

Distinctive Characteristics

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

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

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

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

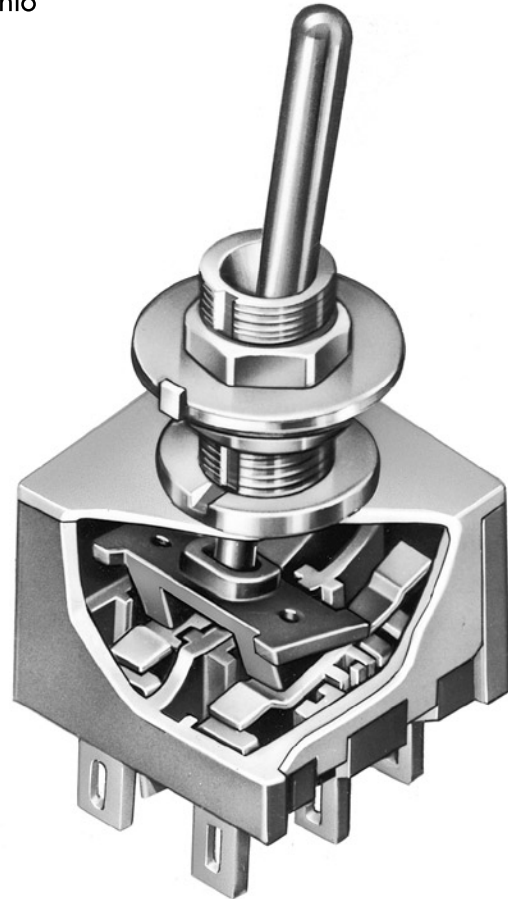
Molded diallyl phthalate case has a UL flammability rating of 94V-0.

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

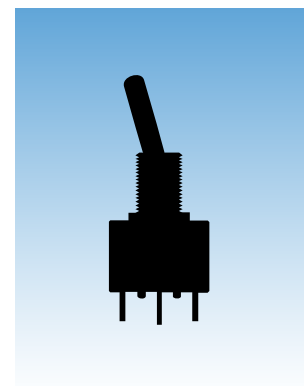
Prominent external insulating barriers increase insulation resistance and dielectric strength.

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

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



Actual Size



General Specifications

Electrical Capacity (Resistive Load)

Power Level (code W):	6A @ 125V AC & 3A @ 250V AC 4A @ 30V DC for On-None-On & On-None-Off; 3A @ 30V DC for all other circuits
Logic Level (code G):	0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Logic/Power Level (code A):	Combines W & G ratings Note: 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
Nominal Operating Force:	3.92N for Single Pole; 4.41N for Double Pole; 6.86N for Three Pole; 7.85N for Four Pole
Angle of Throw:	25°

Materials & Finishes

Toggle:	Brass with chrome plating	Frame:	Stainless steel
Bushing:	Brass with nickel plating	Support Bracket:	Steel with tin 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		

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:	Panel seal bushing options B3 & D3 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
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Processing

