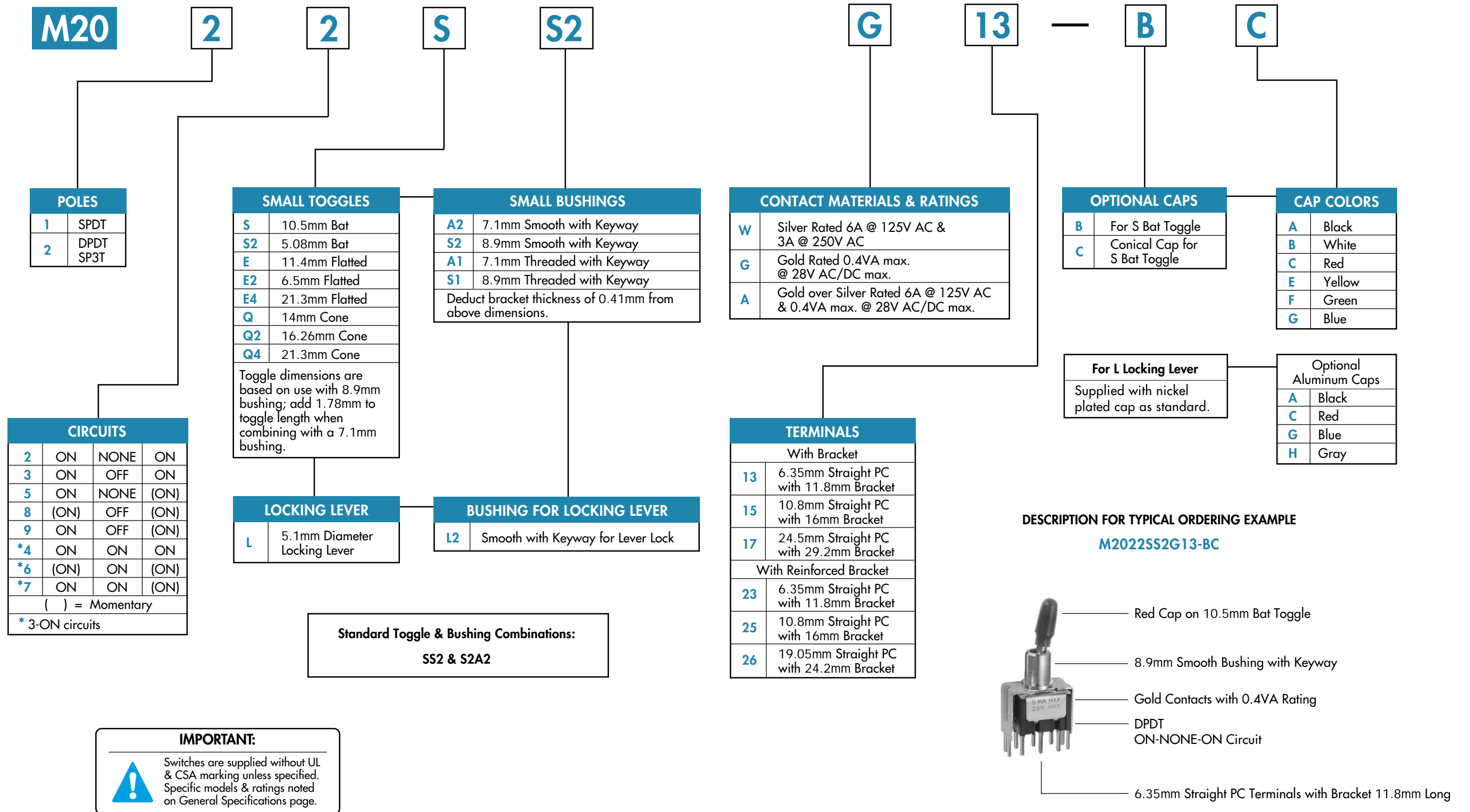


TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE
M2022SS2G13-BC

Standard Toggle & Bushing Combinations:
SS2 & S2A2

IMPORTANT:

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



GENERAL SPECIFICATIONS

Electrical Capacity (Resistive Load)

