



# 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               |



Pushbutton

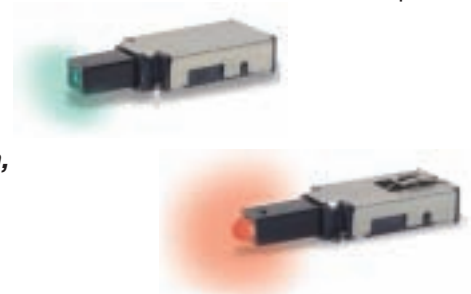
Patent Numbers  
6,974,924 B2 US  
EP1583118B1 Europe

**Features/Benefits**

- **SPDT (N.O. & N.C.)**
- **Low height above PCB**
- **Reliable self-cleaning contact**
- **Surface-mount or thru-hole PCB**
- **Standard or custom actuator**
- **Central LED illumination**
- **Latching or Momentary**
- **Long travel. Smooth feel**
- **RoHS compliant and compatible**

**Typical Applications**

- **Telecom network equipment**
- **Automotive electronics**
- **Consumer electronics**
- **Computer, server, modem, data storage**
- **Professional instrumentation, medical**



**Materials**

FIXED CONTACTS AND TERMINALS: Stainless steel, silver plated with gold flash (STD.)  
MOVABLE CONTACTS: Copper alloy, silver plated with gold flash (STD.)  
BASE: Glass filled LCP (UL94V-0)  
ACTUATOR: Glass filled nylon 4/6 (UL94V-0)  
COVER: Stainless steel

**Operating Environment**

OPERATING TEMPERATURE: -40°C TO 80°C.  
STORAGE TEMPERATURE: -40°C TO 80°C.  
RELATIVE HUMIDITY: 90% R.H. @ 80°C.  
OPERATING LIFE: 30,000 Cycles.  
VIBRATION: Per EIA 186-E Method  
MECHANICAL SHOCK: Per EIA 186-E Method 12.  
OVERLOAD: Withstands 40 N for 1 minute without damage

**Electrical**

MAXIMUM POWER: 3.5 VA  
MIN./MAX. VOLTAGE: 20 mV – 50 VDC  
MIN./MAX. CURRENT: 0.01 mA – 250 mA  
DIELECTRIC STRENGTH: ≥ 250 Vrms  
CONTACT RESISTANCE: ≤ 50 mΩ  
INSULATION RESISTANCE: ≥ 10<sup>9</sup> Ω  
BOUNCE TIME: ≤ 1 ms  
LED SPECIFICATIONS: See page A-5

**Process Environment**

SOLDERABILITY: According to Mil STD 202F Method 208D or EIA RS-186E Method 9.  
LEAD FREE PROCESS COMPATIBLE: 260°C peak, 10 seconds Max. above 250° C.  
WASHING PROCESS: No clean process compatible (SMT)  
Bottom wash compatible (Thru-hole)  
SHEAR TEST (SWITCH/PCB): > 40 N

**Mechanical**

OPERATING FORCE: 2.5 N at Full Travel  
SWITCHING TRAVEL: .067" (1.7 mm)  
LATCH TRAVEL: .131" (3.6 mm)  
FULL TRAVEL: .200" (5.1 mm)

**Packaging**

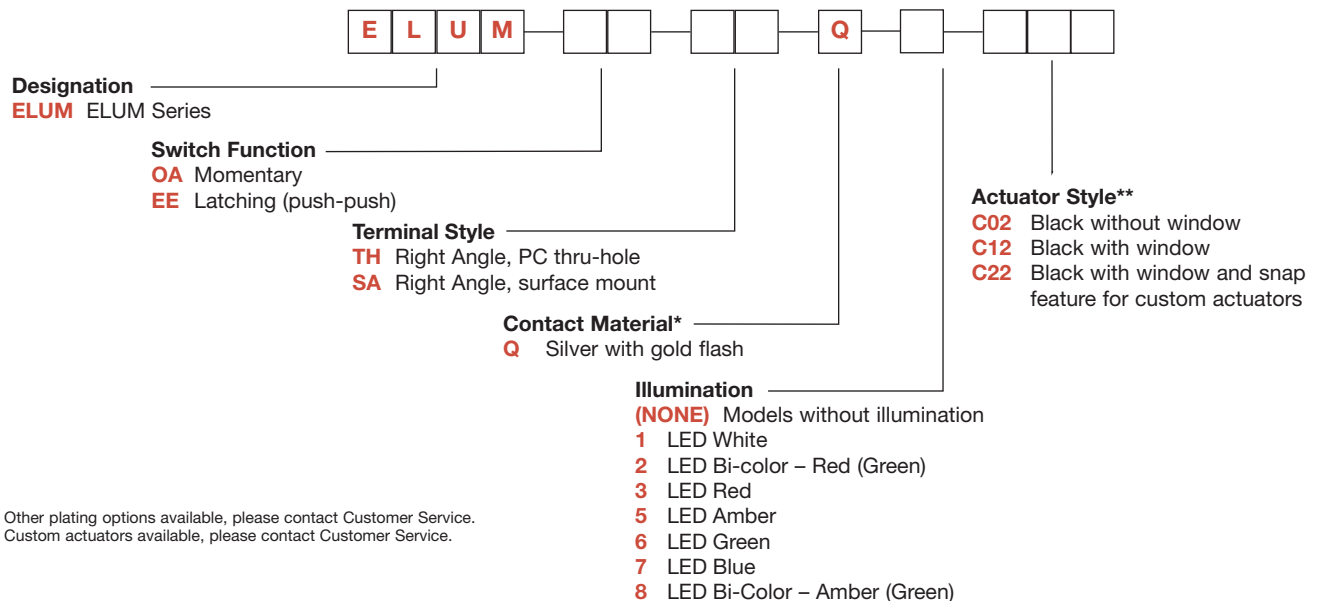
“SA” Terminal Style SMT: Tape and reel per EIA 481-2 (450/reel)  
“TH” Terminal Style PC: Tray (60/tray)

**NOTE:** Any models supplied with Q, contact material are RoHS compliant.

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

**Build-A-Switch**

To order, simply select desired option from each category and place in the appropriate box.



\* Other plating options available, please contact Customer Service.  
\*\* Custom actuators available, please contact Customer Service.



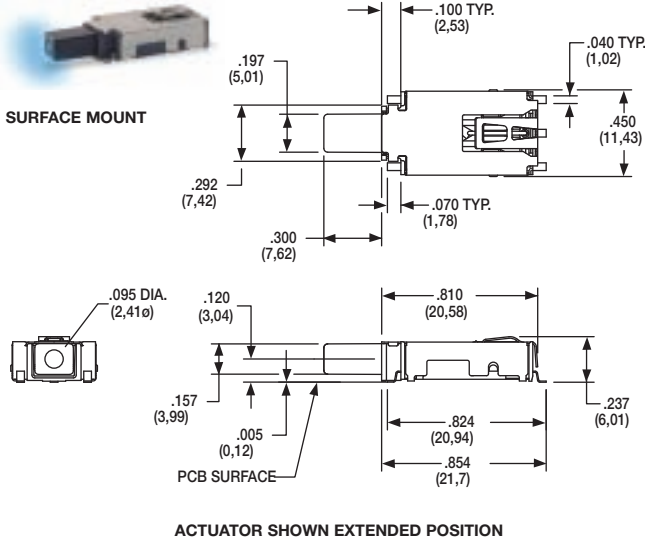


# ELUM™ Series Right Angle Illuminated Latching Pushbutton

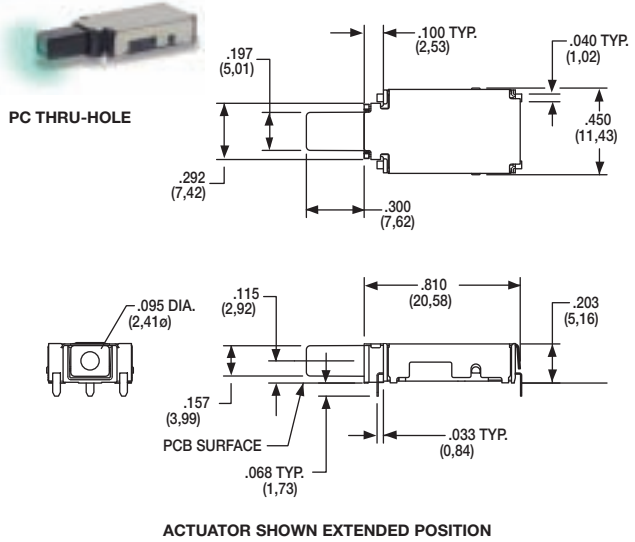
## STANDARD OPTIONS

Pushbutton  
A

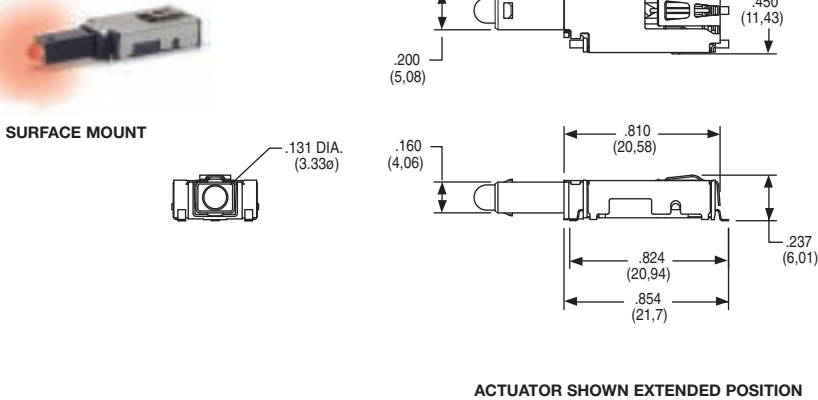
### ELUMEESAQ7C12



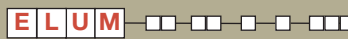
### ELUMOATHQ6C12



### ELUMEESAQ3C22



## DESIGNATION



**ELUM** ELUM SERIES, Illuminated Latching Pushbutton

## SWITCH FUNCTION

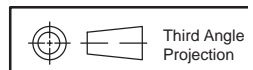
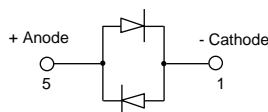


| OPTION CODE | NO. OF POLES            | POSITION 1      | CONNECTED TERMINALS | POSITION 2      | CONNECTED TERMINALS | SCHEMATIC |
|-------------|-------------------------|-----------------|---------------------|-----------------|---------------------|-----------|
|             |                         | SWITCH FUNCTION |                     | SWITCH FUNCTION |                     |           |
| <b>OA</b>   | SP Momentary            | ON              | 3 - 4               | ON (Mom.)       | 3 - 2               |           |
| <b>EE</b>   | SP Latching (Push-Push) | ON              | 3 - 4               | ON              | 3 - 2               |           |

For SPST N.O. function, only terminals 3 & 2 are used.  
For SPST N.C. function, only terminals 3 & 4 are used.  
Circuit: Make before break

LED pins 1 & 5 are independent of switch function.

NOTE:  
For bi-color LED's the polarity must be reversed to alternate the color



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



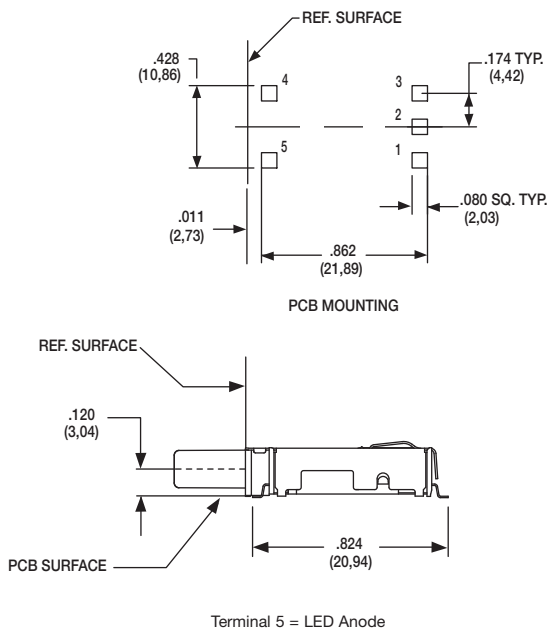
# ELUM™ Series Right Angle Illuminated Latching Pushbutton



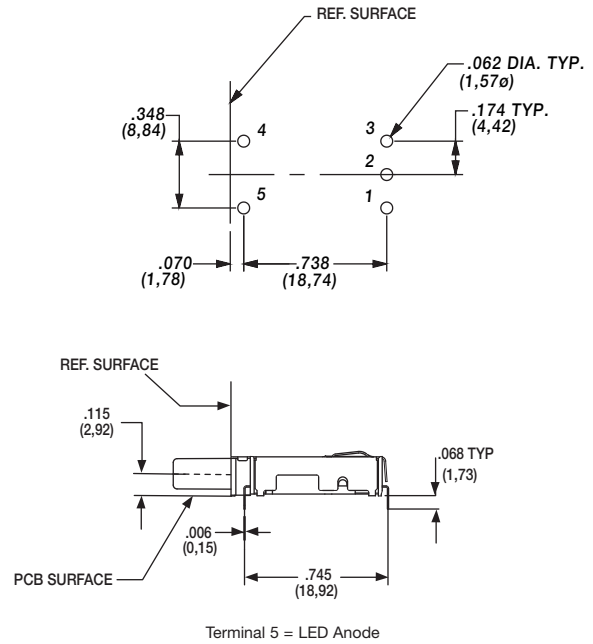
A

Pushbutton

## SA RIGHT ANGLE, SURFACE MOUNT



## TH RIGHT ANGLE, PC THRU-HOLE



## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL       | TERMINAL PLATING       | RATINGS |
|-------------|------------------------|------------------------|---------|
| Q           | SILVER WITH GOLD FLASH | SILVER WITH GOLD FLASH | 250 mA  |

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

FIXED CONTACTS AND TERMINALS: Stainless steel, silver plated with gold flash

MOVABLE CONTACTS: Copper alloy, silver plated with gold flash

**NOTE:** Any models supplied with Q, contact material are RoHS compliant.

## ILLUMINATION

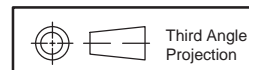
| OPTION CODE | ILLUMINATION TYPE            | TYPICAL INTENSITY* |       | PEAK WAVELENGTH | Vf Forward Voltage |
|-------------|------------------------------|--------------------|-------|-----------------|--------------------|
|             |                              | MIN                | MAX   |                 |                    |
|             |                              | (mcd)              |       | (nm)            |                    |
| 00          | Model without illumination   | N/A                |       | N/A             |                    |
| 01          | LED Super White              | 4,000              | 5,000 | N/A             | 3.5                |
| 02          | LED Bi-Color – Red (Green)   | 10                 | 20    | 635/565         | 2.0                |
| 03          | LED Red                      | 4                  | 8     | 700             | 2.0                |
| 05          | LED Amber                    | 35                 | 50    | 610             | 2.0                |
| 06          | LED Green                    | 35                 | 50    | 565             | 2.0                |
| 07          | LED Super Blue               | 800                | 1,500 | 470             | 3.8                |
| 08          | LED Bi-Color – Amber (Green) | 10                 | 10    | 585/565         | 2.0                |

\*LED FORWARD CURRENT: 20 mA

LED FORWARD VOLTAGE: see chart above

LED REVERSE VOLTAGE: 5.0 V MAX

\* For information on specific and custom LED, please contact Customer Service.



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





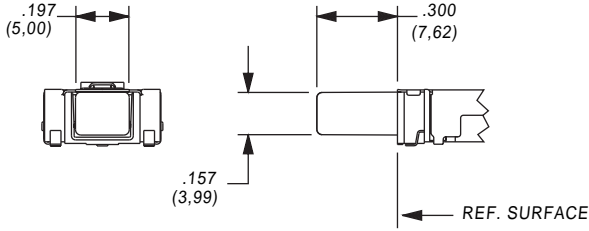
# ELUM™ Series Right Angle Illuminated Latching Pushbutton

## ACTUATOR STYLE\*

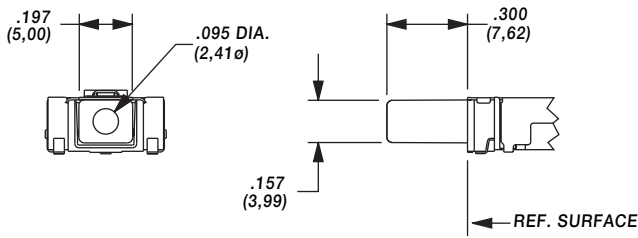


Pushbutton  
A

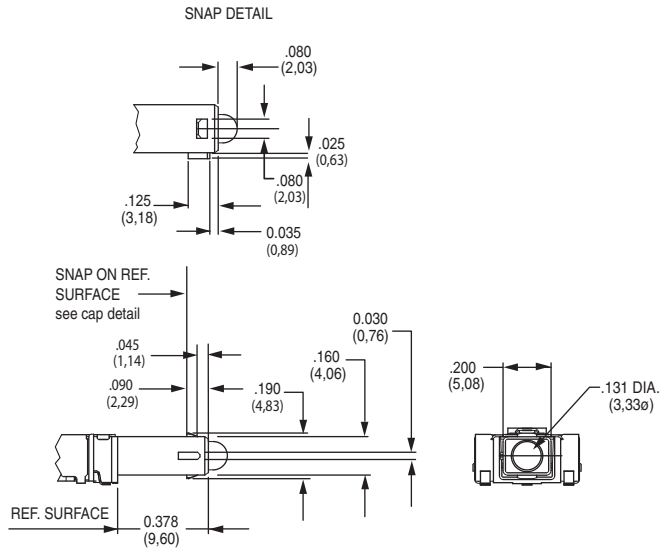
### C02 BLACK WITHOUT WINDOW



### C12 BLACK WITH WINDOW

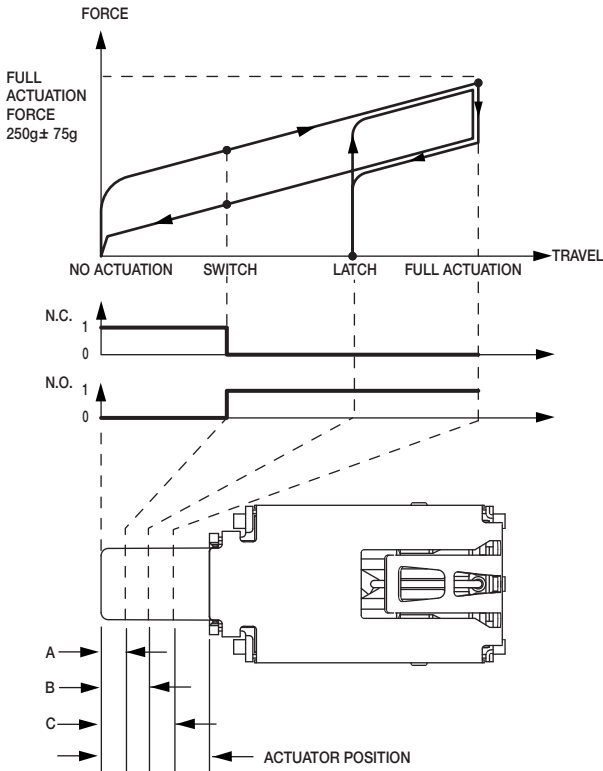


### C22 BLACK WITH WINDOW AND SNAP FEATURE TO ACCEPT CUSTOM CAP



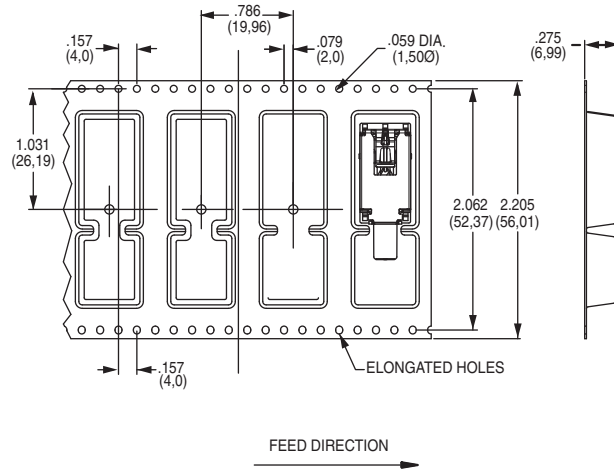
\* Custom actuators available, please contact Customer Service.

## FORCE TRAVEL DIAGRAM



| ACTUATOR POSITION |                |             |             |
|-------------------|----------------|-------------|-------------|
| A                 | SWITCH         | .067 ± .020 | 1,7 ± 0.5mm |
| B                 | LATCH          | .131 ± .020 | 3,3 ± 0.5mm |
| C                 | FULL ACTUATION | .200 ± .020 | 5,1 ± 0.5mm |

## TAPE & REEL



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



# ELUM™ Series Right Angle Illuminated Latching Pushbutton



Pushbutton

## AVAILABLE HARDWARE

Cap



**PART NO.**

**957C00000** High temperature black cap with universal standby symbol

**956C02000** High temperature black cap with no symbol

Material: 4/6 Nylon SMT compatible

Cap



**PART NO.**

**181D01000** Paint and Laser Etched with black paint and universal standby symbol

Material: Clear polycarbonate

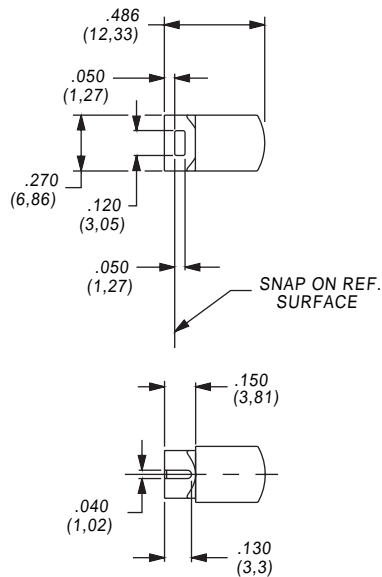
Cap



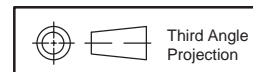
**PART NO.**

**181D00000** Paint and laser etched with white paint underlay and black paint with universal standby symbol.

Material: Clear polycarbonate



**NOTE:** Caps are for use with the C22 actuator style. Other colors and symbols available, consult Customer Service Center.



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



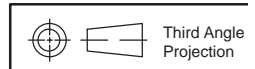
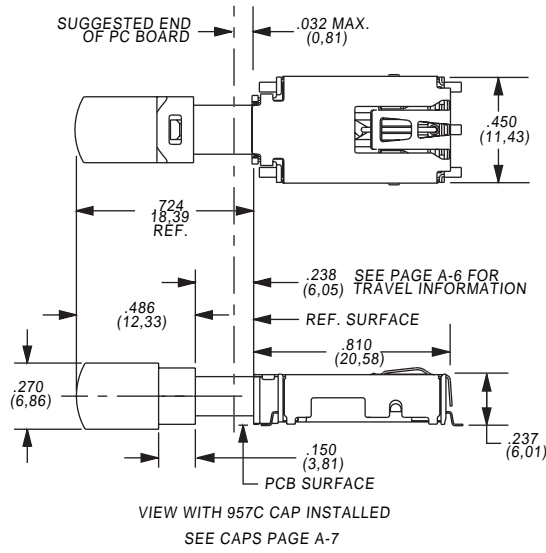


# ELUM™ Series Right Angle Illuminated Latching Pushbutton

## CAP INSTALLATION

A

Pushbutton



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

# 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.

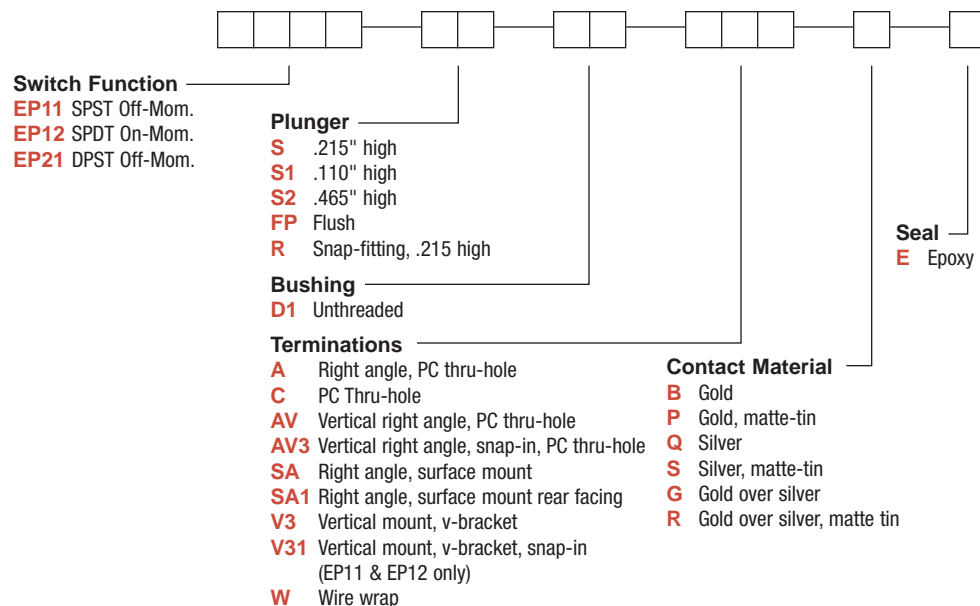
**NOTE:** Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

**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

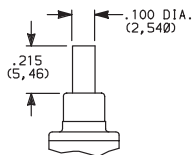
| NO. POLES  | MODEL NO. | SWITCH FUNCTION              |        | CONNECTED TERMINALS          |         | SCHEMATIC |
|--|-----------|------------------------------|--------|------------------------------|---------|-----------|
|  |           | POS. 1                       | POS. 2 | POS. 1                       | 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

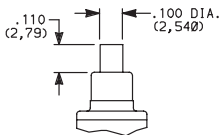
All models with all options when ordered with G, L, M Q, R or S contact material.

## PLUNGER

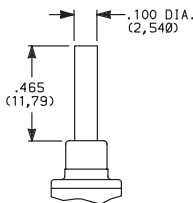
**S** .215" HIGH



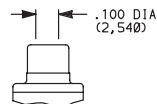
**S1** .110" HIGH



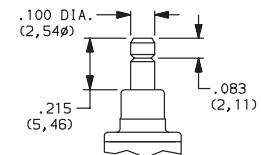
**S2** .465" HIGH



**FP** FLUSH PLUNGER



**R** SNAP-FITTING



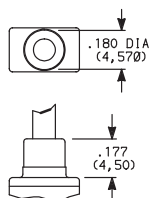
S1 & S2 actuators are not available with EP12 & EP21 models or SA1 termination style.

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

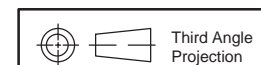
NOTE: Caps available for plunger options, see page A-14.

## 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



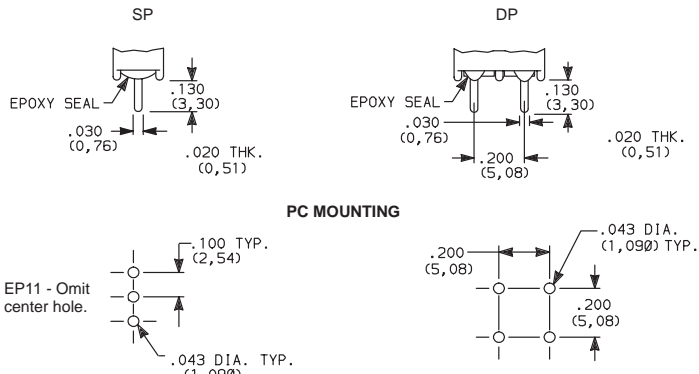
A

Pushbutton

## TERMINATIONS

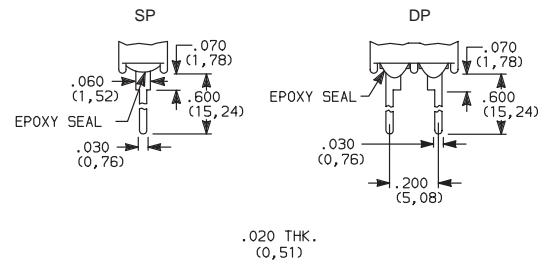


### C PC THRU-HOLE



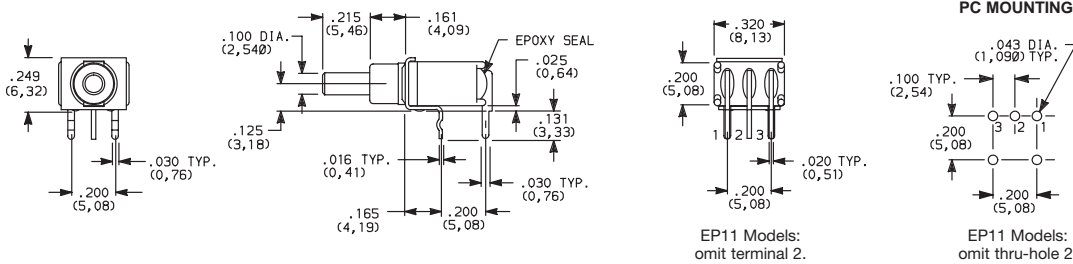
### SP and DP

### W WIRE WRAP



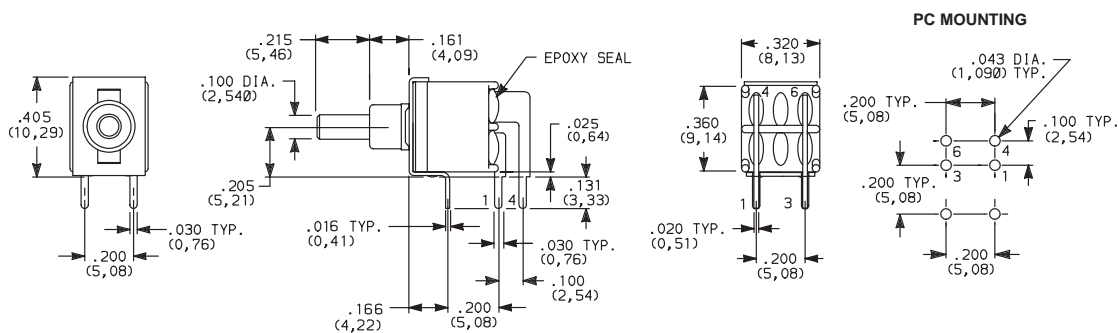
### SP and DP

### A RIGHT ANGLE, PC THRU-HOLE



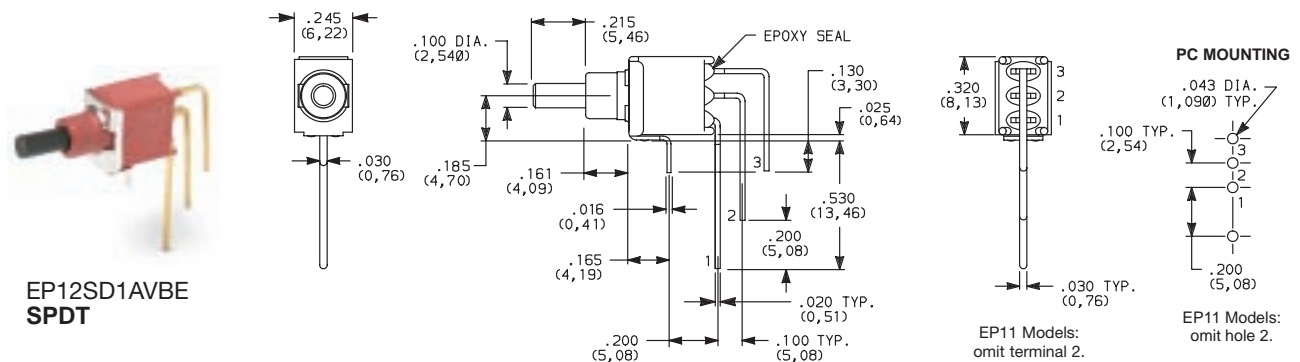
EP12SD1ABE  
SPDT

### 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

## TERMINATIONS



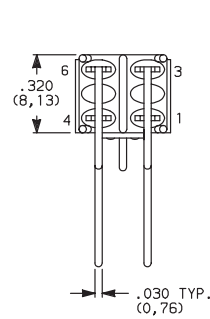
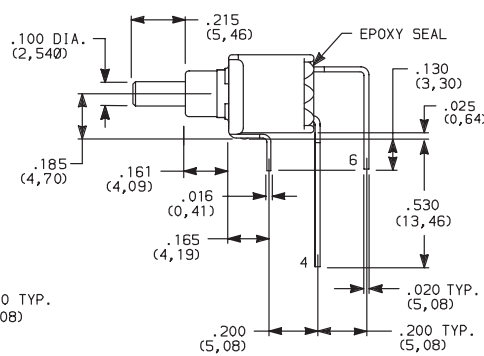
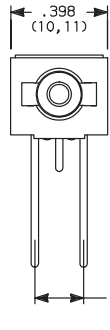
Pushbutton

A

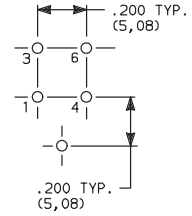
### AV VERTICAL RIGHT ANGLE, THRU-HOLE



**EP21SD1AVBE  
DPST**



#### PC MOUNTING

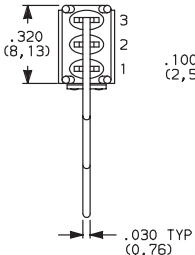
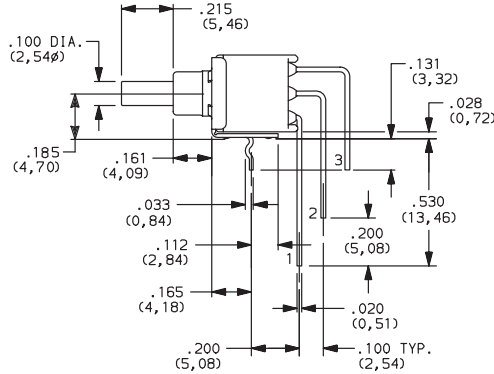
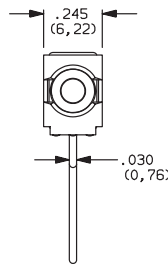


**NOTE:** Terminal bend radii and lead-in manufacturing option.

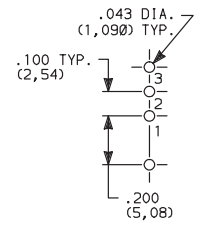
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



**EP12SD1AV3BE  
SPST**



#### PC MOUNTING



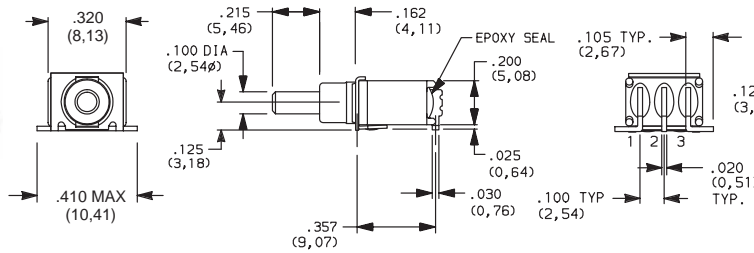
EP11 Models:  
omit hole 2.

### SA RIGHT ANGLE, SURFACE MOUNT

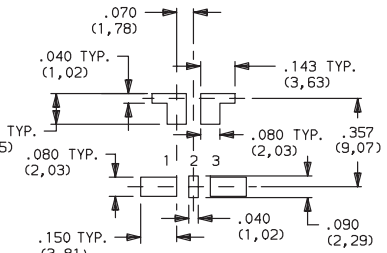
SMT



**EP12SD1SAPE  
SPDT**



#### PC MOUNTING



EP11 Models:  
omit pad 2.

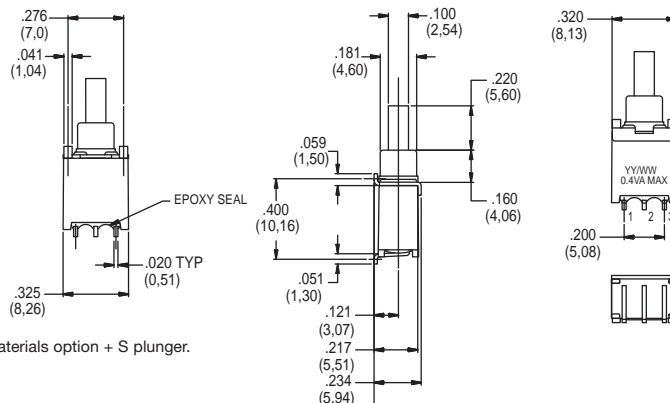
Available with P contact material only.  
Not Available on DPST models.

EP11 Models:  
omit terminal 2.

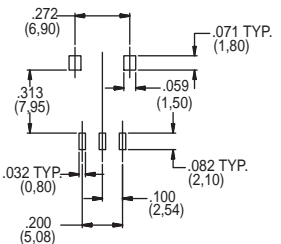
### SA1 RIGHT ANGLE, SURFACE MOUNT



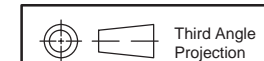
**EP12SD1SA1BE  
SPDT**



#### PC MOUNTING



SA1 is only available with B contact materials option + S plunger.  
Not Available on DPST models.



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



# EP Series Sealed Tiny Pushbutton Switches



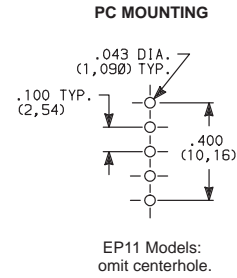
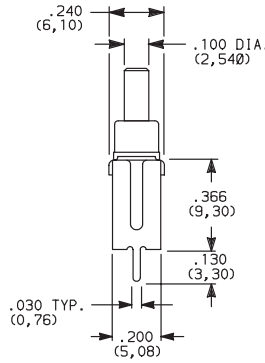
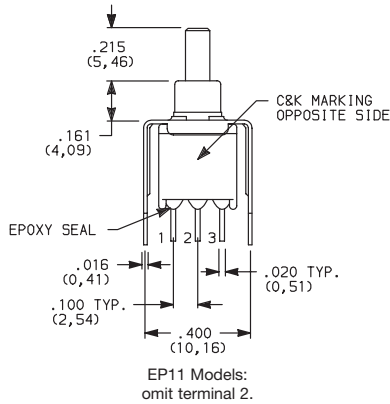
A

Pushbutton

## TERMINATIONS

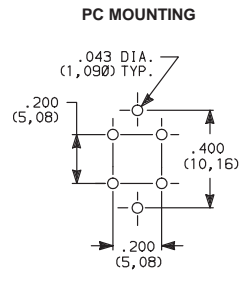
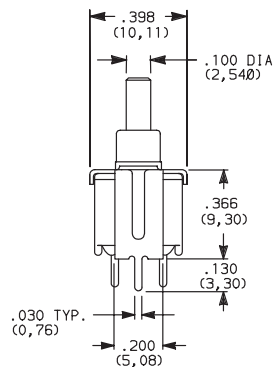
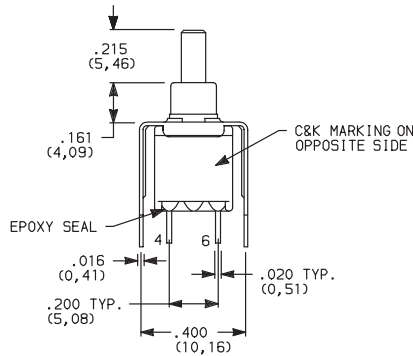
**V3** VERTICAL MOUNT, V-BRACKET

**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<br>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.

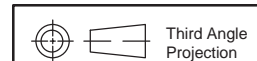
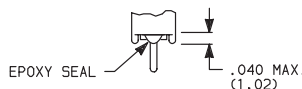
**NOTE:** Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

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



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



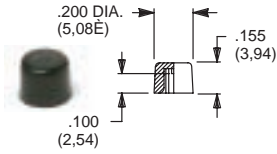


# EP Series Sealed Tiny Pushbutton Switches

## AVAILABLE HARDWARE

Pushbutton  
A

Cap



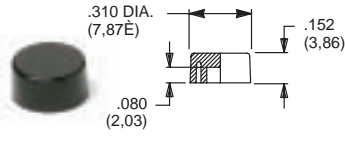
PART NO.

- 508101000** WHITE
- 508102000** BLACK
- 508103000** RED

Material: Nylon  
Finish: Gloss

Not for use on S1 plunger

Cap



PART NO.

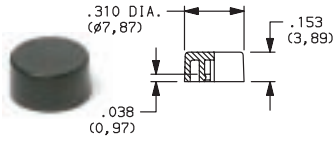
- 465801000** WHITE
- 465802000** BLACK
- 465803000** RED

Material: Nylon  
Finish: Gloss

Not for use on S1 plunger

Cap

Compatible with snap-fitting plungers  
EP11 & EP12 Models. R option only.



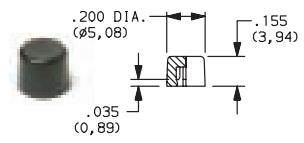
PART NO.

- 585A01000** WHITE
- 585A02000** BLACK
- 585A03000** RED

Material: Nylon  
Finish: Gloss

Cap

Compatible with snap-fitting plungers  
EP11 & EP12 Models. R option only.



PART NO.

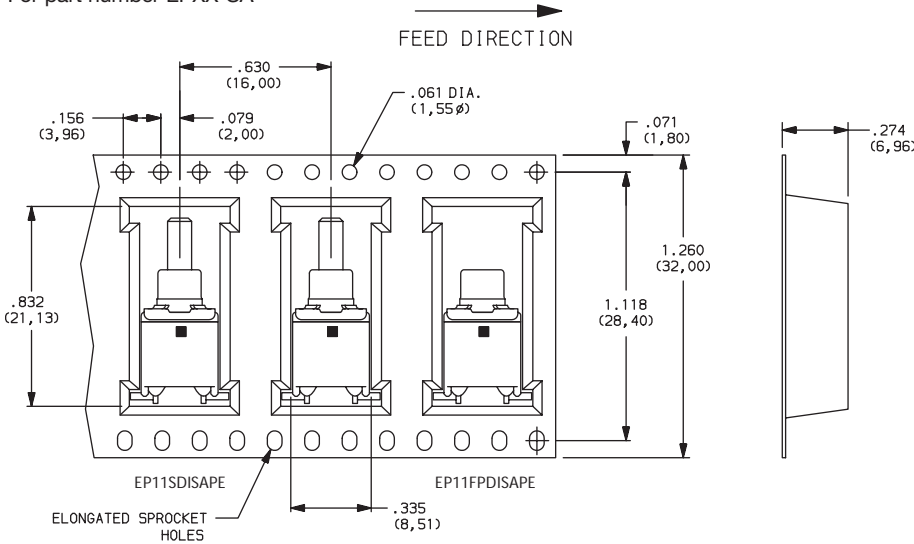
- 785A01000** WHITE
- 785A02000** BLACK
- 785A03000** RED

Material: Nylon  
Finish: Gloss

NOTE: Other colors available, consult Customer Service Center.

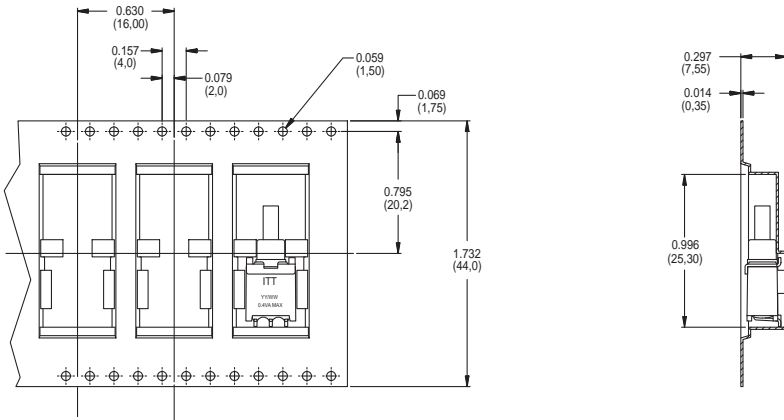
## TAPE & REEL

For part number EPXX-SA

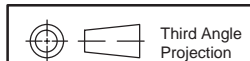


| REEL INFORMATION  |               |
|-------------------|---------------|
| OUTSIDE DIAMETER  | 13.00 (330,0) |
| PILOT HOLE        | .512 (13,0)   |
| QUANTITY PER REEL | 600           |

For part number EPXX-SA1



| REEL INFORMATION  |               |
|-------------------|---------------|
| OUTSIDE DIAMETER  | 13.00 (330,0) |
| PILOT HOLE        | .795 (20,20)  |
| QUANTITY PER REEL | 500           |



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



# TP Series Tiny Pushbutton Switches



A

Pushbutton

## Features/Benefits

- **Subminiature size—capable of switching 1 AMP**
- **Vertical & right angle terminations**
- **PC & panel mount models**
- **Snap-in front panel mounting available**
- **Epoxy terminal seal-compatible with bottom wash cleaning**
- **RoHS compliant models available**



Models Available

## Typical Applications

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



## Specifications

**CONTACT RATING:** B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page A-19 for additional ratings.

**ELECTRICAL LIFE:** TP11, TP21 MODELS: 60,000 make-and-break cycles at full load. TP12 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).