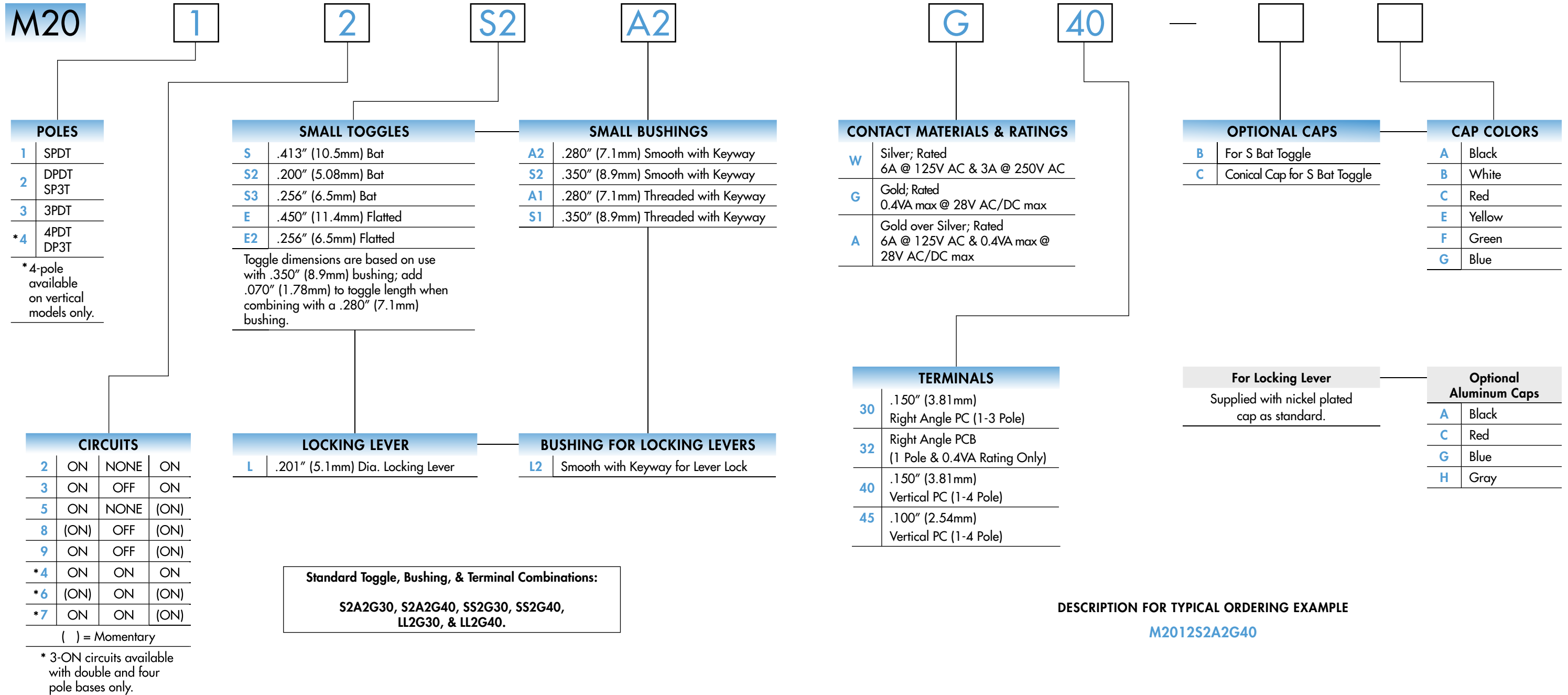
Soldering:	For all Gold Contacts & Circuits 1, 3, 8, & 9, see Wave Soldering Profile A in Supplement section. Manual Soldering: 4 seconds max. @ 410°C max. Note: Lever must be in OFF (center) position. For Silver Contact Circuits 2 & 4 through 7: Wave Soldering: 5 seconds maximum @ 270°C maximum. Manual Soldering: 3 seconds max. @ 350°C max.
Cleaning:	These devices are not process sealed. Hand clean locally using alcohol based solution. See Cleaning Specifications in Supplement section.

Standards & Certifications

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

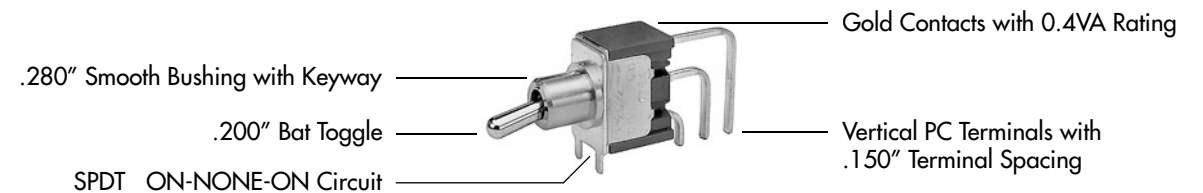


TYPICAL SWITCH ORDERING EXAMPLE



IMPORTANT:

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



POLES & CIRCUITS

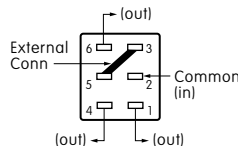
Pole	Model	Toggle Position () = Momentary			Connected Terminals			Throw & Schematics Notes: Terminal numbers are not actually on the switch. * Reverse circuits available upon request.
		Down 	Center 	Up 	Down 	Center 	Up 	
SP	M2012 M2013 *M2015 M2018 *M2019	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (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
3P	M2032 M2033 M2035 M2038 M2039	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT
4P	M2042 M2043 M2045 M2048 M2049	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9 11-12	OPEN	2-1 5-4 8-7 11-10	4PDT

For 3 Throw (3-On)

Pole	Model	Down	Center	Up	Connected Terminals & Schematics
SP	M2024 M2026 M2027	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6 2-3 5-4 2-1 5-4
DP	M2044 M2046 M2047	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6 8-9 11-12 2-3 5-4 8-9 11-10 2-1 5-4 8-7 11-10

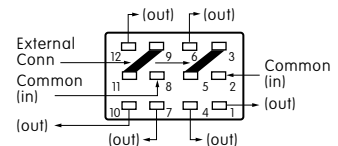
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

External connection must be made during field installation.



SMALL TOGGLES

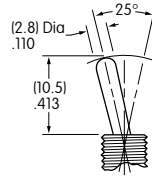
Important:

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

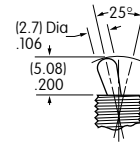
Standard Material & Finish:

Brass with Bright Chrome
Contact factory for optional finishes.

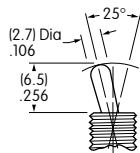
S .413" (10.5mm)
Bat



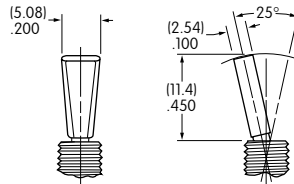
S2 .200" (5.08mm)
Bat



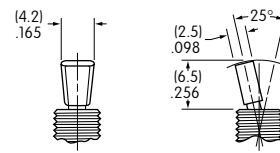
S3 .256" (6.5mm)
Bat



E .450" (11.4mm)
Flatted

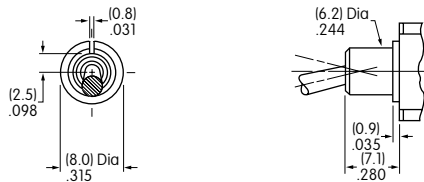


E2 .256" (6.5mm)
Flatted

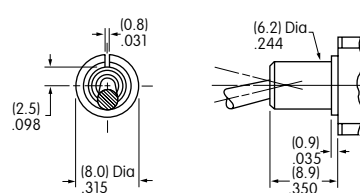


SMALL BUSHINGS

A2 .280" (7.1mm)
Smooth with Keyway

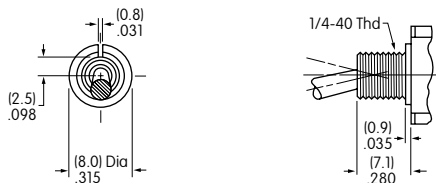


S2 .350" (8.9mm)
Smooth with Keyway

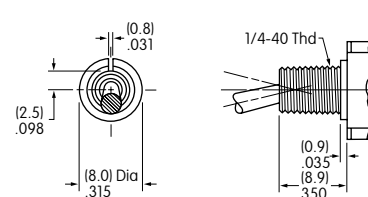


When using this bushing, toggle length is increased by .070" (1.78mm).

A1 .280" (7.1mm)
Threaded with Keyway



S1 .350" (8.9mm)
Threaded with Keyway

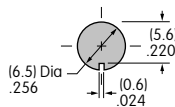


When using this bushing, toggle length is increased by .070" (1.78mm).
Max. Panel Thickness w/Standard Hardware: 0.8mm (.031")

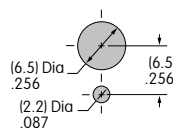
Max. Panel Thickness w/Standard Hardware: 2.6mm (.102")

Panel Cutouts

For A2, S2, A1 or S1 Bushing with Keyway



For A1 or S1 Bushing with Locking Ring



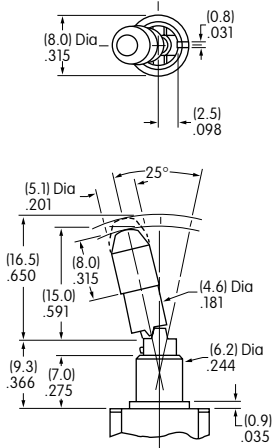
Standard Hardware:

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

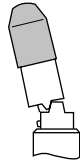
For dimensions, see Accessories & Hardware section.

