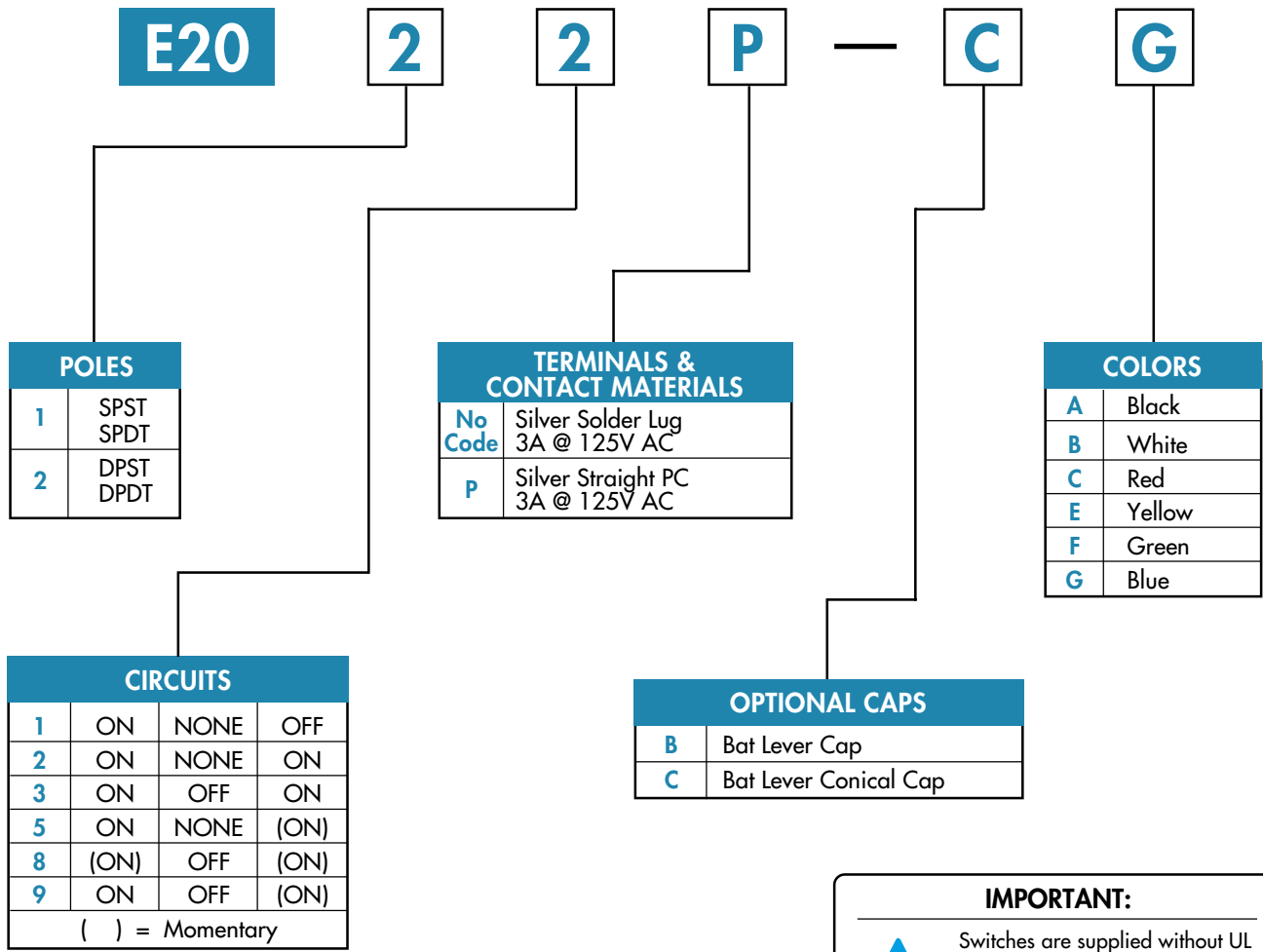





## TYPICAL SWITCH ORDERING EXAMPLE



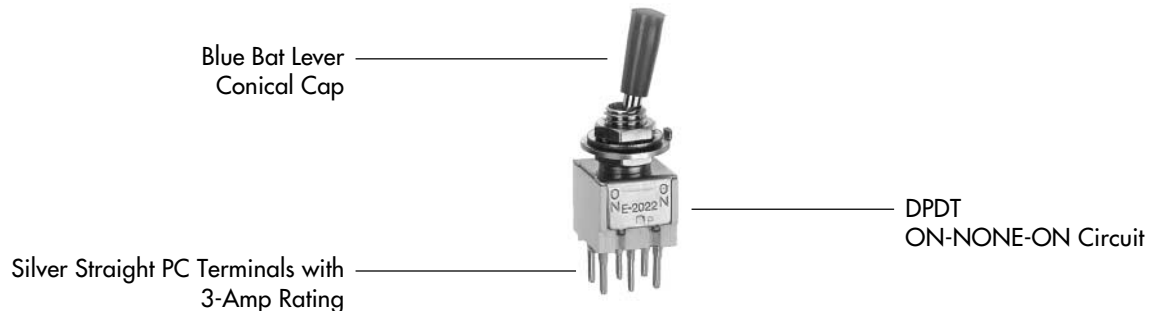
**IMPORTANT:**



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

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**E2022P-CG**





### GENERAL SPECIFICATIONS

#### Electrical Capacity (Resistive Load)

**Power Level (code W):** 3A @ 125V AC

#### Other Ratings

<b>Contact Resistance:</b>	10 milliohms maximum					
<b>Insulation Resistance:</b>	1,000 megohms minimum @ 500V DC					
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts 1,500V AC minimum between contacts & case					
<b>Mechanical Life:</b>	100,000 operations minimum					
<b>Electrical Life:</b>	20,000 operations minimum for silver					
<b>Nominal Operating Force:</b>	Single Pole	Momentary	Alternate	Double Pole	Momentary	Alternate
	E2011		160	E2022		200
	E2012		170	E2023		540
	E2013		460	E2025	410	
	E2015	390		E2028	620	
	E2018	390		E2029	510	600
	E2019	490	400			
<b>Angle of Throw:</b>	25°					

#### Materials & Finishes

<b>Toggle:</b>	Brass with chrome plating
<b>Bushing:</b>	Brass with nickel plating
<b>Frame:</b>	Stainless steel
<b>Case:</b>	Diallyl phthalate resin
<b>Movable Contacts:</b>	Copper with silver plating
<b>Stationary Contacts:</b>	Silver with silver plating
<b>Terminals:</b>	Copper with silver plating

#### Environmental Data

<b>Operating Temp Range:</b>	-10°C through +70°C (+14°F through +158°F)
<b>Humidity:</b>	93% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	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