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

Other Ratings

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

Materials & Finishes

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

Environmental Data

- Operating Temp Range:** -30°C through +85°C (-22°F through +185°F)
- Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range
& returning in 1 minute; 3 right angled directions for 2 hours
- Shock:** 50g acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

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

Standards & Certifications







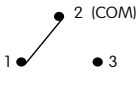
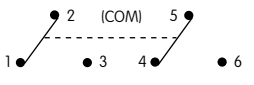
- Flammability Standards:** UL94V-0 available
- UL Recognized:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or
0.4VA maximum @ 28V AC/DC maximum; UL File No. E44145
- CSA Certified:** All models certified at 6A @ 125V AC or 3A @ 250V AC or
0.4VA maximum @ 28V AC/DC maximum; CSA File No. LR23535



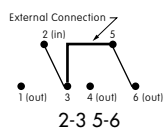
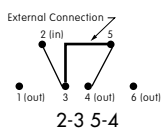
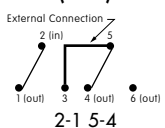
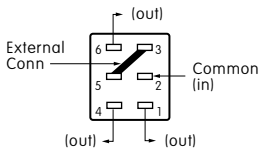
Series M

Miniature Toggle Switches

POLES & CIRCUITS

		Toggle Position () = Momentary			Connected Terminals			Throw & Schematics
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch. * Reverse circuits available upon request.
SP	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)

		Connected Terminals & Schematics			External Connection
Pole	Model	Down	Center	Up	
SP	M2024 M2026 M2027	ON (ON) ON 	ON ON ON 	ON (ON) ON 	The SP3T model utilizes a double pole base. External connections must be made during field installation. 

SMALL TOGGLES

Important:

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

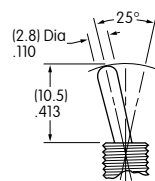
Standard Material & Finish:

Brass with Bright Chrome

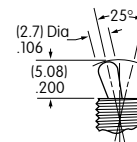
Optional Finishes:

Contact factory for satin chrome or black.

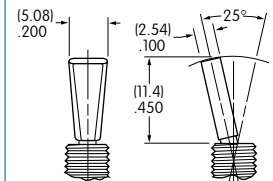
S 10.5mm Bat



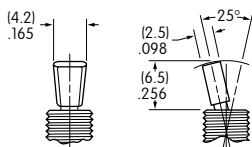
S2 5.08mm Bat



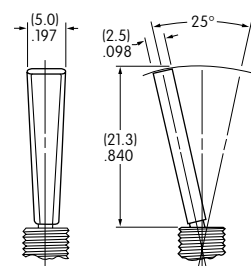
E 11.4mm Flatted



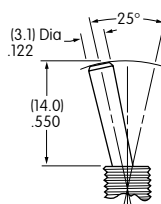
E2 6.5mm Flatted



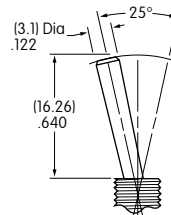
E4 21.3mm Flatted



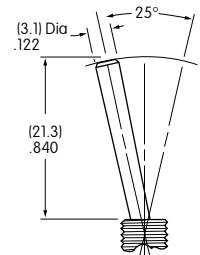
Q 14mm Cone



Q2 16.26 Cone

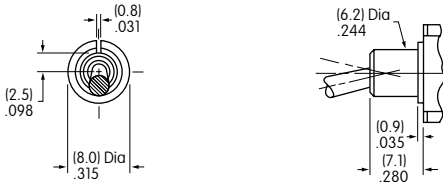


Q4 21.3mm Cone



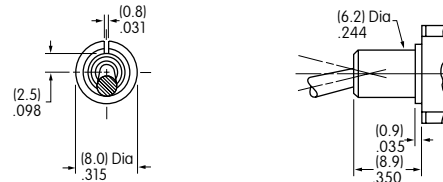
SMALL BUSHINGS

A2 7.1mm Smooth with Keyway

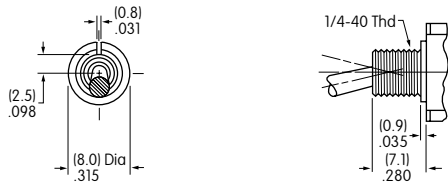


When using this bushing, toggle length is increased by 1.78mm.