LOCKING LEVER & BUSHING

LL2 Smooth with Keyway



Cap for Locking Lever



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

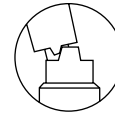
Lever Material & Finish:
 Brass with Chrome Plating

Color Codes for Optional Anodized Aluminum Caps

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

Locking Mechanism

on-none-on



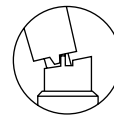
2 positions lock

on-none-(on)



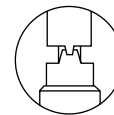
1 position locks

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



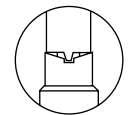
2 positions lock

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 section to find complete explanation of operating range.

A Gold over Silver

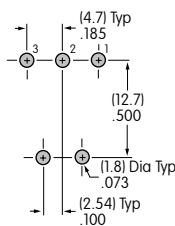
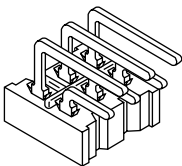
Power Level
or Logic Level

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

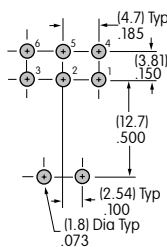
Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

TERMINALS

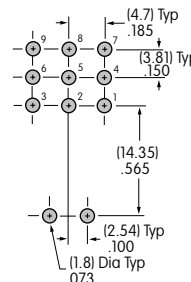
30 .150" (3.81mm) Right Angle PC (1-3 Pole)



Single Pole

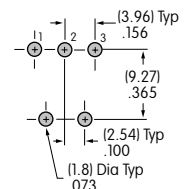
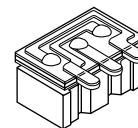


Double Pole



Three Pole

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

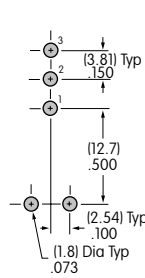
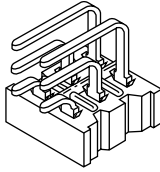


Terminal dimensions are shown on the Typical Switch Dimensions pages which follow.

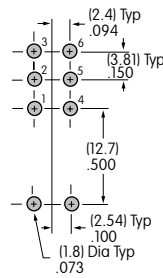
TERMINALS (Continued)

40

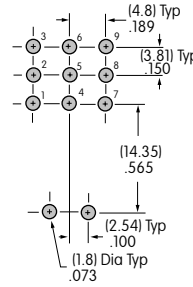
.150" (3.81mm)
Vertical PC (1-4 Pole)



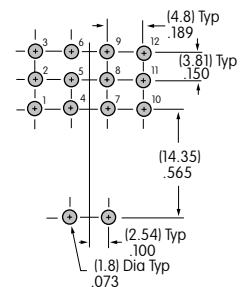
Single Pole



Double Pole



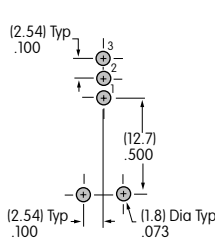
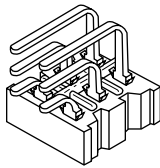
Three Pole



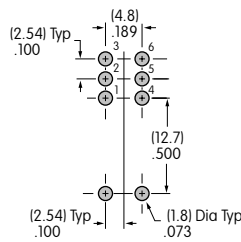
Four Pole

45

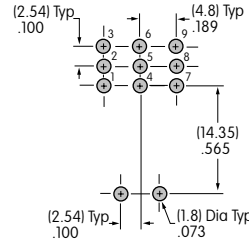
.100" (2.54mm)
Vertical PC (1-4 Pole)



