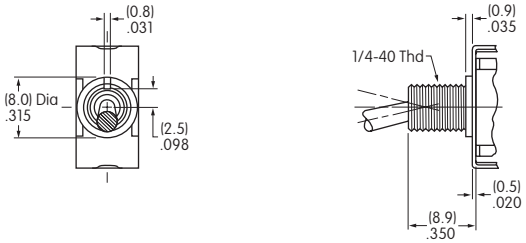


A1 .280" (7.1mm) Threaded with Keyway



When using this bushing, toggle length is increased by .070" (1.78mm). Maximum Panel Thickness with Standard Hardware: .031" (0.8mm)

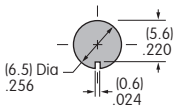
S1 .350" (8.9mm) Threaded with Keyway



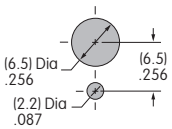
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

Panel Cutouts

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



For A1 or S1 Bushing with Locking Ring



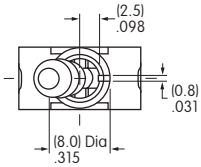
Standard Hardware:

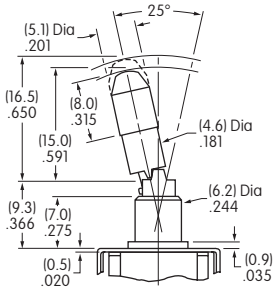
2 Hex Nuts (AT513H)
1 Lockwasher (AT509)
1 Locking Ring (AT507H)

For dimensions, see Accessories & Hardware section.

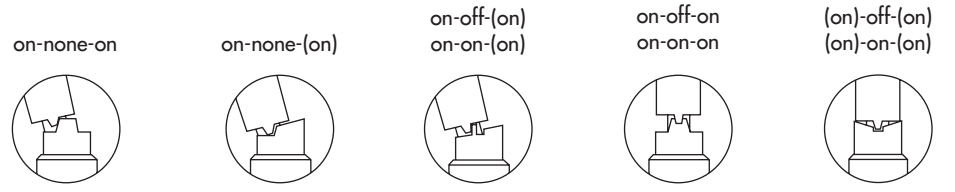
LOCKING LEVER & BUSHING

LL2 Smooth with Keyway



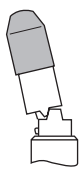


Locking Mechanism



2 positions lock | 1 position locks | 2 positions lock | 3 positions lock | 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 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 section 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 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

15

.425" (10.8mm) Terminal with .630" (16.0mm) Bracket

17

.964" (24.5mm) Terminal with 1.150" (29.2mm) Bracket

Straight PC Mount with Reinforced Bracket

23

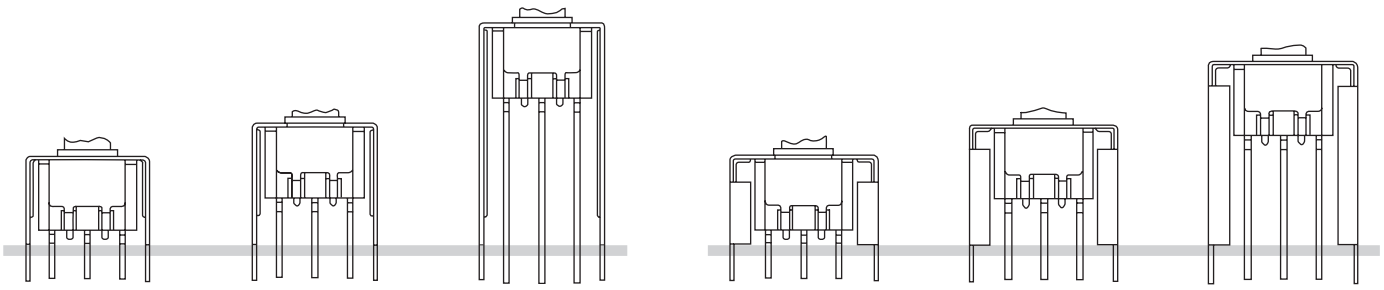
.250" (6.35mm) Terminal with .465" (11.8mm) Bracket

25

.425" (10.8mm) Terminal with .630" (16.0mm) Bracket

26

.750" (19.05mm) Terminal with .953" (24.2mm) Bracket

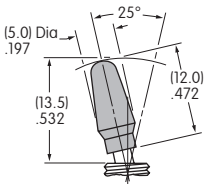


PCB footprints are on the following Typical Switch Dimension page.