S2 8.9mm Smooth with Keyway

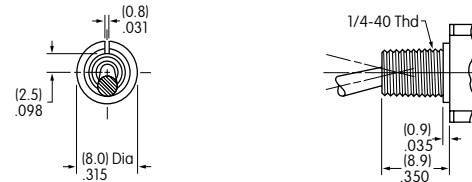


A1 7.1mm Threaded with Keyway



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

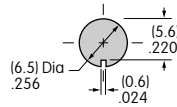
S1 8.9mm Threaded with Keyway



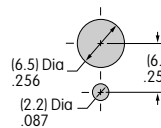
Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

Panel Cutouts

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



For A1 or S1 Bushing with Locking Ring



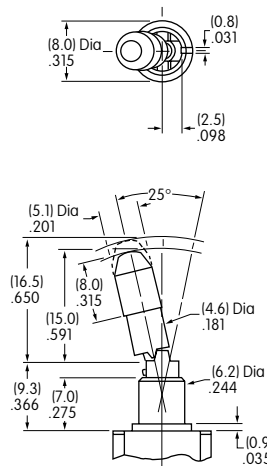
Standard hardware:

- 2 hex nuts (AT513M)
- 1 lockwasher (AT509)
- 1 Locking ring (AT507M)

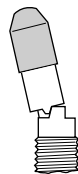
[Dimensions](#)

LOCKING LEVER & BUSHING

LL2 Smooth with Keyway



Cap for Locking Lever



Supplied with Cap AT427
Material & Finish:
Brass with Nickel Plating

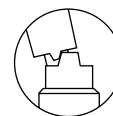
Lever
Material & Finish:
Brass with Chrome Plating

Color Codes for Optional Anodized Aluminum Caps

- | | |
|----------------|----------------------------------|
| A Black | C Red |
| G Blue | H Gray (natural aluminum) |

Locking Mechanism

on-none-on



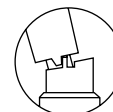
2 positions lock

on-none-(on)