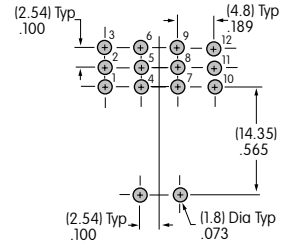
Single Pole



Double Pole



Three Pole



Four Pole

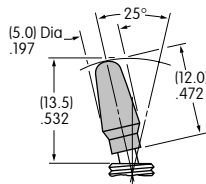
Terminal dimensions are shown on the Typical Switch Dimensions pages which follow.

OPTIONAL CAPS & CAP COLORS

B

AT415
for S Bat Toggle

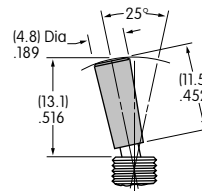
Material:
Polyethylene



C

AT444
Conical Cap for S Bat Toggle

Material:
Polyethylene



Colors Available

A

Black

E

Yellow

B

White

F

Green

C

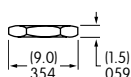
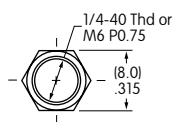
Red

G

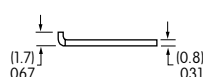
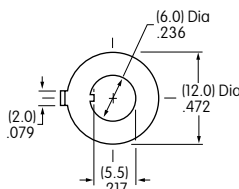
Blue

STANDARD HARDWARE

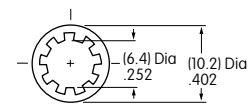
AT513H for Inch
AT513M for Metric
Hex Nut (2 per switch)
Nickel/Brass



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



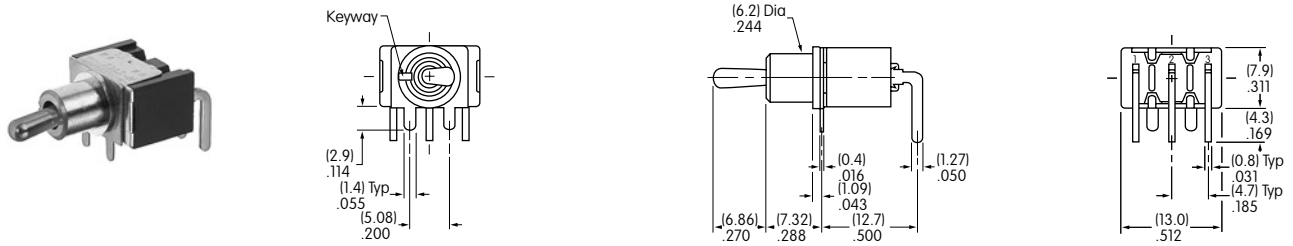
AT509
Lockwasher (1 per switch, none with splashproof)
Steel with Chromate/Zinc