<b>Shock:</b>	50g acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

#### Installation

<b>Mounting Torque:</b>	15kgf/cm (13lb/in) for double nut; 7kgf/cm (6lb/in) for single nut
<b>Soldering Time &amp; Temperature:</b>	3 seconds @ 350°C or 5 seconds @ 270°C

#### Standards & Certifications

<b>Flammability Standards:</b>	UL94V-0 rated case
<b>UL Recognized:</b>	All single & double pole models recognized at 3A @ 125V AC; UL File No. E44145
<b>CSA Certified:</b>	Single pole, double throw solder lug & PC models certified at 3A @ 125V AC; Double pole, double throw PC models certified at 3A @ 125V AC; CSA File No. LR23535



# Series E

Light Duty Miniature 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.
SP	E2011	ON	NONE	OFF	2-3	OPEN	OPEN	SPST
SP	E2012 E2013 E2015 E2018 E2019	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3	OPEN	2-1	SPDT
DP	E2021	ON	NONE	OFF	2-3 5-6	OPEN	OPEN	DPST
DP	E2022 E2023 E2025 E2028 E2029	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

## CONTACT MATERIALS, RATINGS, & TERMINALS

<b>No Code</b>	<b>Solder Lug Silver Contacts</b>	<b>Power Level</b>	<b>3A @ 125V AC</b>	 Epoxy Seal (2.0) .079 (2.0) .079 (1.1) .043 (4.0) .157 Thk (0.7) (0.5) Com .028 .020	<b>Wiring</b> The .043" x .079" oblong hole accommodates one solid 18-gauge wire or two solid or stranded 20-gauge wires.
<b>P</b>	<b>Straight PC Silver Contacts</b>	<b>Power Level</b>	<b>3A @ 125V AC</b>	 Epoxy Seal (6.4) 2.52 (4.3) .169 (1.2) .047 Thk (0.7) (0.5) Com .028 .020	<b>PCB Footprints</b>  Single Pole      Double Pole