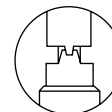
1 position locks

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



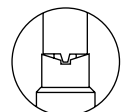
2 positions lock

on-off-on
on-on-on



3 positions lock

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



1 position locks



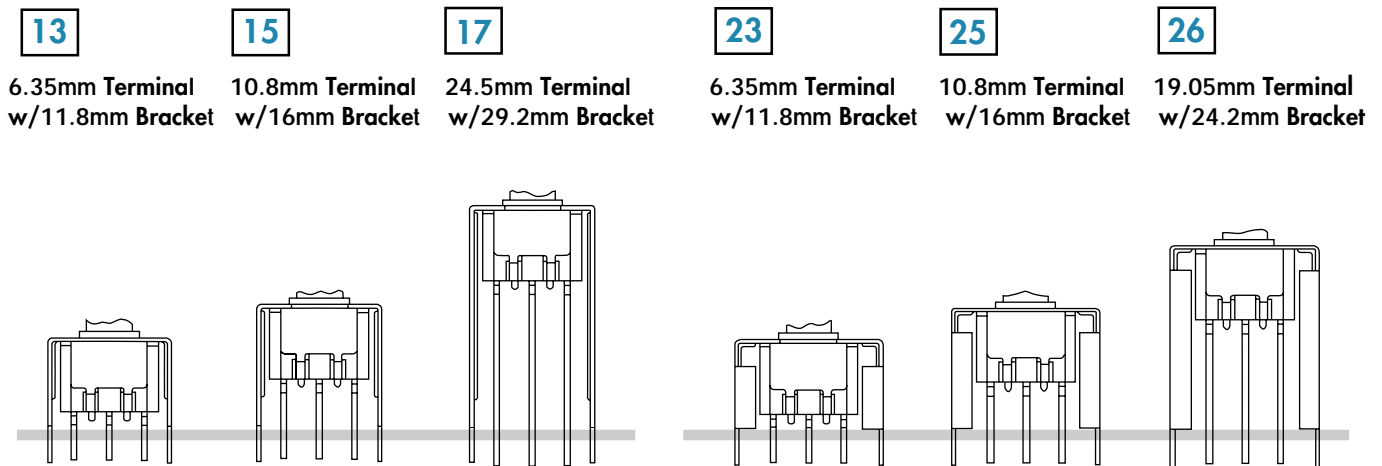
CONTACT MATERIALS & RATINGS

W Silver over Silver	Power Level	6A @ 125V AC & 3A @ 250V AC
G Gold over Brass or Copper	Logic Level	0.4VA maximum @ 28V AC/DC maximum
Note: See Supplement Index (page Z1) to find complete explanation of operating range.		
A Gold over Silver	Power Level or Logic Level	6A @ 125V AC or 0.4VA maximum @ 28V AC/DC maximum
Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement Index to find complete explanation of dual rating and operating range.		

TERMINALS

Straight PC Mount with Bracket

Straight PC Mount with Reinforced Bracket

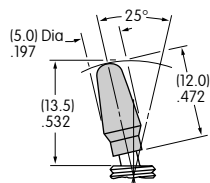


PCB footprints are on the following Typical Switch Dimension pages.

OPTIONAL CAPS & CAP COLORS

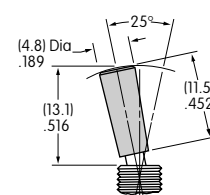
B AT415
for S Bat Toggle

Material:
Polyethylene



C AT444
Conical Cap for S Bat Toggle

Material:
Polyethylene



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



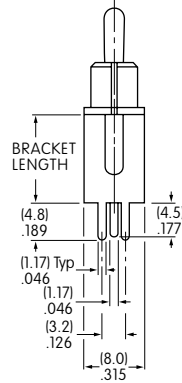
TYPICAL SWITCH DIMENSIONS

Straight PC • Bracket

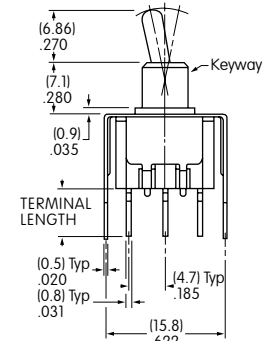
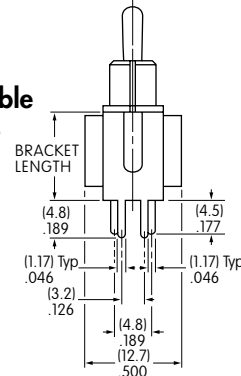


M2012S2A2G13

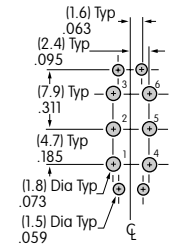
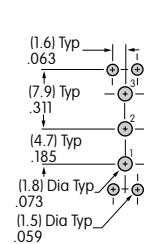
Single Pole



Double Pole



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

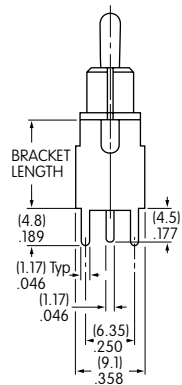


Straight PC • Reinforced Bracket

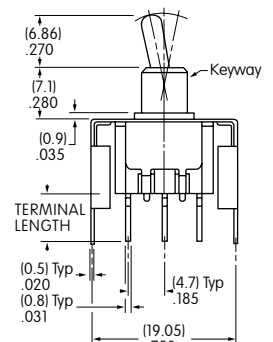
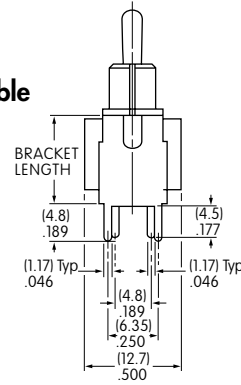


M2012S2A2G23

Single Pole



Double Pole



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