OPTIONAL CAPS & CAP COLORS

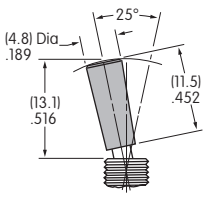
B *** AT415 for S Bat Toggle**

Material:
Polyethylene



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

Material:
Polyethylene

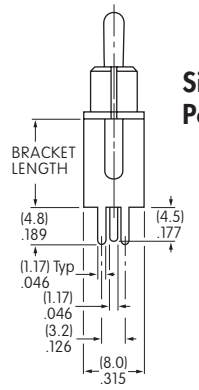


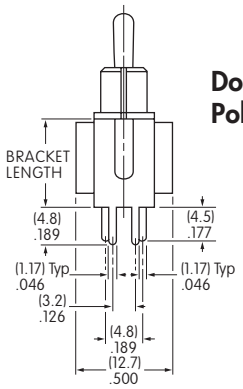
* AT415 and AT444 for use with S toggles only, not S2 or S3 toggles.

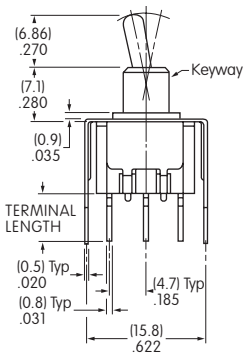
Cap Colors Available: A Black, B White, C Red, E Yellow, F Green, G Blue

TYPICAL SWITCH DIMENSIONS

Straight PC • Bracket

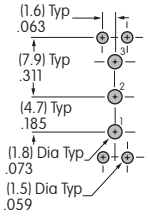


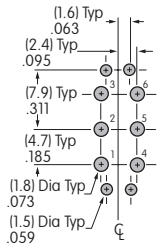






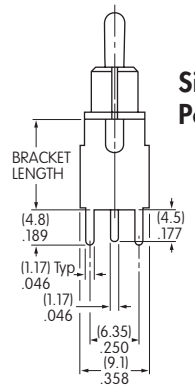
M2012S2A2G13

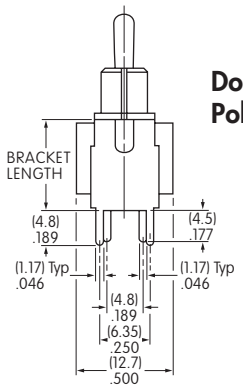


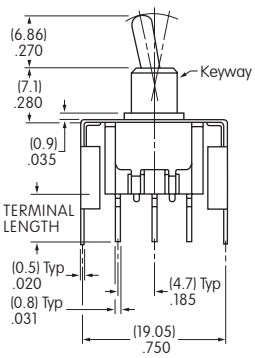


Terminal Code:	Terminal Length:	Bracket Length:
13	.250″ (6.35mm)	.465″ (11.8mm)
15	.425″ (10.8mm)	.630″ (16.0mm)
17	.964″ (24.5mm)	1.150″ (29.2mm)

Straight PC • Reinforced Bracket

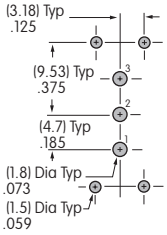


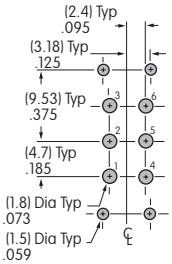






M2012S2A2G23





Terminal Code:	Terminal Length:	Bracket Length:
23	.250″ (6.35mm)	.465″ (11.8mm)
25	.425″ (10.8mm)	.630″ (16.0mm)
26	.750″ (19.05mm)	.953″ (24.2mm)

TYPICAL SWITCH

M20 — 1 — 2 — S2 — A2

Poles

1	SPDT
2	DPDT SP3T
3	3PDT
*4	4PDT DP3T

*4-pole available on vertical models only.

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

Toggle dimensions are based on use with a .350" (8.9mm) bushing; add .070" (1.78mm) to toggle length when combining with a .280" (7.1mm) bushing.

Small Bushings

A2	.280" (7.1mm) Smooth with Keyway
S2	.350" (8.9mm) Smooth with Keyway
A1	.280" (7.1mm) Threaded with Keyway
S1	.350" (8.9mm) Threaded with Keyway

Circuits

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)

( ) = Momentary

* 3-ON circuits available with double and four pole bases only

Locking Lever

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

Bushing For Locking Levers

L2	Smooth with Keyway for Lever Lock

Standard Toggle, Bushing, & Terminal Combinations:

S2A2G30, S2A2G40, SS2G30, SS2G40, LL2G30, & LL2G40

IMPORTANT:

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

ORDERING EXAMPLE

G 40 — □ □

Contact Materials & Ratings

W	Silver; Rated 6A @ 125V AC & 3A @ 250V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max
A	Gold over Silver; Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max