TYPICAL SWITCH DIMENSIONS

.150" (3.81mm) Right Angle PC

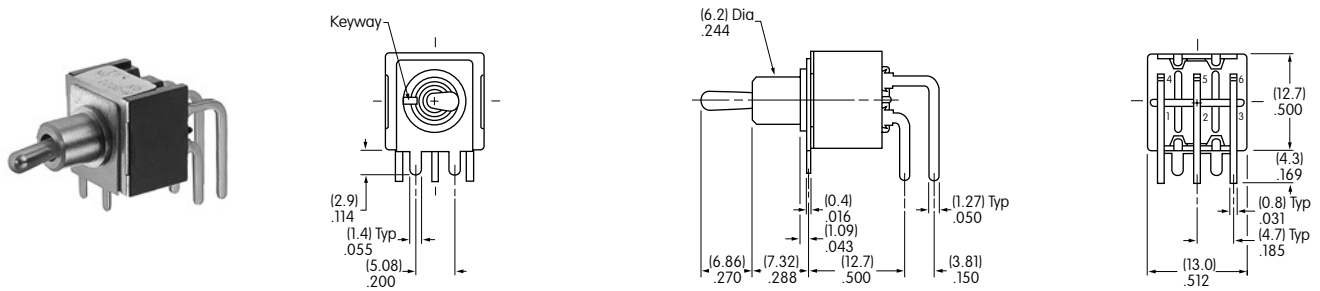
Single Pole



M2012S2A2G30

.150" (3.81mm) Right Angle PC

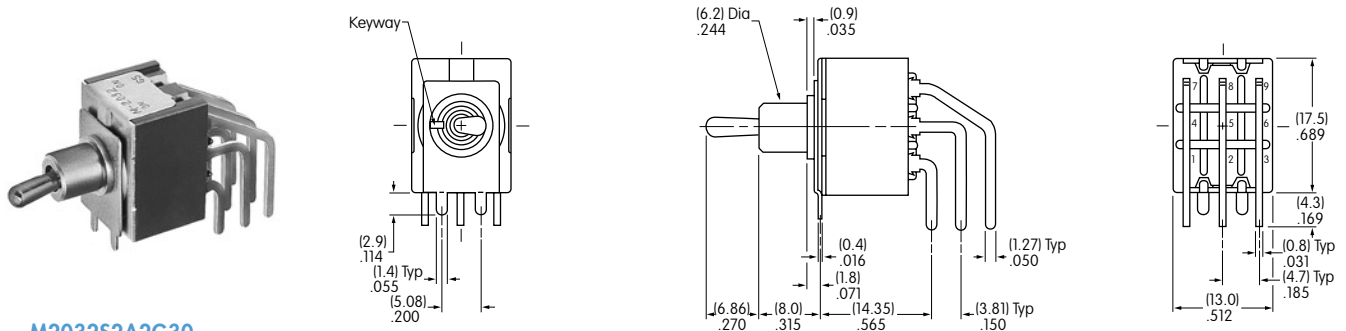
Double Pole



M2022S2A2G30

.150" (3.81mm) Right Angle PC

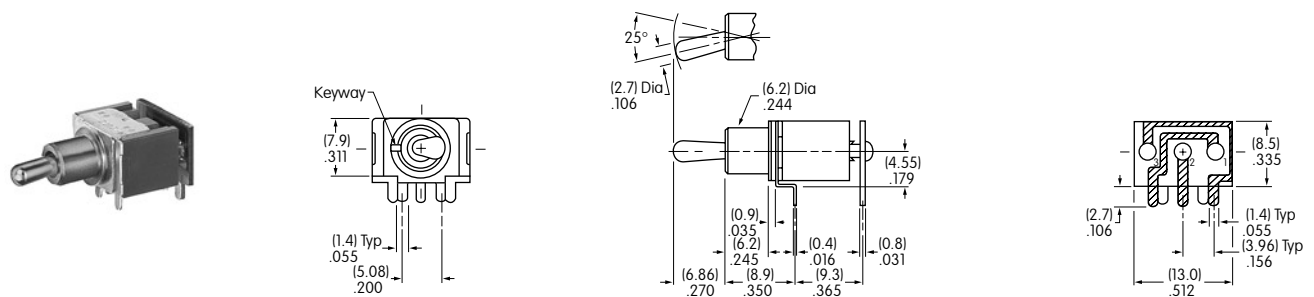
Three Pole



M2032S2A2G30

Right Angle PCB

Single Pole • Reverse Circuit

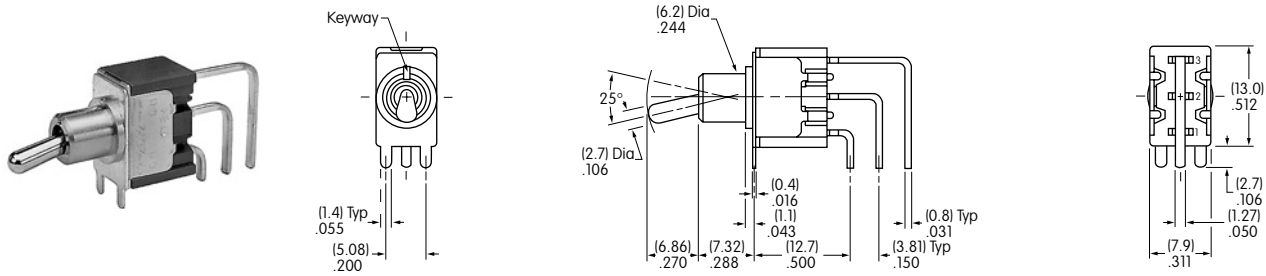


M2012S2A2G32

TYPICAL SWITCH DIMENSIONS

.150" (3.81mm) Vertical PC

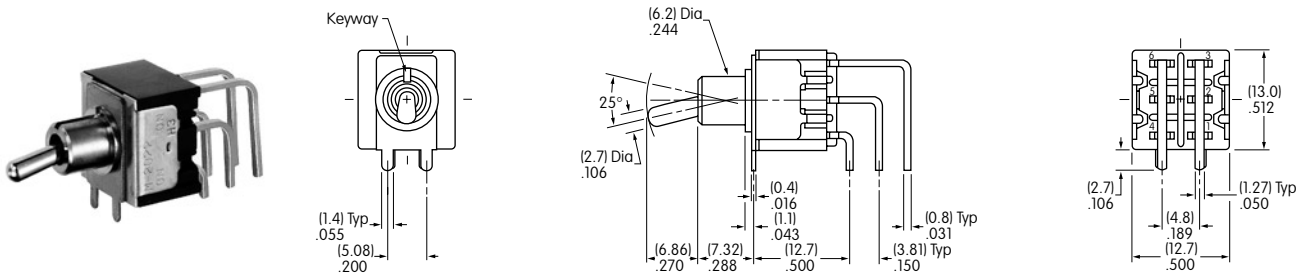
