



# Pushbuttons

## Product Selection Guide

<b>Pushbutton</b>									
<b>Series</b>	<b>ELUM</b>	<b>EP</b>	<b>TP</b>	<b>E020</b>	<b>8020</b>	<b>E010</b>	<b>8060</b>	<b>8500</b>	<b>KM</b>
<b>Switch Type</b>	Mom./Latching	Tiny	Tiny	Snap-acting Mom.	Snap-acting Mom.	Miniature	Alternate Action	Sub-miniature	Sub-miniature
<b>Poles/Throws</b>	SPDT	SPST, SPDT, DPST	SPST, SPDT, DPST	SPDT, DPDT	SPDT, DPDT, 3PDT, 4PDT	SPDT	SPDT, DPDT	SPST	SPST, SPDT
<b>Max. Current</b>	3.5 VA	1 Amp	1 Amp	1 Amp	1 Amp	4 Amps	6 Amps	3 Amps	1 Amp
<b>Process Sealed</b>		•		•		•			
<b>Illuminated</b>	•				•		•	•	
<b>PCB Mount Options</b>									
Thru-hole	•	•	•	•	•	•	•	•	•
Vertical		•	•	•	•	•	•	•	•
Right Angle	•	•	•	•	•	•	•	•	•
Surface Mount	•	•							
<b>Panel Mount</b>			•		•	•	•	•	•
<b>Page No.</b>	A-3	A-9	A-15	A-21	A-29	A-46	A-52	A-62	A-67

<b>Pushbutton</b>							
<b>Series</b>	<b>8600</b>	<b>8700</b>	<b>GP</b>	<b>PN</b>	<b>PHA</b>	<b>F</b>	<b>NE-18</b>
<b>Switch Type</b>	Micro-miniature	Over Travel	Ultra-miniature	Alternate & Mom. Action	Short Stroke	Alternate & Mom. Action	Mains / Power
<b>Poles/Throws</b>	SPST	SPST	SPST, SPDT	SPDT, DPDT, 4PDT	DPDT, 4PDT, 6PDT	DPDT, 4PDT, 6PDT, 8PDT, 10PDT	DPST, DPDT, Varied
<b>Max. Current</b>	500 mA	1 Amp	0A V	200 mA	100 mA	500 mA	6 A
<b>Process Sealed</b>			•				
<b>PCB Mount Options</b>							
Thru-hole	•	•	•	•	•	•	•
Vertical	•	•	•				
Right Angle			•	•	•	•	•
Surface Mount			•				
<b>Panel Mount</b>	•	•				•	•
<b>Page No.</b>	A-71	A-74	A-77	A-81	A-84	A-88	A-98

# EP Series Sealed Tiny Pushbutton Switches



A

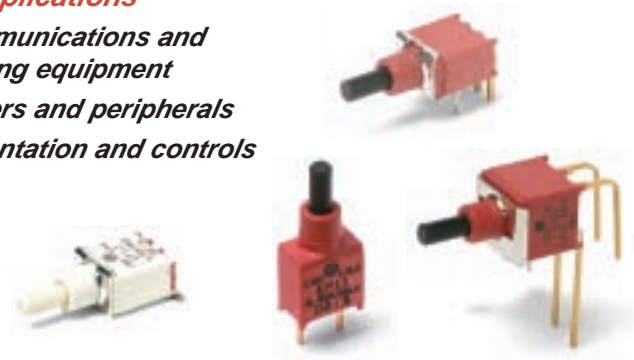
Pushbutton

## Features/Benefits

- Sealed against solder & cleaning processes
- Thru-hole and surface mount models
- Snap-fitting actuator accepts standard caps
- Tape & reel packaging available
- RoHS compliant models available

## Typical Applications

- Telecommunications and networking equipment
- Computers and peripherals
- Instrumentation and controls



Models Available

## Specifications

**CONTACT RATING:** B contact material: 0.4 VA max. @ 20 V AC or DC max. See page A-13 for additional ratings.

**ELECTRICAL LIFE:** EP11, EP21 models: 60,000 make-and-break cycles at full load. EP12 models: 30,000 cycles.

**CONTACT RESISTANCE:** Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

**INSULATION RESISTANCE:** 10<sup>9</sup> Ω min.

**DIELECTRIC STRENGTH:** 1000 Vrms min. @ sea level.

**OPERATING TEMPERATURE:** -30°C to 85°C.

**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**DEGREE OF PROTECTION:** IP57; Protection against harmful dust deposit, full-scale voltage protection, temporary immersion.