Terminals

30	.150" (3.81mm) Right Angle PC (1-3 Pole)
32	Right Angle PCB (1 Pole & 0.4VA Rating Only)
40	.150" (3.81mm) Vertical PC (1-4 Pole)
45	.100" (2.54mm) Vertical PC (1-4 Pole)

Optional Caps

B	For S Bat Toggle
C	Conical Cap for S Bat Toggle

Cap for Locking Lever

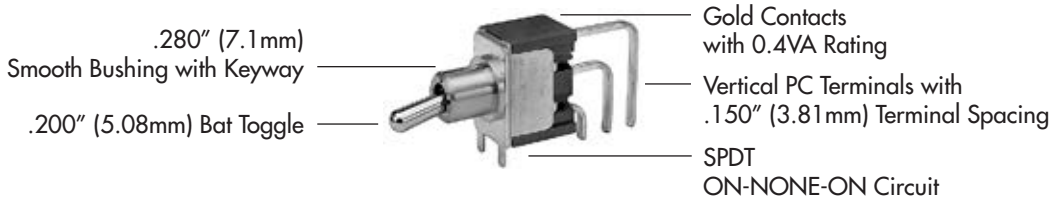
No Code	Nickel Plated Supplied with Switch
A	Black
C	Red
G	Blue

Cap Colors

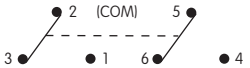
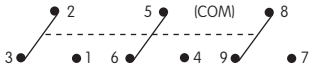
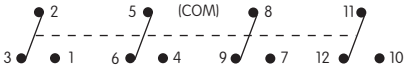
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2012S2A2G40

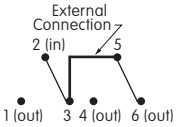
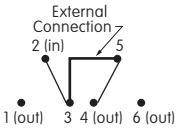
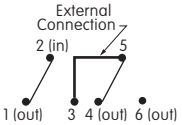
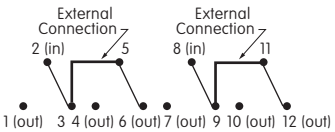
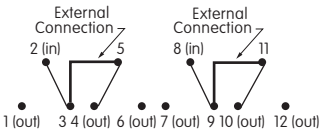
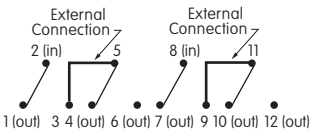


POLES & CIRCUITS

Pole	Model	Toggle Position ( ) = Momentary: Down	Center	Up	Connected Terminals: Down	Center	Up	Throw & Schematics
SP	*M2012	ON	NONE	ON	2-3	OPEN	2-1	SPDT 
	M2013	ON	OFF	ON				
	*M2015	ON	NONE	(ON)				
	M2018	(ON)	OFF	(ON)				
	M2019	ON	OFF	(ON)				
DP	*M2022	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	DPDT 
	M2023	ON	OFF	ON				
	*M2025	ON	NONE	(ON)				
	M2028	(ON)	OFF	(ON)				
	M2029	ON	OFF	(ON)				
3P	M2032	ON	NONE	ON	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT 
	M2033	ON	OFF	ON				
	M2035	ON	NONE	(ON)				
	M2038	(ON)	OFF	(ON)				
	M2039	ON	OFF	(ON)				
4P	M2042	ON	NONE	ON	2-3 5-6 8-9 11-12	OPEN	2-1 5-4 8-7 11-10	4PDT 
	M2043	ON	OFF	ON				
	M2045	ON	NONE	(ON)				
	M2048	(ON)	OFF	(ON)				
	M2049	ON	OFF	(ON)				

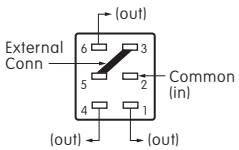
For 3 Throw (3-On)

Connected Terminals & Schematics

Pole	Model	Down	Center	Up	Down	Center	Up
SP	M2024	ON	ON	ON	 2-3 5-6	 2-3 5-4	 2-1 5-4
	M2026	(ON)	ON	(ON)			
	M2027	ON	ON	(ON)			
DP	M2044	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
	M2046	(ON)	ON	(ON)			
	M2047	ON	ON	(ON)			

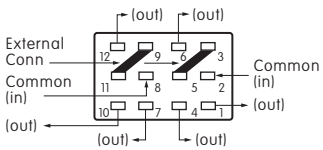
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

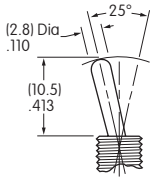
External connection must be made during field installation.



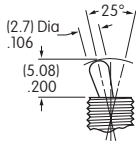
SMALL TOGGLES

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).