**NOTE:** Any models supplied with Q, B, P, 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.

## Materials

**CASE:** Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).

**PLUNGER:** Thermoplastic polyester (UL 94V-0).

**CAP & FRAME:** Nylon, black standard.

**BUSHING:** Brass, nickel plated.

**HOUSING:** Stainless steel.

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

**END CONTACTS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See page A-19 for additional contact materials.

**CENTER CONTACT & ALL TERMINALS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page A-19 for additional contact materials.

**TERMINAL SEAL:** Epoxy. Refer to soldering and cleaning in Technical Data Chapter

**HARDWARE:** Nut & Locking Ring: Brass nickel plated. Lockwasher: Steel, nickel plated.

## 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-16 thru A-20. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

|   |  |   |  |   |   |   |
|---|--|---|--|---|---|---|
| <p><b>Switch Function</b></p> <p><b>TP11</b> SPST Off-Mom.</p> <p><b>TP12</b> SPDT On-Mom.</p> <p><b>TP21</b> DPST Off-Mom.</p> | <p><b>Actuator or Bushing</b></p> <p><b>SH</b> .155" high plunger, threaded, .220" high bushing, flat</p> <p><b>SH8</b> .155" high plunger, unthreaded, .220" high bushing, round</p> <p><b>SH9</b> .155" high plunger, unthreaded, .220" high bushing, flat</p> <p><b>J81</b> Snap-in with frame</p> <p><b>LT</b> .215" high plunger, threaded, .310" high bushing, flat</p> <p><b>LT9</b> .215" high plunger, unthreaded, .310" high bushing, flat</p> <p><b>MS9</b> .130" high plunger, .020" high bushing, round</p> | <p><b>Terminations</b></p> <p><b>A</b> Right angle, PC thru-hole</p> <p><b>C</b> PC Thru-hole</p> <p><b>Z</b> Solder lug</p> <p><b>AV</b> Vertical right angle, PC thru-hole</p> <p><b>V3</b> Vertical mount, v-bracket</p> <p><b>W</b> Wire wrap</p> | <p><b>Seal</b></p> <p><b>E</b> Epoxy</p> | <p><b>Cap Color</b></p> <p><b>2</b> Black</p> <p><b>NONE</b> Models with no cap</p> <p><b>1</b> White</p> | <p><b>Frame Color</b></p> <p><b>2</b> Black</p> <p><b>NONE</b> Models with no frame</p> | <p><b>Contact Material</b></p> <p><b>B</b> Gold</p> <p><b>P</b> Gold, matte-tin</p> <p><b>Q</b> Silver</p> <p><b>G</b> Gold over silver</p> <p><b>R</b> Gold over silver, matte-tin</p> |
|---|--|---|--|---|---|---|



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



# TP Series Tiny Pushbutton Switches

## SWITCH FUNCTION



A

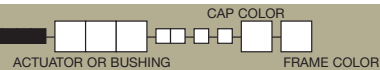
Pushbutton

| 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  | <b>TP11</b> | OFF                          | MOM.   | OPEN                         | 1-3     | SPST      |
|   | <b>TP12</b> | ON                           | MOM.   | 2-1                          | 2-3     | SPDT      |
| <b>SPDT</b><br><br>Part number shown: TP12SHZQE<br>Terminal Nos. For Reference Only |             |                              |        |                              |         |           |
| DP  | <b>TP21</b> | OFF                          | MOM.   | OPEN                         | 1-3,4-6 | DPST      |
| <b>DPST</b><br><br>Part number shown: TP21SHZQE<br>Terminal Nos. For Reference Only |             |                              |        |                              |         |           |

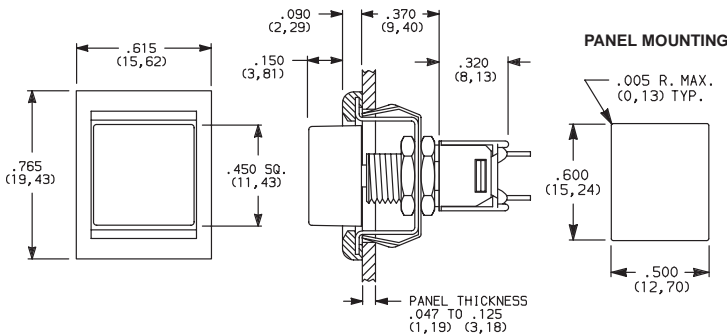
MOM. = Momentary

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

## ACTUATOR—SNAP-IN FRONT MOUNT



### J81 SNAP-IN WITH FRAME

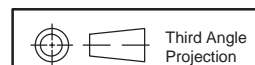


| OPTION CODE | CAP COLOR |
|-------------|-----------|
| <b>2</b>    | BLACK     |
| <b>1</b>    | WHITE     |

| OPTION CODE | FRAME COLOR                 |
|-------------|-----------------------------|
| <b>2</b>    | BLACK                       |
| <b>NONE</b> | No Frame Color (J80 option) |

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.  
**NOTE:** Available with Z, C, or W terminations.

**NOTE:** Caps & frames available separately, see page A-18.



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

# TP Series Tiny Pushbutton Switches



A

Pushbutton

**SH** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
THREADED, FLAT

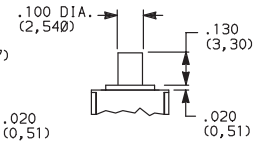
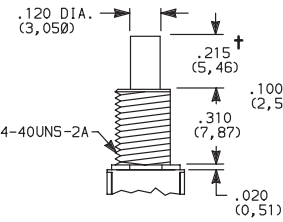
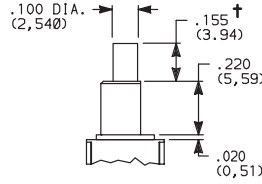
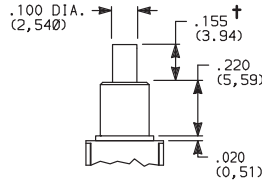
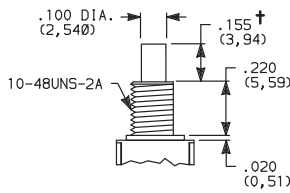
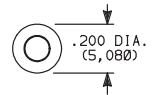
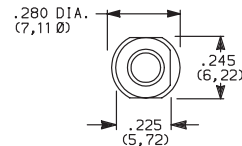
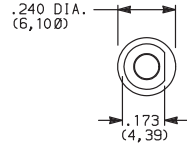
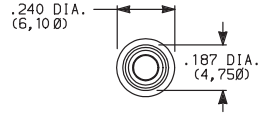
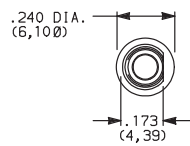
**SH8** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
UNTHREADED

**SH9** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
UNTHREADED, FLAT

**LT** .215" HIGH PLUNGER,  
.310" HIGH BUSHING,  
THREADED

**MS9** .130" HIGH  
PLUNGER

**LT9** .215" HIGH PLUNGER,  
.310" HIGH BUSHING,  
UNTHREADED



Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

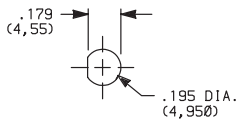
Not available with  
Z terminations.

† Subtract .016 (0,41) for models with A, AV or V3 terminations.

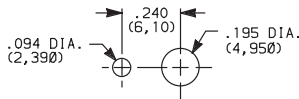
**NOTE:** Caps available for plunger options, see page A-20.

## PANEL MOUNTING

### 10-48 BUSHING

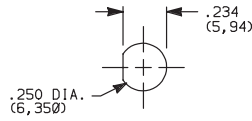


Without locking ring

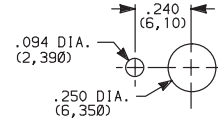


With standard locking ring

### 1/4 IN. BUSHING



Without locking ring



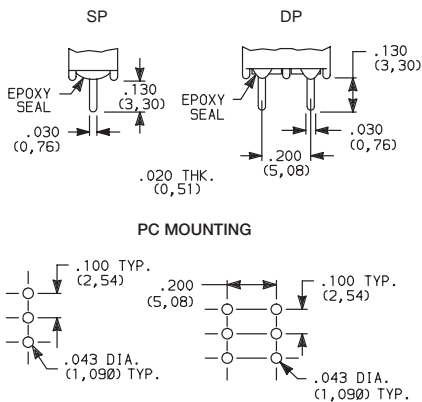
With standard locking ring

**NOTE:** One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings).  
Optional mounting nut and locking ring styles and finishes available separately, see section "Technical Data and Additional Hardware".

## TERMINATIONS

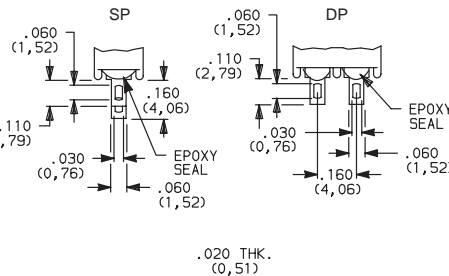


### C PC THRU-HOLE



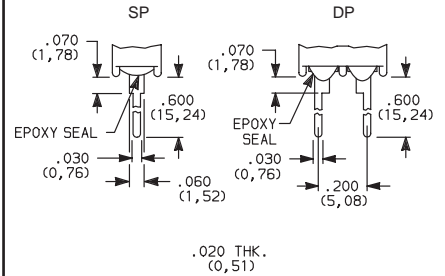
Omit center holes  
for TP11 models

### Z SOLDER LUG



Not available with MS9 bushing or P  
or R contact material.

### W WIRE WRAP



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







# TP Series Tiny Pushbutton Switches

## TERMINATIONS



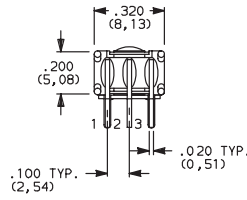
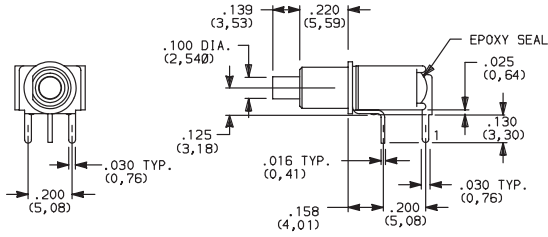
Pushbutton

A

### A RIGHT ANGLE, PC THRU-HOLE

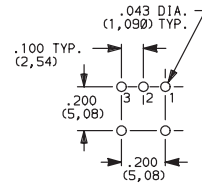


**TP12SH9ABE  
SPDT**



**TP11 Models:  
omit terminal 2.**

#### PC MOUNTING

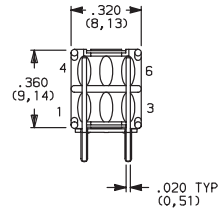
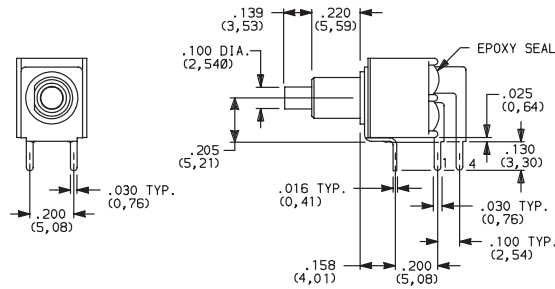


**TP11 Models:  
omit hole 2.**

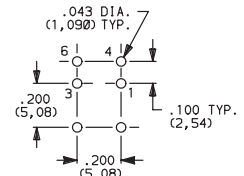
### A RIGHT ANGLE, PC THRU-HOLE



**TP21SH9ABE  
DPST**



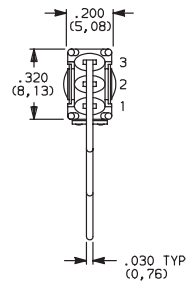
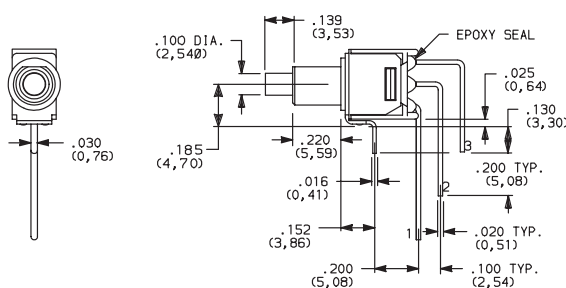
#### PC MOUNTING



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

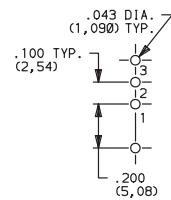


**TP12SH9AVBE  
SPDT**



**TP11 Models:  
omit terminal 2.**

#### PC MOUNTING



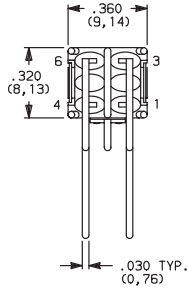
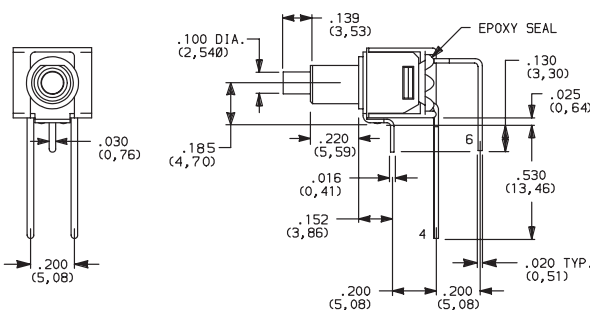
**TP11 Models:  
omit hole 2.**

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

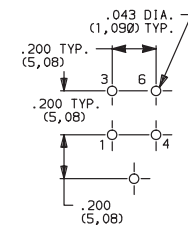
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



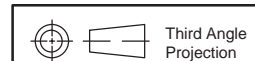
**TP21SH9AVBE  
DPST**



#### PC MOUNTING



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



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



# TP Series Tiny Pushbutton Switches

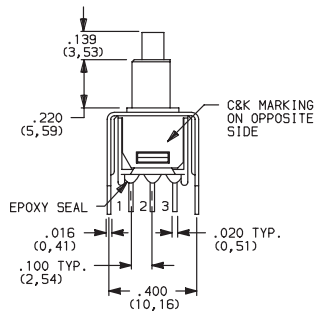


A

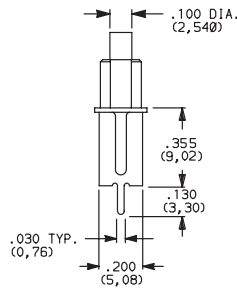
Pushbutton

## TERMINATIONS

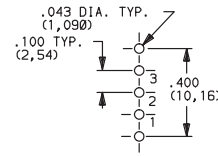
### V3 VERTICAL MOUNT, V-BRACKET



TP11 Models:  
omit terminal 2.



#### PC MOUNTING

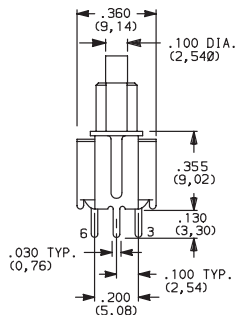
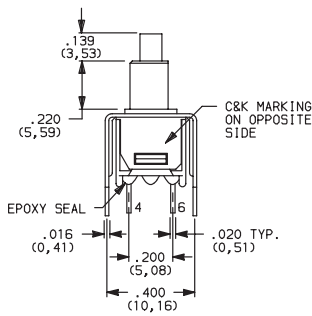


TP11 Models:  
omit hole 2.

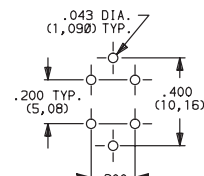


TP12SH9V3BE  
SPDT

### V3 VERTICAL MOUNT, V-BRACKET



#### PC MOUNTING



TP21SH9V3BE  
DPST

## CONTACT MATERIAL

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

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

- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, with gold plate over nickel plate.
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, silver plated.
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- TERMINALS: Copper alloy, with matte-tin over nickel plate.

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

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

B contact material standard with A, AV, V3 & W terminations.

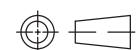
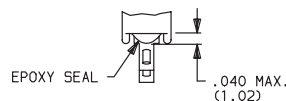
Q contact material standard with C & Z terminations

P, R contact materials not available with Z terminations.

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



Third Angle  
Projection

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



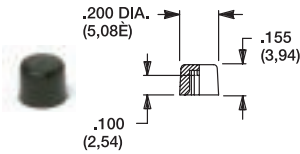


# TP Series Tiny Pushbutton Switches

## AVAILABLE HARDWARE

Pushbutton  
A

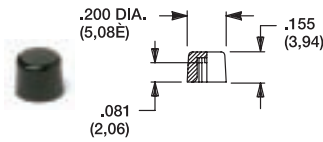
### Cap, .100" DIA. Plungers



**PART NO.**  
**508101000** WHITE  
**508102000** BLACK

Material: Nylon  
 Finish: Gloss

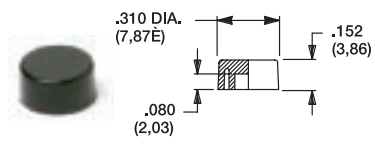
### Cap, .100" DIA. Plungers (Recommended for S9 plunger)



**PART NO.**  
**538701000** WHITE  
**538702000** BLACK

Material: Nylon  
 Finish: Gloss

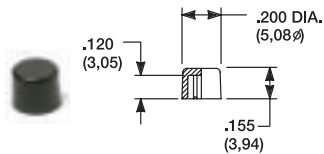
### Cap, .100" DIA. Plungers



**PART NO.**  
**465801000** WHITE  
**465802000** BLACK

Material: Nylon  
 Finish: Gloss

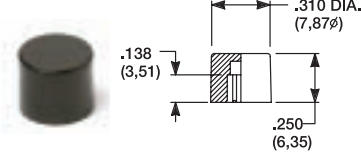
### Cap, .120" DIA. Plungers



**PART NO.**  
**708901000** WHITE  
**708902000** BLACK

Material: Nylon  
 Finish: Gloss

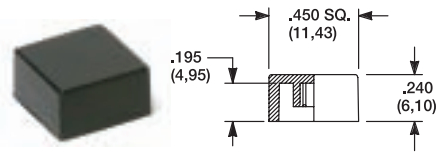
### Cap, .120" DIA. Plungers



**PART NO.**  
**801801000** WHITE  
**801802000** BLACK

Material: Nylon  
 Finish: Gloss

### Cap, J81 option only



**PART NO.**  
**484601000** WHITE  
**484602000** BLACK

Material: Nylon  
 Finish: Gloss

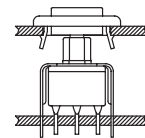
**PART NO.**  
**798201000** WHITE  
**79820263** BLACK

Material: Nylon  
 Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".  
 Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

### TYPICAL APPLICATION

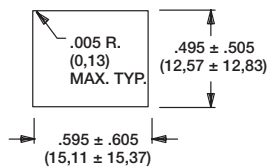


.047" (1,19) PANEL THK.    .062" (1,57) PANEL THK.    .090" (2,29) PANEL THK.    .125" (3,18) PANEL THK.

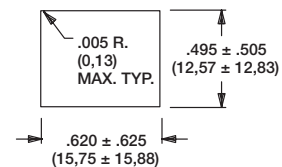
**PART NO.**                      **PART NO.**                      **PART NO.**                      **PART NO.**  
**432502263**                      **432602263**                      **432702263**                      **432802263** BLACK

### PANEL MOUNTING

For part numbers  
 432502263, 432602263

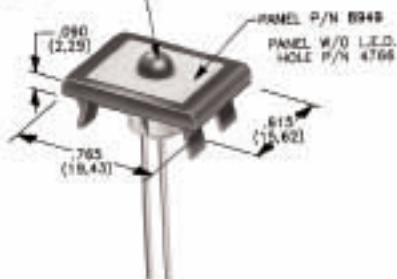


For part numbers  
 432702263, 432802263



### Panel Inserts

LED (.200 DIA. (5,08E)) SNAPS  
 SECURELY INTO INSERT (P/N 8949).  
 HEIGHT DEPENDS ON LED USED.



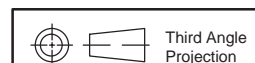
Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.

PANEL INSERT  
 WITH HOLE FOR LED

**PART NO.**  
**894902000**

BLANK PANEL INSERT  
 WITHOUT HOLE FOR LED

**PART NO.**  
**476602000** BLACK



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

# E020 Series Sealed Snap-acting Momentary Pushbutton Switches



## Features/Benefits

- Process sealed with disposable splashproof boot
- Long life contact design
- Snap-fitting plunger available
- RoHS compliant models available

## Typical Applications

- Instrumentation
- Telecommunications and networking equipment
- Computers and peripherals



## Specifications

**CONTACT RATING:** B contact material (EX25 Models): 0.4 VA max. @ 20 V AC or DC max. G contact material (EX21 Models): 1 AMP @120 V AC or 28 V DC or 0.4 VA max. @ 20 V AC or DC max.  
 Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously. See page A-26 for additional ratings.

**ELECTRICAL LIFE:** 60,000 make-and-break cycles at full load.

**CONTACT RESISTANCE:** Below 50 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 75°C.

**CAP INSTALLATION FORCE:** 10 lbs. max. permissible.

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

**NOTE:** Any models supplied with P, R, B 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.

## Materials

**CASE & BUSHING:** Glass filled nylon 6/6, flame retardant (UL 94V-0).

**PLUNGER:** Glass filled nylon or glass filled polyester (PBT) (UL 94V-0).

**SWITCH SUPPORT:** Brass or steel, matte-tin.

**SWITCH SUPPORT RETAINER:** Stainless steel.

**N.O. & N.C. CONTACTS:** EX25 MODELS: B contact material: Copper alloy, with gold plate over nickel plate. EX21 MODELS: G contact material: Coin silver, with gold plate over nickel plate. See page A-26 for additional contact materials.

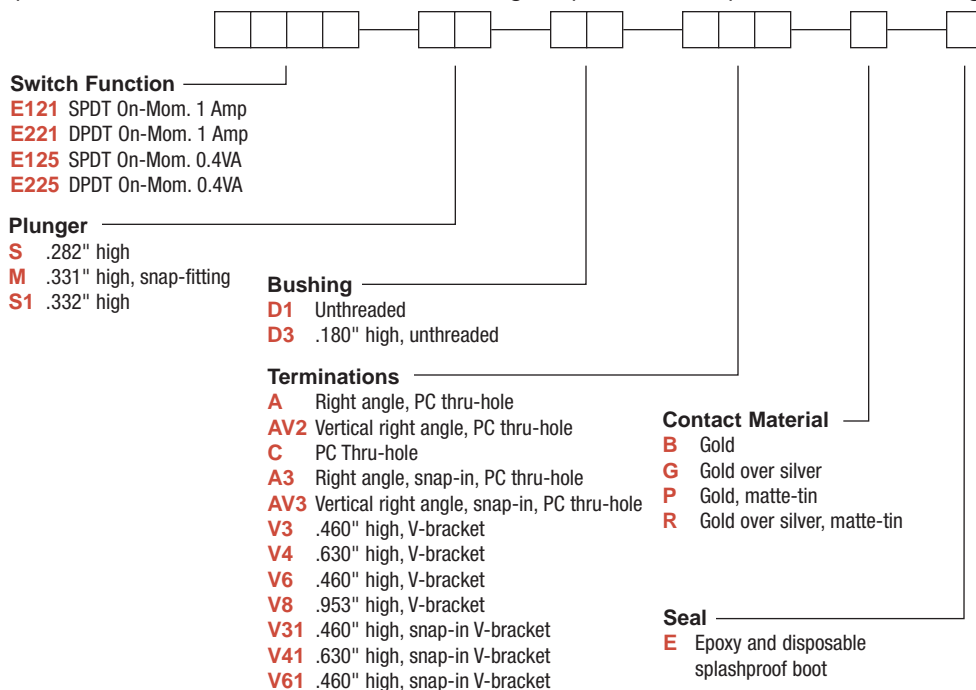
**COMMON CONTACTS & ALL TERMINALS:** Copper alloy, with gold plate over nickel plate. See page A-26 for additional contact materials.

**TERMINAL SEAL:** Epoxy.

**DISPOSABLE BOOT:** Vinyl splashproof boot supplied standard. Remove and discard only after soldering and cleaning processes are complete.

## 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-22 thru A-28. For additional options not shown in catalog, consult our 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



# E020 Series Sealed Snap-acting Momentary Pushbutton Switches

## SWITCH FUNCTION

Pushbutton

| NO. POLES   | MODEL NO.   | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|---|-------------|-----------------|--------|---------------------|---------|-----------|
|   |             | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP  | <b>E121</b> | ON              | MOM.   | 1-3                 | 1-2     |           |
|   | <b>E125</b> | ON              | MOM.   |                     |         |           |
| <p><b>SPDT</b></p> <p>Part number shown: E121SD1CGE</p> |             |                 |        |                     |         |           |
| DP  | <b>E221</b> | ON              | MOM.   | 1-3,4-6             | 1-2,4-5 |           |
|   | <b>E225</b> | ON              | MOM.   |                     |         |           |
| <p><b>DPDT</b></p> <p>Part number shown: E221SD1CBE</p> |             |                 |        |                     |         |           |

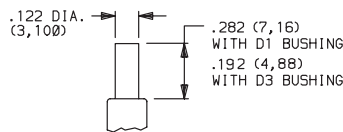
MOM. = Momentary

E121, E221 models with all options when ordered with G, L or R contact material.

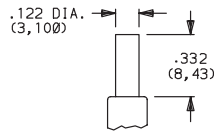
EX25 models must be ordered with B or P contact material.  
EX21 models must be ordered with G or R contact material.

## PLUNGER

**S** .282" HIGH

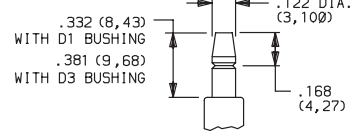


**S1** .332" HIGH



Not Available with D1 bushing.

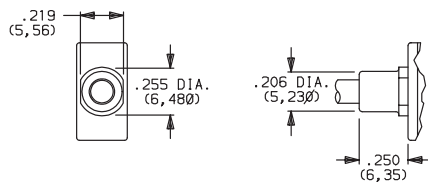
**M** .332" HIGH SNAP-FITTING



NOTE: Caps available for all plunger options, see page A-27.

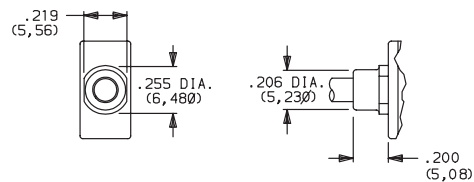
## BUSHING

**D1** UNTHREADED

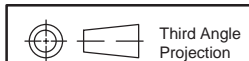


Not available with S1 actuator.

**D3** .180" HIGH UNTHREADED



NOTE: Disposable splashproof vinyl over actuator and bushing supplied std., see page A-26.



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



# E020 Series Sealed Snap-acting Momentary Pushbutton Switches



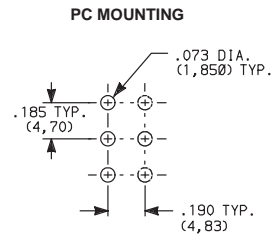
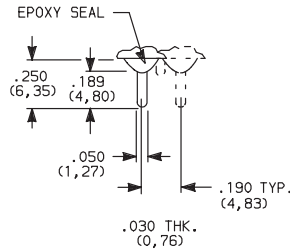
A

Pushbutton

## TERMINATIONS

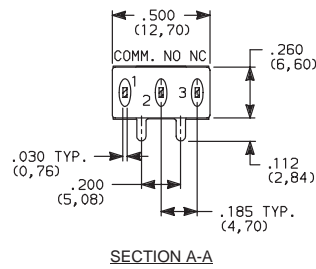
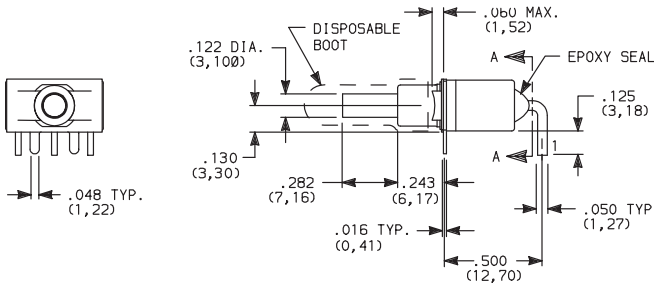


### C PC THRU-HOLE



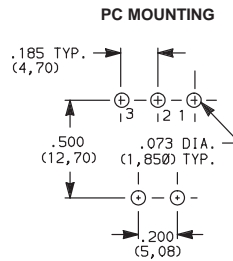
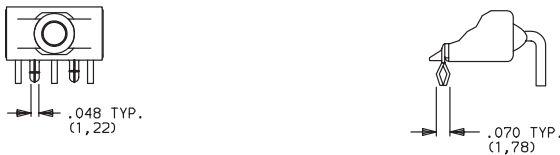
## SPDT and DPDT

### A RIGHT ANGLE, PC THRU-HOLE



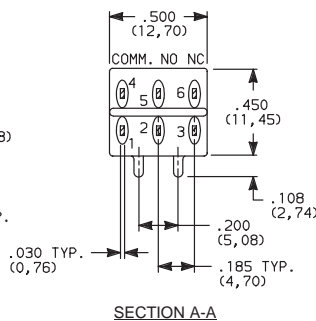
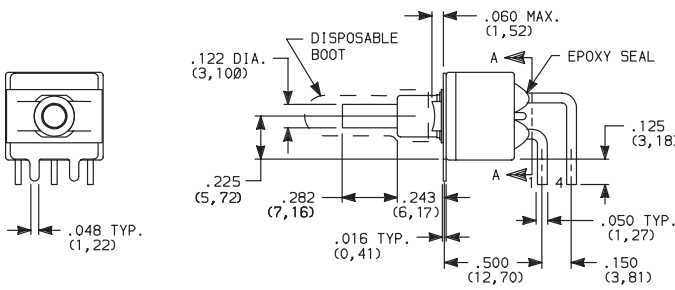
E121SD1AGE SPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



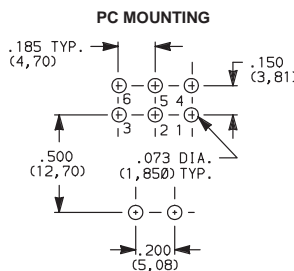
NOTE: Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE

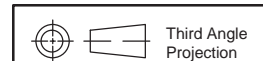


E221SD1AGE DPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



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



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





# E020 Series Sealed Snap-acting Momentary Pushbutton Switches

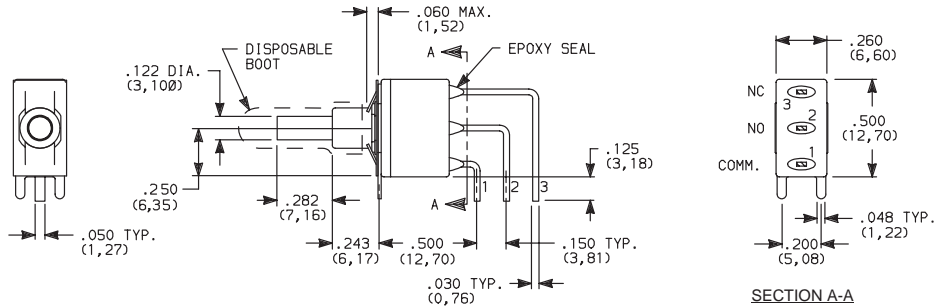
## TERMINATIONS

Pushbutton  
A

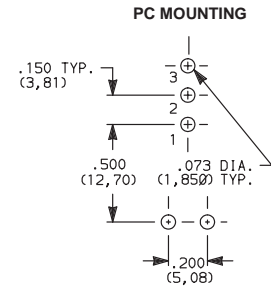
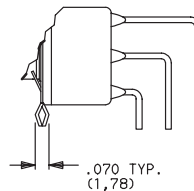
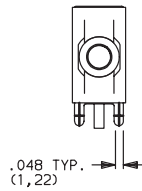
**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



**E121SD1AV2GE  
SPDT**



**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE,  
.150" PITCH

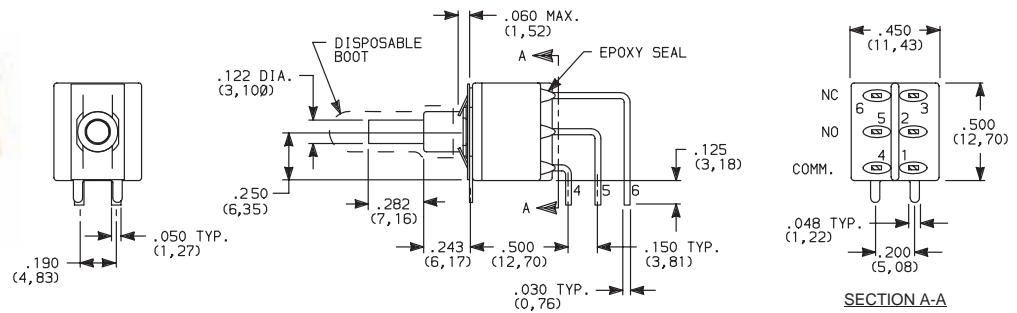


**NOTE:** Terminal bend radii and lead-in manufacturing option.

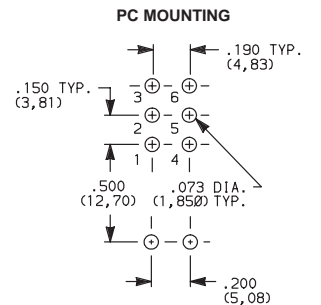
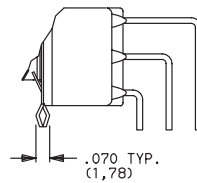
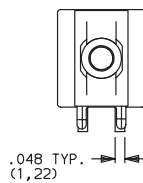
**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE,  
.150" PITCH



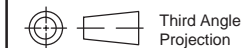
**E221SD1AV2GE  
DPDT**



**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE,  
.150" PITCH



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



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

# E020 Series Sealed Snap-acting Momentary Pushbutton Switches



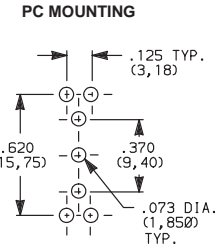
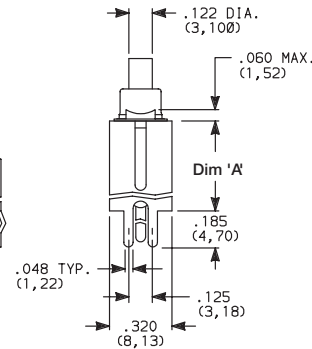
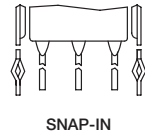
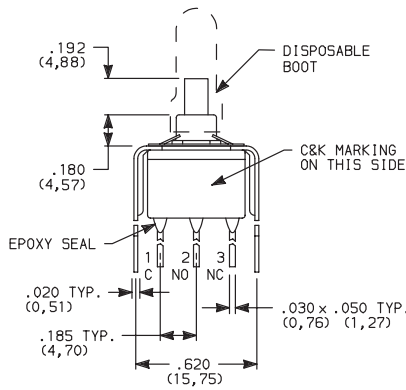
A

Pushbutton

## TERMINATIONS

**V3, V4** VERTICAL MOUNT, V-BRACKET

**V31, V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN

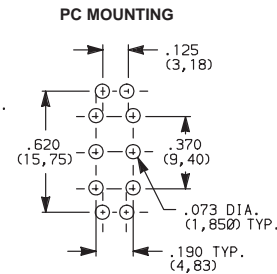
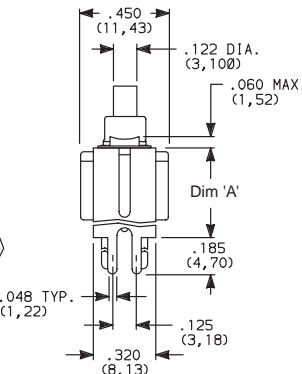
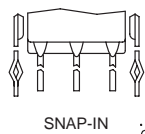
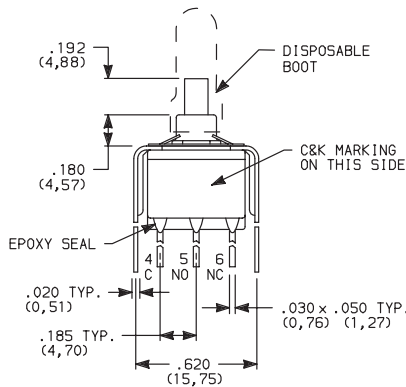


**E121SD3\_GE SPDT**

| OPTION CODE    | DIM 'A'      |
|----------------|--------------|
| <b>V3, V31</b> | .460 (11,68) |
| <b>V4, V41</b> | .630 (16,00) |

**V3, V4** VERTICAL MOUNT, V-BRACKET

**V31, V41** VERTICAL MOUNT, V-BRACKET, SNAP-IN

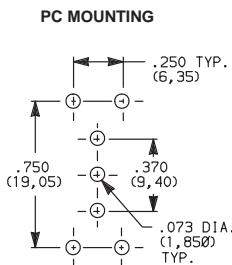
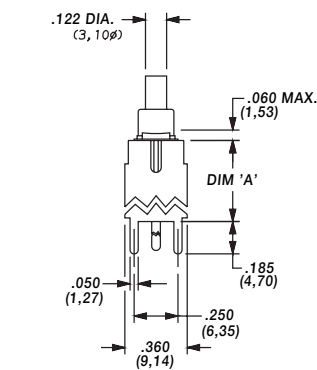
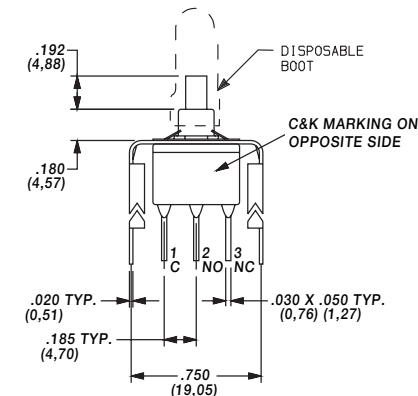


**E221SD3\_GE DPDT**

| OPTION CODE    | DIM 'A'      |
|----------------|--------------|
| <b>V3, V31</b> | .460 (11,68) |
| <b>V4, V41</b> | .630 (16,00) |

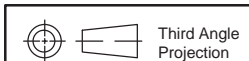
**V6, V8** VERTICAL MOUNT, V-BRACKET

**V61, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



**E121SD3\_GE SPDT**

| OPTION CODE    | DIM 'A'      |
|----------------|--------------|
| <b>V6, V61</b> | .460 (11,68) |
| <b>V8, V81</b> | .953 (24,21) |



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







# E020 Series Sealed Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

A

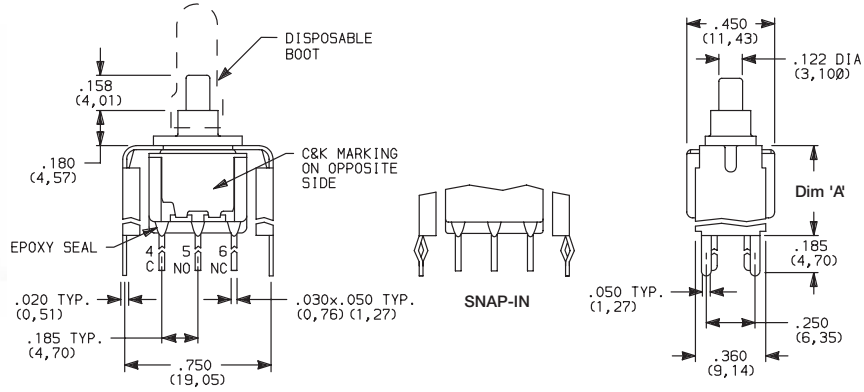
Pushbutton

**V6, V8** VERTICAL MOUNT, V-BRACKET

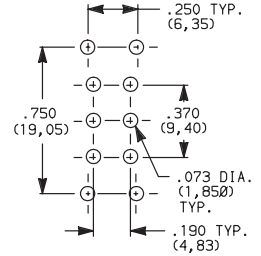
**V61, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



E221SD3V6GE DPDT



## PC MOUNTING



| OPTION CODE    | DIM 'A'      |
|----------------|--------------|
| <b>V6, V61</b> | .460 (11,68) |
| <b>V8, V81</b> | .953 (24,21) |

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING       | RATINGS                        |   |
|-------------|---------------------------------|------------------------|--------------------------------|---|
|             |                                 |                        |                                |   |
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>      | LOW LEVEL/DRY CIRCUIT          | EX25 MODELS ONLY: 0.4 VA MAX.<br>@ 20 V AC OR DC MAX.                             |
| <b>P</b>    |                                 | MATTE-TIN <sup>4</sup> |                                |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>      | LOW LEVEL/DRY CIRCUIT OR POWER | EX21 MODELS ONLY: 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>4</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> N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> TERMINALS: Copper alloy, with matte-tin alloy over nickel plate.

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

E121, E221 models with all options when ordered with mandatory G, R or L contact material.

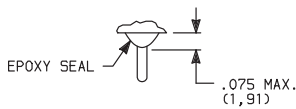
P or B contact material must be ordered with EX25 models.

R or G contact material must be ordered with EX21 models.

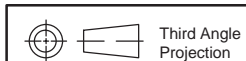
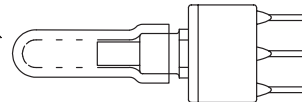
K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

## SEAL

**E** EPOXY SEAL AND DISPOSABLE SPLASHPROOF BOOT



Disposable splashproof boot supplied standard. Remove and discard boot *only after* soldering and cleaning processes are complete.



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

# E020 Series Sealed Snap-acting Momentary Pushbutton Switches

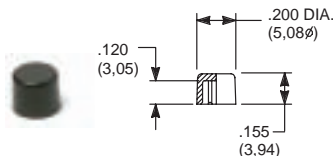


A

Pushbutton

## AVAILABLE HARDWARE

Cap

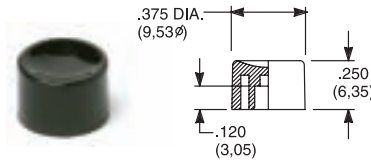


**PART NO.**

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED

Material: Nylon  
Finish: Gloss

Cap

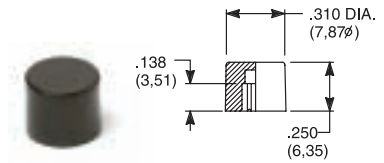


**PART NO.**

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED

Material: Nylon  
Finish: Gloss

Cap

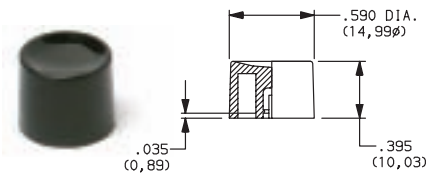


**PART NO.**

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED

Material: Nylon  
Finish: Gloss

Cap, Snap-fitting plunger

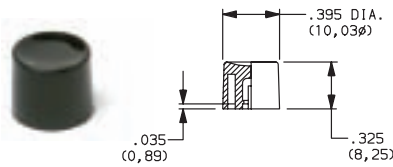


**PART NO.**

- 894001000** WHITE
- 894002000** BLACK
- 894003000** RED

Material: Nylon  
Finish: Gloss

Cap, Snap-fitting plunger

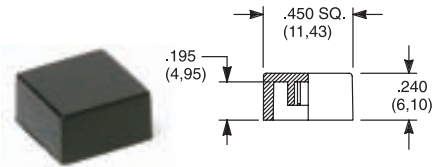


**PART NO.**

- 894101000** WHITE
- 894102000** BLACK
- 894103000** RED

Material: Nylon  
Finish: Gloss

Cap



**PART NO.**

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED

Material: Nylon  
Finish: Gloss

**PART NO.**

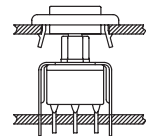
- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED

Material: Nylon  
Finish: Matte

**NOTE:** Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

**TYPICAL APPLICATION**



.047" (1,19) PANEL THK.    .062" (1,57) PANEL THK.    .090" (2,29) PANEL THK.    .125" (3,18) PANEL THK.