**PACKAGING:** Surface mount switches standard in anti-static tape and reel packaging per EIA 481-3, see page A-14 for drawings and reel information. Tape and cover strip are conductive for use near statically sensitive components, consult Customer Service Center.

## Materials

**CASE & BUSHING:** High temperature material, glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0) on SMT models; glass filled nylon 6/6 on PC Through Hole models.

**PLUNGER:** Thermoplastic polyester or glass filled nylon (UL 94V-0), with internal o-ring seal. SA surface mount: High temperature material, glass filled LCP (UL 94V-0).

**SWITCH SUPPORT:** Brass, matte-tin plated.

**CONTACTS & TERMINALS:** B contact material: Copper alloy, with gold plate over nickel plate. See page A-13 for additional contact materials.

**TERMINAL SEAL:** Epoxy.

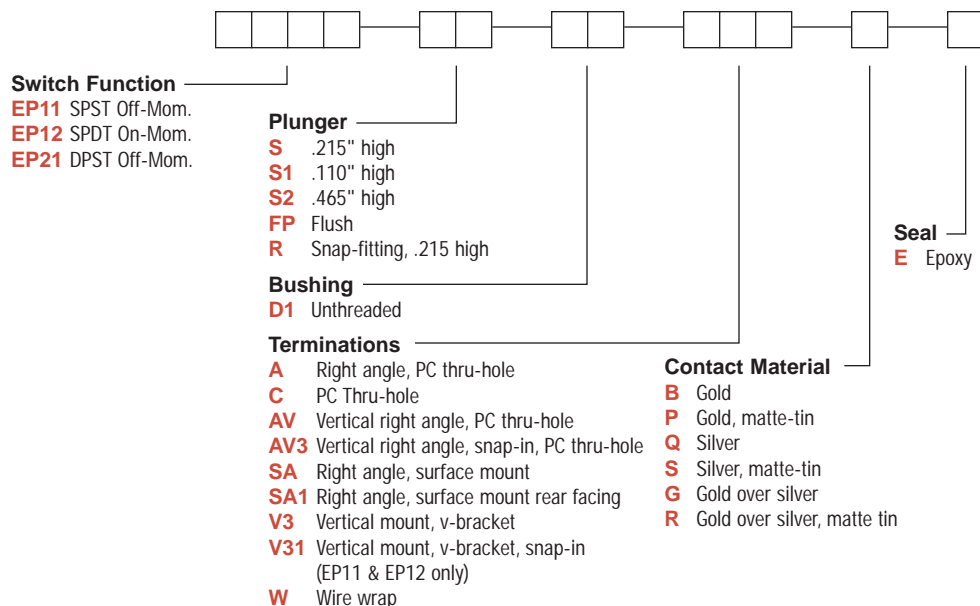
**NOTE:** Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

**CAUTION:** PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be taken in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-10 thru A-14. For additional options not shown in catalog, consult Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# EP Series Sealed Tiny Pushbutton Switches

Pushbutton  
A

## SWITCH FUNCTION

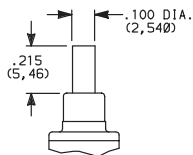
NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
		C&K marking on opposite side		C&K marking on opposite side		
SP	EP11	OFF	MOM.	OPEN	1-3	
	EP12	ON	MOM.	2-1	2-3	
<b>SPDT</b> <p>Part number shown: EP12SD1CBE</p> <p>Terminal Nos. For Reference Only</p>						
DP	EP21	OFF	MOM.	OPEN	1-3,4-6	
<b>DPST</b> <p>Part number shown: EP21SD1CBE</p> <p>Terminal Nos. For Reference Only</p>						

MOM. = Momentary

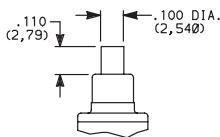
All models with all options when ordered with G, L, M Q, R or S contact material.

## PLUNGER

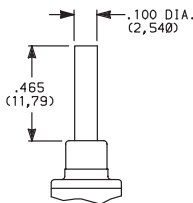
**S** .215" HIGH



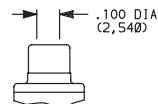
**S1** .110" HIGH



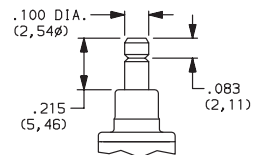
**S2** .465" HIGH



**FP** FLUSH PLUNGER



**R** SNAP-FITTING



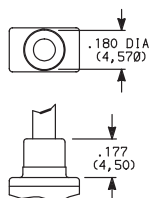
S1 & S2 actuators are not available with EP12 & EP21 models or SA1 termination style.

FP & R actuators are not available with EP21 model or SA1 termination style.