## OPTIONAL CAPS & COLORS

**Standard Toggle**

  
 (7.0) Dia  
 .276  
 (0.8) .031  
 (2.5) .098  
 (2.8) Dia  
 .110  
 (10.5) .413  
 25°  
 (7.9) .311  
 M6 P0.75  
 (0.7) .028  

**Metric Bushing**

**B AT415 Bat Lever Cap**

  
 (5.0) Dia  
 .197  
 (13.5) .532  
 25°  
 (12.0) .472  

Cap Lever Material: Polyethylene

**C AT444 Bat Lever Conical Cap**

  
 (4.8) Dia  
 .189  
 (13.1) .516  
 25°  
 (11.5) .452  

Cap Lever Material: Polyethylene

**Colors Available:**

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

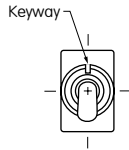


## TYPICAL SWITCH DIMENSIONS

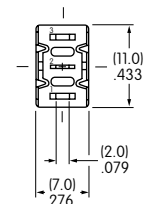
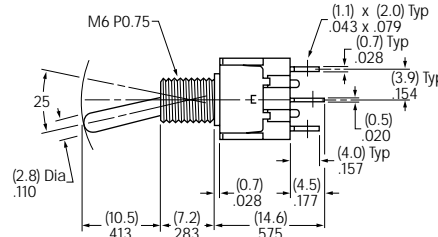
### Solder Lug



E2012



### Single Pole

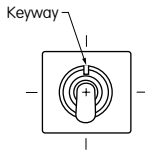


E2011 model does not have terminal 1.

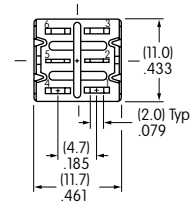
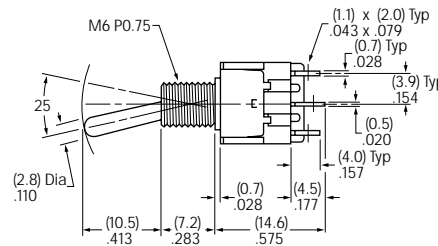
### Solder Lug



E2022



### Double Pole



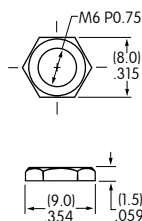
E2021 model does not have terminals 1 & 4.

## STANDARD HARDWARE

Standard Hardware:  
 2 AT513M Metric Hexagon Nuts  
 1 AT507M Metric Locking Ring  
 1 AT509 Internal Tooth Lockwasher

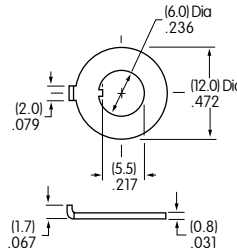
### AT513M Metric Hexagon Nut

Material:  
 Nickel/Brass



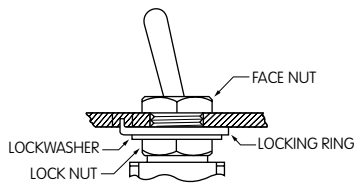
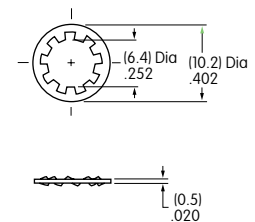
### AT507M Metric Locking Ring

Material:  
 Steel with Chromate/Zinc



### AT509 Lockwasher

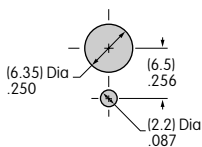
Material:  
 Steel with Chromate/Zinc



Optional hardware available. See [Accessories & Hardware](#) section.

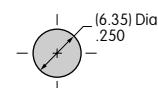
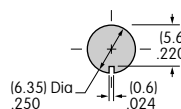
## Panel Thicknesses & Panel Cutouts

**With Standard Hardware**  
 Maximum Effective Panel Thickness:  
 2.2mm (.087")



**Without Bottom Hex Nut**  
 Maximum Effective Panel Thickness:  
 3.9mm (.154")

**Without Locking Ring**  
 Maximum Effective Panel Thickness:  
 3.0mm (.118")



**Without Locking Ring & Bottom Hex Nut**  
 Maximum Effective Panel Thickness:  
 4.7mm (.185")