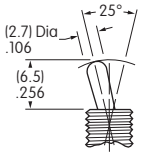
S **.413" (10.5mm)**
Bat



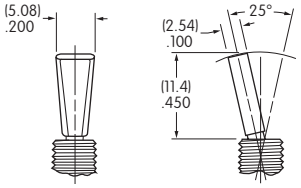
S2 **.200" (5.08mm)**
Bat



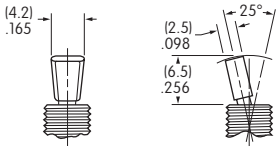
S3 **.256" (6.5mm)**
Bat



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



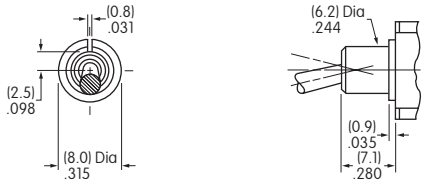
E2 **.256" (6.5mm)**
Flatted



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

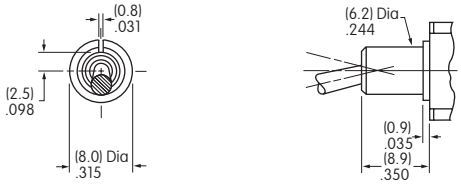
SMALL BUSHINGS

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

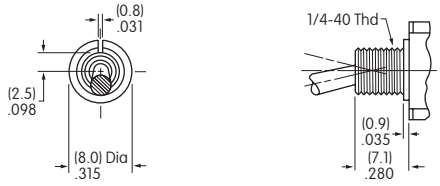


When using this bushing, toggle length is increased by .070" (1.78mm).

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

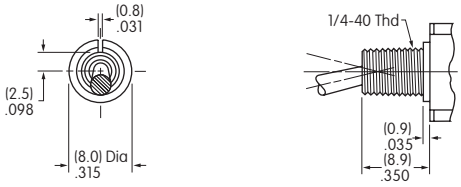


A1 **.280" (7.1mm)**
Threaded with Keyway



When using this bushing, toggle length is increased by .070" (1.78mm). Maximum Panel Thickness with Standard Hardware: .031" (0.8mm)

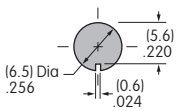
S1 **.350" (8.9mm)**
Threaded with Keyway



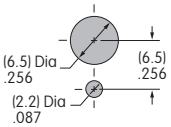
Maximum Panel Thickness with Standard Hardware: .102" (2.6mm)

Panel Cutouts

For A2, S2, A1 or S1 Bushing with Keyway



For A1 or S1 Bushing with Locking Ring

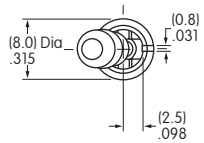


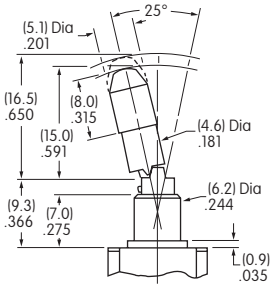
Standard Hardware:
2 Hex Nuts (AT513H)
1 Lockwasher (AT509)
1 Locking Ring (AT507H)

For dimensions, see Accessories & Hardware section.

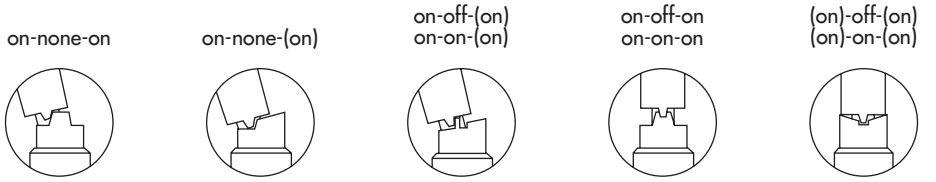
LOCKING LEVER & BUSHING

LL2 **Smooth with Keyway**



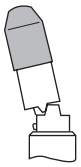


Locking Mechanism



2 positions lock | 1 position locks | 2 positions lock | 3 positions lock | 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 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**

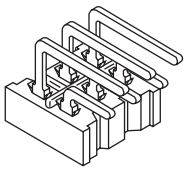
Note: See Supplement section to find complete explanation of operating range.

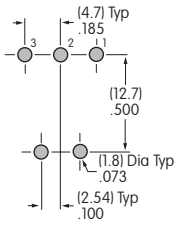
A	**Gold over Silver**	**Power Level or Logic Level**	**6A @ 125V AC or 0.4VA maximum @ 28V AC/DC maximum**

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 section to find complete explanation of dual rating and operating range.