**PART NO.**

- 432501000**
- 432502263**
- 432503000**

**PART NO.**

- 432601000**
- 432602263**
- 432603000**

**PART NO.**

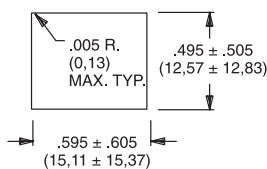
- 432701000**
- 432702263**
- 432703000**

**PART NO.**

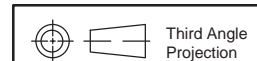
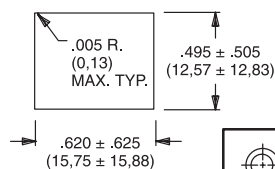
- 432801000** WHITE
- 432802263** BLACK
- 432803000** RED

**PANEL MOUNTING**

For part numbers  
4325xxxxx, 4326xxxxx



For part numbers  
4327xxxxx, 4328xxxxx



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





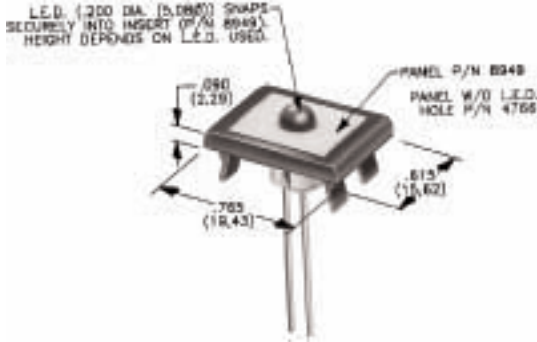
# E020 Series Sealed Snap-acting Momentary Pushbutton Switches

## AVAILABLE HARDWARE

A  
Pushbutton

### PANEL INSERTS

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT  
WITH HOLE FOR LED

BLANK PANEL INSERT  
WITHOUT HOLE FOR LED

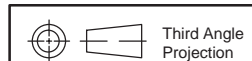
**PART NO.**

**894901000**  
**894902000**  
**894903000**

**PART NO.**

**476601000** WHITE  
**476602000** BLACK  
**476603000** RED

Special colors, custom markings available, consult Customer Service Center.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

# 8020 Series Snap-acting Momentary Pushbutton Switches



A

Pushbutton

## Features/Benefits

- **Positive tactile feel**
- **Multi-positions available**
- **Wide variety of termination options**
- **Epoxy terminal seal compatible with bottom wash cleaning**
- **RoHS compliant models available**

## Typical Applications

- **Instrumentation**
- **Computer peripherals**
- **Telecommunications equipment**



Models Available

## Specifications

**CONTACT RATING:** B contact material (8X25 Models): 0.4 VA max. @ 20 V AC or DC maximum. G contact material (8X21, U8X1 Models): 1 AMP @ 120 V AC or 28 V DC or 0.4 VA max. @ 20 V AC or DC max. Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously. See page A-43 for additional ratings.

**ELECTRICAL LIFE:** 60,000 make-and-break cycles at full load.

**CONTACT RESISTANCE:** Below 50 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:** 1,000 Vrms min. @ sea level.

**OPERATING TEMPERATURE:** 8X2X MODELS: -30°C to 75°C. U8X1 MODELS: -30°C to 65°C.

**CAP INSTALLATION FORCE:** 10 lbs. max. permissible.

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

**NOTE:** Any models supplied with B, P, 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.

## Materials

**CASE:** Glass filled nylon 6/6 or diallyl phthalate (DAP), flame retardant (UL 94V-0).

**PLUNGER:** Glass filled nylon or glass filled polyester (PBT) (UL 94V-0).

**CAP & FRAME:** Nylon, black, standard.

**BUSHING:** Brass or zinc, nickel plated.

**HOUSING:** Stainless steel.

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

**N.O. & N.C. CONTACTS:** 8X21, U8X1 MODELS: G contact material: Coin silver, with gold plate over nickel plate. See page A-43 for additional contact materials.

8X25 MODELS: B contact material: Copper alloy, with gold plate over nickel plate. See page A-43 for additional contact materials.

**COMMON CONTACT & ALL TERMINALS:** Copper alloy, with gold plate over nickel plate.

**TERMINAL SEAL:** Epoxy. Refer to soldering and cleaning Technical Data Chapter.

**HARDWARE:** Nut & Locking Ring: Brass, nickel plated; Lockwasher: Steel, nickel plated.

## 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-30 thru A-45. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



### Switch Function

- 8121** SPDT On-Mom. 1 Amp
- 8125** SPDT On-Mom. 0.4VA
- 8221** DPDT On-Mom. 1 Amp
- 8225** DPDT On-Mom. 0.4VA
- 8321** 3PDT On-Mom. 1 Amp
- 8325** 3PDT On-Mom. 0.4VA
- 8421** 4PDT On-Mom. 1 Amp
- 8425** 4PDT On-Mom. 0.4VA

**Note:** UL/CSA models available, see page A-30 and A-31.

### Actuator or Plunger

- S** Plunger
- NONE** Snap-in
- J80** Snap-in
- J81** Snap-in w/frame
- J82** Snap-in w/frame for LED
- J83** Snap-in w/frame & flush cap
- J84** Snap-in w/frame for LED, flush cap
- J85** Snap-in w/frame & LED
- J95** PC w/V-bracket & LED
- L** Plunger
- M** Snap-fitting plunger

### Bushing

- D9** .280" high, keyway
- H** .250" high, flat
- NONE** No bushing choice required
- D** .280" high, keyway
- D2** .288" high, flat
- D3** .180" high
- D8** .288" high, flat
- H9** .250" high, flat, hi torque
- Y** .350" high, keyway
- Y3** 6.35mm high, keyway, hi torque
- Y4** .378" high, flat, hi torque
- Y9** .350" high, keyway

### Contact Material

- B** Gold
- P** Gold, matte-tin
- G** Gold over silver
- R** Gold over silver, matte-tin

### Seal

- E** Epoxy
- I** Epoxy potted base

### Cap Color

- 2** Black
- NONE** Models without caps
- 1** White
- 3** Red
- 4** Orange
- 5** Yellow
- 6** Green
- 7** Blue
- 9** Gray

### Frame Color

- 2** Black
- NONE** Models without frame
- 1** White
- 3** Red
- 5** Yellow
- 6** Green
- 9** Gray

### LED Color

- 3** Red
- NONE** Models without LED
- 5** Yellow
- 6** Green

### Terminations

- A** Right angle, PC thru-hole
- AV2** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- Z** Solder lug
- A2** Right angle, PC thru-hole
- A3** Right angle, snap-in, PC thru-hole
- A4** Right angle, PC thru-hole, reversed terminals
- A6** Right angle, PC thru-hole
- AV** Vertical right angle, PC thru-hole
- AV1** Vertical right angle, PC thru-hole
- AV3** Vertical right angle, snap-in, PC thru-hole
- R** Right angle with PCB
- R2** Right angle with PCB, reversed terminals
- V2** .555" high, V-bracket
- V3** .460" high, V-bracket
- V4** .630" high, V-bracket
- V6** .460" high, V-bracket
- V7** .630" high, V-bracket
- V8** .953" high, V-bracket
- V9** 1.150" high, V-bracket
- V31** .460" high, snap-in V-bracket
- V61** .460" high, snap-in V-bracket
- W** .750" long, wire wrap
- W1** .964" long, wire wrap
- W3** .425" long, wire wrap
- W4** 1.062" long, wire wrap
- Z3** Quick connect

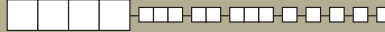


Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# 8020 Series Snap-acting Momentary Pushbutton Switches

## SWITCH FUNCTION



Pushbutton

A

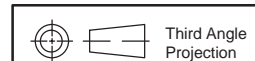
| NO. POLES  | MODEL NO. | UL/CSA* MODEL NO. | SWITCH FUNCTION |        | CONNECTED TERMINALS |             | SCHEMATIC |
|--|-----------|-------------------|-----------------|--------|---------------------|-------------|-----------|
|  |           |                   | POS. 1          | POS. 2 | POS. 1              | POS. 2      |           |
| SP   | 8121      | U811              | ON              | MOM.   | 1-3                 | 1-2         |           |
|  | 8125      |                   | ON              | MOM.   |                     |             |           |
| <p><b>SPDT</b></p> <p>Part number shown: 8121SHZGE</p> <p>Terminal Nos. For Reference Only</p> |           |                   |                 |        |                     |             |           |
| DP   | 8221      | U821              | ON              | MOM.   | 1-3,4-6             | 1-2,4-5     |           |
|  | 8225      |                   | ON              | MOM.   |                     |             |           |
| <p><b>DPDT</b></p> <p>Part number shown: 8221SHZGE</p> <p>Terminal Nos. For Reference Only</p> |           |                   |                 |        |                     |             |           |
| 3P   | 8321      | U831              | ON              | MOM.   | 1-3,4-6,7-9         | 1-2,4-5,7-8 |           |
|  | 8325      |                   | ON              | MOM.   |                     |             |           |
| <p><b>3PDT</b></p> <p>Part number shown: 8321SHZGE</p> <p>Terminal Nos. For Reference Only</p> |           |                   |                 |        |                     |             |           |

MOM. = Momentary

\*U811 thru U841 model numbers with all options (except R, R2 terminations) when ordered with G, L or R contact material.

8X25 models must be ordered with B or P contact material.

8X21 and U8X1 models must be ordered with G or R contact material.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

# 8020 Series Snap-acting Momentary Pushbutton Switches



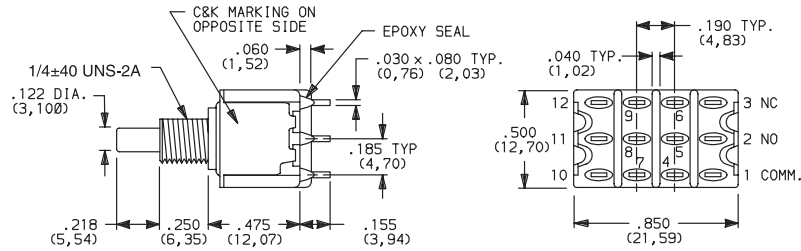
A

Pushbutton

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | UL/CSA* MODEL NO. | SWITCH FUNCTION |        | CONNECTED TERMINALS |                   | SCHEMATIC |
|-----------|-----------|-------------------|-----------------|--------|---------------------|-------------------|-----------|
|           |           |                   | POS. 1          | POS. 2 | POS. 1              | POS. 2            |           |
| 4P        | 8421      | U841              | ON              | MOM.   | 1-3,4-6,7-9,10-12   | 1-2,4-5,7-8,10-11 |           |
|           | 8425      |                   | ON              | MOM.   |                     |                   |           |

### 4PDT



Part number shown: 8421SHZGE

Terminal Nos. For Reference Only

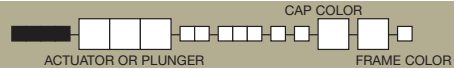
MOM. = Momentary

\* U811 thru U841 model numbers with all options (except R, R2 terminations) when ordered with G, L or R contact material.

8X25 models must be ordered with B or P contact material.

8X21 and U8X1 models must be ordered with G or R contact material.

## ACTUATOR—SNAP-IN FRONT MOUNT

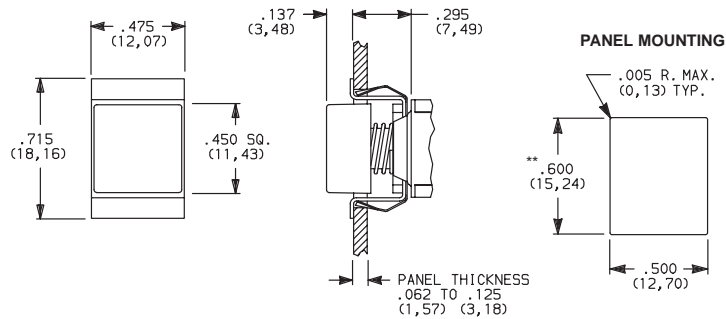


| OPTION CODE | CAP AND FRAME COLOR         |
|-------------|-----------------------------|
| 2           | BLACK                       |
| NONE        | No Frame Color (J80 option) |
| 1           | WHITE                       |
| 3           | RED                         |
| 4           | ORANGE                      |
| 5           | YELLOW                      |
| 6           | GREEN                       |
| 7           | BLUE                        |
| 9           | GRAY                        |

Other colors available, consult Customer Service Center. Cap and Frame Finish: matte.

NOTE: Caps and frames available separately, see pages A-44 and A-45.

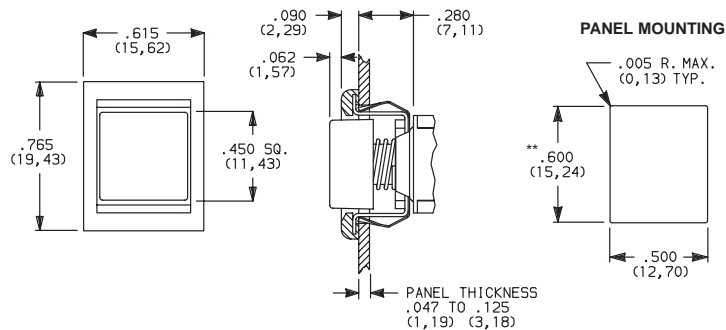
### J80 SNAP-IN



NOTE: No frame color choice required.

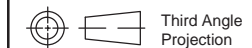
\*\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

### J81 SNAP-IN WITH FRAME



NOTE: Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

\*\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.



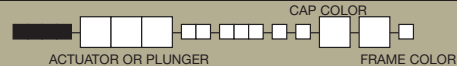
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change





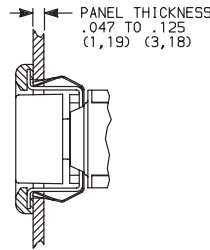
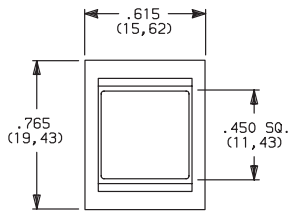
# 8020 Series Snap-acting Momentary Pushbutton Switches

## ACTUATOR—SNAP-IN FRONT MOUNT

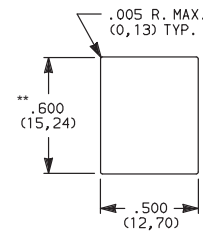


Pushbutton  
A

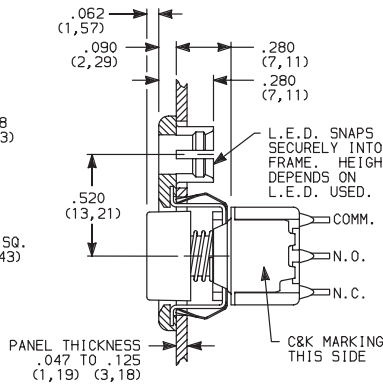
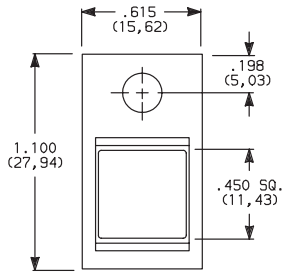
### J83 SNAP-IN WITH FRAME AND FLUSH CAP



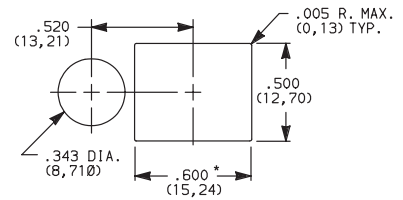
#### PANEL MOUNTING



### J82 SNAP-IN WITH FRAME FOR LED



#### PANEL MOUNTING

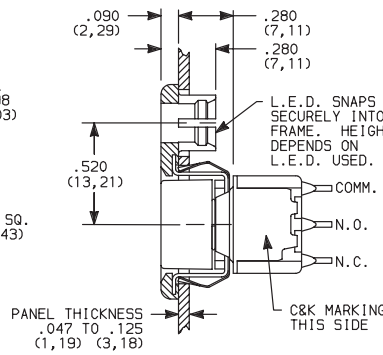
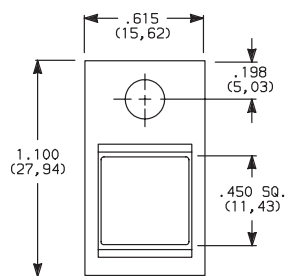


\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

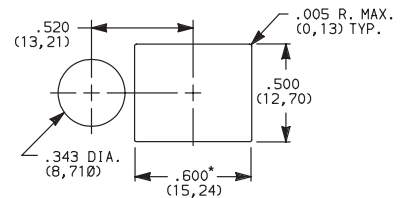
LED not included.

For LED information, see page A-45.

### J84 SNAP-IN WITH FRAME FOR LED, FLUSH CAP



#### PANEL MOUNTING



\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

LED not included.

For LED information, see page A-45.

| OPTION CODE | CAP AND FRAME COLOR |
|-------------|---------------------|
| 2           | BLACK               |
| 1           | WHITE               |
| 3           | RED                 |
| 4           | ORANGE              |
| 5           | YELLOW              |
| 6           | GREEN               |
| 7           | BLUE                |
| 9           | GRAY                |

Other colors available, consult Customer Service Center.  
Cap and Frame Finish: matte.

Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

**NOTE:** Caps and frames available separately, see pages A-44 and A-45.



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



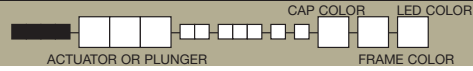
# 8020 Series Snap-acting Momentary Pushbutton Switches



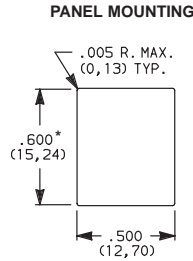
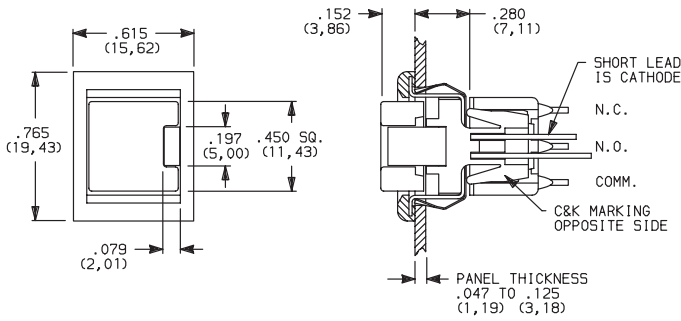
A

Pushbutton

## ACTUATOR—SNAP-IN FRONT MOUNT



### J85 SNAP-IN WITH FRAME AND LED



\* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.



8121J85ZGE23  
SPST

Available with C, W-W4, Z or Z3 terminations and SPDT models only. For LED information see page A-45.

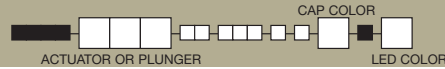
**NOTE:** Caps & frames available separately, see pages A-44 and A-45.

| OPTION CODE | CAP AND FRAME COLOR |
|-------------|---------------------|
| 2           | BLACK               |
| 1           | WHITE               |
| 3           | RED                 |
| 4           | ORANGE              |
| 5           | YELLOW              |
| 6           | GREEN               |
| 7           | BLUE                |
| 9           | GRAY                |

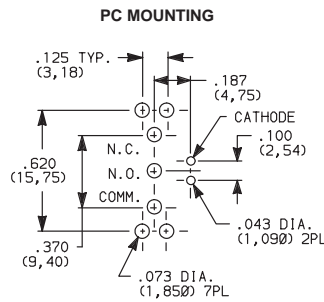
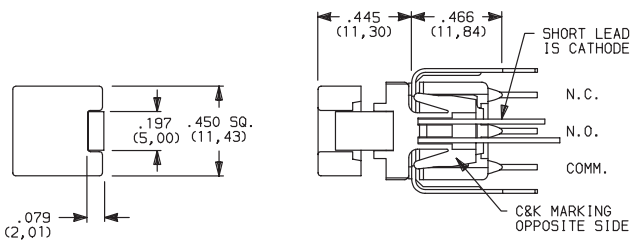
| OPTION CODE | LED COLOR |
|-------------|-----------|
| 3           | RED       |
| 5           | YELLOW    |
| 6           | GREEN     |

For LED information see page A-43.

## ACTUATOR—PC MOUNT



### J95 PC WITH V-BRACKET AND LED



8121J95V3GE23  
SPST

| OPTION CODE | CAP AND FRAME COLOR |
|-------------|---------------------|
| 2           | BLACK               |
| 1           | WHITE               |
| 3           | RED                 |
| 4           | ORANGE              |
| 5           | YELLOW              |
| 6           | GREEN               |
| 7           | BLUE                |
| 9           | GRAY                |

| OPTION CODE | LED COLOR |
|-------------|-----------|
| 3           | RED       |
| 5           | YELLOW    |
| 6           | GREEN     |

For LED information see page A-45.

**NOTE:** Caps available separately, see page A-44. Available with V3 terminations and SPDT models only.



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





# 8020 Series Snap-acting Momentary Pushbutton Switches

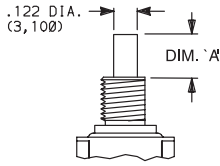
Pushbutton

A

## PLUNGER

ACTUATOR OR PLUNGER

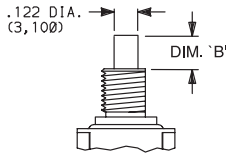
### S PLUNGER



**NONE** NO PLUNGER CHOICE REQUIRED  
(JXX ACTUATORS)

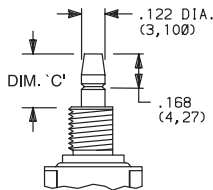
| AVAILABLE BUSHINGS | DIM. 'A'<br>FOR C, W-W4, Z & Z3<br>TERMINATIONS | DIM. 'A'<br>FOR A, A2, A3, A4, A6,<br>AV-A3, R & R2<br>TERMINATIONS | DIM. 'A'<br>FOR V3-V61<br>TERMINATIONS |
|--------------------|---|---|--|
| D, D9              | .244 (6,20)                                     | .228 (5,79)   | .224 (5,69)                            |
| H, H9              | .218 (5,54)                                     | .202 (5,13)   | .198 (5,03)                            |
| Y, Y9              | .203 (5,16)                                     | .187 (4,75)   | .183 (4,65)                            |
| Y3                 | (5,54)  | (5,13)  | (5,03)                                 |
| Y4                 | .185 (4,70)                                     | .169 (4,29)   | .165 (4,19)                            |
| D2, D8             | N/A   | .232 (5,89)   | .228 (5,79)                            |
| D3                 | N/A   | .162 (4,11)   | .158 (4,01)                            |

### L PLUNGER



| AVAILABLE BUSHINGS | DIM. 'B'<br>FOR C, W-W4, Z & Z3<br>TERMINATIONS | DIM. 'B'<br>FOR A, A2, A3, A4, A6,<br>AV-A3, R & R2<br>TERMINATIONS | DIM. 'B'<br>FOR V3-V61<br>TERMINATIONS |
|--------------------|---|---|--|
| Y, Y9              | .178 (4,52)                                     | .162 (4,11)   | .158 (4,01)                            |
| Y4                 | .090 (2,29)                                     | .074 (1,88)   | .070 (1,78)                            |

### M SNAP-FITTING PLUNGER



| AVAILABLE BUSHINGS | DIM. 'C'<br>FOR C, W-W4, Z & Z3<br>TERMINATIONS | DIM. 'C'<br>FOR A, A2, A3, A4, A6,<br>AV-A3, R & R2<br>TERMINATIONS | DIM. 'C'<br>FOR V3-V61<br>TERMINATIONS |
|--------------------|---|---|--|
| D, D9              | .297 (7,54)                                     | .281 (7,14)   | .277 (7,04)                            |
| H, H9              | .267 (6,78)                                     | .251 (6,38)   | .247 (6,27)                            |
| Y, Y9              | .259 (6,58)                                     | .243 (6,17)   | .239 (6,07)                            |
| Y3                 | (6,78)  | (6,37)  | (6,27)                                 |
| Y4                 | .259 (6,58)                                     | .243 (6,17)   | .239 (6,07)                            |
| D2, D8             | N/A   | .273 (6,93)   | .269 (6,83)                            |
| D3                 | N/A   | .361 (9,17)   | .357 (9,07)                            |

N/A = NOT AVAILABLE

**NOTE:** When selecting plunger option, bushing selection must also be made, see next page. No plunger option is required when any JXX actuator option is selected. Additional plunger lengths are available on SPDT and DPDT models, consult Customer Service Center. Not all plunger lengths sufficient for use with caps, see page A-44.

## BUSHING

**NONE** NO BUSHING  
CHOICE REQUIRED  
(JXX ACTUATORS)

**D** .280" HIGH THREADED, KEYWAY

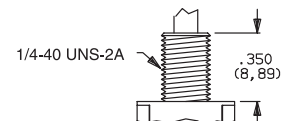
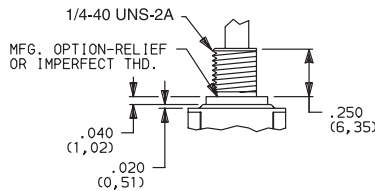
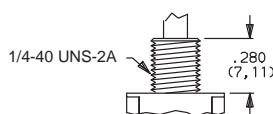
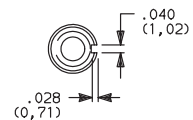
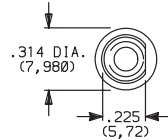
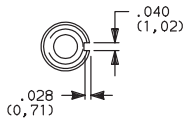
**D9** .280" HIGH UNTHREADED,  
KEYWAY

**H** .250" HIGH THREADED, FLAT

**H9** .250" HIGH UNTHREADED, FLAT

**Y** .350" HIGH THREADED, KEYWAY

**Y9** .350" HIGH UNTHREADED, KEYWAY



D9 bushing standard with A-A6,  
R, R2 AV-AV3 terminations.

H bushing standard with C, W-W4, Z or Z3 terminations.  
H, H9 bushings not available on single pole models with  
A3-A6, R, R2 terminations.

**Will withstand 12 in./lbs. of torque with  
no distortion.**



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



# 8020 Series Snap-acting Momentary Pushbutton Switches

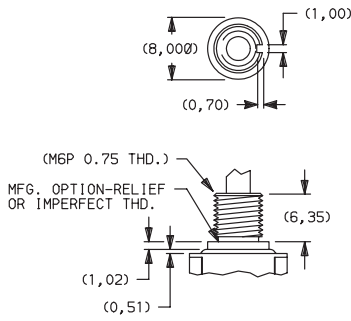


A

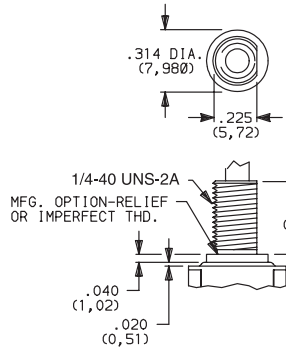
Pushbutton

## BUSHING

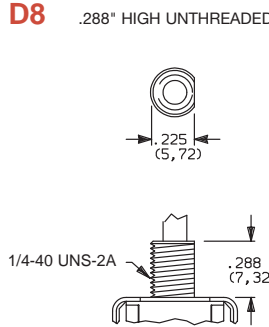
**Y3** 6.35mm THREADED, KEYWAY



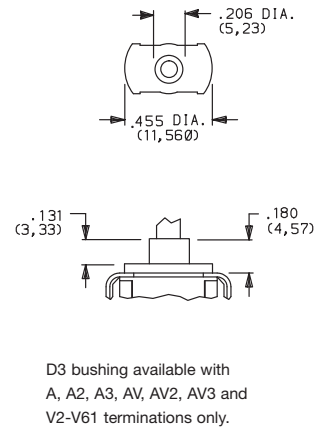
**Y4** .378" HIGH THREADED, FLAT



**D2** .288" HIGH THREADED, FLAT



**D3** .180" HIGH UNTHREADED

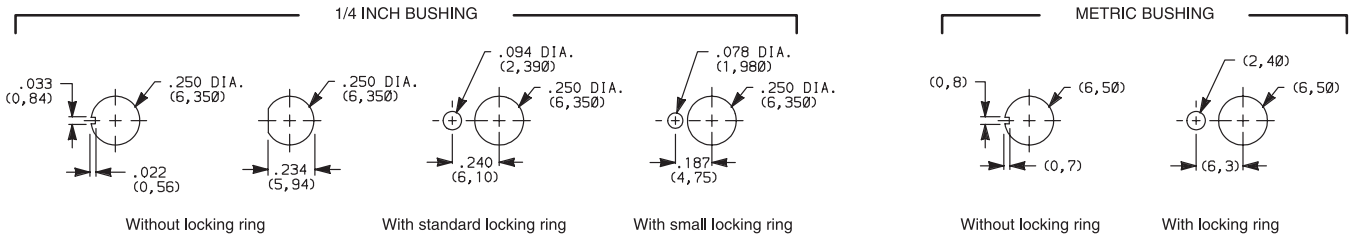


Y3 & Y4 bushings not available on single pole models with A3-A6, R, R2 terminations. Will withstand 12 in./lbs. of torque with no distortion.

D2, D8 bushings not available with C, W-W4, Z, Z3 terminations.

**NOTE:** No bushing option choice required when JXX actuator option is selected. When selecting bushing option, plunger selection must also be made, see previous page. Plunger lengths vary with bushing and termination options selected.

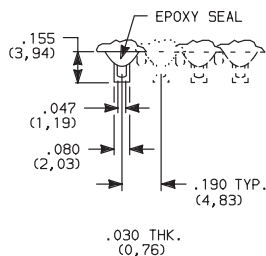
## PANEL MOUNTING



**NOTE:** Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles available, see section "Technical Data and Additional Hardware".

## TERMINATIONS

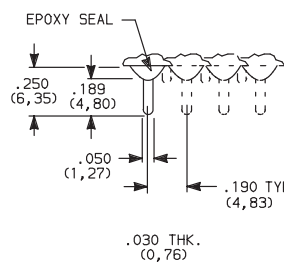
**Z** SOLDER LUG



SPDT thru 4PDT

Not available with J95 actuator, P or R contact material.

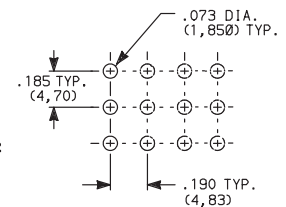
**C** PC THRU-HOLE



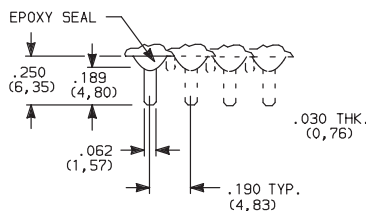
SPDT thru 4PDT

Not available with J95 actuator option.

### PC MOUNTING



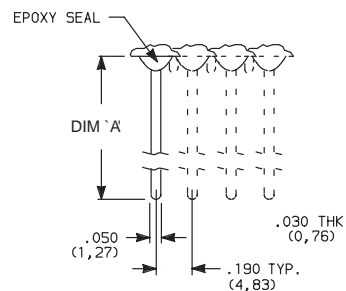
**Z3** QUICK CONNECT



SPDT thru 4PDT

Not available with J95 actuator, P or R contact material. Mating quick connector available, order part number 530100000, page A-44.

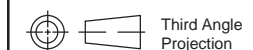
**W W1, W3, W4** WIRE WRAP



SPDT thru 4PDT

Not available with J95 actuator option.

| OPTION CODE | DIM 'A'       |
|-------------|---------------|
| <b>W</b>    | .750 (19,05)  |
| <b>W1</b>   | .964 (24,49)  |
| <b>W3</b>   | .425 (10,80)  |
| <b>W4</b>   | 1.062 (26,97) |



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





# 8020 Series Snap-acting Momentary Pushbutton Switches

## TERMINATIONS



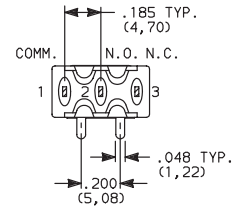
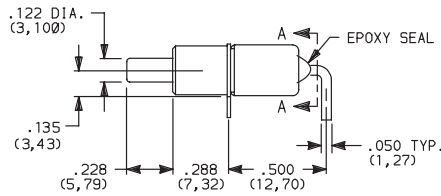
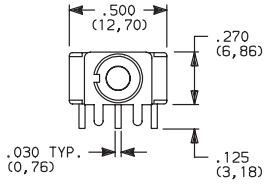
Pushbutton

A

### A RIGHT ANGLE, PC THRU-HOLE

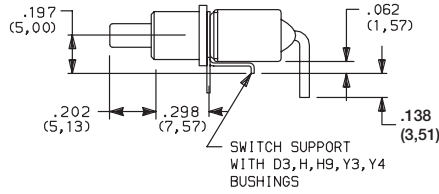


**8121SD9AGE  
SPDT**



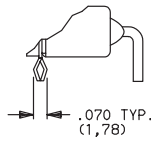
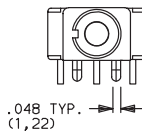
#### SECTION A-A

Terminal Nos.  
For Reference Only.

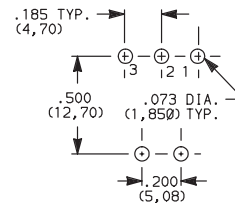


Part Number 8121SH9AGE

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



#### PC MOUNTING

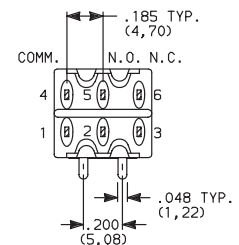
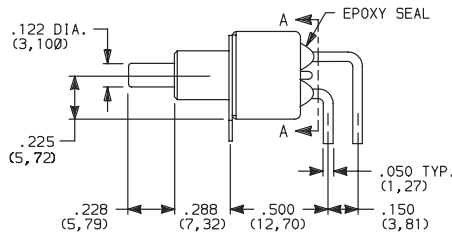
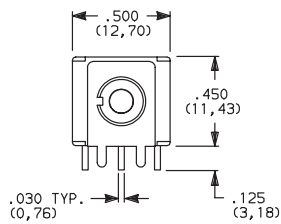


Not available with JXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE

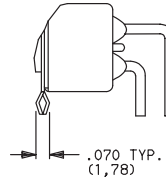
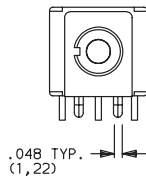


**8221SD9AGE  
DPDT**

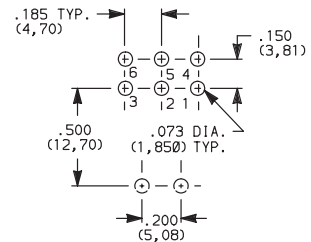


#### SECTION A-A

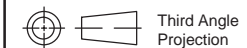
### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



#### PC MOUNTING



Not available with JXX actuators and I seal option.  
Terminal bend radii and lead-in manufacturing option.



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

# 8020 Series Snap-acting Momentary Pushbutton Switches



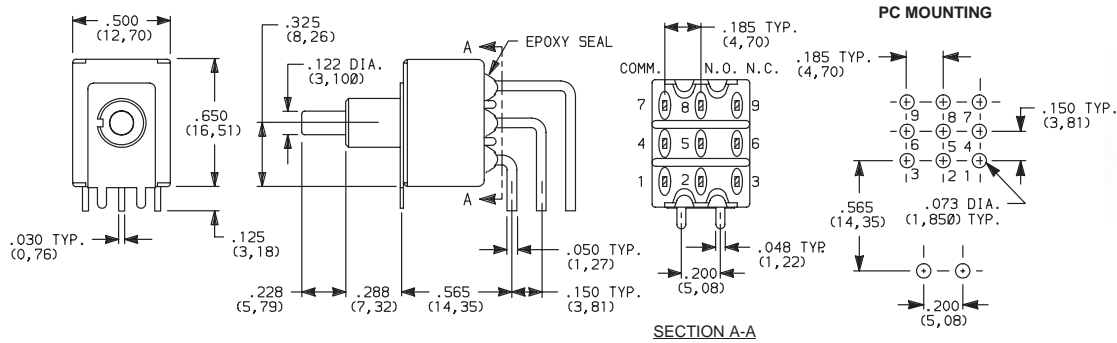
A

Pushbutton

## TERMINATIONS

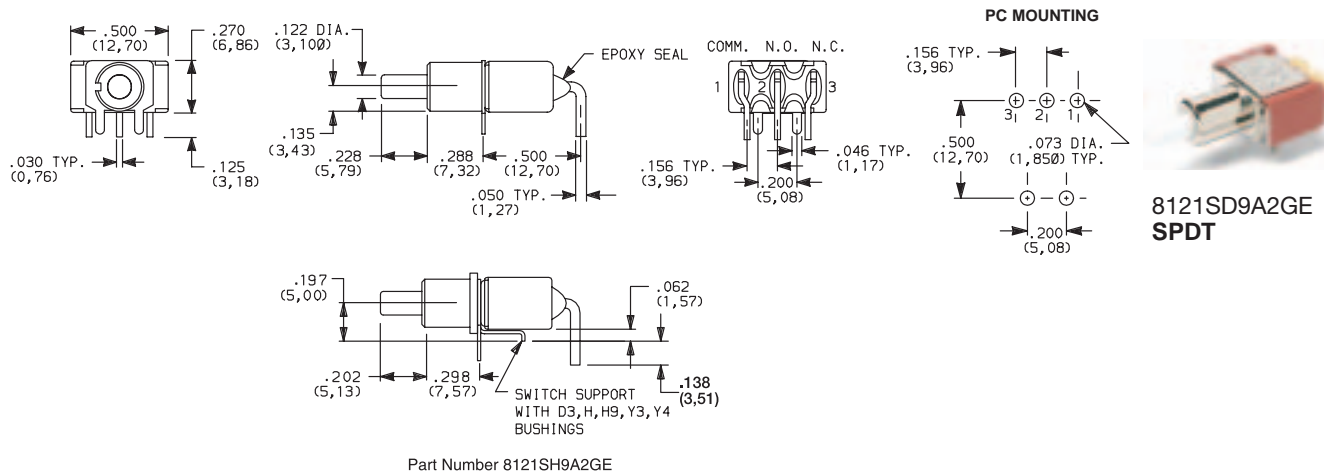


### A RIGHT ANGLE, PC THRU-HOLE



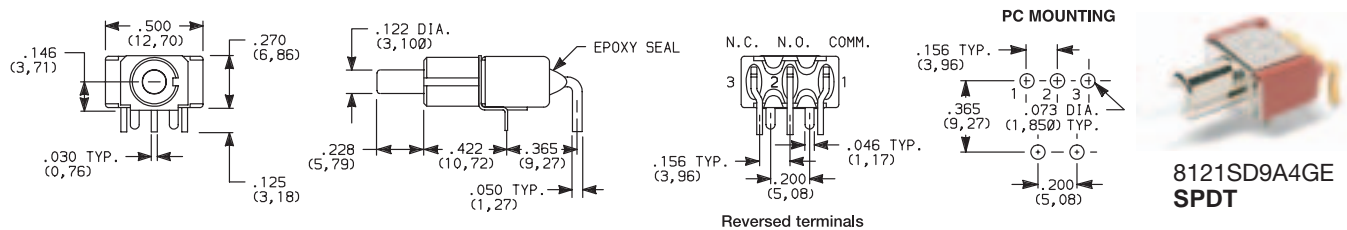
Not available with JXX actuators and I seal option.  
Terminal bend radii and lead-in manufacturing option.

### A2 RIGHT ANGLE, PC THRU-HOLE



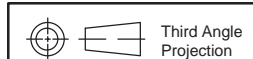
Not available with JXX actuators, I seal option.  
Terminal bend radii and lead-in manufacturing option.

### A4 RIGHT ANGLE, PC THRU-HOLE, REVERSED TERMINALS



Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings and I seal.  
Terminal bend radii and lead-in manufacturing option.

The A4 and R2 termination options are functionally identical and fit the same PC mounting pattern. The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R2, the A4 option is available with UL/CSA.



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





# 8020 Series Snap-acting Momentary Pushbutton Switches

## TERMINATIONS



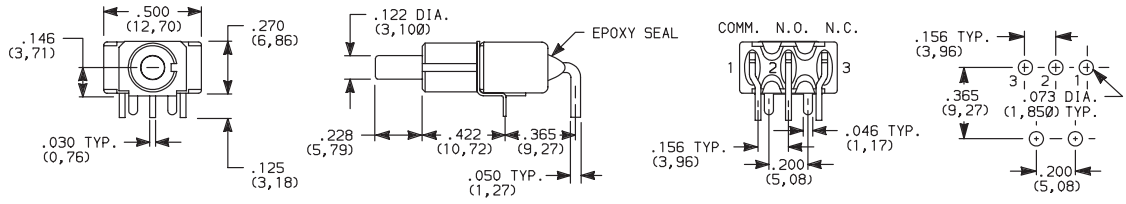
Pushbutton

A

### A6 RIGHT ANGLE, PC THRU-HOLE



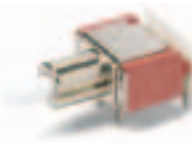
**8121SD9A6GE SPDT**



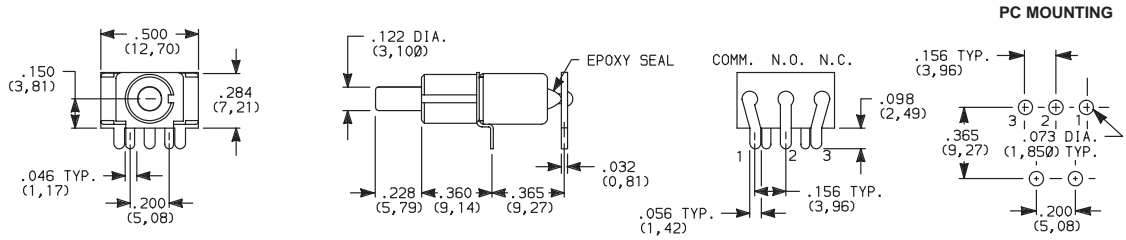
The A6 and R termination options are functionally identical and fit the same PC mounting pattern. The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R, the A6 option is available with UL/CSA.

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings and I seal. Terminal bend radii and lead-in manufacturing option.

### R RIGHT ANGLE WITH PCB



**8121SD9RGE SPDT**

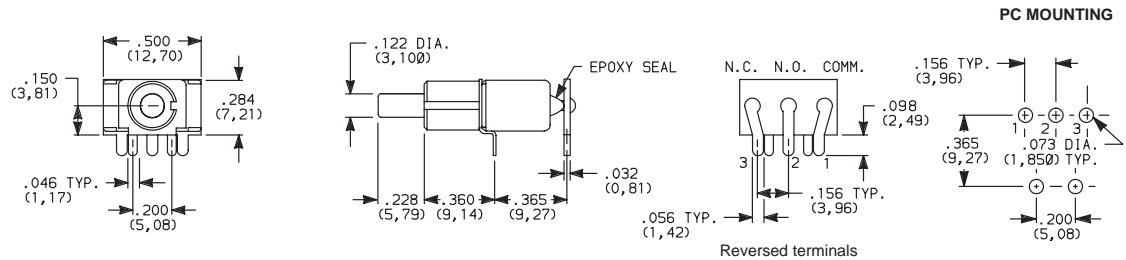


Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option. R termination not UL/CSA approved.