Single Pole



M2012S2A2G40

.150" (3.81mm) Vertical PC

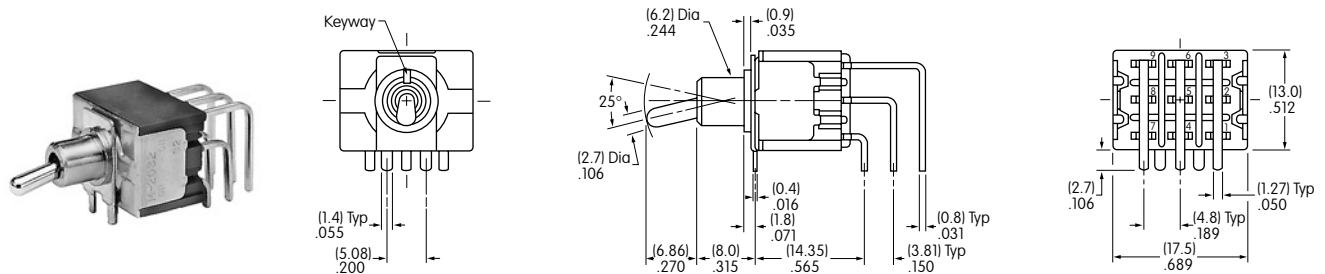
Double Pole



M2022S2A2G40

.150" (3.81mm) Vertical PC

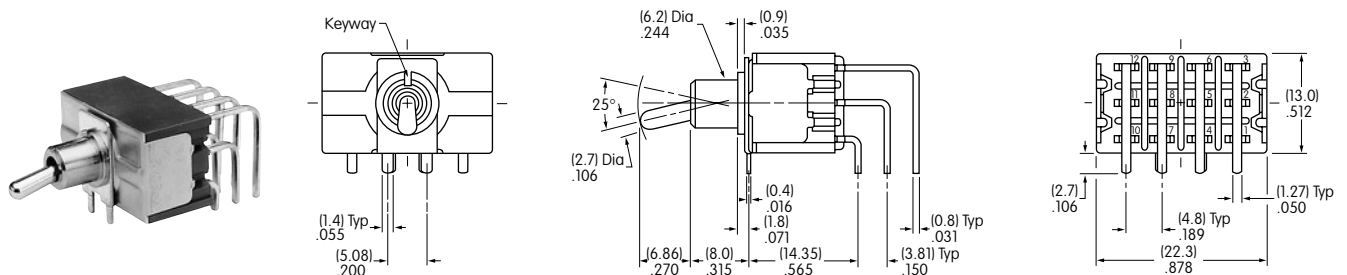
Three Pole



M2032S2A2G40

.150" (3.81mm) Vertical PC

Four Pole

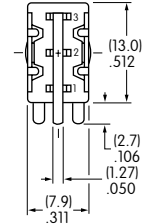
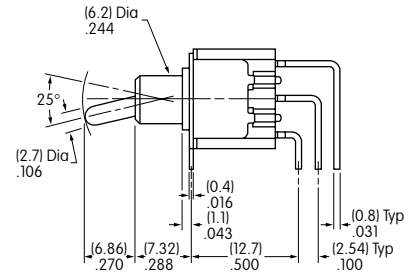
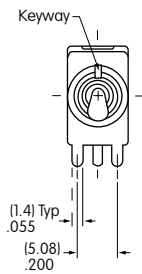


M2042S2A2G40

TYPICAL SWITCH DIMENSIONS

.100" (2.54mm) Vertical PC

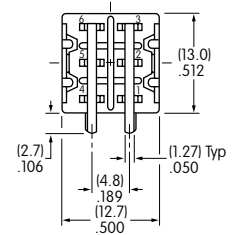
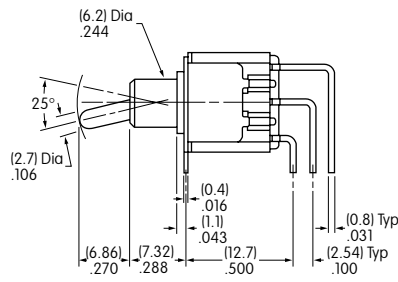