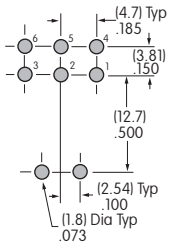
TERMINALS

30 **.150" (3.81mm) Right Angle PC (1-3 Pole)**

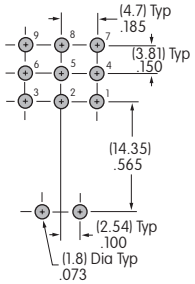




Single Pole

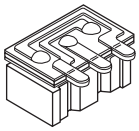


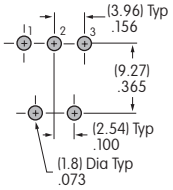
Double Pole



Three Pole

32 **Right Angle PCB with Reverse Circuit (1 Pole & 0.4VA Rating Only)**

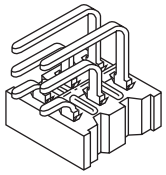


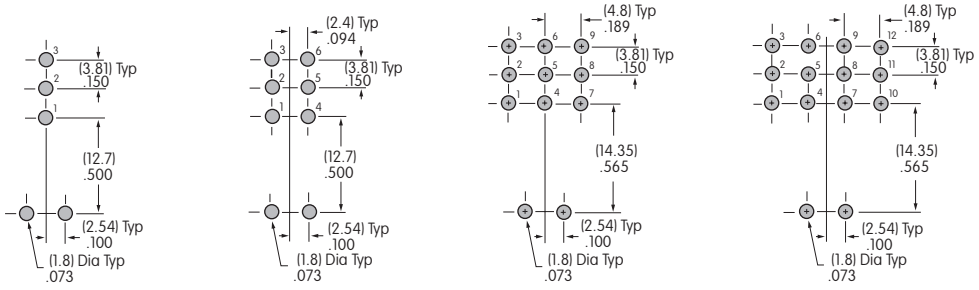


Terminal dimensions are shown on the Typical Switch Dimensions pages which follow.

TERMINALS (Continued)

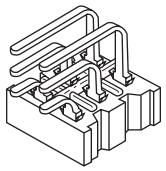
40 **.150" (3.81mm) Vertical PC (1-4 Pole)**

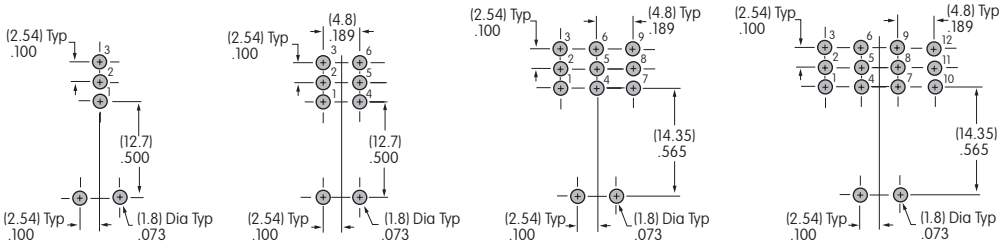




Single Pole | Double Pole | Three Pole | Four Pole

45 **.100" (2.54mm) Vertical PC (1-4 Pole)**





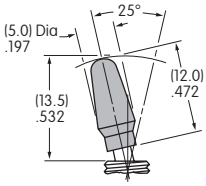
Single Pole | Double Pole | Three Pole | Four Pole

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

OPTIONAL CAPS & CAP COLORS

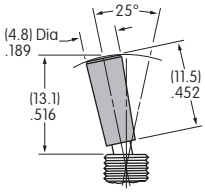
B *** AT415 for S Bat Toggle**

Material: Polyethylene



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

Material: Polyethylene



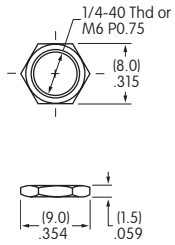
Colors Available

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

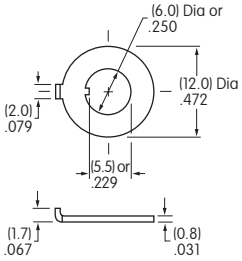
* AT415 and AT444 for use with S toggles only, not S2 or S3 toggles.