### R2 RIGHT ANGLE WITH PCB, REVERSED TERMINALS



**8121SD9R2GE SPDT**

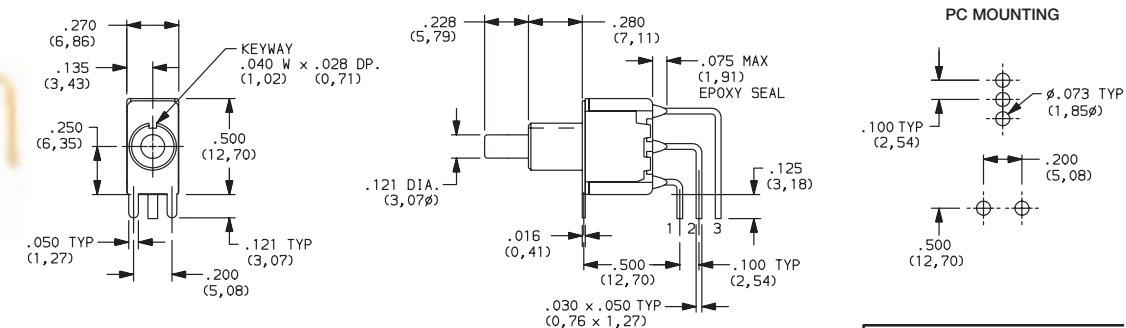


Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option. R2 termination not UL/CSA approved.

### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE, .100" PITCH



**8121SD9AVGE SPDT**



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



# 8020 Series Snap-acting Momentary Pushbutton Switches

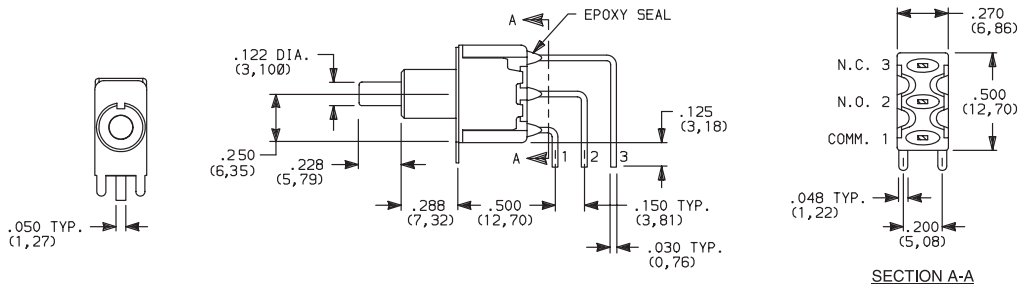


A

Pushbutton

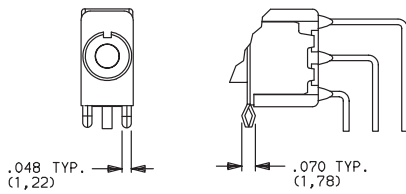
## TERMINATIONS

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

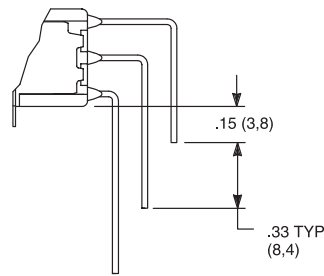


**8121SD9AV2GE SPDT**

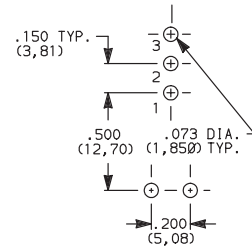
**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



**AV1** VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH

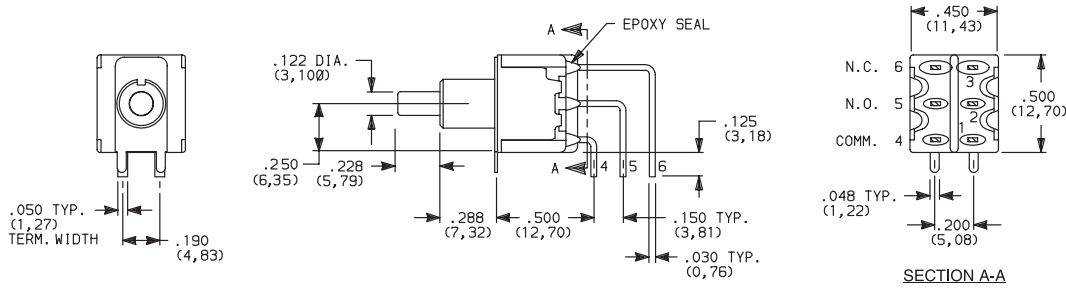


PC MOUNTING



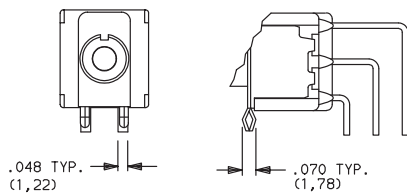
Not available with JXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

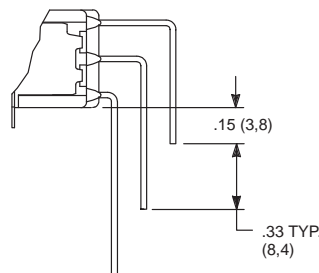


**8221SD9AV2GE DPDT**

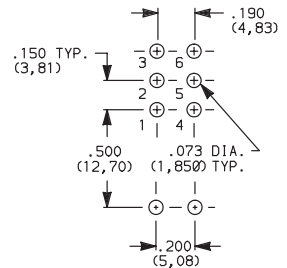
**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



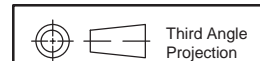
**AV1** VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH



PC MOUNTING



Not available with JXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.



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





# 8020 Series Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

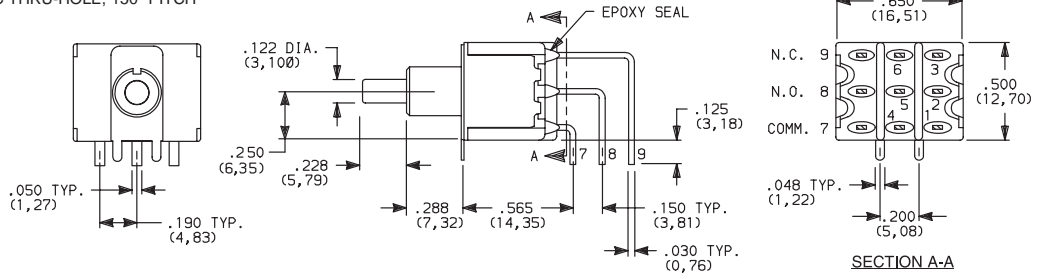


Pushbutton  
A

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, 150° PITCH

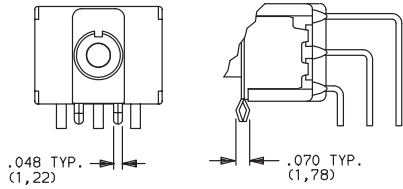


**8321SD9AV2GE**  
**3PDT**

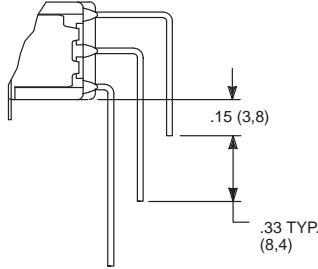


SECTION A-A

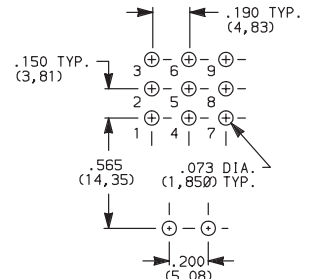
**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



**AV1** VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH



PC MOUNTING

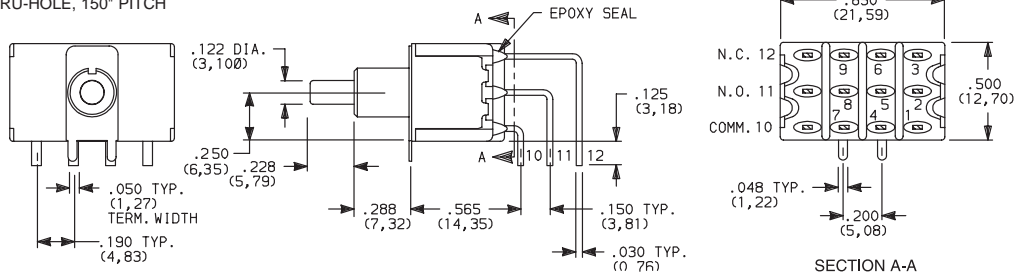


Not available with JXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, 150° PITCH

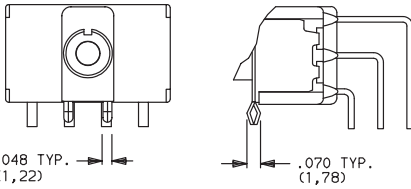


**8421SD9AV2GE**  
**4PDT**

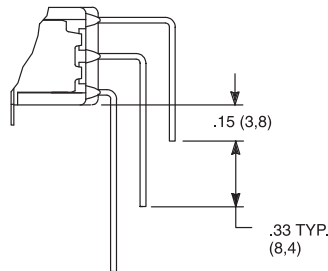


SECTION A-A

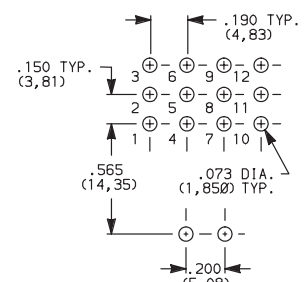
**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



**AV1** VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH



PC MOUNTING



Not available with JXX actuators and I seal.  
Terminal bend radii and lead-in manufacturing option.

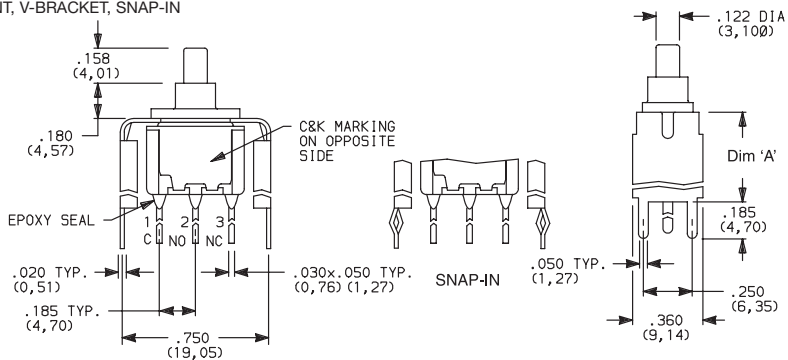
**V2, V6, V7, V8**

VERTICAL MOUNT, V-BRACKET

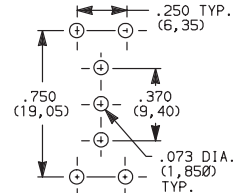
**V61** VERTICAL MOUNT, V-BRACKET, SNAP-IN



**8121SD3\_GE**  
**SPDT**



PC MOUNTING



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V2          | .555 (14,10) |
| V6, V61     | .460 (11,68) |
| V7          | .630 (16,00) |
| V8          | .953 (24,21) |

Not available with JXX actuators and I seal.



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



# 8020 Series Snap-acting Momentary Pushbutton Switches



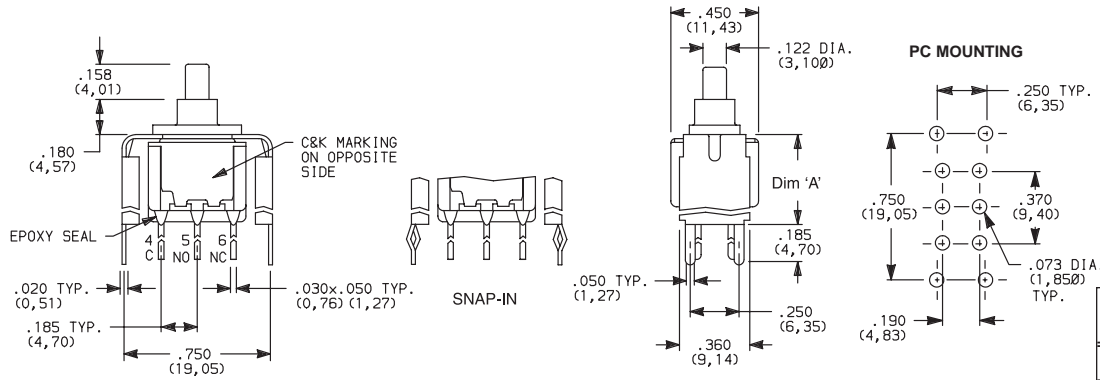
A

Pushbutton

## TERMINATIONS

**V2, V6, V7, V8** VERTICAL MOUNT, V-BRACKET

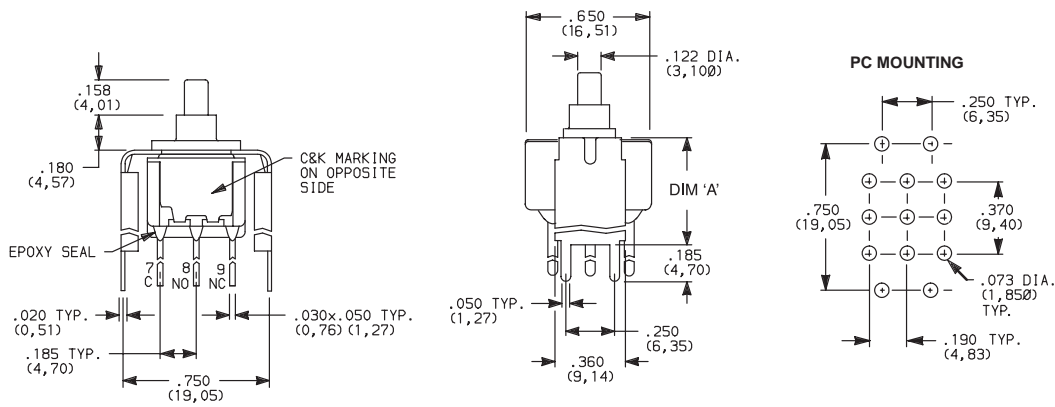
**V61** VERTICAL MOUNT, V-BRACKET, SNAP-IN



| OPTION CODE    | DIM 'A'      |
|----------------|--------------|
| <b>V2</b>      | .555 (14,10) |
| <b>V6, V61</b> | .460 (11,68) |
| <b>V7</b>      | .630 (16,00) |
| <b>V8</b>      | .953 (24,21) |

Not available with JXX actuators and I seal.

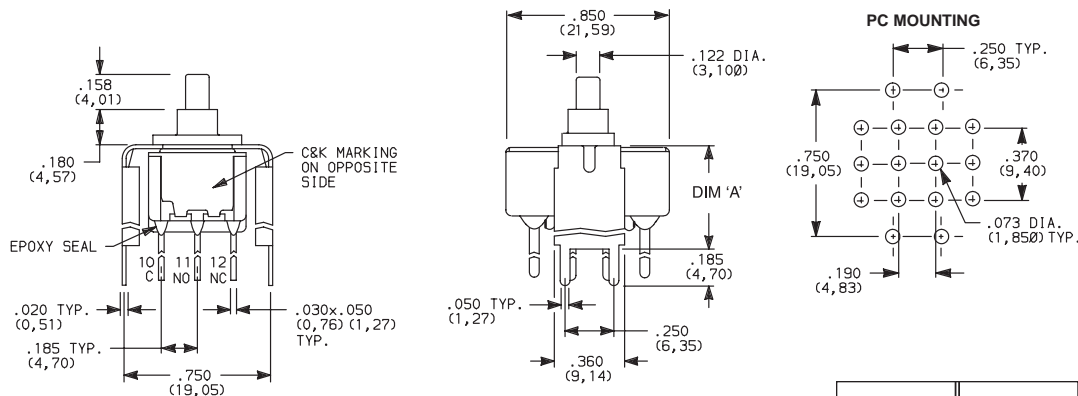
**V2, V7, V8** VERTICAL MOUNT, V-BRACKET



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| <b>V2</b>   | .555 (14,10) |
| <b>V7</b>   | .630 (16,00) |
| <b>V8</b>   | .953 (24,21) |

Not available with JXX actuators and I seal.

**V2, V7, V8** VERTICAL MOUNT, V-BRACKET



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| <b>V2</b>   | .555 (14,10) |
| <b>V7</b>   | .630 (16,00) |
| <b>V8</b>   | .953 (24,21) |

Not available with JXX actuators and I seal.



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







# 8020 Series Snap-acting Momentary Pushbutton Switches

## TERMINATIONS



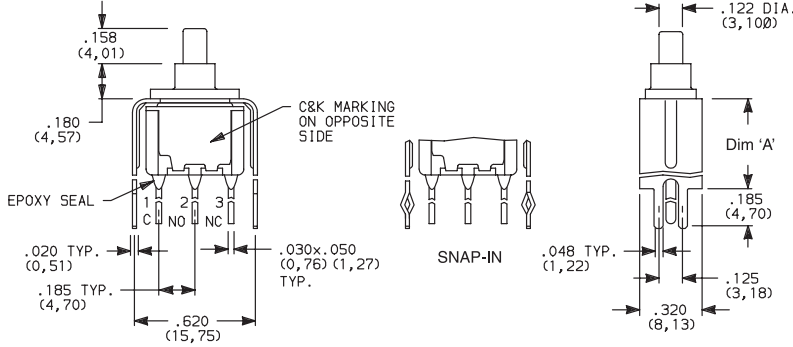
Pushbutton  
A

**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

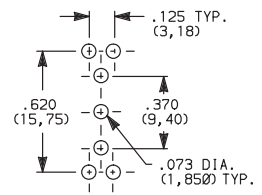
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



8121SD3\_GE  
SPDT



### PC MOUNTING



| OPTION CODE    | DIM 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4</b>      | .630 (16,00)  |
| <b>V9</b>      | 1.150 (29,21) |

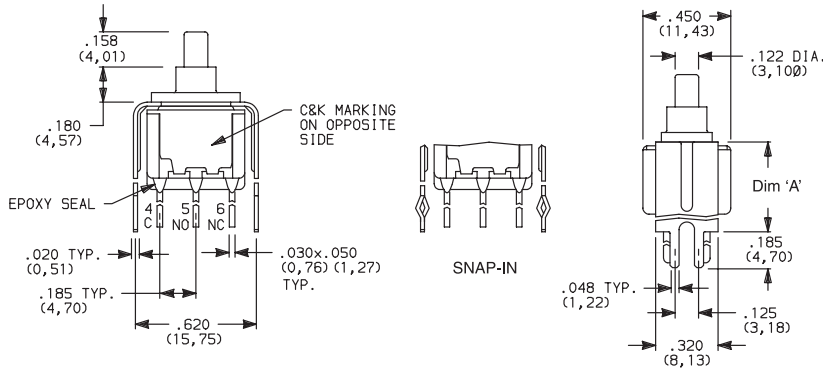
Not available with J8X actuators and I seal.

**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

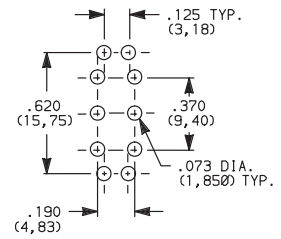
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



8221SD3\_GE  
DPDT



### PC MOUNTING



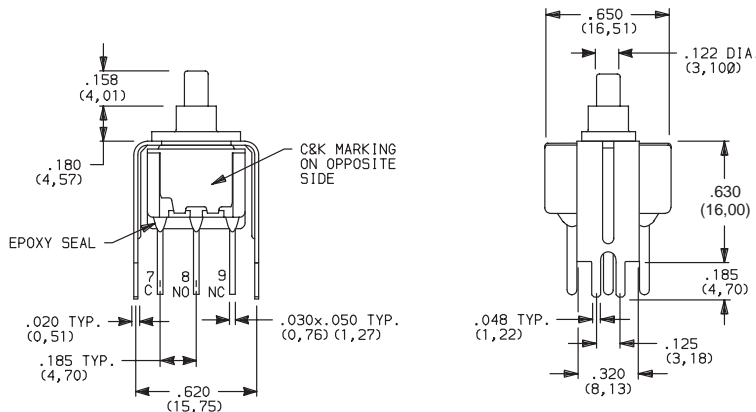
| OPTION CODE    | DIM 'A'       |
|----------------|---------------|
| <b>V3, V31</b> | .460 (11,68)  |
| <b>V4</b>      | .630 (16,00)  |
| <b>V9</b>      | 1.150 (29,21) |

Not available with J8X actuators and I seal.

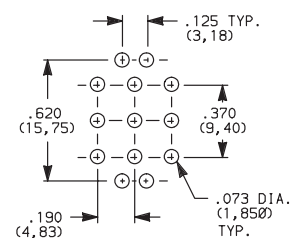
**V4, V9** VERTICAL MOUNT, V-BRACKET



8321SD3V4GE  
3PDT

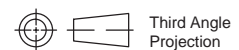


### PC MOUNTING



| OPTION CODE | DIM 'A'       |
|-------------|---------------|
| <b>V4</b>   | .630 (16,00)  |
| <b>V9</b>   | 1.150 (29,21) |

Not available with JXX actuators and I seal.



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

# 8020 Series Snap-acting Momentary Pushbutton Switches



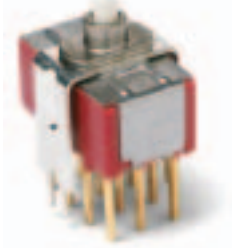
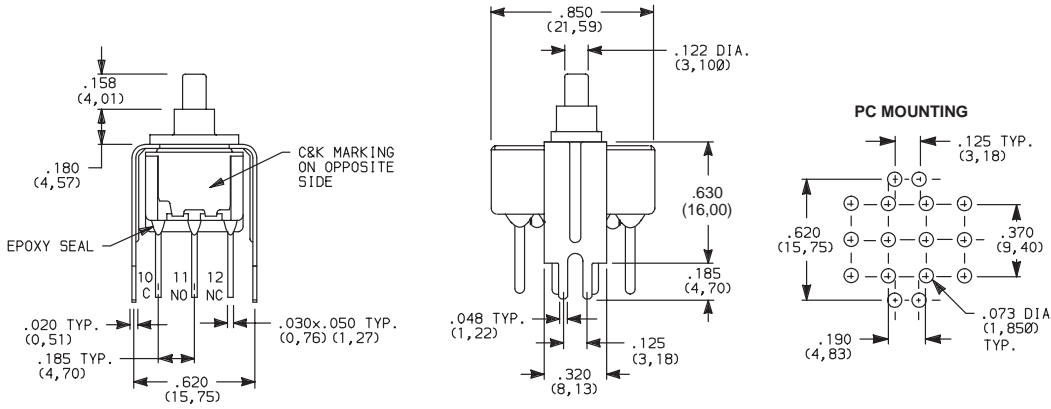
A

Pushbutton

## TERMINATIONS



**V4, V9** VERTICAL MOUNT, V-BRACKET



**8421SD3V4GE  
4PDT**

| OPTION CODE | DIM 'A'       |
|-------------|---------------|
| <b>V4</b>   | .630 (16,00)  |
| <b>V9</b>   | 1.150 (29,21) |

Not available with JXX actuators and I seal.

## CONTACT MATERIAL



| OPTION CODE | CONTACT MATERIAL                | TERMINAL PLATING       | RATINGS                        |   |
|-------------|---------------------------------|------------------------|--------------------------------|---|
| <b>B</b>    | GOLD <sup>1</sup>               | GOLD <sup>1</sup>      | LOW LEVEL/DRY CIRCUIT          | 8x25 MODELS ONLY: 0.4 MAX.<br>@ 20 V AC OR DC MAX.  |
| <b>P</b>    |                                 | MATTE-TIN <sup>4</sup> |                                |   |
| <b>G</b>    | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>      | LOW LEVEL/DRY CIRCUIT OR POWER | 8X21, U8X1 MODELS ONLY: 0.4 VA MAX<br>@ 20 V AC OR DC MAX. OR 1 AMP<br>@ 120 V AC OR 28 V DC. |
| <b>R</b>    |                                 | MATTE-TIN <sup>4</sup> |                                |   |

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

- <sup>1</sup> ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> TERMINALS: Copper alloy, with matte-tin over nickel plate.

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

U811-U841 models with all options (except R, R2 terminations) when ordered with mandatory G, R or L contact material.

B or P contact material must be ordered with 8X25 models.

G or R contact material must be ordered with 8X21, U8X1 models.

P or R contact material not available with Z, Z3 terminations.

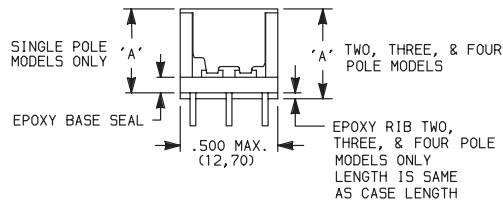
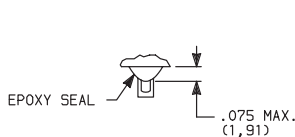
K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

## SEAL



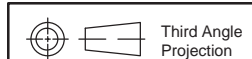
**E** EPOXY SEAL

**I** EPOXY POTTED BASE



| NO. POLES | DIM 'A'      |
|-----------|--------------|
| SP        | .410 (10,41) |
| DP        | .440 (11,18) |
| 3P        | .505 (12,83) |
| 4P        | .505 (12,83) |

**NOTE:** Available with C, W-W4, Z, Z3 terminations only.



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



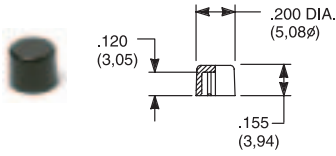


# 8020 Series Snap-acting Momentary Pushbutton Switches

## AVAILABLE HARDWARE

A  
Pushbutton

### Cap

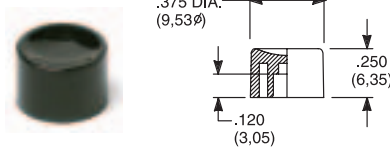


#### PART NO.

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED
- 708904000** ORANGE
- 708905000** YELLOW
- 708906000** GREEN
- 708907000** BLUE
- 708909000** GRAY

Material: Nylon  
Finish: Gloss

### Cap

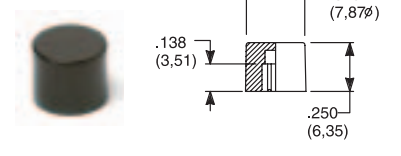


#### PART NO.

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED
- 752704000** ORANGE
- 752705000** YELLOW
- 752706000** GREEN
- 752707000** BLUE
- 752709000** GRAY

Material: Nylon  
Finish: Gloss

### Cap

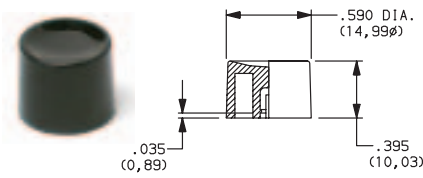


#### PART NO.

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED
- 801804000** ORANGE
- 801805000** YELLOW
- 801806000** GREEN
- 801807000** BLUE
- 801809000** GRAY

Material: Nylon  
Finish: Gloss

### Cap, Snap-fitting plunger

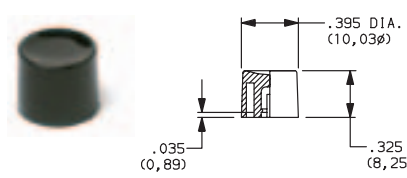


#### PART NO.

- 894001000** WHITE
- 894002000** BLACK
- 894003000** RED
- 894004000** ORANGE
- 894005000** YELLOW
- 894006000** GREEN
- 894007000** BLUE
- 894009000** GRAY

Material: Nylon  
Finish: Gloss

### Cap, Snap-fitting plunger

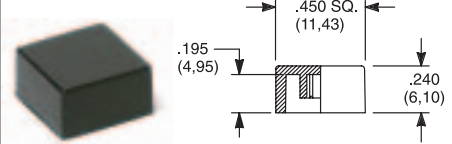


#### PART NO.

- 894101000** WHITE
- 894102000** BLACK
- 894103000** RED
- 894104000** ORANGE
- 894105000** YELLOW
- 894106000** GREEN
- 894107000** BLUE
- 894109000** GRAY

Material: Nylon  
Finish: Gloss

### Cap, J80, J81, J82, J83 & J84 options only



#### PART NO.

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED
- 484604000** ORANGE
- 484605000** YELLOW
- 484606000** GREEN
- 484607000** BLUE
- 484609000** GRAY

Material: Nylon  
Finish: Gloss

#### PART NO.

- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED
- 798204000** ORANGE
- 798205000** YELLOW
- 798206000** GREEN
- 798207000** BLUE
- 798209000** GRAY

Material: Nylon  
Finish: Matte

### Frame



#### PART NO.

- 615601000** WHITE
- 615602263** BLACK
- 615603000** RED
- 615605000** YELLOW
- 615606000** GREEN
- 615609000** GRAY

Material: Nylon  
Finish: Matte

### Frame

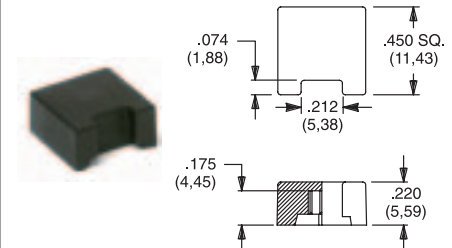


#### PART NO.

- 613301000** WHITE
- 613302263** BLACK
- 613303000** RED
- 613305000** YELLOW
- 613306000** GREEN
- 613309000** GRAY

Material: Nylon  
Finish: Matte

### Cap, J85 & J95 options only



#### PART NO.

- 459701000** WHITE
- 459702000** BLACK
- 459703000** RED
- 459704000** ORANGE
- 459705000** YELLOW
- 459706000** GREEN
- 459707000** BLUE
- 459709000** GRAY

Material: Nylon  
Finish: Gloss

#### PART NO.

- 476801000** WHITE
- 476802000** BLACK
- 476803000** RED
- 476804000** ORANGE
- 476805000** YELLOW
- 476806000** GREEN
- 476807000** BLUE
- 476809000** GRAY

Material: Nylon  
Finish: Matte

### Fits Z3 Termination female connector



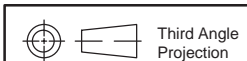
#### PART NO.

**530100000**

Available in loose pieces.

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".

Other cap & frame colors available, consult Customer Service Center.



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



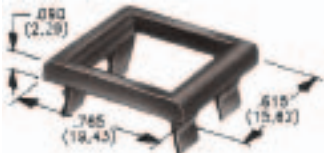
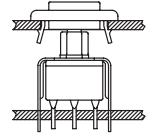
# 8020 Series Snap-acting Momentary Pushbutton Switches



## AVAILABLE HARDWARE

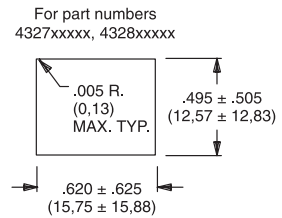
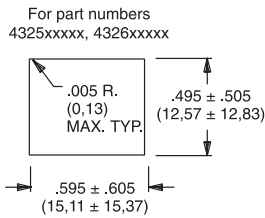
Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

### TYPICAL APPLICATION



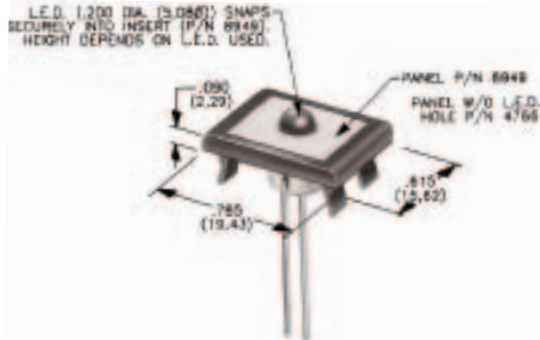
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|-------------------------|-------------------------|-------------------------|-------------------------|
| <b>PART NO.</b>         | <b>PART NO.</b>         | <b>PART NO.</b>         | <b>PART NO.</b>         |
| 432501000               | 432601000               | 432701000               | 432801000               |
| 432502263               | 432602263               | 432702263               | 432802263               |
| 432503000               | 432603000               | 432703000               | 432803000               |
| 432505000               | 432605000               | 432705000               | 432805000               |
| 432506000               | 432606000               | 432706000               | 432806000               |
| 432509000               | 432609000               | 432709000               | 432809000               |
|                         |                         |                         | WHITE                   |
|                         |                         |                         | BLACK                   |
|                         |                         |                         | RED                     |
|                         |                         |                         | YELLOW                  |
|                         |                         |                         | GREEN                   |
|                         |                         |                         | GRAY                    |

### PANEL MOUNTING



### Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. **LED not included.**



### PANEL INSERT WITH HOLE FOR LED

| PART NO.  |
|-----------|
| 894901000 |
| 894902000 |
| 894903000 |
| 894905000 |
| 894906000 |
| 894909000 |

### BLANK PANEL INSERT WITHOUT HOLE FOR LED

| PART NO.  |        |
|-----------|--------|
| 476601000 | WHITE  |
| 476602000 | BLACK  |
| 476603000 | RED    |
| 476605000 | YELLOW |
| 476606000 | GREEN  |
| 476609000 | GRAY   |

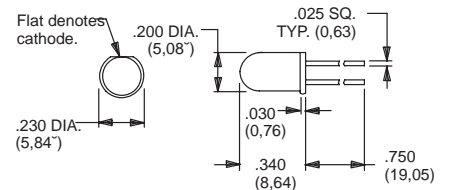
Special colors, custom markings available, consult Customer Service Center.

### LED INFORMATION

SWITCHES WITH LED SUPPLIED: J85, J95 OPTIONS:

Rectangular LEDs are supplied on 8020 Series pushbutton switches with J85 and J95 options. These LEDs are factory installed and are not replaceable. The following specifications apply:

| OPTION CODE | COLOR  | TYP. INTENSITY | TYP. FORWARD VOLTAGE | TYP. FORWARD CURRENT | MAX RATINGS AT 25°C AMBIENT TEMPERATURE |                            |                   |
|-------------|--------|----------------|----------------------|----------------------|---|----------------------------|-------------------|
|             |        |                |                      |                      | FORWARD VOLTAGE                         | CONTINUOUS FORWARD CURRENT | POWER DISSIPATION |
| 6           | Green  | 1.0 mcd        | 2.1 V                | 20 mA                | 2.5 V                                   | 50 mA                      | 125 mW            |
| 3           | Red*   | 0.5 mcd        |                      | 10 mA                |   | 30 mA                      | 75 mW             |
| 5           | Yellow | 4.0 mcd        |                      | 20 mA                |   | 50 mA                      | 125 mW            |

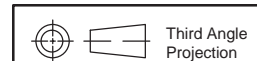


**Process Information:** Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

**Caution:** Circuit elements must limit forward current of LED to 50mA max. continuous.

\* Extra-bright red LED available (typ. intensity 4.5 mcd), consult Customer Service Center. LEDs are not supplied with J82, J84 options. LED snaps into switch frame surrounding actuator and is wired externally.

Suggested LED for J82 & J84 options. Dimensions for reference only.



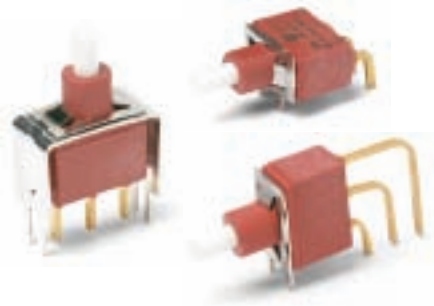
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change





# E010 Series Sealed Momentary Pushbutton Switches

Pushbutton  
A



## Features/Benefits

- *Process sealed, withstands soldering and cleaning*
- *Long life contact design*
- *Snap-fitting plunger available, accepts a variety of caps*
- *RoHS compliant models available*

## Typical Applications

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



## Specifications

**CONTACT RATING:** Q contact material: 4 AMPS @ 125 V AC or 28 V DC. See page A-50 for additional ratings.

**ELECTRICAL LIFE:** 40,000 make-and-break cycles at full load.

**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 75°C.

**CAP INSTALLATION FORCE:** 10 lbs. max. permissible.

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

**NOTE:** Any models supplied with P, Q, B 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.

## Materials

**CASE & BUSHING:** Glass filled nylon 6/6, flame retardant (UL 94V-0).

**PLUNGER:** Glass filled nylon or glass filled polyester (PBT) (UL 94V-0), with internal o-ring seal standard.

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

**SWITCH SUPPORT RETAINER:** Stainless steel.

**END CONTACTS:** Q contact material: Coin silver, silver plated. See A-50 for additional ratings.

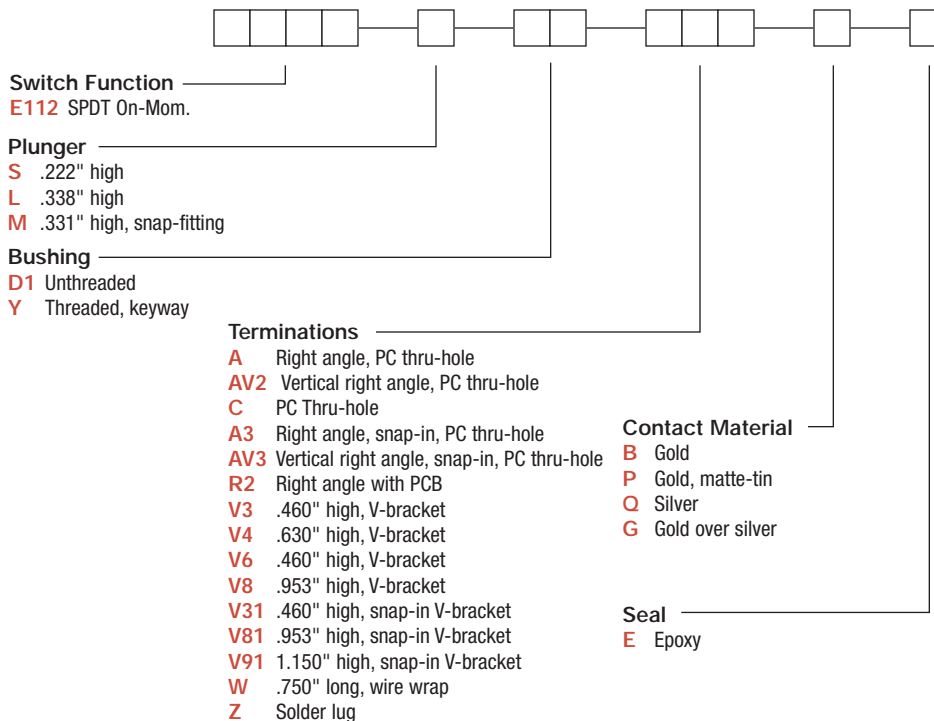
**CENTER CONTACTS & ALL TERMINALS:** Q contact material: Copper alloy, silver plated. See page A-50 for additional ratings.

**TERMINAL SEAL:** Epoxy.

**HARDWARE:** Nut & locking ring-Brass, nickel plated. Lockwasher-Steel, nickel plated.

## 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-47 thru A-51. 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*

# E010 Series Sealed Momentary Pushbutton Switches



A

Pushbutton

## SWITCH FUNCTION

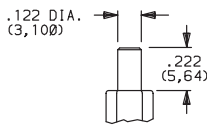
| NO. POLES                            | MODEL NO.   | SWITCH FUNCTION       |        | CONNECTED TERMINALS   |        | SCHEMATIC   |
|--------------------------------------|-------------|-----------------------|--------|-----------------------|--------|-------------|
|                                      |             | POS. 1                | POS. 2 | POS. 1                | POS. 2 |             |
|                                      |             |                       |        |                       |        |             |
|                                      |             | C&K marking this side |        | C&K marking this side |        |             |
| SP                                   | <b>E112</b> | ON                    | MOM.   | 2-1                   | 2-3    | <p>SPDT</p> |
| <p>Part number shown: E112SD1CQE</p> |             |                       |        |                       |        |             |

MOM. = Momentary

All models with all options when ordered with G or Q contact material.

## PLUNGER

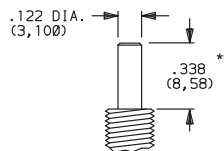
**S** .218" HIGH



Standard with D1 bushing (as shown).

† Subtract .100 (2,54) from plunger length when ordered with Y bushing.

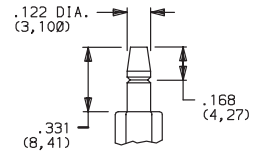
**L** .338" HIGH



Standard with Y bushing (as shown).

\*\* Add .100 (2,54) from plunger length when ordered with D1 bushing.

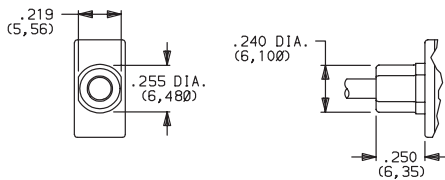
**M** .331" HIGH, SNAP-FITTING



NOTE: Caps available for all plunger options, see pages A-50 and A-51.

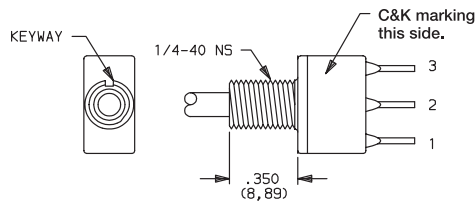
## BUSHING

**D1** UNTHREADED



S plunger standard with D1 bushing.

**Y** THREADED, KEYWAY

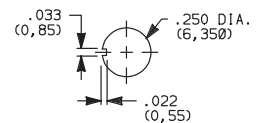


L plunger standard with Y bushing. Available only with C, Z terminations.

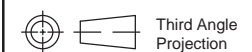
Hardware: One dress nut part number 780701201, one hex nut and lockwasher supplied standard.

Withstands 4 in./lbs. without distortion.

**PANEL MOUNTING**



NOTE: Internal o-ring actuator seal standard for all bushing options.



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





# E010 Series Sealed Momentary Pushbutton Switches

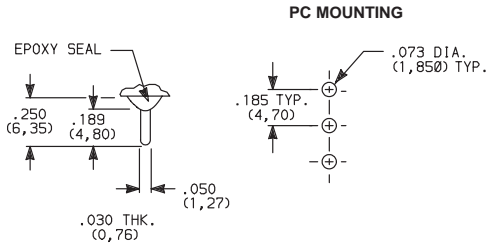
## TERMINATIONS



Pushbutton

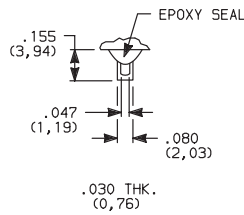
A

### C PC THRU-HOLE



SPDT

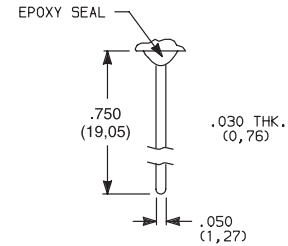
### Z SOLDER LUG



SPDT

Not available with P contact materials.

### W WIRE WRAP

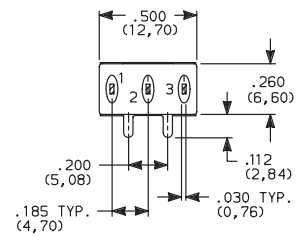
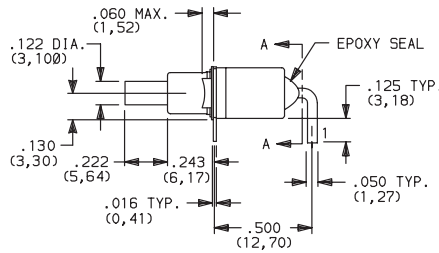
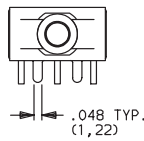


SPDT

### A RIGHT ANGLE, PC THRU-HOLE

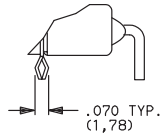
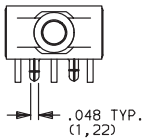


**E112SD1ABE  
SPDT**

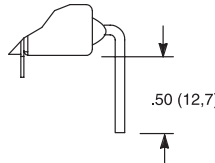


SECTION A-A

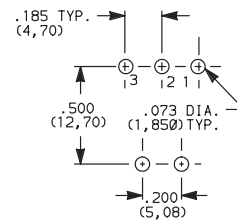
### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



### AW RIGHT ANGLE, EXTENDED, PC THRU-HOLE



### PC MOUNTING

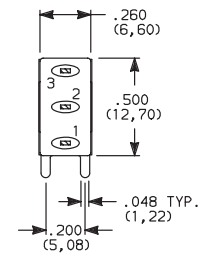
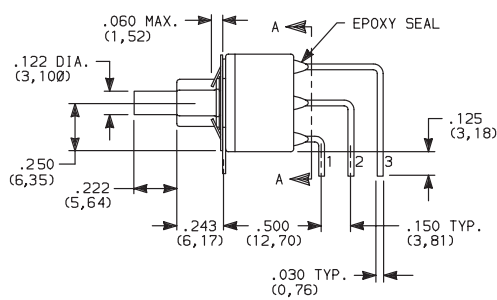
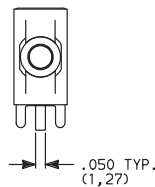


NOTE: Terminal bend radii and lead-in manufacturing option. Available with D1 bushing only.

### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150° PITCH

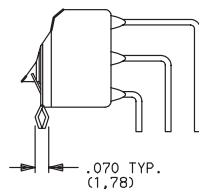
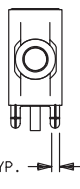


**E112SD1AV2BE  
SPDT**

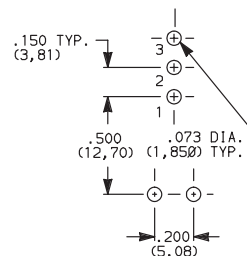


SECTION A-A

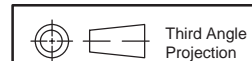
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150° PITCH



### PC MOUNTING



NOTE: Terminal bend radii and lead-in manufacturing option. Available with D1 bushing only.



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



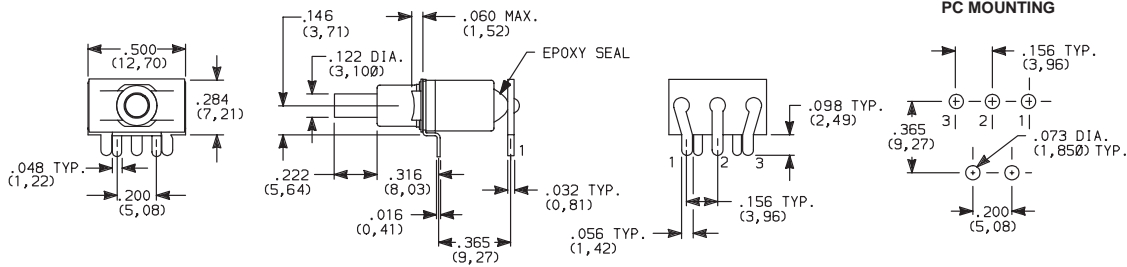
# E010 Series Sealed Momentary Pushbutton Switches



Pushbutton

## TERMINATIONS

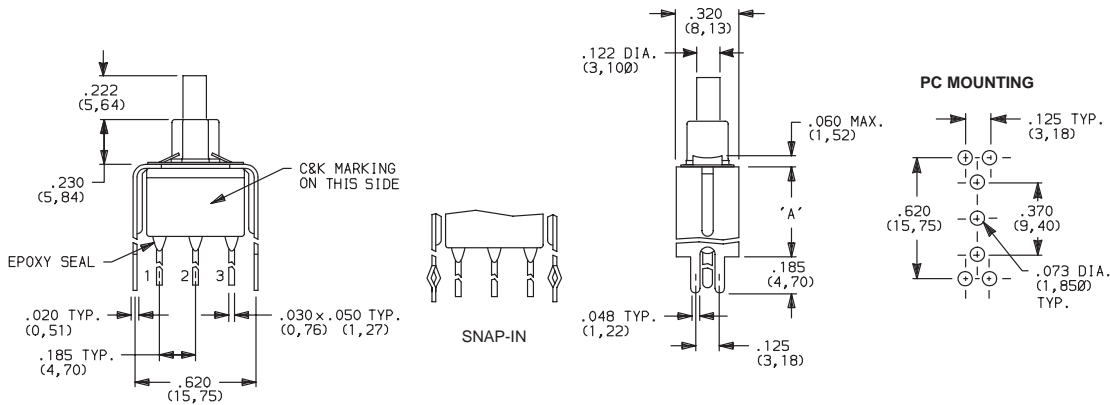
### R2 RIGHT ANGLE WITH PCB



NOTE: Available with D1 bushing and B contact material only.

### V3, V4 VERTICAL MOUNT, V-BRACKET

### V31, V91 VERTICAL MOUNT, V-BRACKET, SNAP-IN

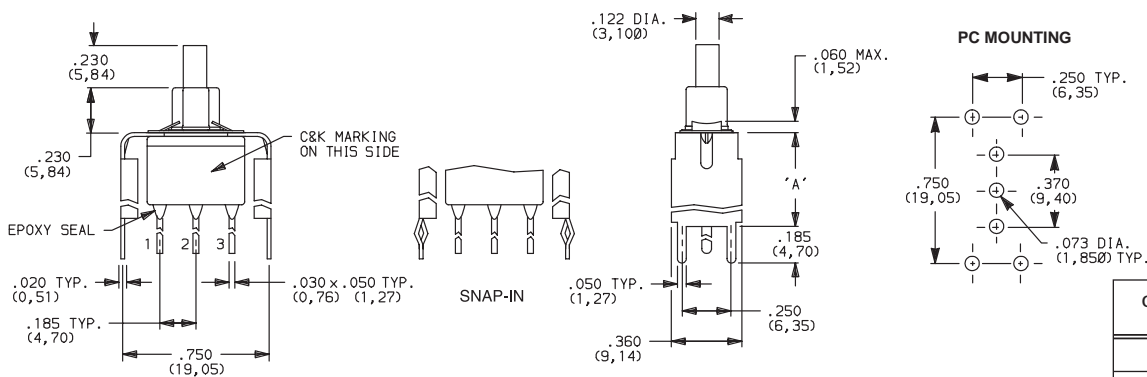


| OPTION CODE | DIM 'A'       |
|-------------|---------------|
| V3, V31     | .460 (11,68)  |
| V4          | .630 (16,00)  |
| V91         | 1.150 (29,21) |

NOTE: Available with D1 bushing only.

### V6, V8 VERTICAL MOUNT, V-BRACKET

### V81 VERTICAL MOUNT, V-BRACKET, SNAP-IN



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V6          | .460 (11,68) |
| V8, V81     | .953 (24,21) |

NOTE: Available with D1 bushing only.



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





# E010 Series Sealed Momentary Pushbutton Switches

## CONTACT MATERIAL



Pushbutton  
A

| 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                          | 4 AMPS @ 125 V AC OR 28 V DC.  |
| <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<br>4 AMPS @ 125 V AC OR 28 V DC. |

\* 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: Coin silver, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with matte-tin over nickel plate.

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

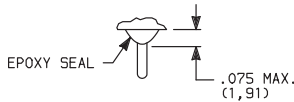
All models with all options when ordered with G or Q contact material. B contact material standard with all terminations except C, Z. B contact material must be ordered with R2 terminations. Q contact material standard with C, Z terminations. P contact materials not available with Z terminations.

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

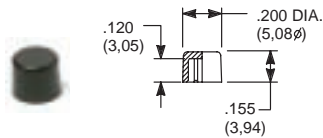


**E** EPOXY SEAL



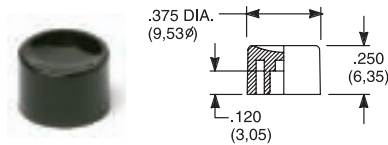
## AVAILABLE HARDWARE

Cap



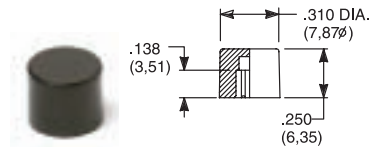
PART NO.  
**708901000** WHITE  
**708902000** BLACK  
**708903000** RED  
 Material: Nylon  
 Finish: Gloss

Cap



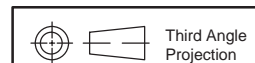
PART NO.  
**752701000** WHITE  
**752702000** BLACK  
**752703000** RED  
 Material: Nylon  
 Finish: Gloss

Cap



PART NO.  
**801801000** WHITE  
**801802000** BLACK  
**801803000** RED  
 Material: Nylon  
 Finish: Gloss

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware". Other cap colors available, consult Customer Service Center.



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

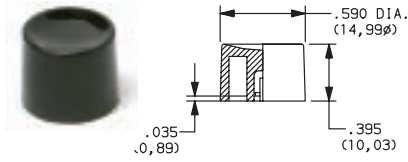


# E010 Series Sealed Momentary Pushbutton Switches



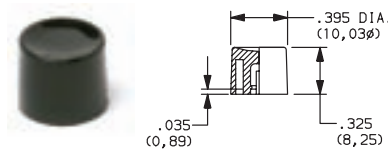
## AVAILABLE HARDWARE

Cap, Snap-fitting plunger



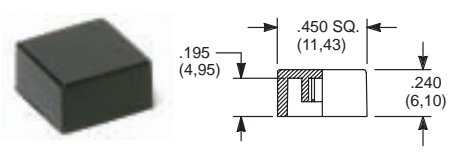
**PART NO.**  
**894001000** WHITE  
**894002000** BLACK  
**894003000** RED  
 Material: Nylon  
 Finish: Gloss

Cap, Snap-fitting plunger



**PART NO.**  
**894101000** WHITE  
**894102000** BLACK  
**894103000** RED  
 Material: Nylon  
 Finish: Gloss

Cap



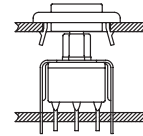
**PART NO.**  
**484601000** WHITE  
**484602000** BLACK  
**484603000** RED  
 Material: Nylon  
 Finish: Gloss

**PART NO.**  
**798201000** WHITE  
**798202263** BLACK  
**798203000** RED  
 Material: Nylon  
 Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware". Other cap colors available, consult Customer Service Center.

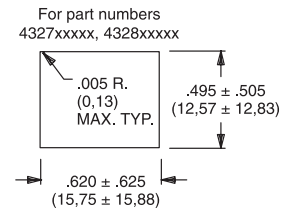
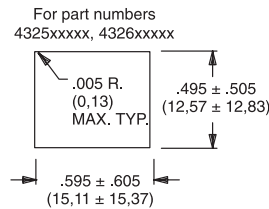
Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

TYPICAL APPLICATION



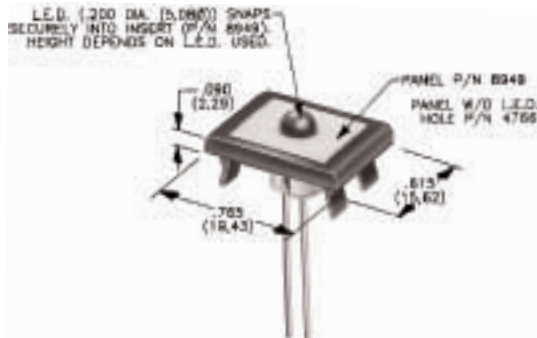
| .047" (1,19) PANEL THK.   | .062" (1,57) PANEL THK.   | .090" (2,29) PANEL THK.   | .125" (3,18) PANEL THK.   |
|---|---|---|---|
| <b>PART NO.</b><br><b>432501000</b><br><b>432502263</b><br><b>432503000</b> | <b>PART NO.</b><br><b>432601000</b><br><b>432602263</b><br><b>432603000</b> | <b>PART NO.</b><br><b>432701000</b><br><b>432702263</b><br><b>432703000</b> | <b>PART NO.</b><br><b>432801000</b> WHITE<br><b>432802263</b> BLACK<br><b>432803000</b> RED |

PANEL MOUNTING



Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT WITH HOLE FOR LED

**PART NO.**  
**894901000**  
**894902000**  
**894903000**

BLANK PANEL INSERT WITHOUT HOLE FOR LED

**PART NO.**  
**476601000** WHITE  
**476602000** BLACK  
**476603000** RED

Special colors, custom markings available, consult Customer Service Center.



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





Pushbutton  
A

# 8060 Series Alternate Action and Momentary Pushbutton Switches



### Features/Benefits

- Long travel
- Available with LED
- Long life contact design
- Epoxy terminal seal compatible with bottom wash cleaning
- RoHS compliant models available

### Typical Applications

- Instrumentation
- Computers and peripherals
- Telecommunications and networking equipment



Models Available

### Specifications

CONTACT RATING: Q contact material: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC. See page A-59 for additional ratings.

ELECTRICAL LIFE: 50,000 make-and-break cycles at full load.

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: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C

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

CAP INSTALLATION FORCE: 10 lbs. maximum permissible.

**NOTE:** Any models supplied with P, R, S, Q, B 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.

### Materials

CASE: Glass filled nylon 6/6 or diallyl phthalate (DAP), flame retardant (UL 94V-0).

PLUNGER: S, S1, S2 Options: Glass filled nylon or glass filled polyester (PBT) (UL 94V-0). L, L1 Options: Brass, nickel plated.

CAP & FRAME: Nylon, black standard.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, matte-tin plated.

END CONTACTS: Q contact material: Coin silver, silver plated. See page A-59 for additional contact materials.

CENTER CONTACT & ALL TERMINALS: Q contact material: Copper alloy, silver plated. See page A-59 for additional contact materials.

TERMINAL SEAL: Epoxy. Refer to soldering and cleaning in Technical Data Chapter.

HARDWARE: Nut & Locking Ring: Brass, nickel plated; Lockwasher: Steel, nickel plated.

### 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-53 thru A-61. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



#### Switch Function

- 8161** SPDT On-On
- 8168** SPDT On-Mom.
- 8261** DPDT On-On

#### Actuator or Plunger

- S** .710" high plunger with .375" dia. cap
- J80** Snap-in
- J81** Snap-in with frame
- J82** Snap-in with frame for LED
- J86** Snap-in with frame & LED
- L** .740" high plunger with .395" dia. cap
- L1** .740" high plunger with .590" dia. cap
- S1** .615" high plunger with .200" dia. cap
- S2** .710" high plunger with .310" dia. cap

#### Bushing

- H** .300" high, flat, hi torque
- H9** .300" high, flat, hi torque
- NONE** No bushing choice required
- Y3** 7.6mm, keyway

#### Terminations

- A** Right angle, PC thru-hole
- AV2** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- Z** Solder lug
- A3** Right angle, snap-in, PC thru-hole
- AV3** Vertical right angle, snap-in, PC thru-hole
- V3** .460" high, V-bracket
- V4** .630" high, V-bracket
- V6** .460" high, V-bracket
- V21** .555" high, snap-in V-bracket
- V31** .460" high, snap-in V-bracket
- W** .750" long, wire wrap
- Z3** Quick connect

#### Contact Material

- B** Gold
- P** Gold, matte-tin
- Q** Silver
- S** Silver, matte-tin
- G** Gold over silver
- R** Gold over silver, matte-tin

#### Seal

- E** Epoxy
- I** Epoxy potted base

#### Cap Color

- 2** Black
- 1** White
- 3** Red
- 4** Orange
- 5** Yellow
- 9** Gray

#### Frame Color

- 2** Black

#### LED Color

- 3** Red
- NONE** Models without LED



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

# 8060 Series Alternate Action and Momentary Pushbutton Switches



A

Pushbutton

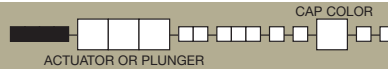
## SWITCH FUNCTION

| NO. POLES  | MODEL NO.    | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|--|--------------|-----------------|--------|---------------------|---------|-----------|
|  |              | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP   | 8161<br>8168 | ON              | ON     | 2-3                 | 2-1     | SPDT      |
|  |              | ON              | MOM.   | 2-3                 | 2-1     | SPDT      |
| <p><b>SPDT</b></p> <p>Part number shown: 8161SHZQE</p> |              |                 |        |                     |         |           |
| DP   | 8261         | ON              | ON     | 2-3-5-6             | 2-1-5-4 | DPDT      |
| <p><b>DPDT</b></p> <p>Part number shown: 8261SHZQE</p> |              |                 |        |                     |         |           |

MOM. = Momentary

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

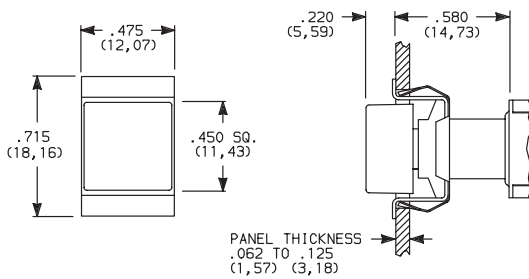
## ACTUATOR—SNAP-IN FRONT MOUNT



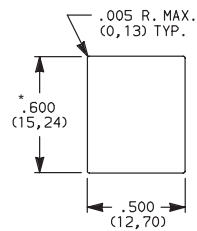
| OPTION CODE | CAP COLOR |
|-------------|-----------|
| 2           | BLACK     |
| 1           | WHITE     |
| 3           | RED       |
| 4           | ORANGE    |
| 5           | YELLOW    |
| 9           | GRAY      |

Cap Finish: matte.  
Other colors available, consult Customer Service Center.  
Available with C, W, Z or Z3 terminations.  
**NOTE:** Caps & frames available separately, see pages A-60 and A-61.

### J80 SNAP-IN



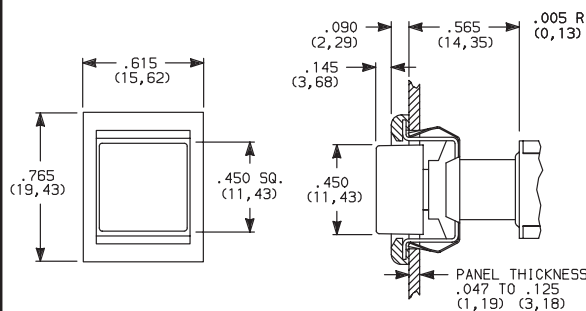
### PANEL MOUNTING



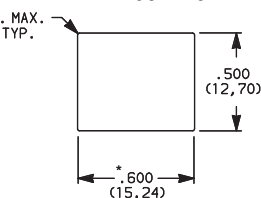
\*Increase this dimension to .620/.625 (15.75/15.88) for .091/.125 (2.41/2.18) thick panels.



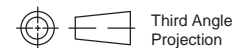
### J81 SNAP-IN WITH BLACK FRAME



### PANEL MOUNTING



\*Increase this dimension to .620/.625 (15.75/15.88) for .091/.125 (2.41/2.18) thick panels.



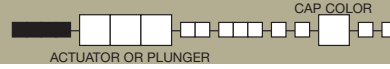
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change





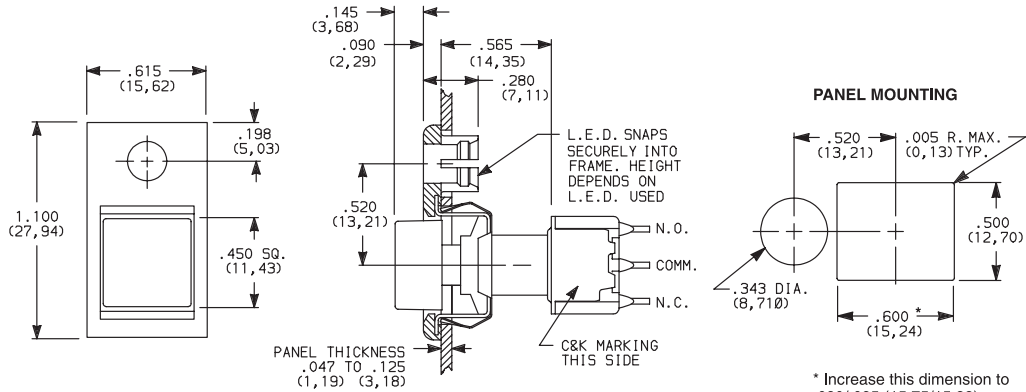
# 8060 Series Alternate Action and Momentary Pushbutton Switches

## ACTUATOR—SNAP-IN FRONT MOUNT



Pushbutton  
A

### J82 SNAP-IN WITH BLACK FRAME FOR LED



Available with C, W, Z or Z3 terminations.

**LED not included.**  
For LED information, see page A-61.

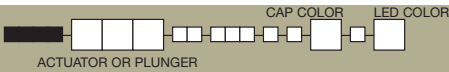
**NOTE:** Caps & frames available separately, see pages A-60 and A-61.

Other colors available, consult Customer Service Center.

| OPTION CODE | CAP COLOR |
|-------------|-----------|
| 2           | BLACK     |
| 1           | WHITE     |
| 3           | RED       |
| 4           | ORANGE    |
| 5           | YELLOW    |
| 9           | GRAY      |

\* Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thick panels.

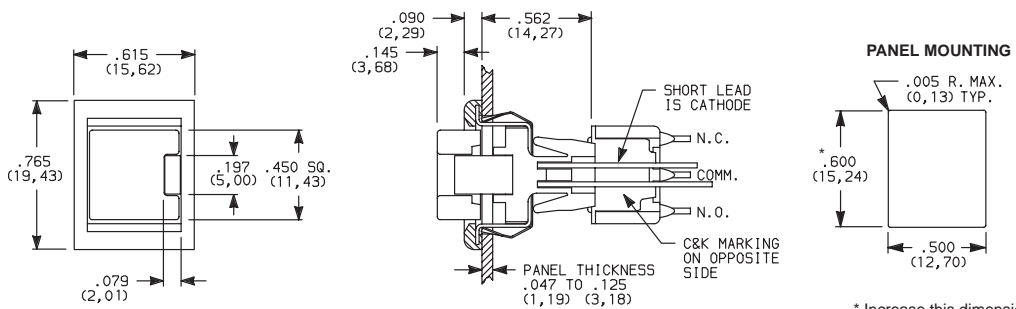
## ACTUATOR—SNAP-IN FRONT MOUNT



### J86 SNAP-IN WITH BLACK FRAME AND LED



8161J86ZQE223  
SPDT



Available with C, W, Z or Z3 terminations and SPDT models only.

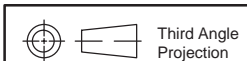
**NOTE:** Caps & frames available separately, see pages A-60 and A-61.

Other colors available, consult Customer Service Center.

| OPTION CODE | CAP COLOR |
|-------------|-----------|
| 2           | BLACK     |
| 1           | WHITE     |
| 3           | RED       |
| 4           | ORANGE    |
| 5           | YELLOW    |
| 9           | GRAY      |

| OPTION CODE | LED COLOR |
|-------------|-----------|
| 3           | RED       |

For LED information, see page A-59.



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



# 8060 Series Alternate Action and Momentary Pushbutton Switches

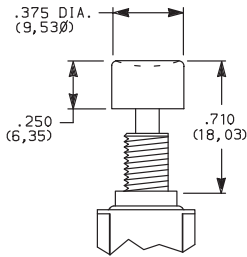


A

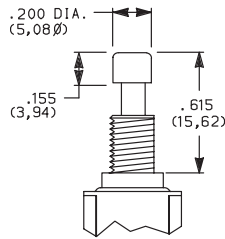
Pushbutton

## PLUNGER

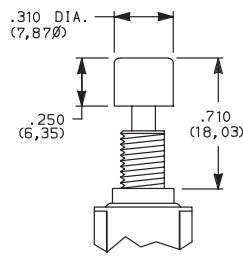
**S** PLUNGER WITH CAP P/N 7527



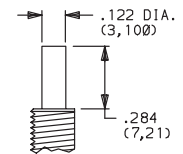
**S1** PLUNGER WITH CAP P/N 7089



**S2** PLUNGER WITH CAP P/N 8018

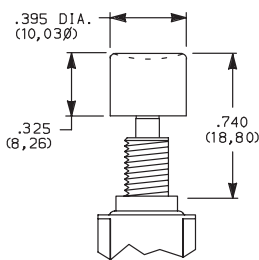


**S, S1, S2 plunger dimensions.**

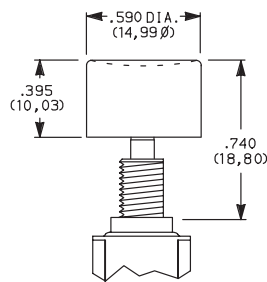


Plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

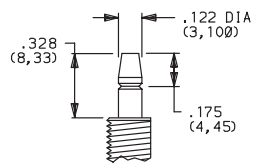
**L** PLUNGER WITH CAP P/N 8941



**L1** PLUNGER WITH CAP P/N 8940



**L, L1 plunger dimensions.**



Plunger Material: Brass, chrome plated.

| OPTION CODE | CAP COLOR |
|-------------|-----------|
| 2           | BLACK     |
| 1           | WHITE     |
| 3           | RED       |
| 4           | ORANGE    |
| 5           | YELLOW    |
| 9           | GRAY      |

Cap Finish: gloss. Cap supplied not installed. Other colors available, consult Customer Service Center.

**NOTE:** When selecting plunger and cap option, bushing selection must also be made, see below.

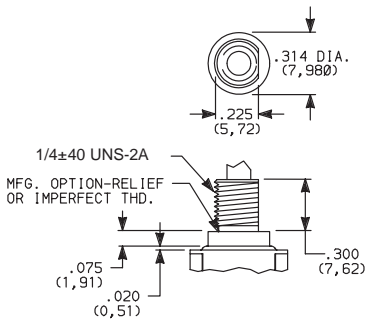
## BUSHING

**H** .300" HIGH THREADED, FLAT

**NONE** NO BUSHING CHOICE REQUIRED (JXX ACTUATORS)

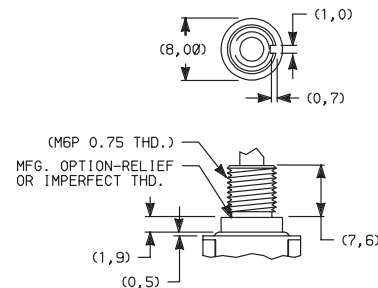
**Y3** 7.6mm THREADED, KEYWAY

**H9** .300" HIGH UNTHREADED, FLAT



H bushing standard with C, W, Z or Z3 terminations. H9 bushing standard with A, A3, AV2, AV3, or V3-V31 terminations.

Withstands 12 in./lbs. of torque with no distortion.

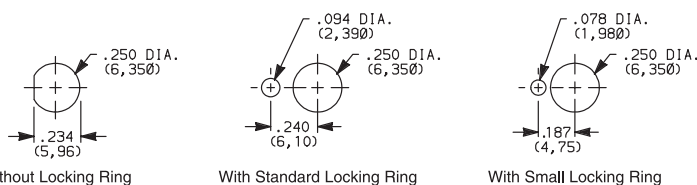


Withstands 12 in./lbs. of torque with no distortion.

**NOTE:** When selecting bushing option, plunger selection must also be made, see above. No bushing option choice required when any JXX actuator option is selected.

### PANEL MOUNTING

#### 1/4 IN. BUSHING

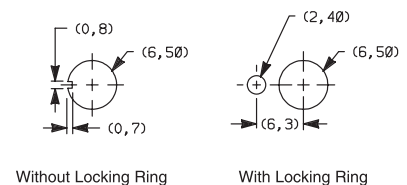


Without Locking Ring

With Standard Locking Ring

With Small Locking Ring

#### METRIC BUSHING



Without Locking Ring

With Locking Ring

**NOTE.** Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see section "Technical Data and Additional Hardware".



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





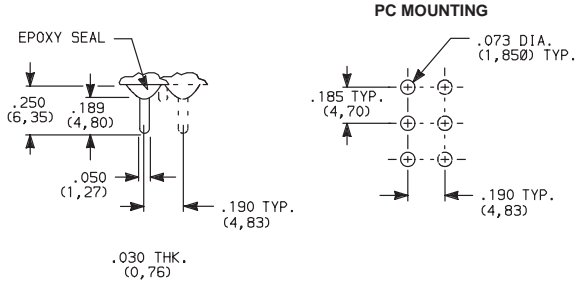
Pushbutton  
A

# 8060 Series Alternate Action and Momentary Pushbutton Switches

## TERMINATIONS

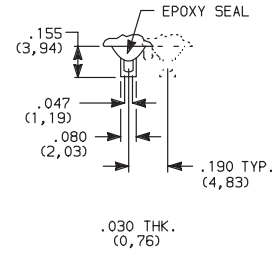


### C PC THRU-HOLE



### SPDT and DPDT

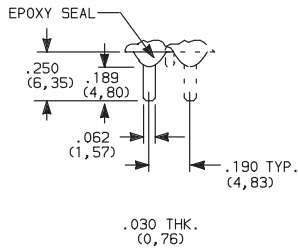
### Z SOLDER LUG



### SPDT and DPDT

Not available with P, S or R contact material.

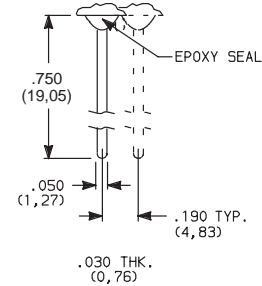
### Z3 QUICK CONNECT



### SPDT and DPDT

Not available with P, S or R contact material.  
Mating quick connector available;  
order part number 530100000, page A-61.

### W WIRE WRAP

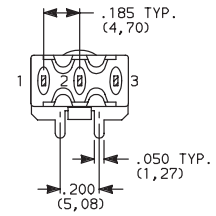
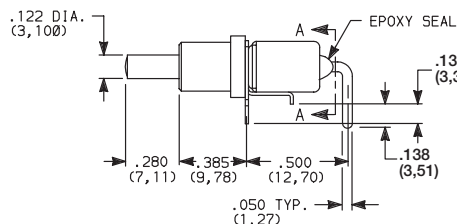
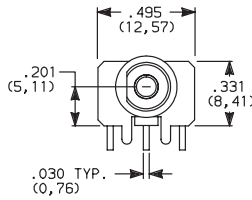


### SPDT and DPDT

### A RIGHT ANGLE, PC THRU-HOLE

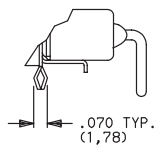
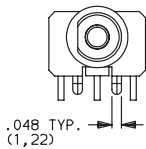


8161SH9ABE2  
SPDT

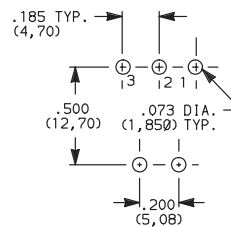


SECTION A-A

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



### PC MOUNTING



Not available with I seal.  
Terminal bend radii and lead-in manufacturing option.

NOTE: PC pattern must clear switch support leg.



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



# 8060 Series Alternate Action and Momentary Pushbutton Switches

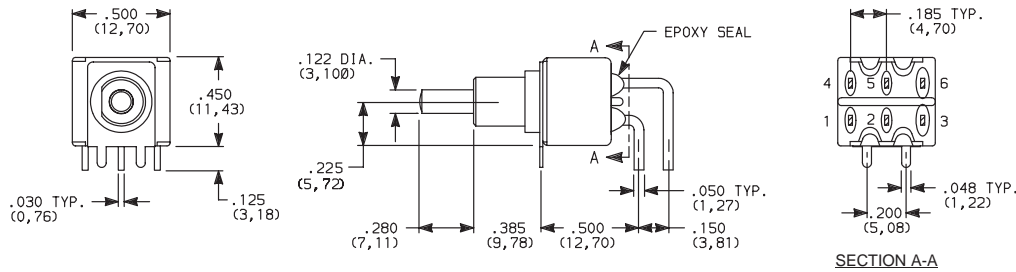


A

Pushbutton

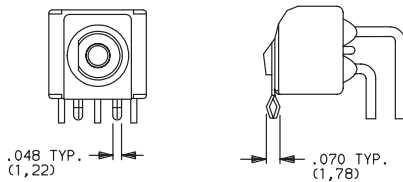
## TERMINATIONS

### A RIGHT ANGLE, PC THRU-HOLE

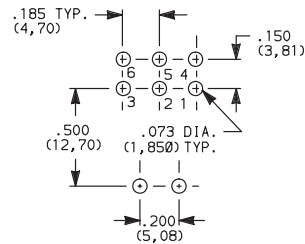


8261SH9ABE2  
DPDT

### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

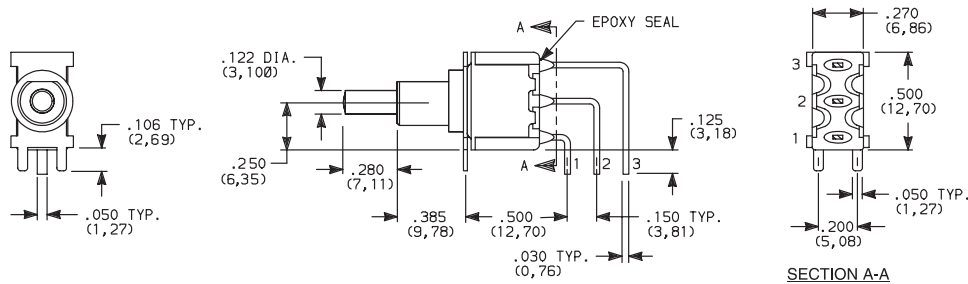


#### PC MOUNTING



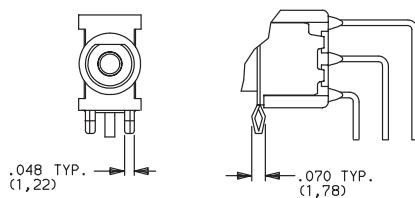
Not available with I seal.  
Terminal bend radii and lead-in manufacturing option.

### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

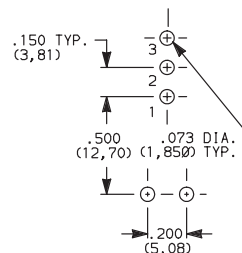


8161SH9AV2BE2  
SPDT

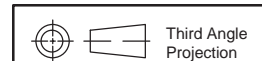
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



#### PC MOUNTING



Not available with I seal.  
Terminal bend radii and lead-in manufacturing option.



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

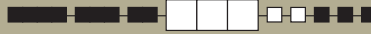






# 8060 Series Alternate Action and Momentary Pushbutton Switches

## TERMINATIONS

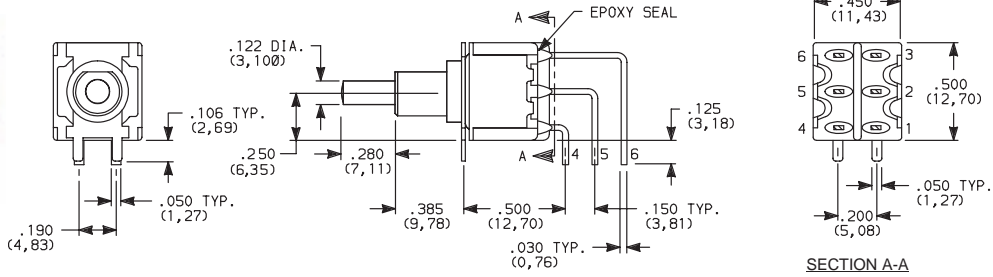


Pushbutton  
A

**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

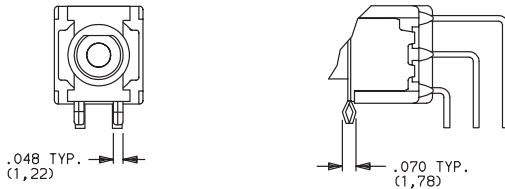


**8261SH9AV2BE2  
DPDT**

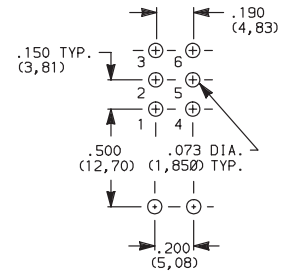


SECTION A-A

**AV3** VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



PC MOUNTING



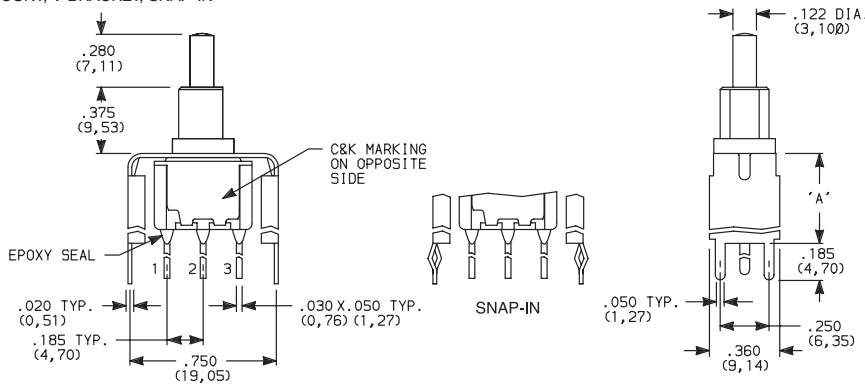
Not available with I seal.  
Terminal bend radii and lead-in manufacturing option.

**V6** VERTICAL MOUNT, V-BRACKET

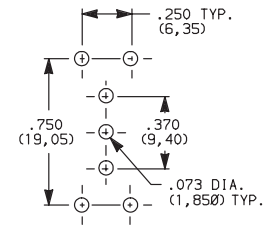
**V21** VERTICAL MOUNT, V-BRACKET, SNAP-IN



**8161SH9\_BE2  
SPDT**



PC MOUNTING



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V21         | .555 (14,10) |
| V6          | .460 (11,68) |

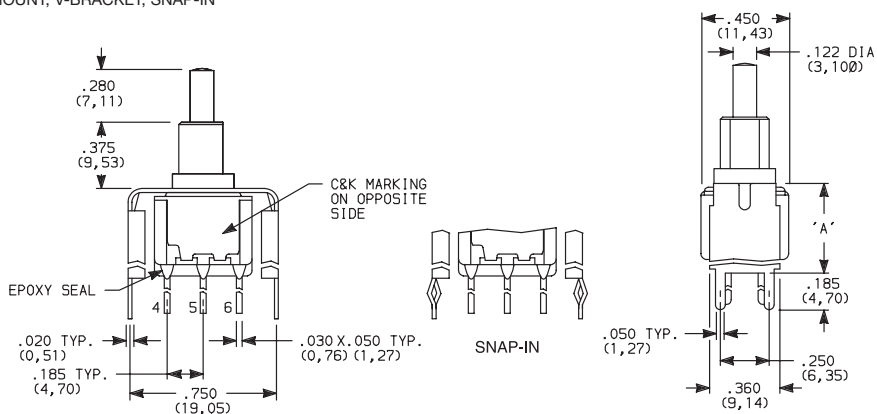
Not available with I seal.

**V6** VERTICAL MOUNT, V-BRACKET

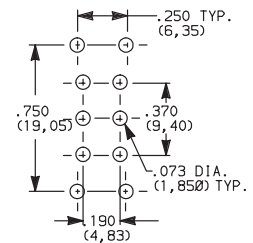
**V21** VERTICAL MOUNT, V-BRACKET, SNAP-IN



**8261SH9\_BE2  
DPDT**



PC MOUNTING



| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V21         | .555 (14,10) |
| V6          | .460 (11,68) |

Not available with I seal.



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

# 8060 Series Alternate Action and Momentary Pushbutton Switches



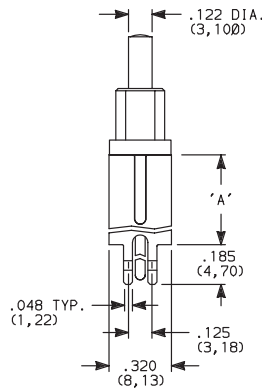
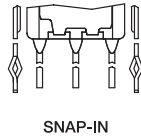
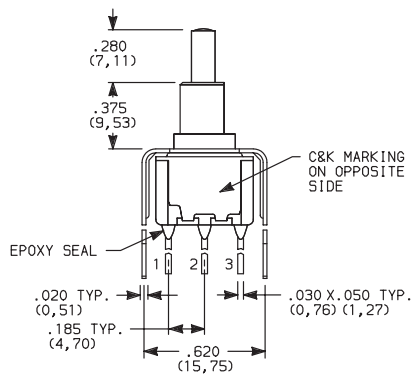
A

Pushbutton

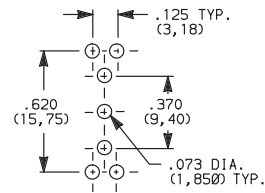
## TERMINATIONS

**V3, V4** VERTICAL MOUNT, V-BRACKET

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



PC MOUNTING



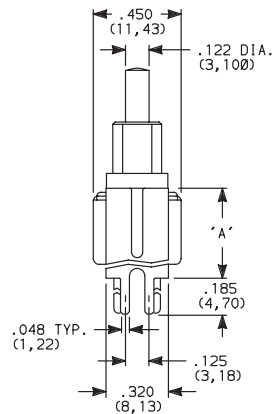
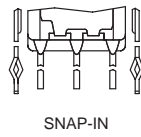
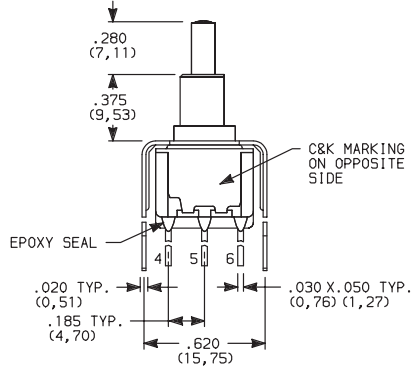
8161SH9\_BE2  
SPDT

| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V3, V31     | .460 (11,68) |
| V4          | .630 (16,00) |

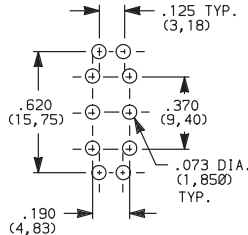
Not available with I seal.

**V3, V4** VERTICAL MOUNT, V-BRACKET

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



PC MOUNTING



8261SH9\_BE2  
DPDT

| OPTION CODE | DIM 'A'      |
|-------------|--------------|
| V3, V31     | .460 (11,68) |
| V4          | .630 (16,00) |

Not available with I seal.

## 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                          | 6 AMPS @ 120 V AC OR 28 V DC;<br>3 AMPS @ 250 V AC.                                       |
| <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<br>6 AMPS @ 120 V AC OR 28 V DC;<br>3 AMPS @ 250 V AC. |
| <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.

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

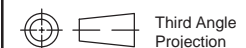
B contact material standard with all terminations except C, Z & Z3.

Q contact material standard with C, Z & Z3 terminations.

P, S & R contact materials not available with Z & Z3 terminations.

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.