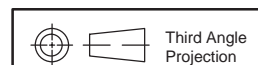
**NOTE:** Caps available for plunger options, see page A-14.

## BUSHING

**D1** UNTHREADED



**NOTE:** Internal actuator o-ring standard.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# EP Series Sealed Tiny Pushbutton Switches



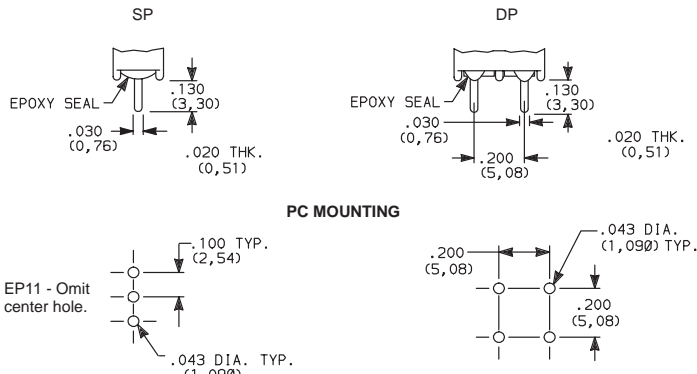
A

Pushbutton

## TERMINATIONS

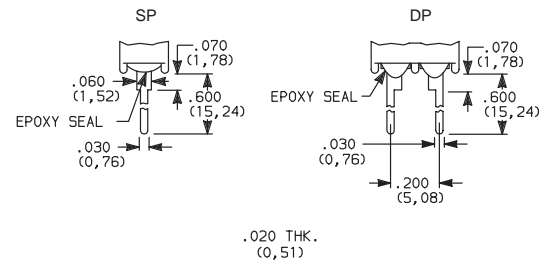


### C PC THRU-HOLE



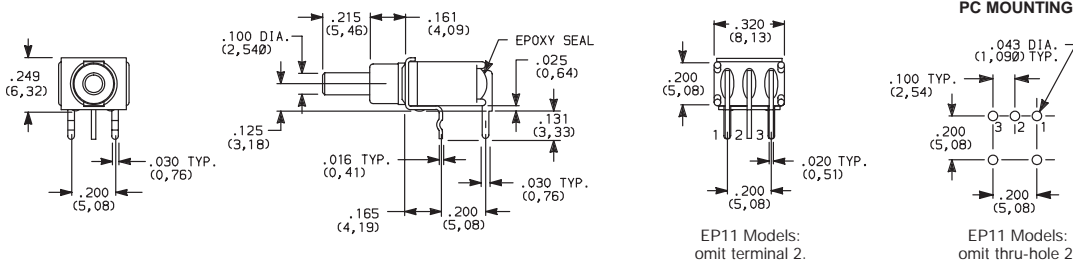
### SP and DP

### W WIRE WRAP



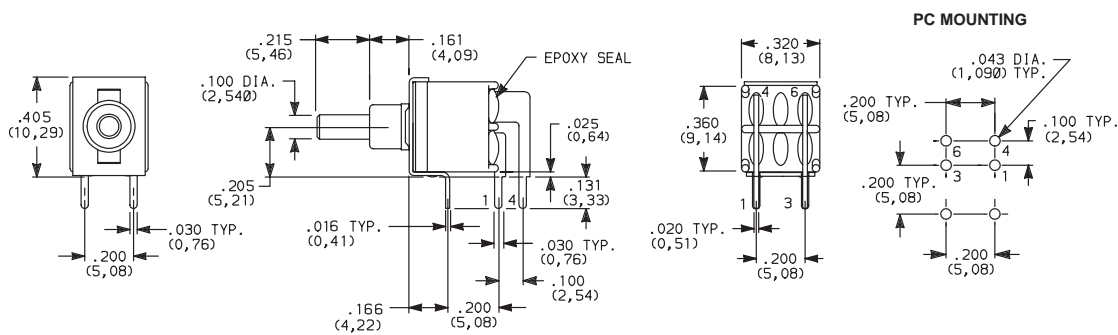
### SP and DP

### A RIGHT ANGLE, PC THRU-HOLE



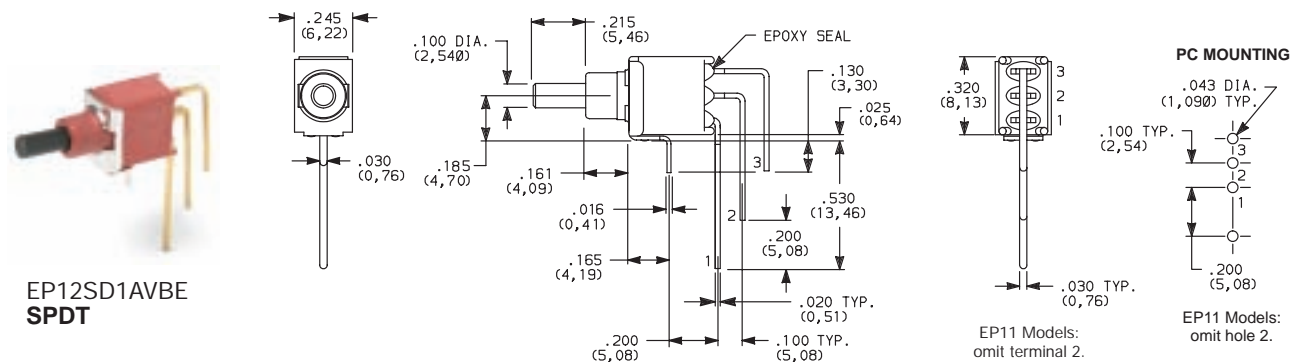
EP12SD1ABE  
SPDT

### A RIGHT ANGLE, PC THRU-HOLE



EP21SD1ABE  
DPST

### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



EP12SD1AVBE  
SPDT

NOTE: Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# EP Series Sealed Tiny Pushbutton Switches



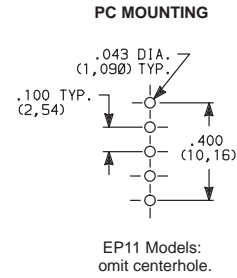
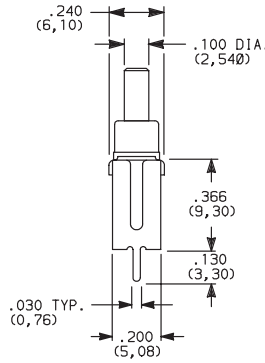
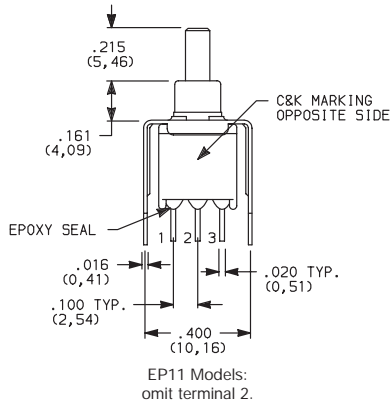
A

Pushbutton

## TERMINATIONS

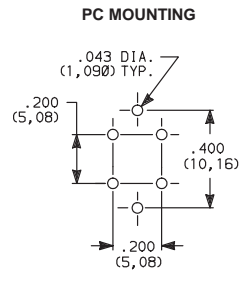
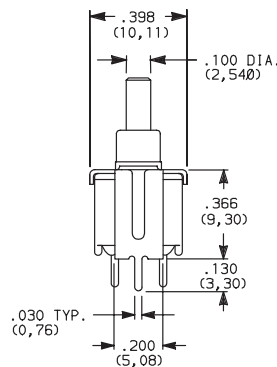
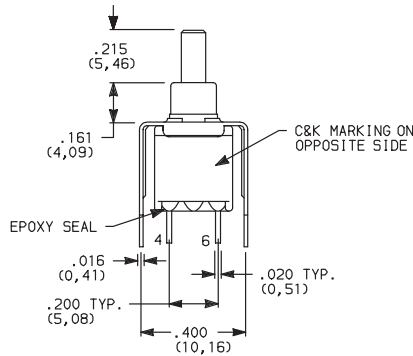
**V3** VERTICAL MOUNT, V-BRACKET

**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



EP12SD1V3BE  
SPDT

**V3** VERTICAL MOUNT, V-BRACKET



EP21SD1V3BE  
DPST

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B</b>	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
<b>P</b>		MATTE-TIN <sup>6</sup>		
<b>Q</b>	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	1 AMP @ 120 V AC OR 28 V DC.
<b>S</b>		MATTE-TIN <sup>6</sup>		
<b>G</b>	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
<b>R</b>		MATTE-TIN <sup>6</sup>		

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

<sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.

<sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

<sup>4</sup> END CONTACTS: Coin silver, silver plated.

<sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

<sup>6</sup> TERMINALS: Copper alloy, with matte tin over nickel plate.

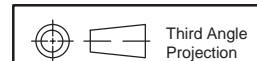
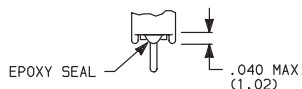
**NOTE:** Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

All models with all options when ordered with G, L, M, S, R or Q contact material.

K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

## SEAL

**E** EPOXY SEAL



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