STANDARD HARDWARE

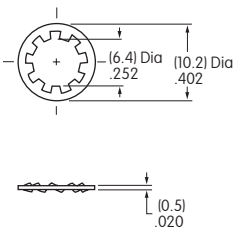
AT513H for Inch
AT513M for Metric
Hex Nut (2 per switch)
Brass/Nickel



AT507H for Inch
AT507M for Metric
Locking Ring (1 per switch)
Steel with Zinc/Chromate



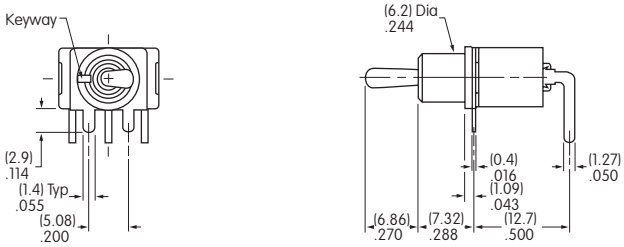
AT509
Lockwasher (1 per switch, none with splashproof)
Steel with Zinc/Chromate



TYPICAL SWITCH DIMENSIONS

.150" (3.81mm) Right Angle PC — Single Pole

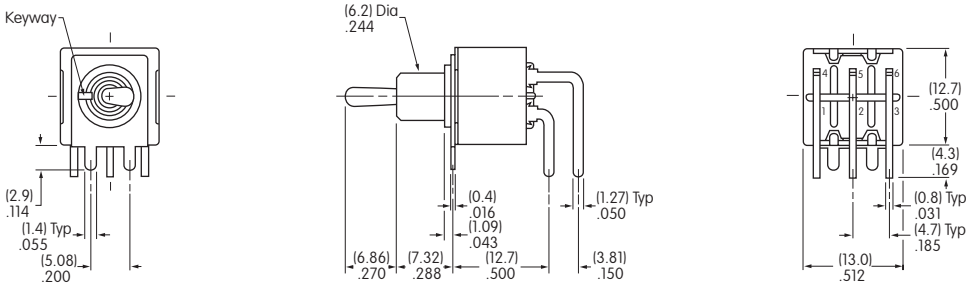




M2012S2A2G30

.150" (3.81mm) Right Angle PC — Double Pole

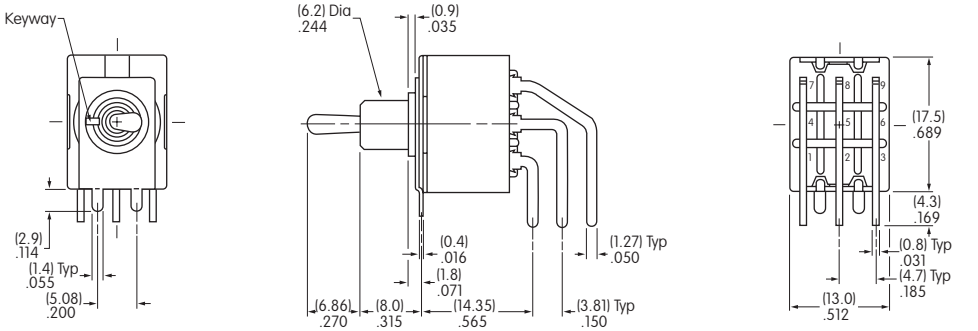




M2022S2A2G30

.150" (3.81mm) Right Angle PC — Three Pole



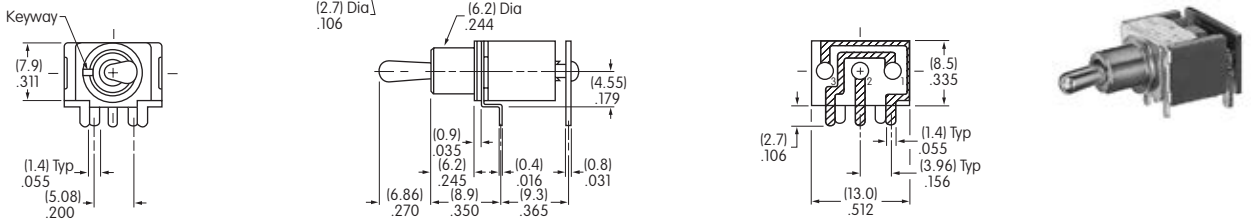


M2032S2A2G30

TYPICAL SWITCH DIMENSIONS

Single Pole • Reverse Circuit

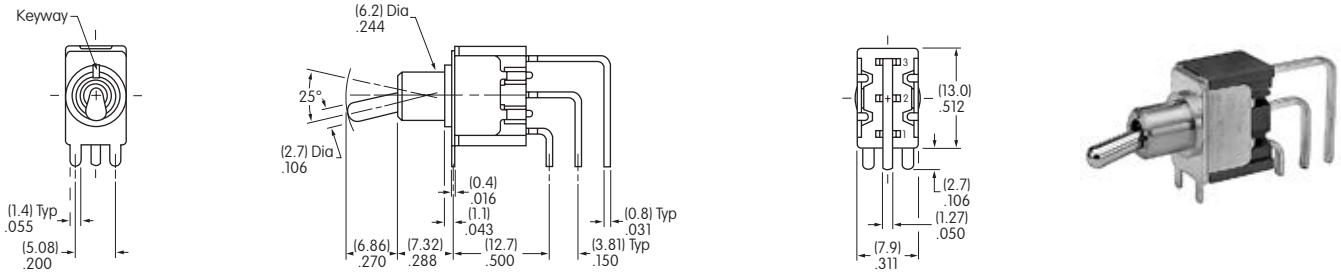
Right Angle PCB



M2012S2A2G32

Single Pole

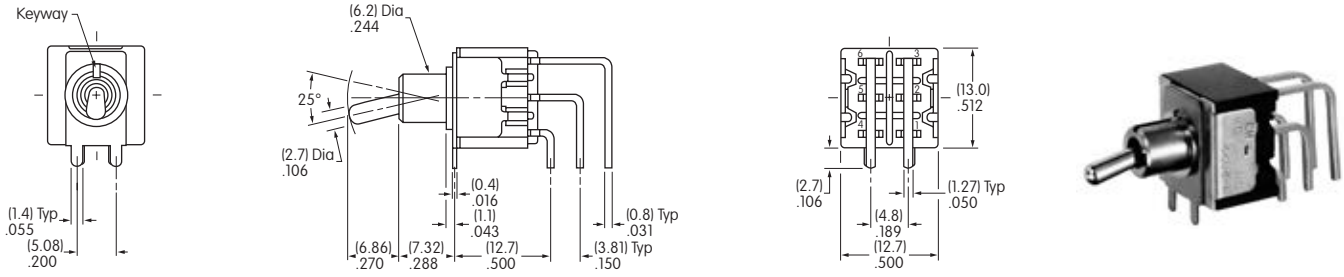
.150" (3.81mm) Vertical PC



M2012S2A2G40

Double Pole

.150" (3.81mm) Vertical PC

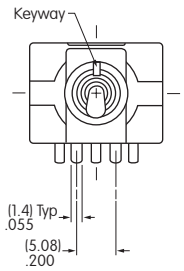


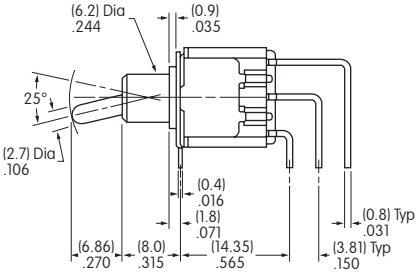
M2022S2A2G40

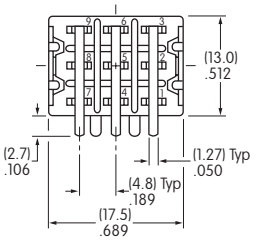