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



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

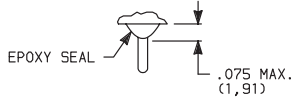


# 8060 Series Alternate Action and Momentary Pushbutton Switches

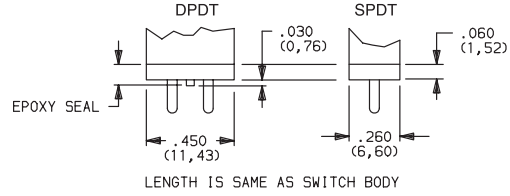
## SEAL

Pushbutton  
A

**E** EPOXY SEAL



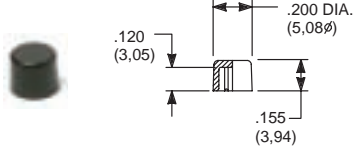
**I** EPOXY POTTED BASE



**NOTE:** Available with C, W, Z, Z3 terminations only.

## AVAILABLE HARDWARE

Cap

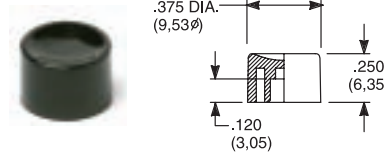


**PART NO.**

- 708901000 WHITE
- 708902000 BLACK
- 708903000 RED
- 708904000 ORANGE
- 708905000 YELLOW
- 708909000 GRAY

Material: Nylon  
Finish: Gloss

Cap

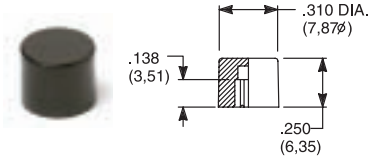


**PART NO.**

- 752701000 WHITE
- 752702000 BLACK
- 752703000 RED
- 752704000 ORANGE
- 752705000 YELLOW
- 752709000 GRAY

Material: Nylon  
Finish: Gloss

Cap

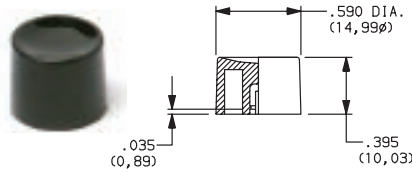


**PART NO.**

- 801801000 WHITE
- 801802000 BLACK
- 801803000 RED
- 801804000 ORANGE
- 801805000 YELLOW
- 801809000 GRAY

Material: Nylon  
Finish: Gloss

Cap, Snap-fitting plunger

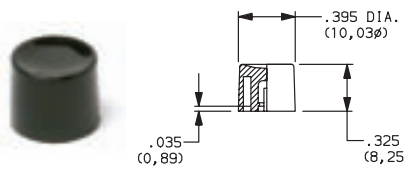


**PART NO.**

- 894001000 WHITE
- 894002000 BLACK
- 894003000 RED
- 894004000 ORANGE
- 894005000 YELLOW
- 894009000 GRAY

Material: Nylon  
Finish: Gloss

Cap, Snap-fitting plunger

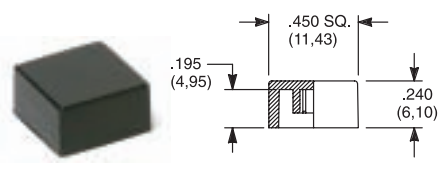


**PART NO.**

- 894101000 WHITE
- 894102000 BLACK
- 894103000 RED
- 894104000 ORANGE
- 894105000 YELLOW
- 894109000 GRAY

Material: Nylon  
Finish: Gloss

Cap, J80, J81 & J82 options only



**PART NO.**

- 484601000 WHITE
- 484602000 BLACK
- 484603000 RED
- 484604000 ORANGE
- 484605000 YELLOW
- 484609000 GRAY

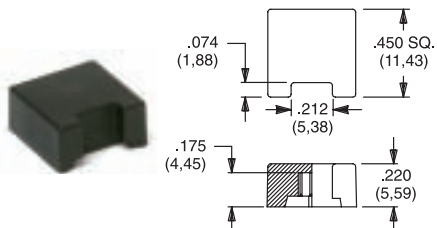
Material: Nylon  
Finish: Gloss

**PART NO.**

- 798201000 WHITE
- 798202263 BLACK
- 798203000 RED
- 798204000 ORANGE
- 798205000 YELLOW
- 798209000 GRAY

Material: Nylon  
Finish: Matte

Cap, J86 & J96 options only



**PART NO.**

- 459701000 WHITE
- 459702000 BLACK
- 459703000 RED
- 459704000 ORANGE
- 459705000 YELLOW
- 459709000 GRAY

Material: Nylon  
Finish: Gloss

**PART NO.**

- 476801000 WHITE
- 476802000 BLACK
- 476803000 RED
- 476804000 ORANGE
- 476805000 YELLOW
- 476809000 GRAY

Material: Nylon  
Finish: Matte

Frame



**PART NO.**

- 615602263 BLACK

Material: Nylon  
Finish: Matte

Frame



**PART NO.**

- 613302263 BLACK

Material: Nylon  
Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware". Other cap & frame colors available, consult Customer Service Center.



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



# 8060 Series Alternate Action and Momentary Pushbutton Switches



## AVAILABLE HARDWARE

Fits Z3 Termination female connector

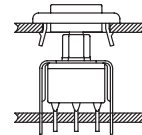
PART NO.  
**530100000**

Available in loose pieces.



Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

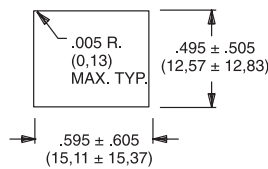
### TYPICAL APPLICATION



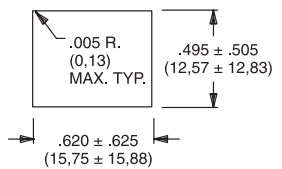
| .047" (1,19) PANEL THK.      | .062" (1,57) PANEL THK.      | .090" (2,29) PANEL THK.      | .125" (3,18) PANEL THK.            |
|------------------------------|------------------------------|------------------------------|------------------------------------|
| PART NO.<br><b>432502263</b> | PART NO.<br><b>432602263</b> | PART NO.<br><b>432702263</b> | PART NO.<br><b>432802263</b> BLACK |

### PANEL MOUNTING

For part numbers 4325xxxxx, 4326xxxxx

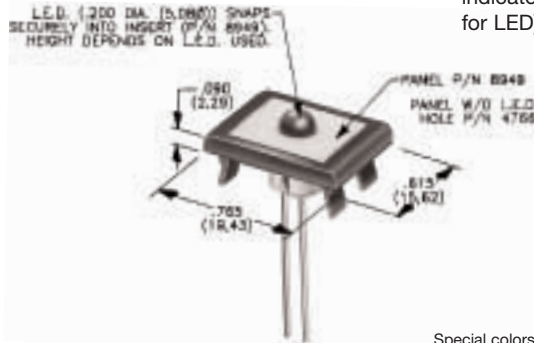


For part numbers 4327xxxxx, 4328xxxxx



### Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT WITH HOLE FOR LED

PART NO.  
**894902000**

BLANK PANEL INSERT WITHOUT HOLE FOR LED

PART NO.  
**476602000** BLACK

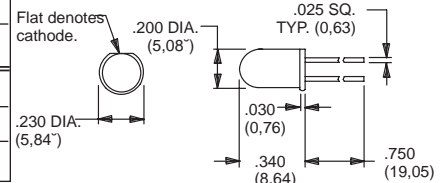
Special colors, custom markings available, consult Customer Service Center.

### LED INFORMATION

SWITCHES WITH LED SUPPLIED: J86 OPTION:

Rectangular LEDs are supplied on 8060 Series pushbutton switches with J86 option. These LEDs are factory installed and are not replaceable. The following specifications apply:

| OPTION CODE | COLOR  | TYP. INTENSITY | TYP. FORWARD VOLTAGE | TYP. FORWARD CURRENT | MAX RATINGS AT 25°C AMBIENT TEMPERATURE |                            |                   |
|-------------|--------|----------------|----------------------|----------------------|---|----------------------------|-------------------|
|             |        |                |                      |                      | FORWARD VOLTAGE                         | CONTINUOUS FORWARD CURRENT | POWER DISSIPATION |
| 6           | Green  | 1.0 mcd        | 2.1 V                | 20 mA                | 2.5 V                                   | 50 mA                      | 125 mW            |
| 3           | Red*   | 0.5 mcd        |                      | 10 mA                |   | 30 mA                      | 75 mW             |
| 5           | Yellow | 4.0 mcd        |                      | 20 mA                |   | 50 mA                      | 125 mW            |



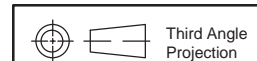
Suggested LED for J82 & J84 options. Dimensions for reference only.

**Process Information:** Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

**Caution:** Circuit elements must limit forward current of LED to 50mA max. continuous.

\* Extra-bright red LED available (typ. intensity 4.5 mcd), consult Customer Service Center.

LEDs are not supplied with J82 & J84 options. LED snaps into switch frame surrounding actuator and is wired externally.



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





# 8500 Series Subminiature Pushbutton Switches



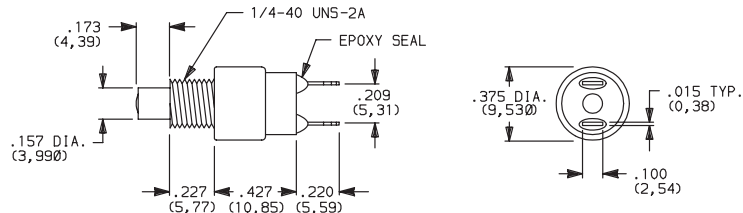
A

Pushbutton

## SWITCH FUNCTION

| NO. POLES | MODEL NO.   | RATING | SWITCH FUNCTION |        | TOTAL TRAVEL                                      | ACTUATION FORCE    | SCHEMATIC            |
|-----------|-------------|--------|-----------------|--------|---|--------------------|----------------------|
|           |             |        | POS. 1          | POS. 2 |   |                    |                      |
| SP        | <b>8531</b> | 1 AMP  |                 |        | .095 (2,41) TYP. with overtravel .042 (1,07) TYP. | 7.7 oz (220g) TYP. | N.O. with overtravel |
|           | <b>8551</b> | 3 AMPS |                 |        |   |                    |                      |

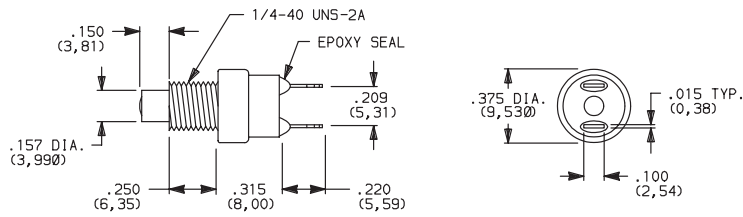
### SPST



Part number shown: 8531MZQE2

|    |             |        |     |      |                  |                  |      |
|----|-------------|--------|-----|------|------------------|------------------|------|
| SP | <b>8532</b> | 1 AMP  | OFF | MOM. | .050 (1,27) TYP. | 6 oz (170g) TYP. | N.O. |
|    | <b>8552</b> | 3 AMPS |     |      |                  |                  |      |

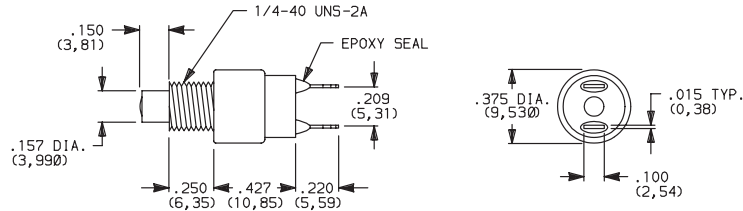
### SPST



Part number shown: 8532MZQE2

|    |             |       |    |      |   |                      |                      |
|----|-------------|-------|----|------|---|----------------------|----------------------|
| SP | <b>8533</b> | 1 AMP | ON | MOM. | .080 (2,03) TYP. with pretravel .057 (1,45) TYP.  | 11.5 oz (456 g) TYP. | N.C. with pretravel  |
|    | <b>8534</b> | 1 AMP | ON | MOM. | .032 (0,81) TYP. with overtravel .028 (0,71) TYP. | 10.3 oz (282g) TYP.  | N.C. with overtravel |

### SPST



Part number shown: 8533MZQE2

MOM. = Momentary  
All models with all options when ordered with G or Q contact material.



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

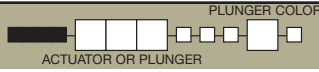


# 8500 Series Subminiature Pushbutton Switches

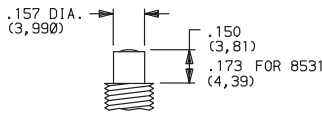
Pushbutton

A

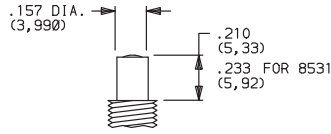
## PLUNGER



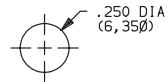
### M .150" HIGH PLUNGER



### S .210" HIGH PLUNGER



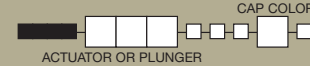
### PANEL MOUNTING



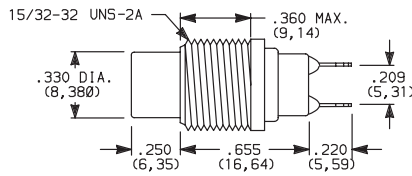
| OPTION CODE | PLUNGER COLOR |
|-------------|---------------|
| 2           | BLACK         |
| 3           | RED           |

**NOTE:** One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

## ACTUATOR

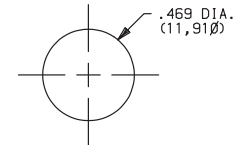


### T 15/32 BUSHING



**NOTE:** No frame color choice required.

### PANEL MOUNTING



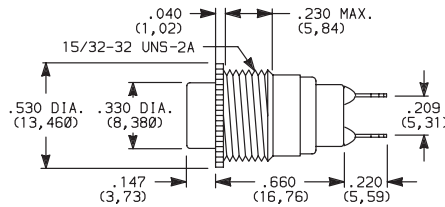
| OPTION CODE | CAP COLOR |
|-------------|-----------|
| 2           | BLACK     |
| 1           | WHITE     |
| 3           | RED       |
| 9           | GRAY      |

Cap Finish: gloss. Other colors available, consult Customer Service Center.

One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

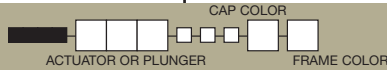
**NOTE:** Caps available for plunger options, see page A-65.

### T1 15/32 BUSHING WITH FRAME

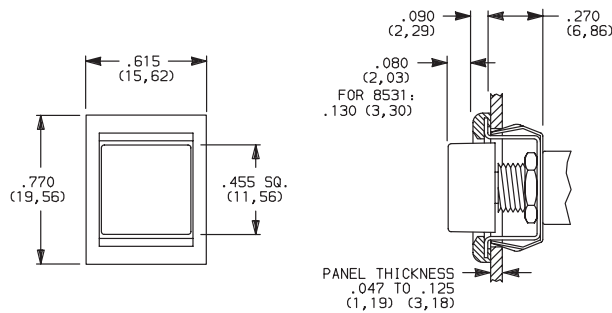


**NOTE:** No frame color choice required. Available with 8532 and 8534 models only.

## ACTUATOR—SNAP-IN FRONT MOUNT



### J81 SNAP-IN WITH FRAME



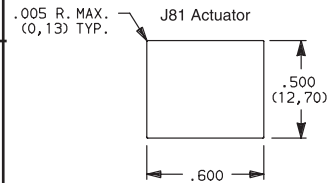
| OPTION CODE | CAP AND FRAME COLOR |
|-------------|---------------------|
| 2           | BLACK               |

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.

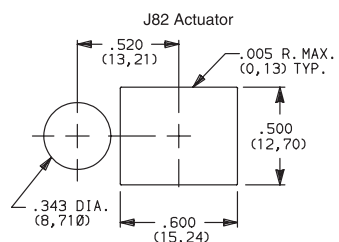
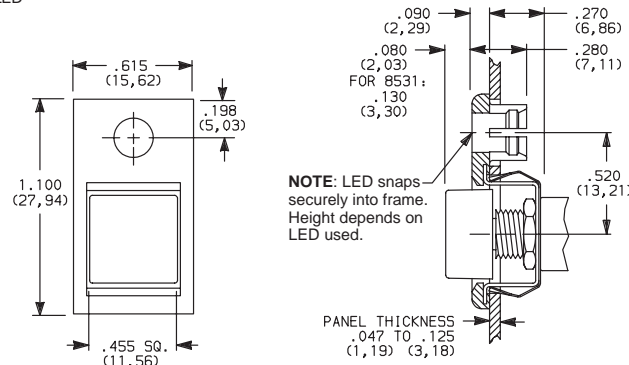
One mounting nut and lockwasher supplied with all actuators.

**NOTE:** Caps & frames available separately, see pages A-65 and A-66.

### PANEL MOUNTING



### J82 SNAP-IN WITH FRAME FOR LED



**LED not included.** For LED information, see page A-66.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



# 8500 Series Subminiature Pushbutton Switches



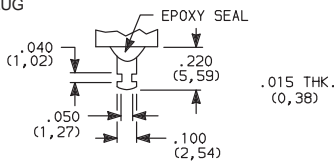
A

Pushbutton

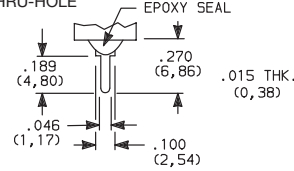
## TERMINATIONS



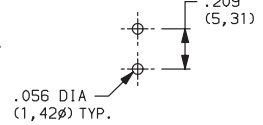
### Z SOLDER LUG



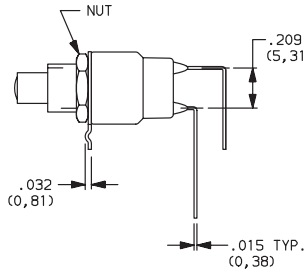
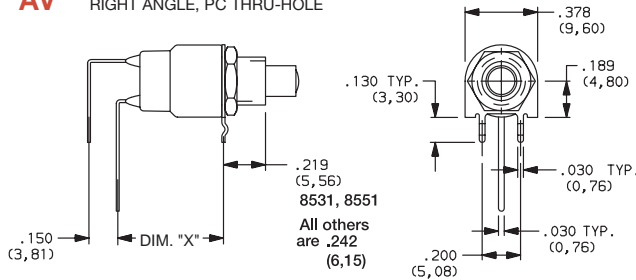
### C PC THRU-HOLE



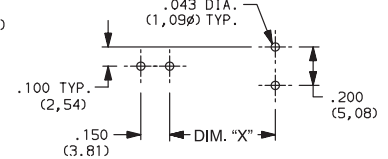
### PC MOUNTING



### AV RIGHT ANGLE, PC THRU-HOLE



### PC MOUNTING



Available with

| MODEL NO.  | DIM "X" |
|------------|---------|
| 8531, 8533 | 0.550   |
| 8532, 8534 | 0.438   |

NOTE: Available with M or S plunger models, and B contact material only.

## CONTACT MATERIAL



| OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | TERMINAL PLATING              | CONTACT MATERIAL    | RATINGS                        |  |
|-------------|------------------|-------------------|-------------------------------|---------------------|--------------------------------|--|
| <b>B</b>    | YES              | YES               | GOLD <sup>1</sup>             | GOLD                | LOW LEVEL/DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>Q</b>    | YES              | YES               | SILVER <sup>4</sup>           | SILVER <sup>5</sup> | POWER                          | 853X MODELS: 1 AMP @ 120 V AC OR 28 V DC.<br>855X MODELS: 3 AMPS @ 120 V AC OR 28 V DC.                              |
| <b>G</b>    | YES              | YES               | GOLD OVER SILVER <sup>2</sup> | GOLD <sup>3</sup>   | LOW LEVEL/DRY CIRCUIT OR POWER | 0.4 V MAX @20 V AC OR DC MAX. OR 853X MODELS: 1 AMP @ 120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @120 V AC OR 28 V DC. |

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

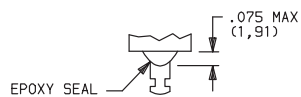
- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> CONTACTS: Coin silver, silver plated.
- <sup>5</sup> TERMINALS: Copper alloy, silver plated.

NOTE: Any models supplied with Q, B or G contact material are RoHS compliant.  
All models with all options when ordered with G or Q contact material.  
Q contact material standard with C, Z terminations.  
8551 & 8552 available with Q contact material only.

## SEAL

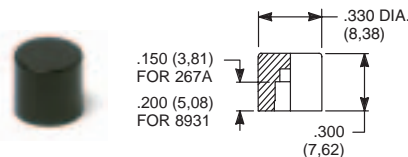


### E EPOXY SEAL



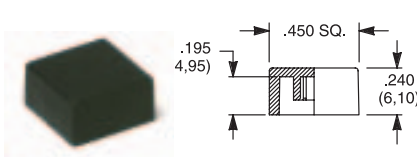
## REPLACEMENT HARDWARE

### Cap for 0.157" dia. plungers



|                          |  |
|--------------------------|--|
| <b>PART NO.</b>          | <b>PART NO.</b>                          |
| 267A01000 WHITE          | 893101000 WHITE                          |
| 267A02000 BLACK          | 893102000 BLACK                          |
| 267A03000 RED            | 893103000 RED                            |
| 267A09000 GRAY           | 893109000 GRAY                           |
| 85X2T, 8534T models only | 85X1T, 8532T1, 8533T, 8534T1 models only |
| Material: Nylon          | Material: Nylon                          |
| Finish: Gloss            | Finish: Gloss                            |

### Cap, J80, J81 & J 82 options only



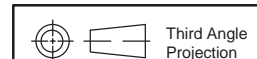
|                        |
|------------------------|
| <b>PART NO.</b>        |
| 448901000 WHITE        |
| 448902000 BLACK        |
| 448903000 RED          |
| 448909000 GRAY         |
| Material: Nylon        |
| Finish: Gloss or matte |

### Frame



|                 |
|-----------------|
| <b>PART NO.</b> |
| 613302263 BLACK |
| Material: Nylon |
| Finish: Matte   |

Other colors available, consult Customer Service Center.



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







# 8500 Series Subminiature Pushbutton Switches

## AVAILABLE HARDWARE

Pushbutton  
A

### Frame



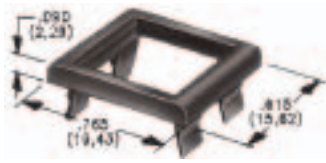
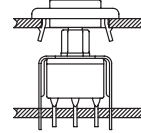
**PART NO.**  
**615602263** BLACK

Material: Nylon  
Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".  
Other colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

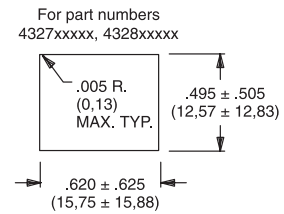
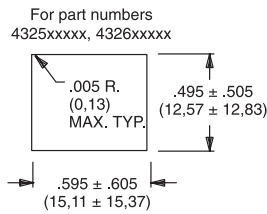
### TYPICAL APPLICATION



.047" (1,19) PANEL THK.    .062" (1,57) PANEL THK.    .090" (2,29) PANEL THK.    .125" (3,18) PANEL THK.

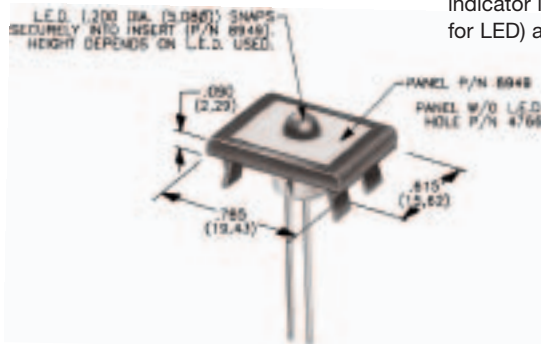
**PART NO.**                      **PART NO.**                      **PART NO.**                      **PART NO.**  
**432502263**                      **432602263**                      **432702263**                      **432802263** BLACK

### PANEL MOUNTING



### Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. **LED not included.**



PANEL INSERT  
WITH HOLE FOR LED

**PART NO.**  
**894902000**

BLANK PANEL INSERT  
WITHOUT HOLE FOR LED

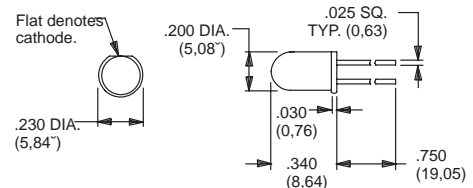
**PART NO.**  
**476602000** BLACK

Special colors, custom markings available, consult Customer Service Center.

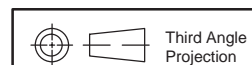
### LED INFORMATION

**Process Information:** Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

LEDs are not supplied with J82 option. LED snaps into switch frame surrounding actuator and is wired externally.



Suggested LED for J82 option.  
Dimensions for reference only.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



# KM Series Subminiature Pushbutton Switches



## Features/Benefits

- **Reliable contact design**
- **Available with pretravel and overtravel**
- **Extended overtravel option**
- **RoHS compliant**

## Typical Applications

- **Alarm systems**
- **Computers**
- **Detector switch application**



Models Available

## Specifications

**CONTACT RATING:** Q contact material (KM11, KM12 Models): 0.25 AMPS @ 125 V AC or DC (UL); (KM33 Model): 1 AMP @ 125 V AC or 28 V DC. See page A-69 for additional ratings.

**ELECTRICAL LIFE:** 10,000 actuations min. at full load.

**CONTACT RESISTANCE:** Below 30 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:** 1,000 Vrms min. @ sea level.

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

**CAP INSTALLATION FORCE:** 10 lbs. max. permissible.

**NOTE:** Any models supplied with Q or B 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.

## Materials

**HOUSING & BUSHING:** 6/6 nylon (UL94V-2), black.

**ACTUATOR:** 6/6 nylon (UL 94V-2), natural. Internal o-ring seal, available on KM11 & KM33 models.

**MOVABLE CONTACT:** B contact material: Bronze or copper, with gold plate over nickel plate. See page A-69 for additional contact materials.

**STATIONARY CONTACTS & TERMINALS:** B contact material: Copper, with gold plate over nickel plate. See page A-69 for additional contact materials.

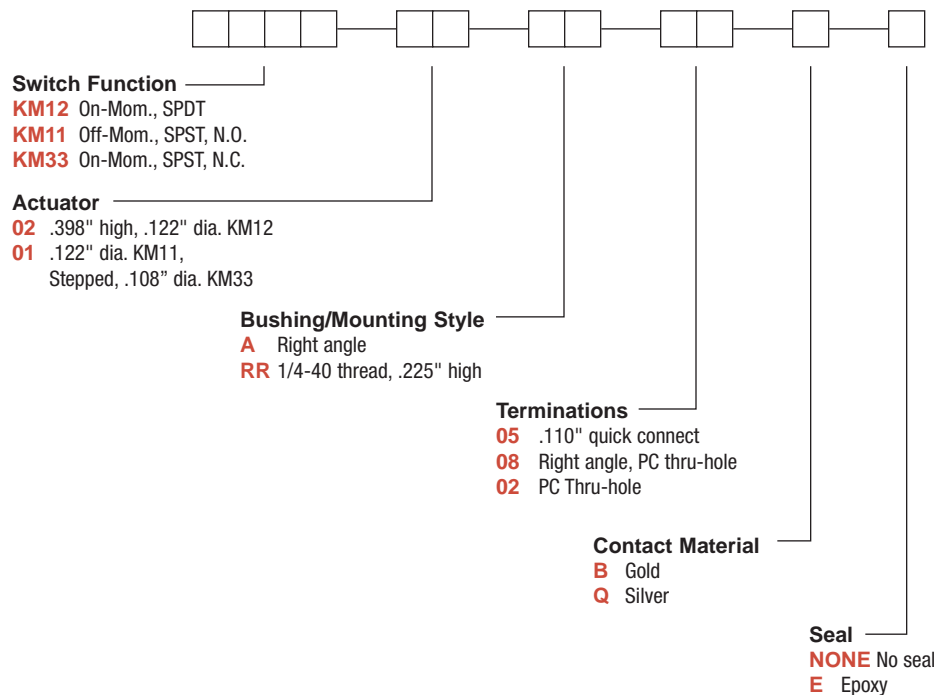
**RETURN SPRING:** Music wire, phosphor coated.

**MOUNTING NUT:** Brass, nickel plated.

**TERMINAL SEAL:** Epoxy.

## 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-68 and A-70. For additional options not shown in catalog, consult Customer Service Center.



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



# KM Series Subminiature Pushbutton Switches

## SWITCH FUNCTION



A

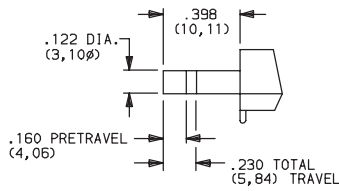
Pushbutton

| NO. POLES   | MODEL NO.   | SWITCH FUNCTION |        | CONNECTED TERMINALS |        | SCHEMATIC |
|-------------|-------------|-----------------|--------|---------------------|--------|-----------|
|             |             | POS. 1          | POS. 2 | POS. 1              | POS. 2 |           |
| SP          | <b>KM11</b> | OFF             | MOM.   | OPEN                | 2-1    | SPST N.O. |
|             | <b>KM33</b> | ON              | MOM.   | 2-1                 | OPEN   | SPST N.C. |
| <b>SPST</b> |             |                 |        |                     |        |           |
| SP          | <b>KM12</b> | ON              | MOM.   | 2-1                 | 4-3    | SPDT      |
| <b>SPDT</b> |             |                 |        |                     |        |           |

## ACTUATOR

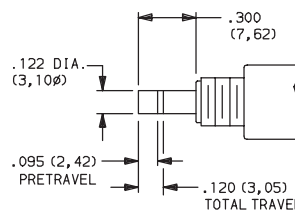


**02** .398" HIGH, .122" DIA.

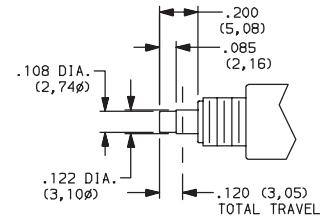


KM12 models only.

**01** .122" DIA.



KM11 models only.



KM33 models only.

NOTE: Caps available for plunger options, see page A-70.



Third Angle  
Projection

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

**C&K**

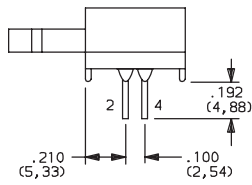
# KM Series Subminiature Pushbutton Switches



## BUSHING/ MOUNTING STYLE

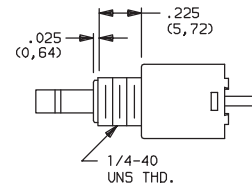


**A** RIGHT ANGLE



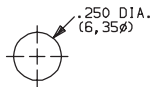
KM12 models only.

**RR** 1/4-40 THREAD, .225" HIGH



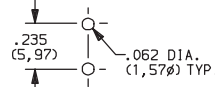
KM11 & KM33 models only.

### PANEL MOUNTING

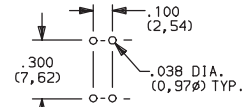


KM11 & KM33 models.

### PC MOUNTING



KM11 models only.

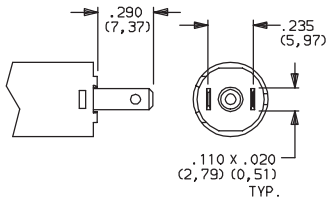


KM12 models only.

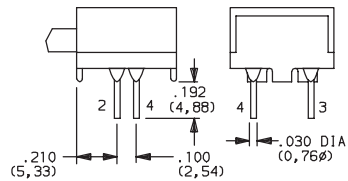
## TERMINATIONS



**05** .110" QUICK CONNECT

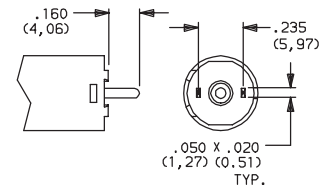


**08** RIGHT ANGLE, PC THRU-HOLE



KM12 models only.

**02** PC THRU-HOLE



KM11 models only.

## CONTACT MATERIAL



| OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | CONTACT AND TERMINAL MATERIAL | RATINGS               |   |
|-------------|------------------|-------------------|-------------------------------|-----------------------|---|
|             |                  |                   |                               |                       |   |
| <b>B</b>    | YES              | YES               | GOLD <sup>1</sup>             | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC MAX.  |
| <b>Q</b>    | YES              | YES               | SILVER <sup>2</sup>           | POWER                 | 0.25 AMPS @ 125 V AC OR DC (KM11, KM12) (UL)<br>1 AMP @ 125 V AC OR 28 V DC (KM33). |


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

<sup>1</sup> STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate.  
MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate.

<sup>2</sup> STATIONARY CONTACTS & TERMINALS: Copper, silver plated (standard with all termination options).  
MOVABLE CONTACT: Phosphor bronze or beryllium copper, silver plated.

<sup>3</sup> STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate over silver plate.  
MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate over silver plate.

**NOTE:** Any models supplied with Q or B contact material are RoHS compliant.

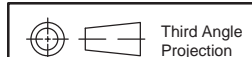
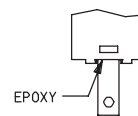
KM11, KM12 models  when ordered with 'Q' contact material.

## SEAL



**NONE** NO SEAL

**E** EPOXY SEAL



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



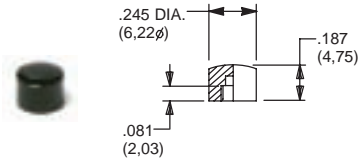


# KM Series Subminiature Pushbutton Switches

## AVAILABLE HARDWARE

Pushbutton  
A

Cap, KM33 models

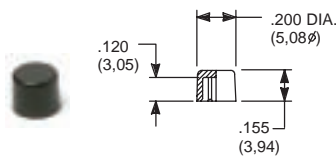


**PART NO.**

- 785101000** WHITE
- 785102000** BLACK
- 785103000** RED

Material: Nylon  
Finish: Gloss

Cap, KM11 models

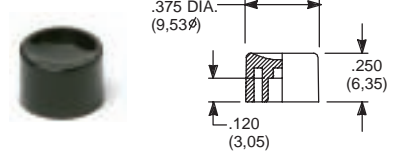


**PART NO.**

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED

Material: Nylon  
Finish: Gloss

Cap, KM11 models

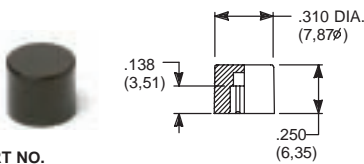


**PART NO.**

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED

Material: Nylon  
Finish: Gloss

Cap, KM11 models

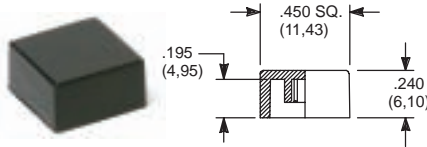


**PART NO.**

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED

Material: Nylon  
Finish: Gloss

Cap, KM11 models



**PART NO.**

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED

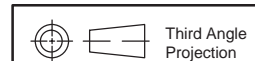
Material: Nylon  
Finish: Gloss

**PART NO.**

- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED

Material: Nylon  
Finish: Matte

**NOTE:** Other cap colors available, consult Customer Service Center.



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

# 8600 Series Microminiature Pushbutton Switches



## Features/Benefits

- Available with overtravel
- Normally closed models available
- Microminiature size ideal for applications where space is limited
- RoHS compliant

## Typical Applications

- Detection
- Telecommunications and networking equipment
- Computers and peripherals



Models Available

## Specifications

**CONTACT RATING:** Q contact material (8631, 8632 Models): 500 mA @ 120 V AC or 28 V DC; 250 mA @ 250 V AC; (8633 Model): 250 mA @ 120 V AC or 28 V DC; 125 mA @ 250 V AC. See page A-73 for additional ratings.

### ELECTRICAL LIFE:

8631 and 8633 MODELS: 250,000 actuations at full load.  
8632 MODEL: 100,000 actuations at full load.

**CONTACT RESISTANCE:** Below 30 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

**INSULATION RESISTANCE:** 109 Ω min.

**DIELECTRIC STRENGTH:** 500 Vrms min. @ sea level.

**OPERATING TEMPERATURE:** -30°C to 65°C.

**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9.

## Materials

**CASE:** Glass filled phenolic or diallyl phthalate (DAP), (UL94V-0).

**PLUNGER:** Glass filled nylon (UL94V-0), black standard.

**BUSHING:** Brass, nickel plated.

**CONTACTS:** Q contact material: Coin silver, silver plated.  
See page A-73 for additional contact materials.

### TERMINALS:

8631, 8632 MODELS: Copper alloy, silver plated.

8633 MODEL: Q contact material: Coin silver.

See page A-73 for additional contact materials.

### TERMINAL SEAL:

8633 MODEL: Epoxy.

8631, 8632 MODELS: Terminals insert molded.

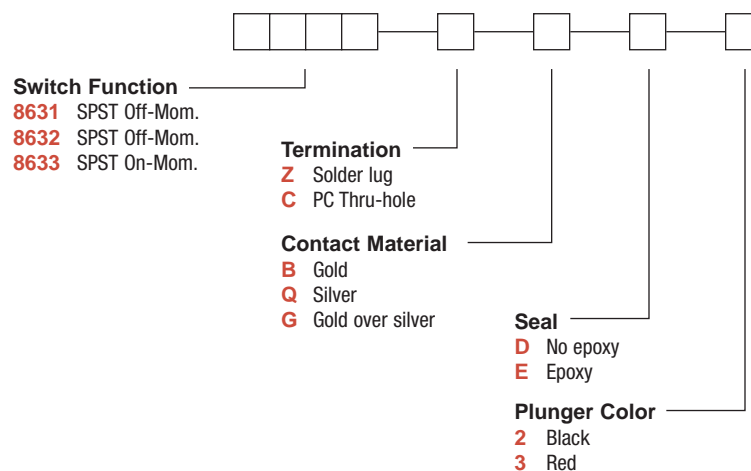
**HARDWARE:** Nut: Brass, nickel plated.

**NOTE:** Any models supplied with Q, B 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.

## 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-72 and A-73. For additional options not shown in catalog, consult Customer Service Center.





# 8600 Series Microminiature Pushbutton Switches

## SWITCH FUNCTION



A

Pushbutton

| NO. POLES                                      | MODEL NO.   | SWITCH FUNCTION |        | TOTAL TRAVEL   | ACTUATION FORCE     | SCHEMATIC            |
|--|-------------|-----------------|--------|--|---------------------|----------------------|
|  |             | POS. 1          | POS. 2 |  |                     |                      |
| SP   | <b>8631</b> | OFF             | MOM.   | .040 (1,02) TYP.                                     | 5 oz (140g) TYP.    | N.O.                 |
| <b>SPST</b> <p>Part number shown: 8631ZQD2</p> |             |                 |        |  |                     |                      |
| SP   | <b>8632</b> | OFF             | MOM.   | .106 (2,69) TYP. with overtravel<br>.024 (0,61) TYP. | 6.25 oz (177g) TYP. | N.O. with overtravel |
| <b>SPST</b> <p>Part number shown: 8632ZQD2</p> |             |                 |        |  |                     |                      |
| SP   | <b>8633</b> | ON              | MOM.   | .048 (1,22) TYP.                                     | 5 oz (140g) TYP.    | N.C.                 |
| <b>SPST</b> <p>Part number shown: 8633ZQE2</p> |             |                 |        |  |                     |                      |

MOM. = Momentary

NOTE: Caps available for plunger options, see page A-73.

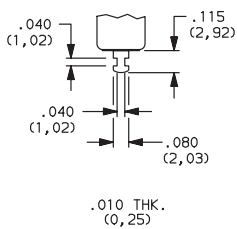
## TERMINATIONS



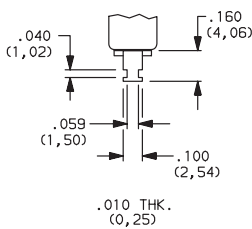
**Z** SOLDER LUG

**C** PC THRU-HOLE

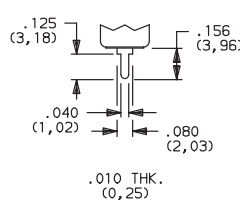
8631, 8632 models only.



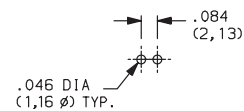
8633 models only.



8631, 8632 models only.



PC MOUNTING



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

# 8600 Series Microminiature Pushbutton Switches



A

Pushbutton

## CONTACT MATERIAL

| OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | CONTACT MATERIAL                 | TERMINAL PLATING    | RATINGS                           |  |
|-------------|------------------|-------------------|----------------------------------|---------------------|-----------------------------------|--|
| <b>B</b>    | YES              | YES               | GOLD <sup>1</sup>                | GOLD <sup>1</sup>   | LOW LEVEL/<br>DRY CIRCUIT         | 0.4 VA MAX. @ 20 V AC OR DC MAX.   |
| <b>Q</b>    | YES              | YES               | SILVER <sup>4</sup>              | SILVER <sup>5</sup> | POWER                             | 8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC;<br>250 mA @ 250 V AC. 8633 MODELS: 250 mA @ 120 V AC OR<br>28 V DC; 125 mA @ 250 V AC.                                    |
| <b>G</b>    | YES              | YES               | GOLD OVER<br>SILVER <sup>4</sup> | GOLD <sup>3</sup>   | LOW LEVEL/DRY<br>CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR 8631, 8632 MODELS:<br>500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633<br>MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC. |

\* 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> CONTACTS: Coin silver, with gold plate over nickel plate.

<sup>3</sup> TERMINALS: Copper alloy, with gold plate over nickel plate.  
8633 model only: Coin silver, with gold plate over nickel plate.

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

<sup>5</sup> TERMINALS: Copper alloy, silver plated. 8633 model only: coin silver.

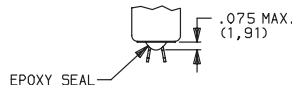
**NOTE:** Any models supplied with Q, B or G contact material are RoHS compliant.

8631, 8632 models with all options when ordered with G or Q contact material.  
Q contact material standard with C, Z terminations.

## SEAL

**D** NO EPOXY SEAL

**E** EPOXY SEAL



Not available on 8633 model.  
Standard on 8631, 8632 models.

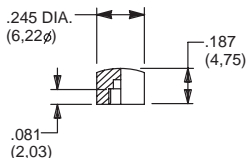
Not available on 8631, 8632 models.  
Standard on 8633 model only.

## PLUNGER COLOR

| OPTION CODE | COLOR |
|-------------|-------|
| <b>2</b>    | BLACK |
| <b>3</b>    | RED   |

## AVAILABLE HARDWARE

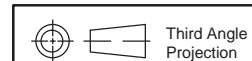
Cap



**PART NO.**  
**785101000** WHITE  
**785102000** BLACK  
**785103000** RED

Material: Nylon  
Finish: Gloss

**NOTE:** Other cap colors available, consult Customer Service Center.



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







# 8700 Series Overtravel Pushbutton Switches

A

Pushbutton



## Features/Benefits

- *Extended pre-travel or over-travel*
- *Heavy-duty brass plunger*
- *Long electrical life — 100K cycles*
- *RoHS compliant*

## Typical Applications

- *Telecommunications*
- *High end Instrumentation*
- *Medical & test equipment*
- *Detection*

## Specifications

CONTACT RATING: Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page A-76 for additional ratings.

ELECTRICAL LIFE: 100,000 actuations at full load.

CONTACT RESISTANCE: Below 30 mΩ typ. Initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE:  $10^3 \Omega$  min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

**NOTE:** Any models supplied with Q, or B 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.

## Materials

CASE: Diallyl phthalate (DAP) (UL 94V-0).

PLUNGER:

8731 – .390" brass, nickel plated.

8732 – .390" PBT polyester, black.

BUSHING: brass, nickel plated.

CONTACTS: Q contact material: Coin silver, silver plated. See page A-76 for additional contact materials.

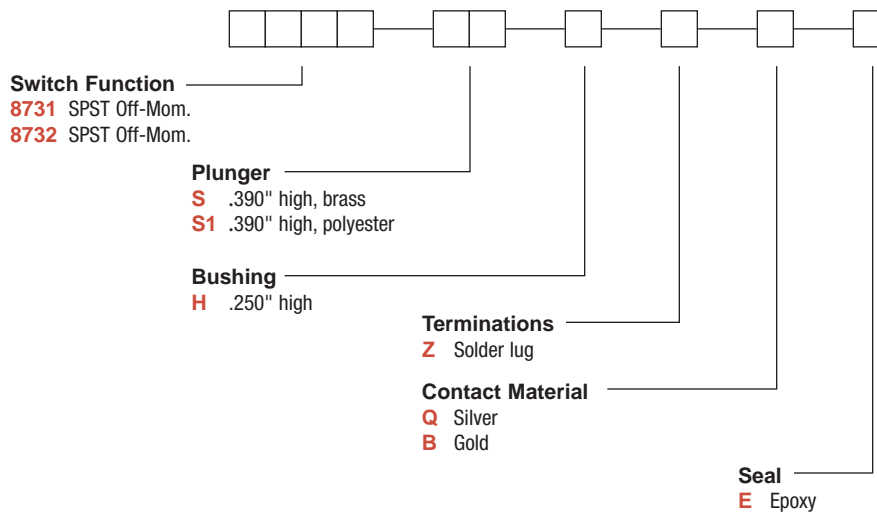
TERMINALS: Q contact material: Copper alloy, silver plated. See page A-76 for additional contact materials.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut: Brass, nickel plated; lockwasher: Steel, bright nickel plate. One mounting nut & lockwasher supplied with all switches.