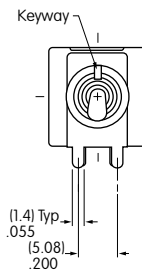
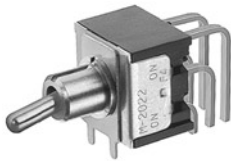
Single Pole



M2012S2A2G45

.100" (2.54mm) Vertical PC

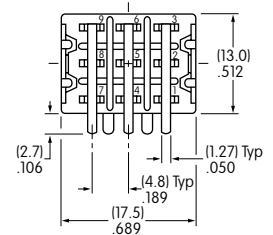
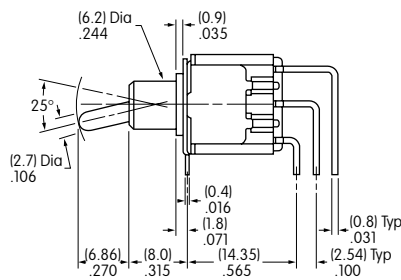
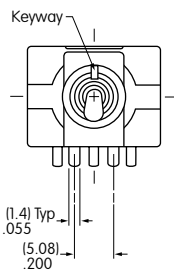
Double Pole



M2022S2A2G45

.100" (2.54mm) Vertical PC

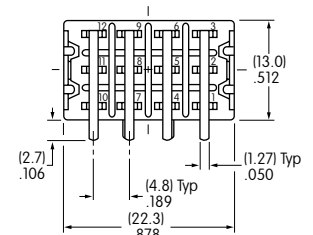
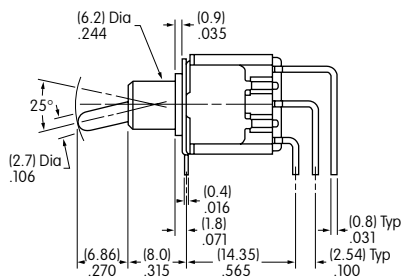
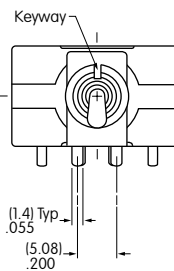
Three Pole



M2032S2A2G45

.100" (2.54mm) Vertical PC

Four Pole



M2042S2A2G45