TYPICAL SWITCH DIMENSIONS

.150" (3.81mm) Vertical PC — Three Pole





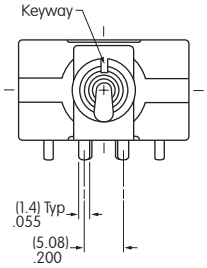


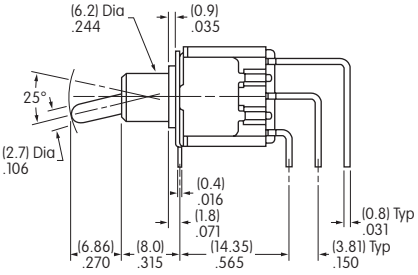


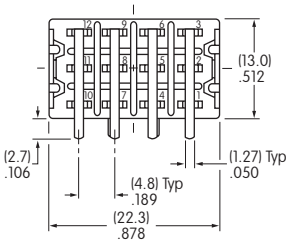
M2032S2A2G40

.150" (3.81mm) Vertical PC — Four Pole





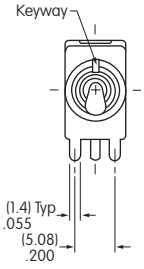


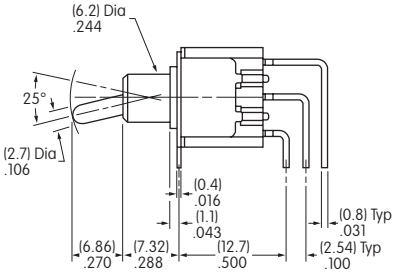


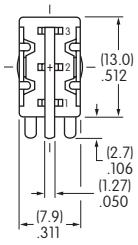
M2042S2A2G40

.100" (2.54mm) Vertical PC — Single Pole







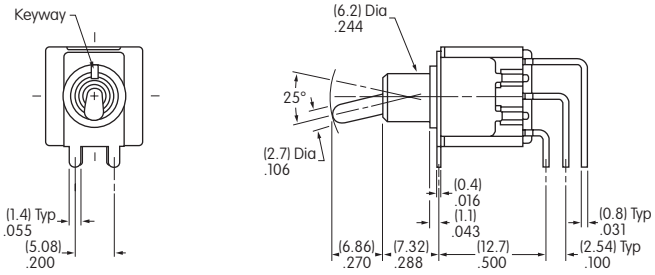


M2012S2A2G45

TYPICAL SWITCH DIMENSIONS

Double Pole

.100" (2.54mm) Vertical PC

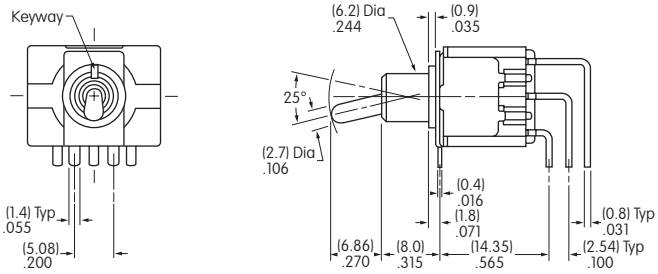




M2022S2A2G45

Three Pole

.100" (2.54mm) Vertical PC

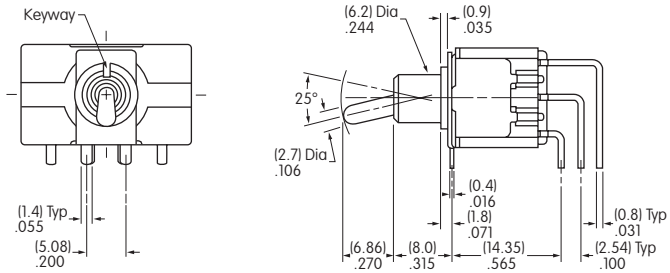




M2032S2A2G45

Four Pole

.100" (2.54mm) Vertical PC





M2042S2A2G45

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

NKK Switches:

M2013S2A2G40 M2012SA2G30 M2012EA2G30 M2012ES2G30 M2012ES2G40 M2012S2A2W40 M2032ES1G40 M2012S2A1G32 M2013S2A2W30 M2022LL2W30 M2022SA2G30 M2022SA2G40 M2025SA2G30/305 M2033S2A2G40 M2042SA1G40 M2032S2A2G30 