## 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-75 and A-76. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



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



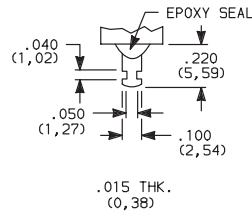


# 8700 Series Overtravel Pushbutton Switches

Pushbutton  
A

## TERMINATIONS

**Z** SOLDER LUG



## CONTACT MATERIAL

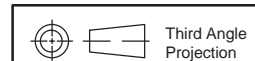
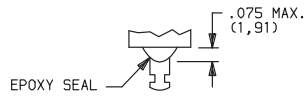
| OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | CONTACT MATERIAL | TERMINAL PLATING | RATINGS               |                                  |
|-------------|------------------|-------------------|------------------|------------------|-----------------------|----------------------------------|
|             |                  |                   |                  |                  | POWER                 |                                  |
| <b>Q</b>    | YES              | YES               | SILVER           | SILVER           |                       | 1 AMP @ 125 V AC OR 28 V DC.     |
| <b>B</b>    | YES              | YES               | GOLD             | GOLD             | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC MAX. |

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

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

## SEAL

**E** EPOXY SEAL



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

# GP Series Sealed Ultraminiature Pushbutton Switches

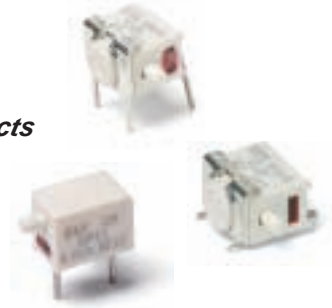


## Features/Benefits

- **Ultraminiature design saves space**
- **Process compatible, withstands most soldering and washing processes**
- **Thru-hole and surface mount models available**
- **Sealed construction—internal o-ring and epoxy base**
- **RoHS compliant**

## Typical Applications

- **Telecommunications and network equipment**
- **Computers and peripheral products**
- **Instrumentation**
- **Medical Applications**



## Specifications

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.  
 MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.  
 CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA.  
 INSULATION RESISTANCE: 10<sup>9</sup>Ω min.  
 DIELECTRIC STRENGTH: 500 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-80 for drawings and reel information. Thru-Hole parts are shipped in trays.  
 All models are RoHS compliant and compliant.

## Materials

HOUSING & BASE: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).  
 ACTUATOR: Glass filled nylon 4/6, flame retardant (UL 94V-0) with standard internal o-ring seal.  
 SWITCH SUPPORT: Brass, tin plated.  
 MOVABLE CONTACT: Copper alloy, with gold plate over nickel plate.  
 STATIONARY CONTACTS Copper alloy, with gold plate over nickel plate.  
 TERMINALS: Copper alloy, with gold flash over nickel plate.  
 TERMINAL SEAL: Epoxy/Urethane. All terminals insert molded.

**NOTE:** Any models supplied with B contact material are RoHS compliant and compatible.

**NOTE:** Materials listed above are general specifications. Specifications available for specific and custom switches, consult Customer Service Center.

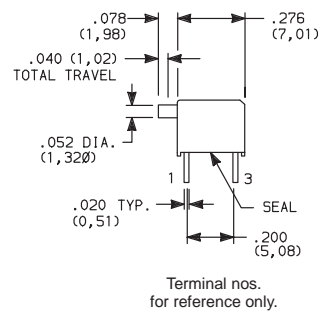
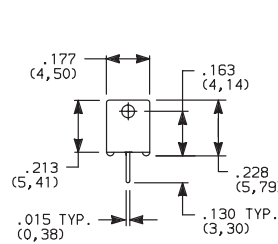
**CAUTION:** PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be taken in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

## How To Order

Complete part numbers for GP Series Sealed Ultraminiature Pushbutton Switches are shown on pages A-78 thru A-80.

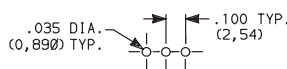
| PART NUMBER     | SWITCH FUNCTION |        | SCHEMATIC |
|-----------------|-----------------|--------|-----------|
|                 | POS. 1          | POS. 2 |           |
| <b>GP11MCBE</b> | OFF             | MOM.   |           |
| Conn. Terms.    | OPEN            | 1-3    | SPST      |
| <b>GP12MCBE</b> | ON              | MOM.   |           |
| Conn. Terms.    | 2-1             | 2-3    | SPDT      |

MOM. = Momentary

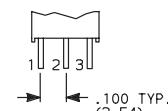


GP11MCBE SPST

### PC MOUNTING



GP11— omit center hole.



GP12 Model



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



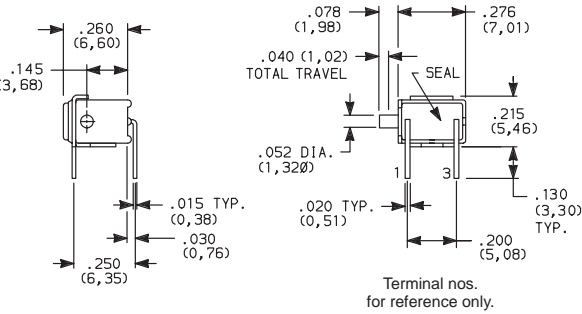
# GP Series Sealed Ultraminiature Pushbutton Switches

A

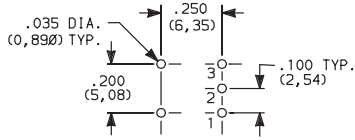
Pushbutton



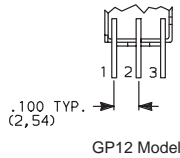
**GP11MABE  
SPST**



**PC MOUNTING**



GP11- omit hole 2.



GP12 Model

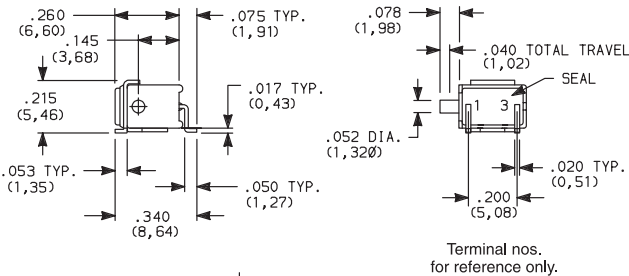
| PART NUMBER     | SWITCH FUNCTION |        | SCHEMATIC |
|-----------------|-----------------|--------|-----------|
|                 | POS.1           | POS. 2 |           |
| <b>GP11MABE</b> | OFF             | MOM.   | <br>SPST  |
| Conn. Terms.    | OPEN            | 1-3    |           |
| <b>GP12MABE</b> | ON              | MOM.   | <br>SPDT  |
| Conn. Terms.    | 2-1             | 2-3    |           |

MOM. = Momentary

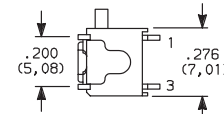
SMT



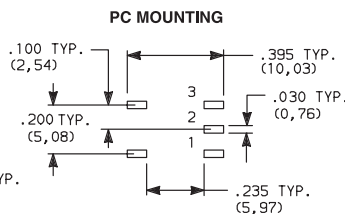
**GP11MSABE  
SPST**



Terminal nos.  
for reference only.



GP12 Model



GP11- omit pad 2.

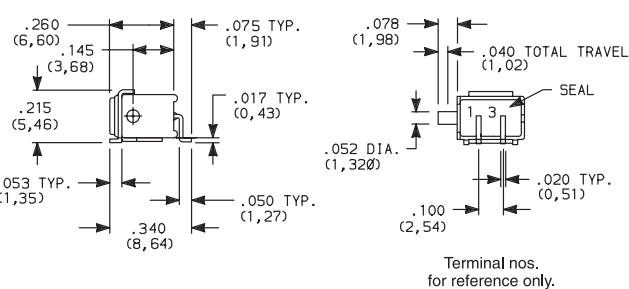
| PART NUMBER      | SWITCH FUNCTION |        | SCHEMATIC |
|------------------|-----------------|--------|-----------|
|                  | POS.1           | POS. 2 |           |
| <b>GP11MSABE</b> | OFF             | MOM.   | <br>SPST  |
| Conn. Terms.     | OPEN            | 1-3    |           |
| <b>GP12MSABE</b> | ON              | MOM.   | <br>SPDT  |
| Conn. Terms.     | 2-1             | 2-3    |           |

MOM. = Momentary

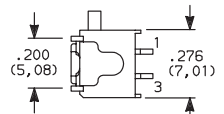
SMT



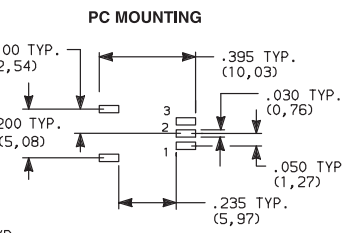
**GP11MSA1BE  
SPST**



Terminal nos.  
for reference only.



GP12 Model



GP11- omit pad 2.

| PART NUMBER       | SWITCH FUNCTION |        | SCHEMATIC |
|-------------------|-----------------|--------|-----------|
|                   | POS.1           | POS. 2 |           |
| <b>GP11MSA1BE</b> | OFF             | MOM.   | <br>SPST  |
| Conn. Terms.      | OPEN            | 1-3    |           |
| <b>GP12MSA1BE</b> | ON              | MOM.   | <br>SPDT  |
| Conn. Terms.      | 2-1             | 2-3    |           |

MOM. = Momentary



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

# GP Series Sealed Ultraminiature Pushbutton Switches

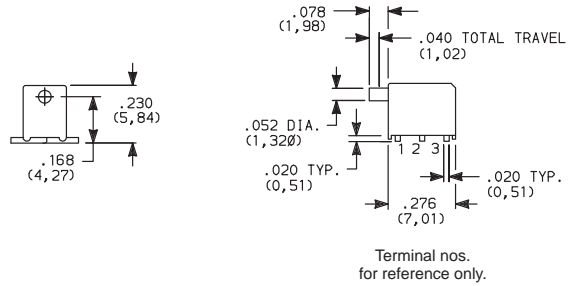


A

Pushbutton

| PART NUMBER      | SWITCH FUNCTION |        | SCHEMATIC |
|------------------|-----------------|--------|-----------|
|                  | POS. 1          | POS. 2 |           |
| <b>GP12MSCBE</b> | ON              | MOM.   | <br>SPDT  |
| Conn. Terms.     | 2-1             | 2-3    |           |

MOM. = Momentary



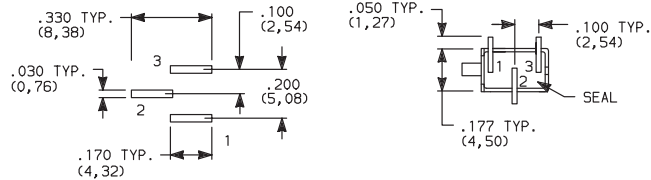
SMT



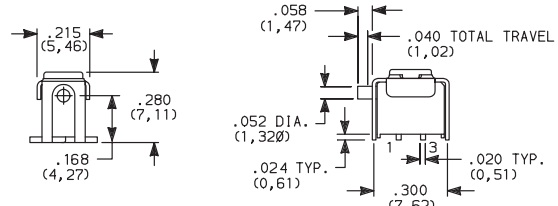
**GP12MSCBE SPDT**

Terminal nos. for reference only.

### PC MOUNTING



**NOTE:** Recommended for infrequent use applications only  
For increased switch mounting strength, order, SV1 termination style with support bracket (see below).



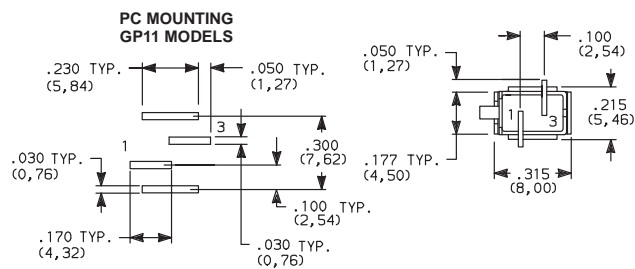
SMT



**GP11MSV1BE SPST**

| PART NUMBER       | SWITCH FUNCTION |        | SCHEMATIC |
|-------------------|-----------------|--------|-----------|
|                   | POS. 1          | POS. 2 |           |
| <b>GP11MSV1BE</b> | OFF             | MOM.   | <br>SPST  |
| Conn. Terms.      | OPEN            | 1-3    |           |
| <b>GP12MSV1BE</b> | ON              | MOM.   | <br>SPDT  |
| Conn. Terms.      | 2-1             | 2-3    |           |

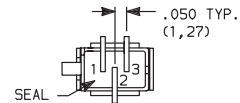
MOM. = Momentary



### PC MOUNTING GP11 MODELS



### PC MOUNTING GP12 Models



GP12 Model

Terminal nos. for reference only.



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



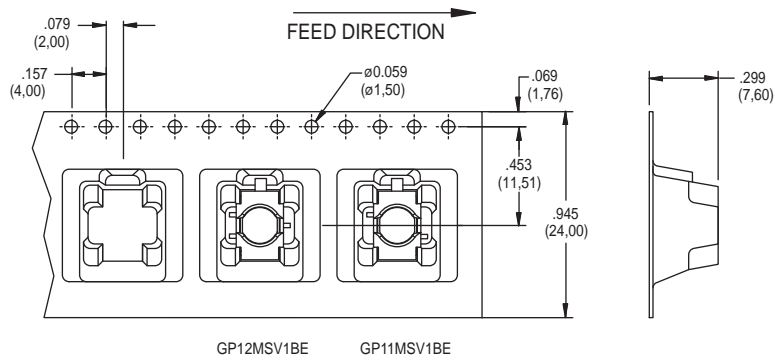
# GP Series Sealed Ultraminiature Pushbutton Switches

## TAPE & REEL

Pushbutton  
A

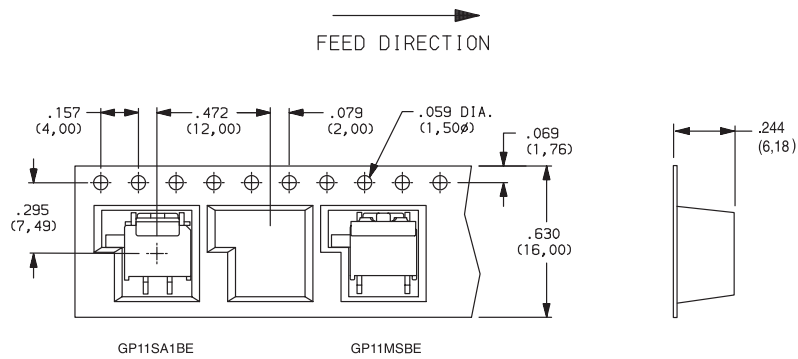
For part numbers GP11MSV1BE, GP12MSV1BE

| REEL INFORMATION  |               |
|-------------------|---------------|
| OUTSIDE DIAMETER  | 13.00 (330,0) |
| PILOT HOLE        | .512 (13,0)   |
| QUANTITY PER REEL | 600           |



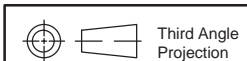
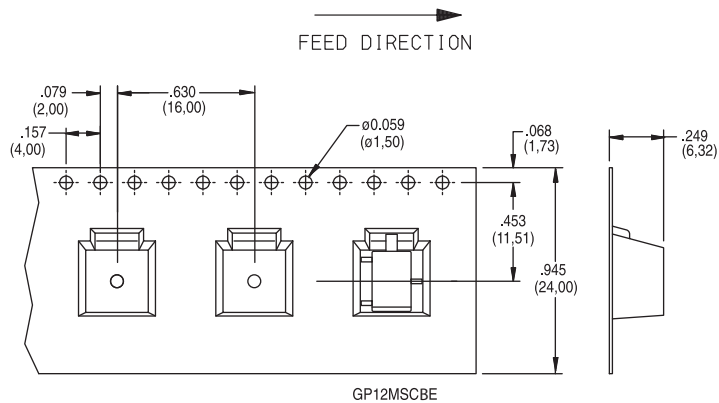
For part numbers GPXXSA1BE, GPXXMSABE

| REEL INFORMATION  |               |
|-------------------|---------------|
| OUTSIDE DIAMETER  | 13.00 (330,0) |
| PILOT HOLE        | .512 (13,0)   |
| QUANTITY PER REEL | 600           |



For part numbers GP12MSCBE

| REEL INFORMATION  |               |
|-------------------|---------------|
| OUTSIDE DIAMETER  | 13.00 (330,0) |
| PILOT HOLE        | .512 (13,0)   |
| QUANTITY PER REEL | 600           |



Third Angle  
Projection

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

**C&K**

# PN Series Alternate & Momentary Action Pushbutton Switches

## Features/Benefits

- Momentary or locking action
- 3 actuation forces for customized feel
- Low cost, reliable contact design
- 1-4 poles available
- RoHS compliant

## Typical Applications

- Computers and peripherals
- Instrumentation and measurement equipment
- Non-power, on-off switch applications



## Specifications

CONTACT RATING: 0.2 AMP @ 30 V DC max.  
 ELECTRICAL LIFE: 10,000 make-and-break cycles at full load.  
 MECHANICAL LIFE: 10,000 on/off cycles.  
 CONTACT RESISTANCE: 50 mΩ max. initial, 100 milliohms max. at end of life.  
 INSULATION RESISTANCE: 100 MΩ min. at 500 V DC.  
 DIELECTRIC STRENGTH: 500 V AC min.  
 OPERATING/STORAGE TEMPERATURES: -10°C to 60°C.  
 PACKAGING: Switches are supplied in anti-static bags or anti-static trays.

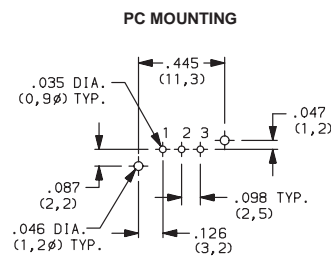
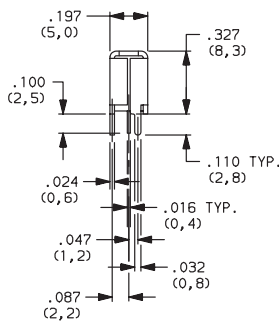
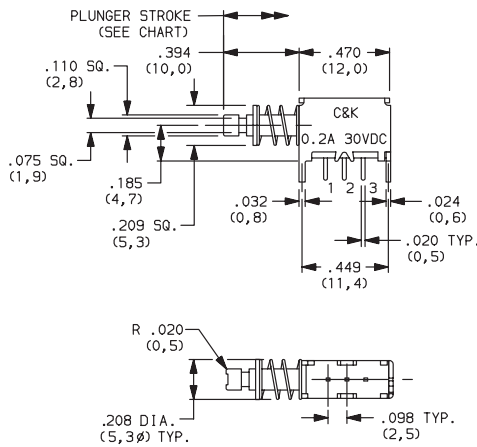
**NOTE:** All models are RoHS compliant and compatible.

## Materials

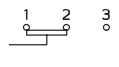
FRAME: Tin plated steel.  
 ACTUATOR: Polyacetal. Color: Manufacturing option.  
 BASE: Laminated phenolic.  
 TERMINALS: Silver plated brass.  
 MOVABLE CONTACTS: Silver plated (or clad) phosphor bronze.  
 RETURN SPRING: Music wire.  
 DETENT SPRING: Phosphor bronze.  
 DETENT SPRING PLATE: Phosphor bronze.  
 RETURN SPRING RETAINER RING: Nickel (or tin) plated steel.  
 TERMINAL SEAL: Epoxy.

## How To Order

Complete part numbers for PN Series Alternate & Momentary Action Pushbutton Switches are shown on pages A-82 thru A-83.



PN11SBSA03QE  
SPDT

| PART NUMBER  | SWITCH FUNCTION | OPERATING FORCE (typ.) | STROKE      |             | SHORTING/<br>NON-SHORTING | SCHEMATIC   |
|--------------|-----------------|------------------------|-------------|-------------|---------------------------|---|
|              |                 |                        | LOCK STROKE | FULL STROKE |                           |   |
| PN11SBNA03QE | SPDT Momentary  | 120g max.              | —           | .140 (3,5)  | Non-Shorting              |  |
| PN11SCNA03QE | SPDT Momentary  | 150g                   | —           |             |                           |   |
| PN11SHNA03QE | SPDT Momentary  | 230g                   | —           |             |                           |   |
| PN11SJNA03QE | SPDT Momentary  | 330g                   | —           |             |                           |   |
| PN12SHNA03QE | SPDT Locking    | 230g                   | .100g (2,5) |             |                           |   |
| PN12SJNA03QE | SPDT Locking    | 330g                   | .100g (2,5) | .140 (3,5)  | Shorting                  |   |
| PN11SBSA03QE | SPDT Momentary  | 120g max.              | —           |             |                           |   |
| PN11SCSA03QE | SPDT Momentary  | 150g                   | —           |             |                           |   |
| PN11SHSA03QE | SPDT Momentary  | 230g                   | —           |             |                           |   |
| PN11SJSA03QE | SPDT Momentary  | 330g                   | —           |             |                           |   |
| PN12SHSA03QE | SPDT Locking    | 230g                   | .100g (2,5) | .100 (2,5)  |                           |   |
| PN12SJSA03QE | SPDT Locking    | 330g                   | .100 (2,5)  |             |                           |   |



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





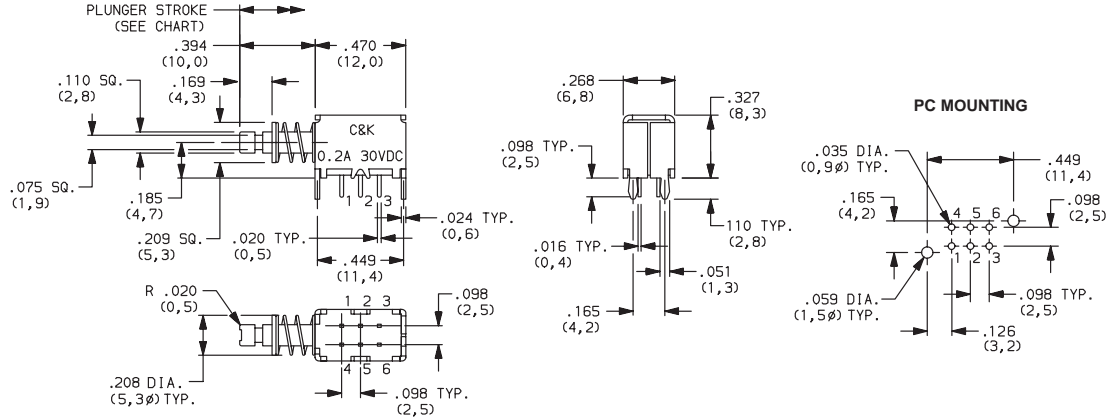


# PN Series Alternate & Momentary Action Pushbutton Switches

A  
Pushbutton



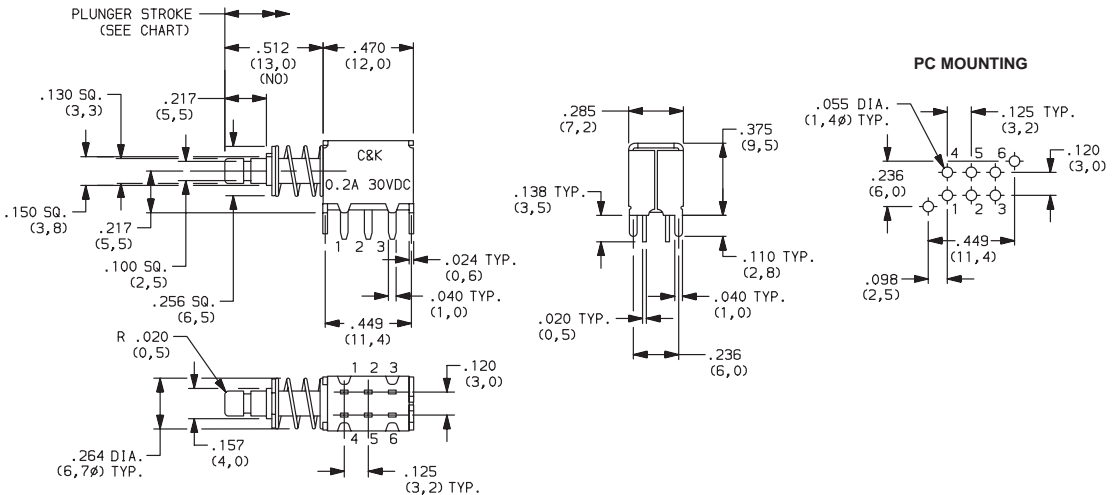
**PN21SBSA03QE  
DPDT**



| PART NUMBER         | SWITCH FUNCTION | OPERATING FORCE (typ.) | STROKE      |             | SHORTING/<br>NON-SHORTING | SCHEMATIC |
|---------------------|-----------------|------------------------|-------------|-------------|---------------------------|-----------|
|                     |                 |                        | LOCK STROKE | FULL STROKE |                           |           |
| <b>PN21SBNA03QE</b> | DPDT Momentary  | 120g max.              | —           | .140 (3,5)  | Non-Shorting              |           |
| <b>PN21SDNA03QE</b> | DPDT Momentary  | 175g                   | —           |             |                           |           |
| <b>PN21SJNA03QE</b> | DPDT Momentary  | 330g                   | —           |             |                           |           |
| <b>PN22SJNA03QE</b> | DPDT Locking    | 330g                   | .100 (2,5)  | .140 (3,5)  | Shorting                  |           |
| <b>PN21SBSA03QE</b> | DPDT Momentary  | 120g max.              | —           |             |                           |           |
| <b>PN21SDSA03QE</b> | DPDT Momentary  | 175g                   | —           |             |                           |           |
| <b>PN21SJSA03QE</b> | DPDT Momentary  | 330g                   | —           | .100 (2,5)  |                           |           |
| <b>PN22SJSA03QE</b> | DPDT Locking    | 330g                   | .100 (2,5)  |             |                           |           |



**PN21LASA03QE  
DPDT**



| PART NUMBER         | SWITCH FUNCTION | OPERATING FORCE (typ.) | STROKE      |             | SHORTING/<br>NON-SHORTING | SCHEMATIC |
|---------------------|-----------------|------------------------|-------------|-------------|---------------------------|-----------|
|                     |                 |                        | LOCK STROKE | FULL STROKE |                           |           |
| <b>PN21LANA03QE</b> | DPDT Momentary  | 100g max.              | —           | .140 (3,5)  | Non-Shorting              |           |
| <b>PN21LFNA03QE</b> | DPDT Momentary  | 120g                   | —           |             |                           |           |
| <b>PN21LDNA03QE</b> | DPDT Momentary  | 175g                   | —           |             |                           |           |
| <b>PN21LENA03QE</b> | DPDT Momentary  | 300g                   | —           | .140 (3,5)  | Shorting                  |           |
| <b>PN22LENA03QE</b> | DPDT Locking    | 300g                   | .100 (2,5)  |             |                           |           |
| <b>PN21LASA03QE</b> | DPDT Momentary  | 100g max.              | —           |             |                           |           |
| <b>PN21LFSA03QE</b> | DPDT Momentary  | 120g                   | —           | .100 (2,5)  |                           |           |
| <b>PN21LDSA03QE</b> | DPDT Momentary  | 175g                   | —           |             |                           |           |
| <b>PN21LESA03QE</b> | DPDT Momentary  | 300g                   | —           |             |                           |           |
| <b>PN22LESA03QE</b> | DPDT Locking    | 300g                   | .100 (2,5)  |             |                           |           |



Third Angle  
Projection

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

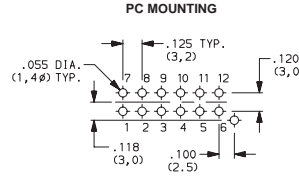
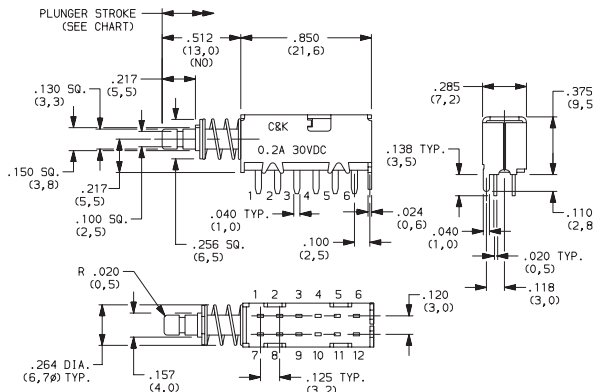


# PN Series Alternate & Momentary Action Pushbutton Switches



A

Pushbutton

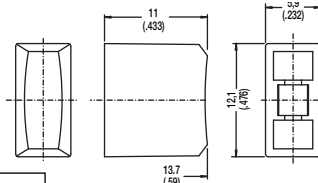


PN41LGS A02QE  
4PDT

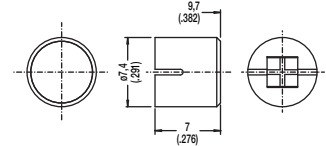
| PART NUMBER   | SWITCH FUNCTION | OPERATING FORCE (typ.) | STROKE      |             | SHORTING/<br>NON-SHORTING | SCHEMATIC |
|---------------|-----------------|------------------------|-------------|-------------|---------------------------|-----------|
|               |                 |                        | LOCK STROKE | FULL STROKE |                           |           |
| PN41LGNA02QE  | 4PDT Momentary  | 175g                   | —           | .140 (3,5)  | Non-Shorting              |           |
| PN41LENA02QE  | 4PDT Momentary  | 300g                   | —           |             |                           |           |
| PN42LENA02QE  | 4PDT Locking    | 300g                   | .100 (2,5)  | .140 (3,5)  | Shorting                  |           |
| PN41LGS A02QE | 4PDT Momentary  | 175g                   | —           |             |                           |           |
| PN41LESA02QE  | 4PDT Momentary  | 300g                   | —           | .140 (3,5)  | Shorting                  |           |
| PN42LESA02QE  | 4PDT Locking    | 300g                   | .100 (2,5)  |             |                           |           |

BUTTONS MUST BE ORDERED SEPARATELY. SHIPPED IN BULK.

PE



PV

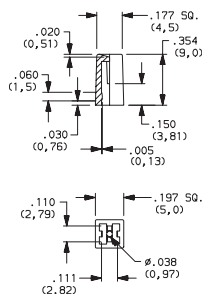


| OPTION CODE | COLOR |
|-------------|-------|
| RD          | Red   |
| GY          | Gray  |
| BK          | Black |
| WH          | White |

PE and PV buttons fit .130" square plungers

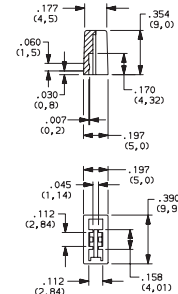
## Indexed

- G001A Black
- G001G Gray
- G001I Ivory
- G001R Red



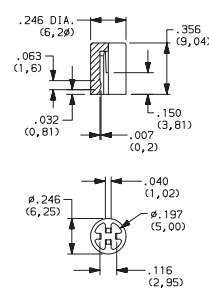
## Rectangular

- G002A Black
- G002G Gray
- G002I Ivory
- G002R Red



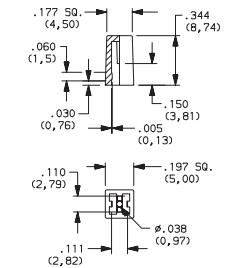
## Round

- G003A Black
- G003G Gray
- G003I Ivory
- G003R Red



## Square

- G004A Black
- G004G Gray
- G004I Ivory
- G004R Red



G001, G002, G003 and G004 buttons fit .110" square plungers.



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



# PHA Series Short Stroke Pushbutton Switches



### Features/Benefits

- *Momentary or latching action*
- *Low cost, reliable contact design*
- *2, 4 & 6 pole configurations*
- *Sealed contacts*
- *Optional buttons*
- *RoHS compliant*

### Typical Applications

- *Computers and peripherals*
- *Instrumentation and measurement equipment*
- *Non-power, on-off switch applications*

### Specifications

SWITCHING POWER MAX.: 3 W DC  
 SWITCHING VOLTAGE MAX.: 30 V DC  
 SWITCHING CURRENT MAX.: 100 mA DC  
 DIELECTRIC STRENGTH (50 Hz/1 min.): 500 V between open contacts. 1500 V between chassis and contacts.  
 OPERATING LIFE: Impulse/momentary (OA):  $\wedge 10^4$  operations.  
 Latching (EE):  $\wedge 10^4$  operations  
 CONTACT RESISTANCE: New: %20 m $\Omega$   
 After 105 operations: %40 m $\Omega$   
 INSULATION RESISTANCE:  $\wedge 10^{10}\Omega$   
 CAPACITANCE: %1.5 pF  
 CONTACT BOUNCE: %2 ms  
 Operating speed 200 mm/s (7.87 inch/s)  
 TOTAL TRAVEL/LATCHING TRAVEL: 2.5mm/1.5mm  
 (.0984 inch/.0591 inch)  
 OPERATING FORCE:  
 2U: 170cN $\pm$ 50cN (170 grams $\pm$ 50 grams)  
 4U: 230cN $\pm$ 70cN (230 grams $\pm$ 70 grams)  
 6U: 300cN $\pm$ 100cN (300 grams $\pm$ 100 grams)  
 SEALING: Sealed contacts.

### Materials

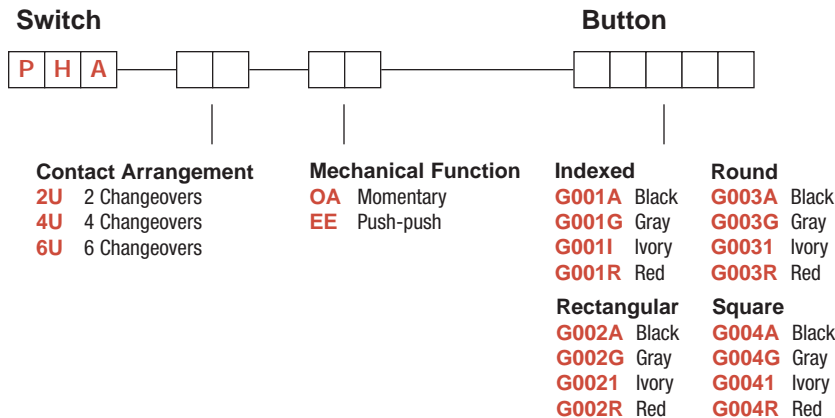
FIXED TERMINAL: Brass, silver plated.  
 MOVABLE CONTACT: Phosphor bronze, silver plated.  
 SWITCH BODY: PPE  
 ACTUATOR: POM  
 STANDOFF CLIP: POM  
 RETURN SPRING: Music wire.  
 RETURN SPRING RETAINER: Carbon steel, tin plated.  
 DETENT SPRING PLATE: Phosphor bronze.  
 DETENT SPRING: Stainless steel.  
 BASE: Laminated phenolic.  
 TERMINAL SEAL: Epoxy.

**NOTE:** All models are RoHS compliant and compatible.

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

### 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-85 thru A-87. For additional options not shown in catalog, consult Customer Service Center.



#### BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.



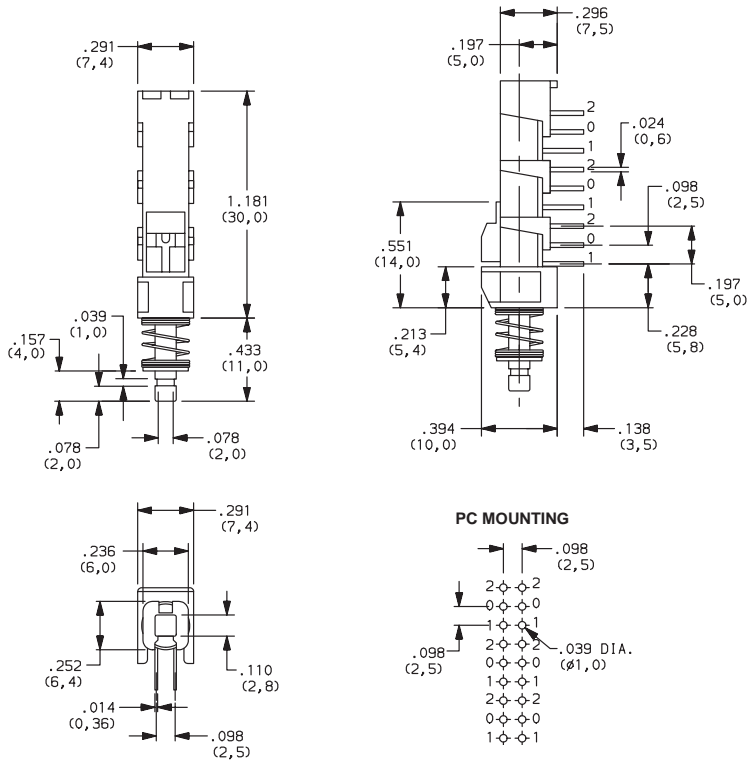


# PHA Series Short Stroke Pushbutton Switches

## DESIGNATION

Pushbutton

**6U** 6 CHANGEOVERS



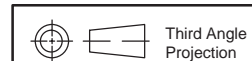
## CONTACT ARRANGEMENT

| OPTION CODE | NO. OF POLES * | SCHEMATIC |
|-------------|----------------|-----------|
| <b>2U</b>   | 2PDT           |           |
| <b>4U</b>   | 4PDT           | 2X        |
| <b>6U</b>   | 6PDT           | 3X        |

\*Non-shorting contacts.

## MECHANICAL FUNCTION

| OPTION CODE | FUNCTION  |
|-------------|-----------|
| <b>OA</b>   | Momentary |
| <b>EE</b>   | Push-push |



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

# PHA Series Short Stroke Pushbutton Switches



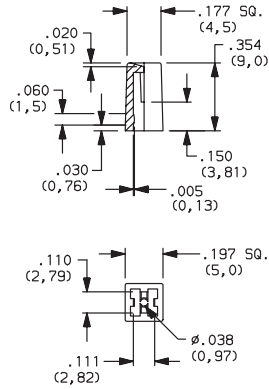
A

Pushbutton

## BUTTONS

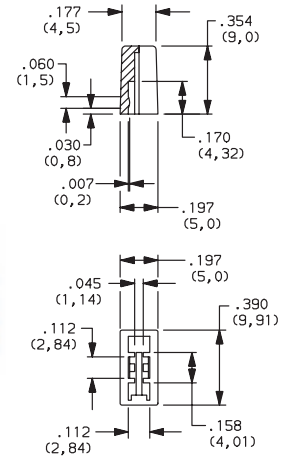
### Indexed

- G001A** Black
- G001G** Gray
- G001I** Ivory
- G001R** Red



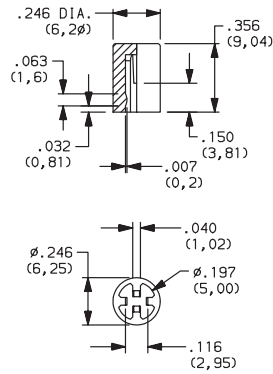
### Rectangular

- G002A** Black
- G002G** Gray
- G002I** Ivory
- G002R** Red



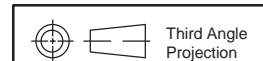
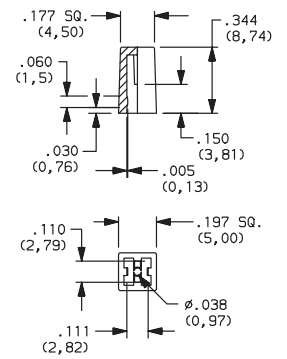
### Round

- G003A** Black
- G003G** Gray
- G003I** Ivory
- G003R** Red



### Square

- G004A** Black
- G004G** Gray
- G004I** Ivory
- G004R** Red



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



# F Series Pushbutton Switches

## Features/Benefits

- Up to 10 poles per module
- Various contact terminals
- Various mounting & switch ganging configurations
- Mechanical indicator buttons
- RoHS compliant

## Typical Applications

- Audio selection
- Digital equipment interface
- Medical equipment interface



## Specifications

SWITCHING POWER: F module max. AC/DC: Silver: 50 VA/15W, Gold: 1 VA/300 mW.

SWITCHING VOLTAGE: F module max. AC/DC: Silver: 125/30V, Gold: 50/30 V.

SWITCHING CURRENT: F module max. AC/DC: Silver: 0.5A/0.5A, Gold: 0.04A/0.01A.

CARRYING CURRENT: Max at  $\dot{u} = 20\text{C}$ : Silver: < 2A, Gold: <0.5A.

DIELECTRIC STRENGTH (50 Hz, 1 min.): Chassis/contact:  $\wedge 1500\text{V}$  Between contacts:  $\wedge 1500\text{V}$ .

OPERATING LIFE "OA/EE" (24V/200mA):  $> 10^5$  operations "GR":  $> 3.5 \times 10^4$  operations.

CONTACT RESISTANCE: Initial: Typical %10 m $\Omega$ , max. 20 m $\Omega$  After operating life: %100 m $\Omega$

INSULATION RESISTANCE:  $\wedge 10^9 \Omega$  between open contacts,  $\wedge 10^9 \Omega$  between chassis and contacts.

CAPACITANCE (at f = 10 kHz): %0.7 pF between 2 contacts.

TOTAL TRAVEL/LATCHING TRAVEL: 4.7mm/3.3mm (.185 inch/.130 inch).

All models and options are RoHS compliant and compatible.

**NOTE:** All models and options are RoHS compliant and compatible.

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

TYPICAL F OPERATING FORCE: 2U: 6.5N (650 grams); 4U: 6.5N (650 grams); 6U: 7.5N (750 grams); 8U: 9.0N (900 grams); 10U: 9.0N (900 grams).

EUROPEAN TYPICAL SF OPERATING FORCE:  
2U: 3.5N $\pm 0.5\text{N}$  (350 grams $\pm 100$  grams); 4U: 5N $\pm 1\text{N}$  (500 grams $\pm 100$  grams); 6U: 6.5N $\pm 1\text{N}$  (650 grams $\pm 100$  grams); 8U: 9.0N $\pm 1\text{N}$  (900 grams $\pm 100$  grams).

OPERATING TEMPERATURE RANGE: -40°C to 70°C.

## Materials

HOUSING: Polycarbonate UL 94V-0 or polyester UL 94V-0.

ACTUATOR: Polyester UL 94V-0.

MOVABLE CONTACTS: Bimetal brass, silver plated, gold plate over nickel.

STATIONARY CONTACTS & TERMINALS: Brass, silver plated, gold plated.

TERMINAL BOARD: Polyester UL 94V-0.

RETURN SPRING: Music wire.

TERMINAL SEAL: RTV adhesive sealant.

CHASSIS: Steel.

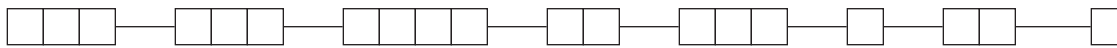
LOCKOUT PIN: Steel.

BLOCKERS: Steel.

## 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-92 thru A-100. For additional options not shown in catalog, consult Customer Service Center. If requesting only a switch, select either a North American or European switch as noted below. Chassis and buttons are sold separately. If multiple stations are selected, we will assume all switches are the same unless noted otherwise.

## North American Order Code - Switch Only



### Designation

- F** F Series
- FLT** Light touch F series
- ZF** Central mounted F series

### Contact Arrangement

- 2U** 2PDT
- 4U** 4PDT
- 6U** 6PDT
- 8U** SPDT
- 10U** 10PDT

### Mechanical Function

- OA** Momentary
- EE** Alternate (push-push)
- GR** Interlock
- AOR** Central release
- OASP** Momentary with lockout
- GRSP** Interlock with lockout

### Terminal Sealing

- (NONE)** None
- TB** Top/bottom

### Terminal Style

- (NONE)** Solder lugs & PC pins
- 01A** Cut solder lugs
- 01B** Cut PC pins, for other configurations, consult factory

### Electrical Function

- (NONE)** BBM
- M** MBB (special)

### Contact Material

- (NONE)** Silver, AG
- AU** Gold

### Dress nut\*

\*Central mounted F series only

- (NONE)** No dress nut
- B** Black
- C** Chrome



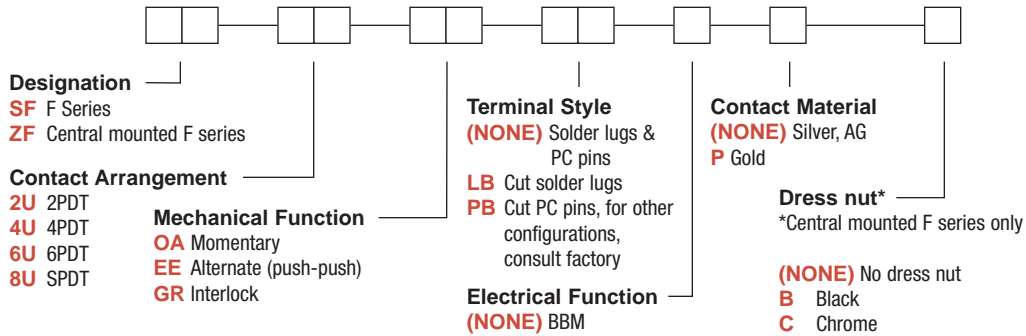
Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

# F Series Pushbutton Switches



A  
Pushbutton

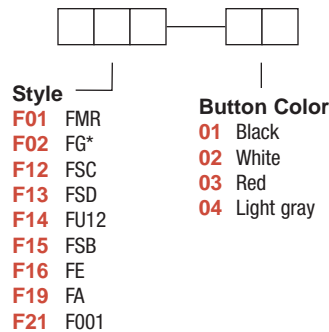
## European Order Code - Switch Only



\*Minimum order quantities apply.