M2012LL2G40-RO M2012S2S2W30 M2012S2S2W40 M2012SS2G45 M2013SA2A40 M2013SA2W40 M2013SS1G30 M2013SS1G45 M2013SS2G45 M2018ES1A40 M2018SA2G40 M2018SS1W40 M2018SS1W45 M2022LL2A30 M2022S3A2W40 M2022SA1W30 M2023ES2W40-RO M2023S2A2W30 M2024SS2G45 M2032S2A2W40-RO M2042SS1G45 M2042SS1W45 M2022SS1W30-BA-RO M2012S2A1W30 M2022S2A2W40/UC M2013S2A2G40-RO M2012SS1G45-RO M2022SS2G45 M2027S2A2G30 M2048SS2W40/CUL M2049SS2W40/CUL M2022SA2W40 M2032E2S1G40 M2024SS2G30 M2022SS1W30-RO M2033SS1A40 M2012SA2G32 M2015S2A2A40 M2015S2A2W40 M2024S3A2A30 M2026SA2G40 M2032S2A2W30 M2046SA2G40 M2012LL2A40 M2024S3S1G30 M2012S2S1W40 M2013S2S1W40 M2042SS1G45-BA M2012S2S1W30 M2027S2A2W30 M2022S2S1W40 M2012LL2G45 M2013SS1G40 M2012S2A2G45 M2022LL1G45 M2012S2A2W45 M2023S2A2G40 M2012SA2G40 M2012S2A2W30 M2012LL1G45 M2022S2A2G45 M2032S2A2W40 M2022LL1G30 M2022SA1W40 M2029ES1G30 M2012ES2W40 M2012S2A1G40/UC M2012SS2G30/U M2018S2A2G30 M2013SS2G30 M2022SS2W45 M2012SS1W40 M2029ES2G30 M2013LL2G30 M2029SS2G30 M2022SS1W40 M2021S2A2G40 M2012E2A2W40 M2023SS1G30 M2024SS1W40 M2018ES1G30 M2032S2A2G40 M2012SA2W40 M2012S2A2A30/UC