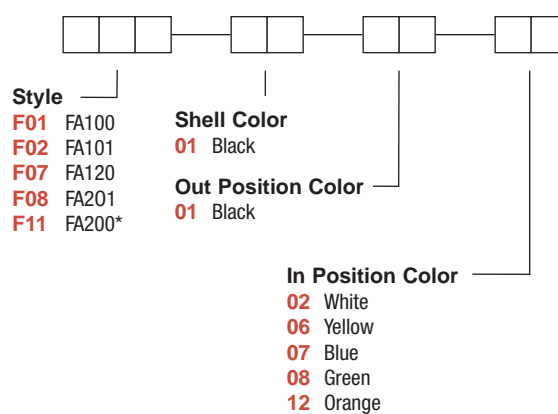
## Order Code - Buttons

### Solid Buttons



\*Button options for central mounting configurations, use 'FG' for central mount with chrome dress nut, use 'FA200' for central mount with black dress nut.

### Mechanical Indicator Buttons



## BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.





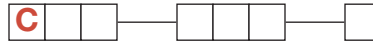
# F Series Pushbutton Switches

Pushbutton  
A

## Order Code - Chassis

To order a switch with chassis, create the switch part number listed above and add the Chassis part number configurator information at the end of the part number.

Note: We do not guarantee or recommend interlocking beyond 10 stations.



### No. of Stations

**01 thru 23** Comes with standard .094 (2,4mm) mounting holes  
Note: Single station chassis available with special mounting configurations, consult factory.

### Spacing between Stations

**00** Single station  
**10** 10mm  
**12.5** 12.5mm  
**15** 15mm  
**17.5** 17.5mm  
**20** 20mm

### Special Acknowledgements

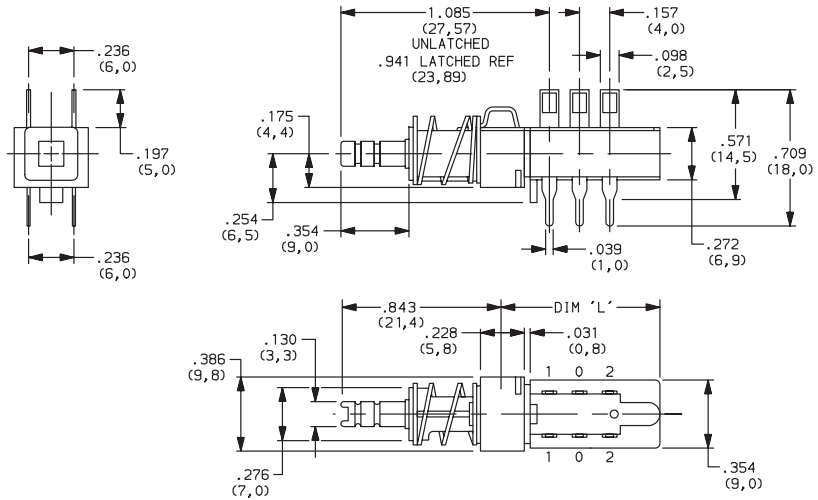
See note

\*Minimum order quantities apply.

## SWITCHES WITH STANDARD OPTIONS

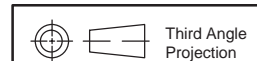
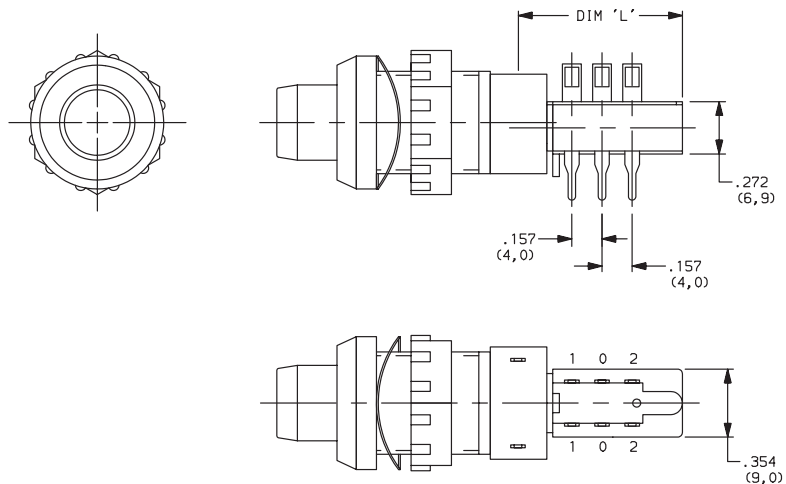
### F2UEE

| CONTACT ARRANGEMENT | LENGTH DIM 'L' |
|---------------------|----------------|
| 2U                  | 0.827 (21,00)  |
| 4U                  | 1.300 (33,00)  |
| 6U                  | 1.770 (45,00)  |
| 8U                  | 2.240 (57,00)  |
| 10U                 | 2.720 (69,00)  |



### ZF2UEEBF11010108

| CONTACT ARRANGEMENT | LENGTH DIM 'L' |
|---------------------|----------------|
| 2U                  | 0.827 (21,00)  |
| 4U                  | 1.300 (33,00)  |
| 6U                  | 1.770 (45,00)  |
| 8U                  | 2.240 (57,00)  |
| 10U                 | 2.720 (69,00)  |



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



# F Series Pushbutton Switches



A

Pushbutton

## DESIGNATION



### Designation, North America

- F** F Series
- FLT** Light touch F series
- ZF** Central mounted F series

### Designation, Europe

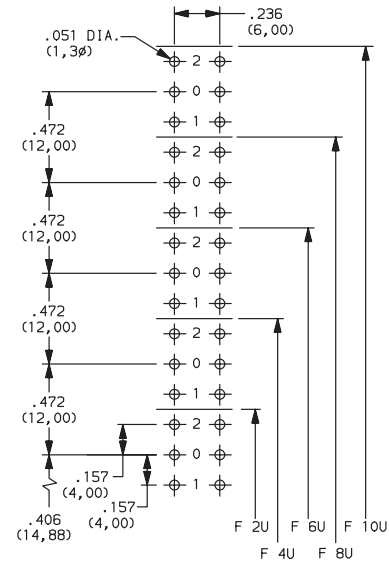
- SF** F Series
- ZF** Central mounted F series

## CONTACT ARRANGEMENT



| OPTION CODE | NO. OF POLES | SCHEMATIC |
|-------------|--------------|-----------|
| <b>2U</b>   | 2PDT         |           |
| <b>4U</b>   | 4PDT         | 2X        |
| <b>6U</b>   | 6PDT         | 3X        |
| <b>8U</b>   | 8PDT         | 4X        |
| <b>10U</b>  | 10PDT        | 5X        |

### PC MOUNTING



## MECHANICAL FUNCTION



### North America

| OPTION CODE | FUNCTION               |
|-------------|------------------------|
| <b>OA</b>   | Momentary              |
| <b>EE</b>   | Alternate (push-push)  |
| <b>GR</b>   | Interlock              |
| <b>AOR</b>  | Central release        |
| <b>OASP</b> | Momentary with lockout |
| <b>GRSP</b> | Interlock with lockout |

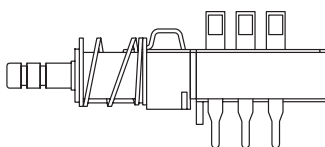
### Europe

| OPTION CODE | FUNCTION              |
|-------------|-----------------------|
| <b>OA</b>   | Momentary             |
| <b>EE</b>   | Alternate (push-push) |
| <b>GR</b>   | Interlock             |

## TERMINAL SEALING

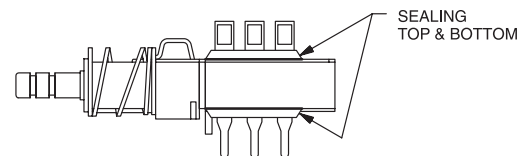


**(NONE)** NO SEAL



F2UEE shown in example above.

**TB** TOP & BOTTOM



**NOTE:** Available for North America only



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



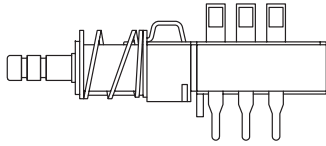


# F Series Pushbutton Switches

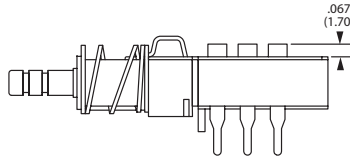
Pushbutton  
A

## TERMINAL STYLE

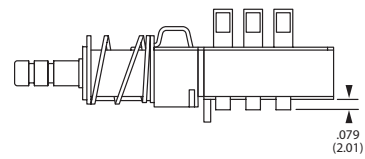
**(NONE)** SOLDER LUGS & PC PINS



**01A** CUT SOLDER LUGS (North America)  
**LB** CUT SOLDER LUGS (Europe)



**01B** CUT PC PINS (North America)  
**PB** CUT PC PINS (Europe)



## ELECTRICAL FUNCTION

| OPTION CODE   | FUNCTION                          |
|---------------|-----------------------------------|
| <b>(NONE)</b> | BBM Non-shorting                  |
| <b>M</b>      | MBB Shorting (North America only) |

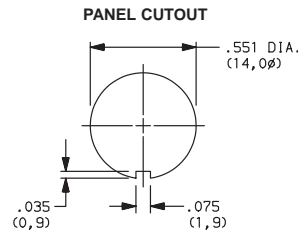
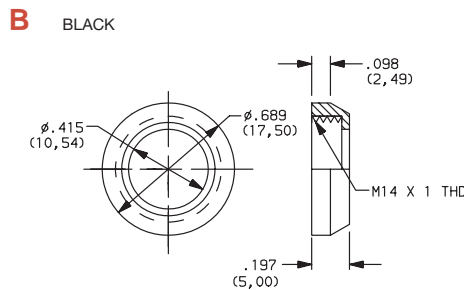
## CONTACT MATERIAL

| NORTH AMERICA OPTION CODE | EUROPE OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | MATERIAL   | RATING                             |
|---------------------------|--------------------|------------------|-------------------|------------|------------------------------------|
| <b>(NONE)</b>             | <b>(NONE)</b>      | YES              | YES               | SILVER, AG | 50 VA/15 W; 125/30 V; 0.5/0.5 A    |
| <b>AU</b>                 | <b>P</b>           | YES              | YES               | GOLD       | 1 VA/300mW; 50/30 V; 0.04 A/0.01 A |

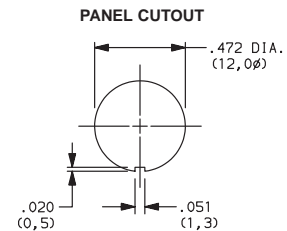
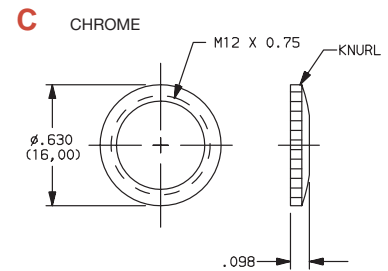
\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

## DRESS NUT

**(NONE)** NO DRESS NUT FOR F & F/LT DESIGNATIONS



NOTE: Available with ZF designation and FA200 buttons.



NOTE: Available with ZF designation and FG button.



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



# F Series Pushbutton Switches



A

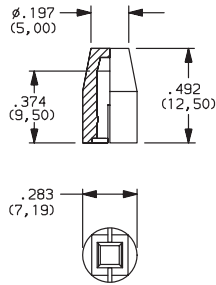
Pushbutton

SOLID BUTTON       COLOR

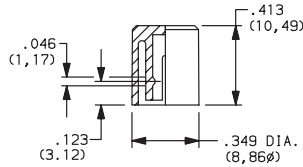
STYLE

## STYLE

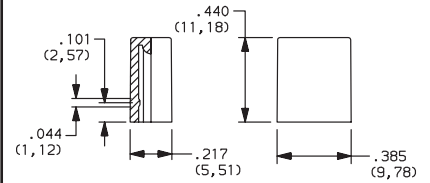
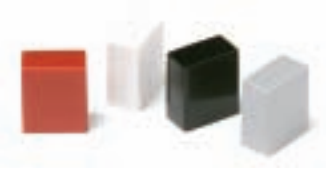
**F01** FMR



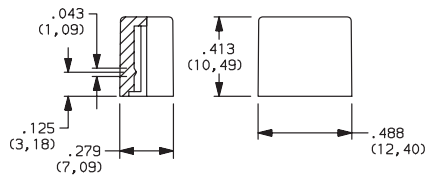
**F02** FG



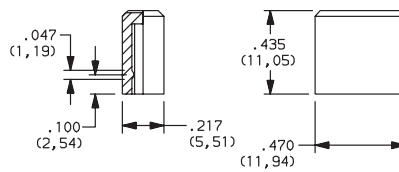
**F12** FSC



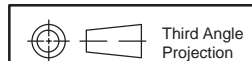
**F13** FSD



**F14** FU12



| OPTION CODE | COLOR    |
|-------------|----------|
| 01          | BLACK    |
| 02          | WHITE    |
| 03          | RED      |
| 04          | LT. GRAY |



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



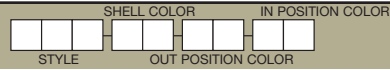
# F Series Pushbutton Switches



A

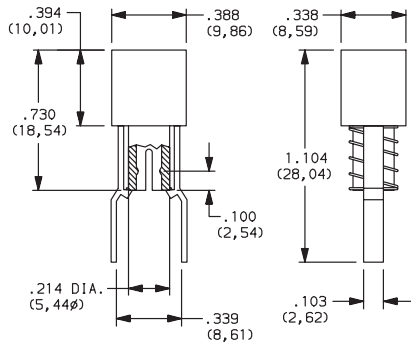
Pushbutton

## MECHANICAL BUTTON

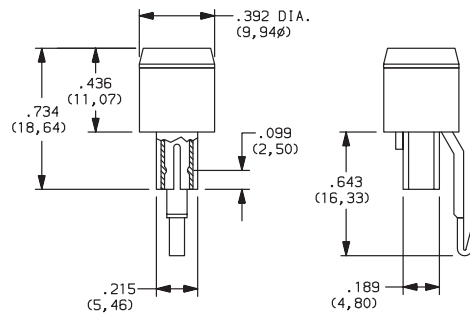


### STYLE

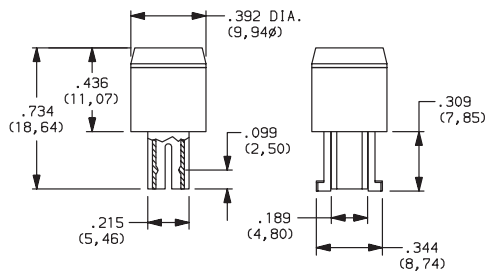
**F07** FA120



**F08** FA201



**F11** FA200



### SHELL COLOR

**01** BLACK

### OUT POSITION COLOR

**01** BLACK

### IN POSITION COLOR

| OPTION CODE | COLOR  |
|-------------|--------|
| <b>02</b>   | WHITE  |
| <b>06</b>   | YELLOW |
| <b>07</b>   | BLUE   |
| <b>08</b>   | GREEN  |
| <b>12</b>   | ORANGE |



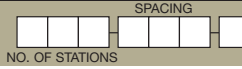
Third Angle Projection

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



# F Series Pushbutton Switches

## CHASSIS



Pushbutton

A

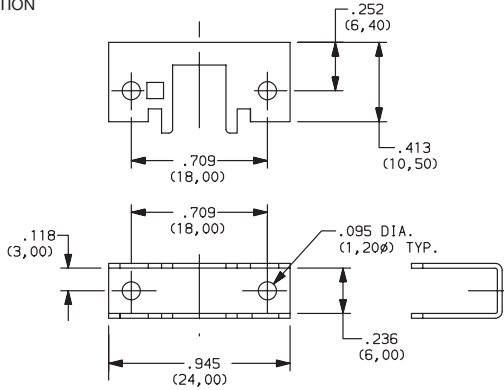
## NUMBER OF STATIONS

**C00 Thru C10** Comes with standard 0.094 (2,44mm) mounting holes

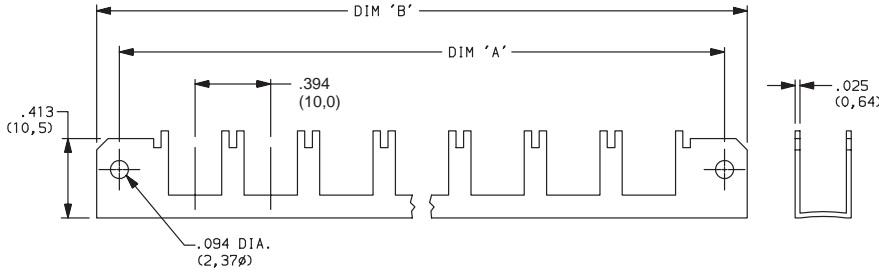
**NOTE:** Single station chassis available with mounting configurations, consult factory.

## SPACING

**00** SINGLE STATION

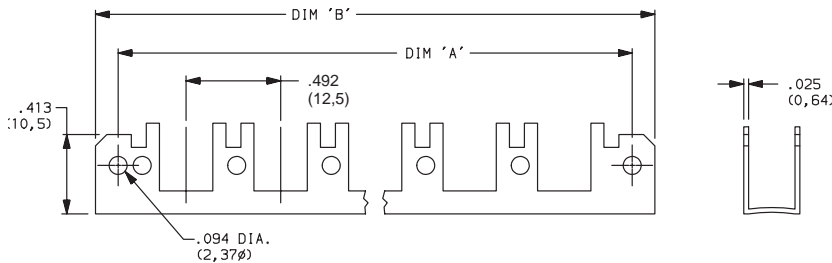


**10** 10mm



| No. of Stations | Dim. 'A'          | Dim. 'B'          | Tolerance |
|-----------------|-------------------|-------------------|-----------|
| 2               | 1.182<br>(30,02)  | 1.418<br>(36,02)  | 0.005     |
| 3               | 1.575<br>(40,01)  | 1.811<br>(46,00)  | 0.010     |
| 4               | 1.969<br>(50,01)  | 2.205<br>(56,01)  | 0.010     |
| 5               | 2.363<br>(60,02)  | 2.599<br>(66,01)  | 0.010     |
| 6               | 2.757<br>(70,03)  | 2.993<br>(76,02)  | 0.015     |
| 7               | 3.150<br>(80,01)  | 3.386<br>(86,00)  | 0.015     |
| 8               | 3.544<br>(90,02)  | 3.780<br>(96,01)  | 0.015     |
| 9               | 3.938<br>(100,03) | 4.174<br>(106,02) | 0.015     |
| 10              | 4.331<br>(110,01) | 4.567<br>(116,00) | 0.015     |

**12.5** 12.5mm



| No. of Stations | Dim. 'A'          | Dim. 'B'          | Tolerance |
|-----------------|-------------------|-------------------|-----------|
| 2               | 1.200<br>(30,48)  | 1.436<br>(36,47)  | 0.005     |
| 3               | 1.692<br>(42,98)  | 1.928<br>(48,97)  | 0.010     |
| 4               | 2.184<br>(55,47)  | 2.420<br>(61,47)  | 0.010     |
| 5               | 2.676<br>(67,97)  | 2.912<br>(73,96)  | 0.010     |
| 6               | 3.169<br>(80,49)  | 3.405<br>(86,49)  | 0.015     |
| 7               | 3.661<br>(92,99)  | 3.897<br>(98,98)  | 0.015     |
| 8               | 4.153<br>(105,49) | 4.389<br>(111,48) | 0.015     |
| 9               | 4.645<br>(117,98) | 4.881<br>(123,98) | 0.015     |
| 10              | 5.137<br>(130,48) | 5.373<br>(136,47) | 0.015     |



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



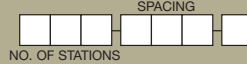
# F Series Pushbutton Switches



A

Pushbutton

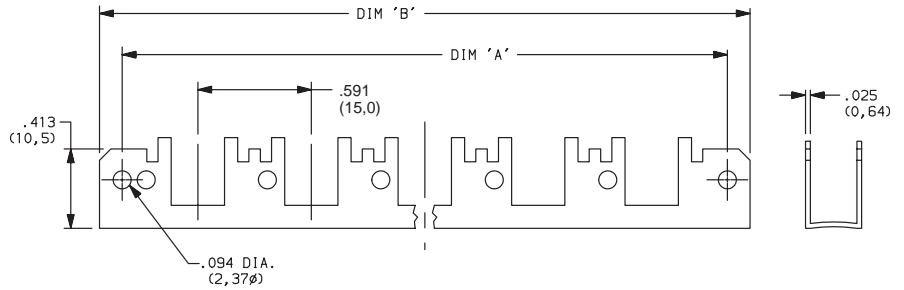
CHASSIS



## SPACING

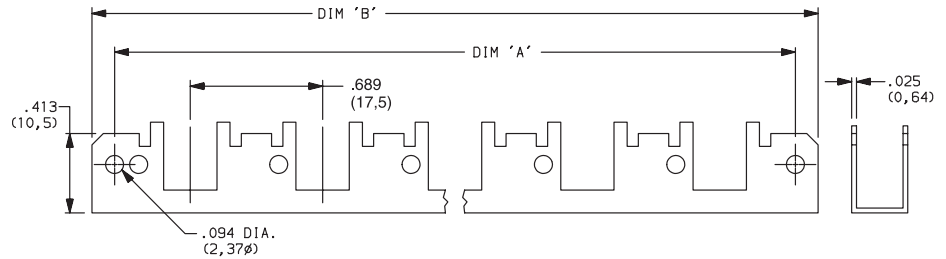
**15** 15mm

| No. of Stations | Dim. 'A'          | Dim. 'B'          | Tolerance |
|-----------------|-------------------|-------------------|-----------|
| 2               | 1.374<br>(34,90)  | 1.615<br>(41,02)  | 0.005     |
| 3               | 1.969<br>(50,01)  | 2.205<br>(56,01)  | 0.010     |
| 4               | 2.560<br>(65,02)  | 2.796<br>(71,02)  | 0.010     |
| 5               | 3.150<br>(80,01)  | 3.386<br>(86,00)  | 0.010     |
| 6               | 3.741<br>(95,02)  | 3.977<br>(101,02) | 0.015     |
| 7               | 4.332<br>(110,03) | 4.568<br>(116,03) | 0.015     |
| 8               | 4.922<br>(125,02) | 5.158<br>(131,01) | 0.015     |
| 9               | 5.513<br>(140,03) | 5.749<br>(146,02) | 0.015     |
| 10              | 6.103<br>(155,02) | 6.339<br>(161,01) | 0.015     |



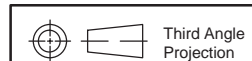
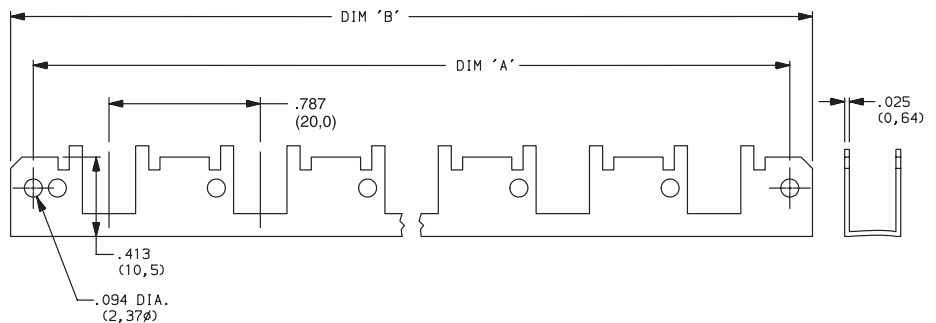
**17.5** 17.5mm

| No. of Stations | Dim. 'A'          | Dim. 'B'          | Tolerance |
|-----------------|-------------------|-------------------|-----------|
| 2               | 1.477<br>(37,52)  | 1.713<br>(43,51)  | 0.005     |
| 3               | 2.166<br>(55,02)  | 2.402<br>(61,01)  | 0.010     |
| 4               | 2.855<br>(75,52)  | 3.091<br>(78,51)  | 0.010     |
| 5               | 3.544<br>(90,02)  | 3.780<br>(96,01)  | 0.010     |
| 6               | 4.233<br>(107,52) | 4.469<br>(113,51) | 0.015     |
| 7               | 4.922<br>(125,02) | 5.158<br>(131,01) | 0.015     |
| 8               | 5.611<br>(142,52) | 5.847<br>(148,51) | 0.015     |
| 9               | 6.300<br>(160,02) | 6.536<br>(166,01) | 0.015     |
| 10              | 6.989<br>(177,52) | 7.225<br>(183,52) | 0.015     |



**20** 20mm

| No. of Stations | Dim. 'A'          | Dim. 'B'          | Tolerance |
|-----------------|-------------------|-------------------|-----------|
| 2               | 1.575<br>(40,01)  | 1.811<br>(46,00)  | 0.005     |
| 3               | 2.363<br>(60,02)  | 2.599<br>(66,01)  | 0.010     |
| 4               | 3.150<br>(80,01)  | 3.386<br>(86,00)  | 0.010     |
| 5               | 3.938<br>(100,03) | 4.174<br>(106,02) | 0.010     |
| 6               | 4.725<br>(120,02) | 4.961<br>(126,01) | 0.015     |
| 7               | 5.512<br>(140,00) | 5.748<br>(146,00) | 0.015     |
| 8               | 6.300<br>(160,02) | 6.536<br>(166,01) | 0.015     |
| 9               | 7.087<br>(180,01) | 7.323<br>(186,00) | 0.015     |
| 10              | 7.875<br>(200,03) | 8.111<br>(206,02) | 0.015     |



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







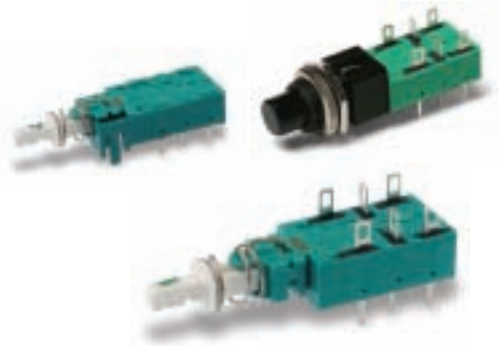
# NE-18 Series Mains / Power Switches

### Features/Benefits

- Chassis or panel mount
- Various buttons
- Various contact configurations
- RoHS compliant

### Typical Applications

- Mains/power switching
- Consumer electronics
- Audio equipment
- Digital products



### Specifications

#### POWER CONTACT:

SWITCHING POWER MAX. AC/DC: NE18: 1500/100 W,  
NE18CTII: 1000/100 W; AC (Inductive  $\cos \phi = 0.6$ ): NE18: 900W,  
NE18CTII: 600W.

SWITCHING VOLTAGE MAX. AC/DC: 250/100V

#### SWITCHING CURRENT MAX. AC/DC

AC (Inductive  $\cos \phi = 0.6$ ): NE18:  $6 A^2$ /1 A, NE18CTII:  $4 A^2$ /1 A

INRUSH CURRENT MAX. AC<sup>1</sup>): NE18: 36 A, NE18CTII: 64 A

DIELECTRIC STRENGTH (50 Hz, 1 min.): 2000 V

OPERATING LIFE AT MAX. LOAD AND AT MAX. INRUSH  
CURRENT:  $\sim 10^4$  operations<sup>5</sup>)

CONTACT RESISTANCE: Initial: 50m $\Omega$ ; After  $10^4$  operations: 70m $\Omega$ .

INSULATION RESISTANCE:  $\sim 10^{12} \Omega$  chassis – nearest contact;  
 $\sim 10^{12} \Omega$  mains contact – mains contact;  $\sim 10^{12} \Omega$  mains contact –  
mains contact after  $10^4$  operations.

#### LOW VOLTAGE CONTACT:

SWITCHING POWER MAX.: 12W

SWITCHING VOLTAGE MAX.: 24V

SWITCHING CURRENT MAX.: 0.5A

TOTAL TRAVEL: 4.7mm (.185 inch)

LATCHING TRAVEL: 3.3mm (.130 inch)

OPERATING FORCE: Without auxiliary low voltage contacts:

NE18: 7N (700 grams); NE18CTII: 9.5N (950 grams).

With auxiliary low voltage contacts: NE18: 8N (800 grams);

NE18CTII: 11N (1100 grams).

SEALING: Dust proof.

### Materials

HOUSING, ACTUATOR & TERMINAL BOARD: Thermoplastic polyester (UL 94V-0).

MOVABLE CONTACT: Silver nickel alloy, silver plated.

FIXED CONTACTS: Silver nickel alloy, silver plated.

COMMON CONTACTS & TERMINALS: Copper alloy, silver plated.

RETURN SPRING: Music wire.

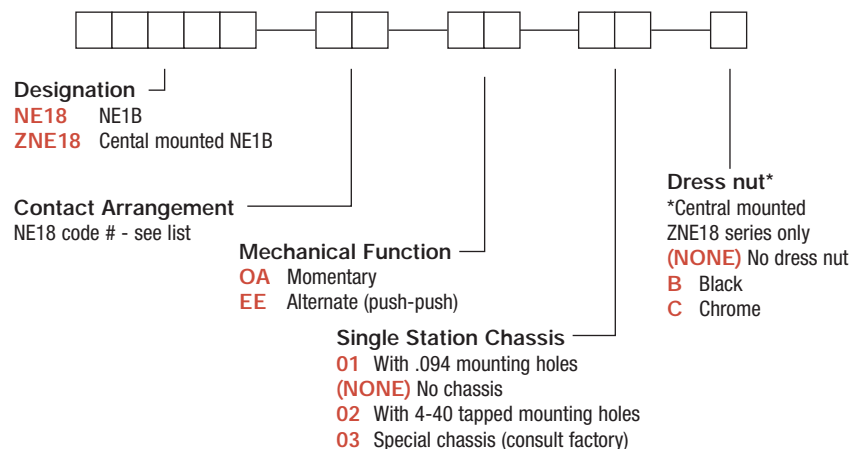
**NOTE: All models are RoHS compliant and compatible.**

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

### 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-102 thru A-109. For additional options not shown in catalog, consult Customer Service Center.

If requesting only a switch, select the switch as noted below. Buttons are sold separately.



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

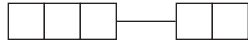
# NE-18 Series Mains / Power Switches



A  
Pushbutton

## Order Code - Buttons

### Solid Buttons



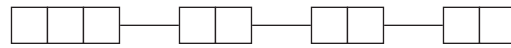
#### Style

- F01 FMR
- F02 FG\*
- F12 FSC
- F13 FSD
- F14 FU12
- F15 FSB
- F16 FE
- F19 FA
- F21 F001

#### Button Color

- 01 Black
- 02 White
- 03 Red
- 04 Light gray

### Mechanical Indicator Buttons



#### Style

- F01 FA100
- F02 FA101
- F07 FA120
- F08 FA201
- F11 FA200\*

#### Shell Color

- 01 Black

#### Out Position Color

- 01 Black

#### In Position Color

- 02 White
- 06 Yellow
- 07 Blue
- 08 Green
- 12 Orange

\*Button options for central mounting configurations, use 'FG' for central mount with chrome dress nut, use 'FA200' for central mount with black dress nut.

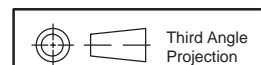
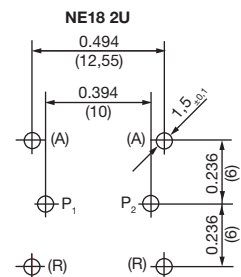
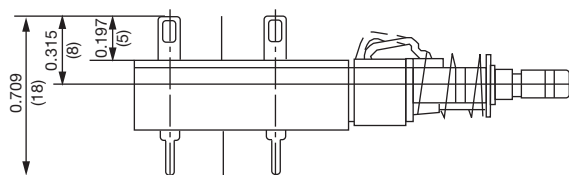
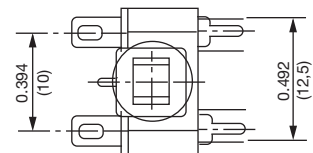
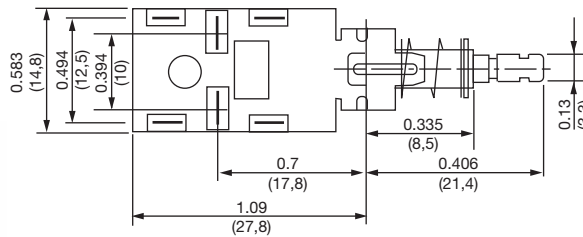
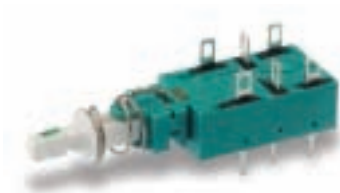
### BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.

## DESIGNATION & SWITCHES WITH STANDARD OPTIONS



### NE1838EE



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



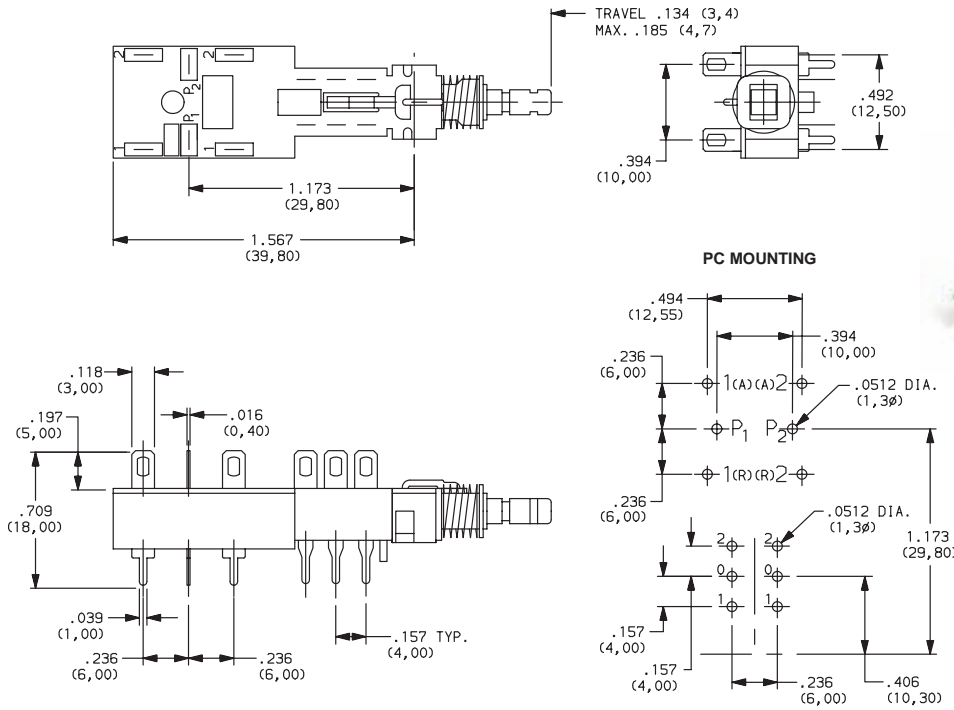
Pushbutton  
A

# NE-18 Series Mains / Power Switches

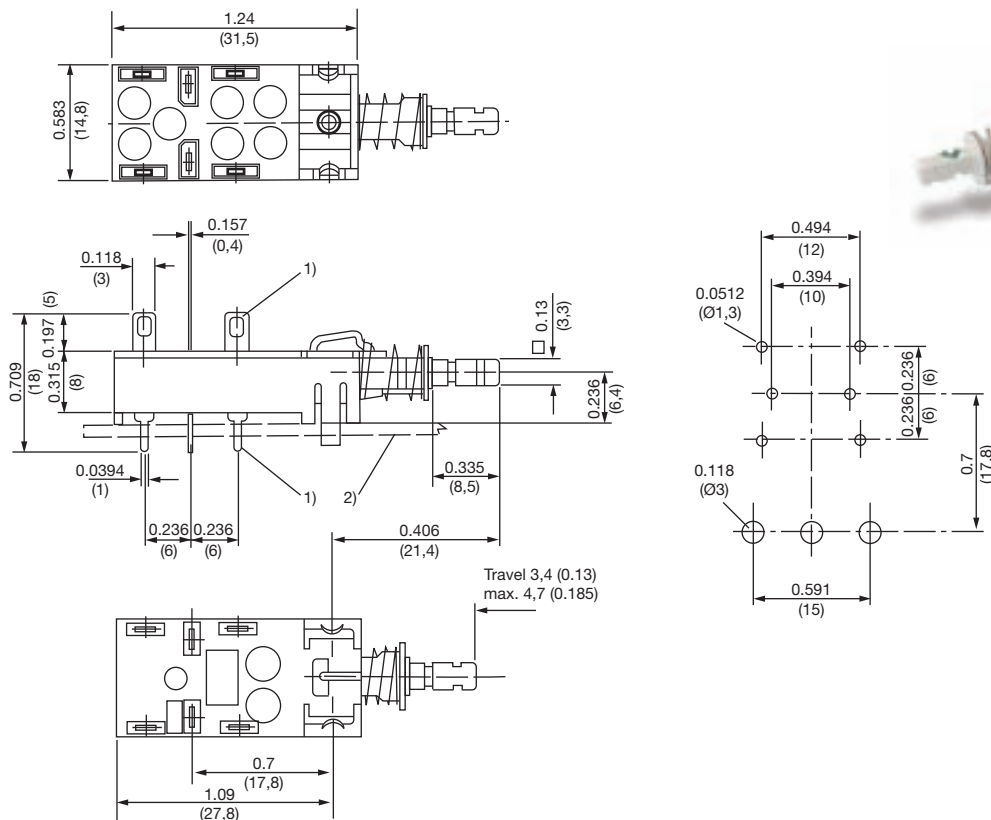
DESIGNATION & SWITCHES WITH STANDARD OPTIONS



## NE1839EE

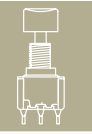


## NE1848EE



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

# NE-18 Series Mains / Power Switches



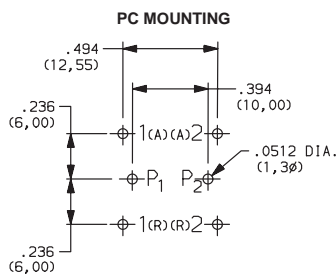
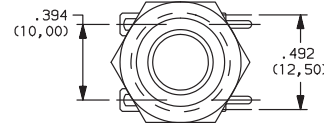
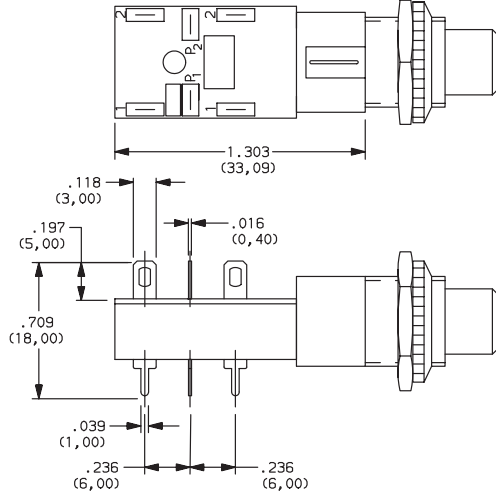
A

Pushbutton

DESIGNATION & SWITCHES WITH STANDARD OPTIONS



ZNE1838EECF0201



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



# NE-18 Series Mains / Power Switches

Pushbutton  
A

## CONTACT ARRANGEMENT



| OPTION CODE<br>Contact capacity<br>and availability | STYLE           | ELECTRICAL<br>CIRCUIT |
|---|-----------------|-----------------------|
| <b>37</b>   | NE18 – 2AX      | DPST                  |
| <b>38</b>   | NE18 – 2UX      | DPDT                  |
| <b>51</b>   | 2U + NE18 – 2AX | DPST*                 |
| <b>52 (4A/64)</b>                                   | NE18CTII – 2AX  | DPST                  |
| <b>39</b>   | 2U + NE18 – 2UX | DPDT*                 |
| <b>41</b>   | NE18 – 2AP      | DPST                  |
| <b>42</b>   | NE18 – 2UP      | DPDT                  |
| <b>43</b>   | NE18 – 2AW      | DPST                  |
| <b>44</b>   | NE18 – 2UW      | DPDT                  |
| <b>45</b>   | NE18 – 2ASX     | DPST                  |

| OPTION CODE<br>Contact capacity<br>and availability | STYLE               | ELECTRICAL<br>CIRCUIT |
|---|---------------------|-----------------------|
| <b>46</b>   | NE18 – 2USX         | DPDT                  |
| <b>47</b>   | NE18 – 2ASP         | DPST                  |
| <b>48</b>   | NE18 – 2USP         | DPDT                  |
| <b>49</b>   | NE18 – 2ASW         | DPST                  |
| <b>50</b>   | NE18 – 2USW         | DPDT                  |
| <b>53 (4A/64)</b>                                   | 2U + NE18CTII – 2AX | DPST                  |
| <b>54</b>   | 2U + NE18 – 2AW     | DPST                  |
| <b>55</b>   | 2U + NE18 – 2AP     | DPST                  |
| <b>56</b>   | 2U + NE18 – 2UW     | DPDT                  |
| <b>57</b>   | 2U + NE18 – 2UP     | DPDT                  |

- \* 2U + Denotes auxiliary set of low current contacts DPDT  
 2A = DPST  
 2U = DPDT  
 S = Snap-in mounting  
 X = Solder lug/PC pins  
 W = Solder lugs only  
 P = PC pins only

### NOTES

- Contact plating is silver on all Power Switches.
- The electrical function is Break Before Make (BBM) on all Power Switches.
- The terminals will be epoxy sealed.

| TYPE     | POSSIBLE CONTACT ARRANGEMENT |                    | CONTACT SPACING          | PROTECTION CLASS<br>(CEE 24) | APPROVALS   |
|----------|------------------------------|--------------------|--------------------------|------------------------------|---|
|          | POWER CONTACTS <sup>1</sup>  | AUXILIARY CONTACTS |                          |                              |   |
| NE18     | 2A <sup>2</sup>              | 2U                 | > 3mm<br>(.118 inch)     | II                           | VDE, BSI, DEMKO,<br>NEMKO, SEMKO, SEV,<br>CSA, UL                     |
| NE18     | 2A <sup>2</sup><br>2U        | 2U                 | > 3mm (m)<br>(.118 inch) | I                            | VDE, MEEI, BSI <sup>3</sup> ,<br>DEMKO, NEMKO,<br>SEMKO, SEV, CSA, UL |
| NE18CTII | 2A <sup>2</sup>              | 2U                 | > 3mm<br>(.118 inch)     | II                           | VDE, BSI, DEMKO, CSA,<br>SEMKO, SEV, UL, NEMKO                        |

- 1) A = make contact, R = break contact, U = changeover contact, m = VDE sign for switches with a contact spacing (air gap) < 3mm (.118 inch) according to VDE 0630/CEE 24.
- 2) With 2A mains contacts: Mounting only by PC pins is not sufficient.
- 3) BSI only for 2U mains contacts.

## MECHANICAL FUNCTION



| OPTION CODE | FUNCTION              |
|-------------|-----------------------|
| <b>OA</b>   | Momentary             |
| <b>EE</b>   | Alternate (push-push) |



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

# NE-18 Series Mains / Power Switches



A

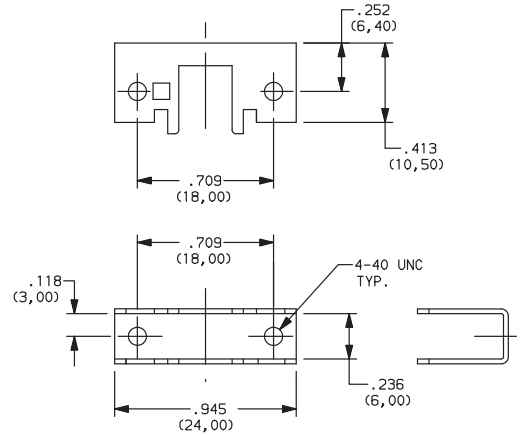
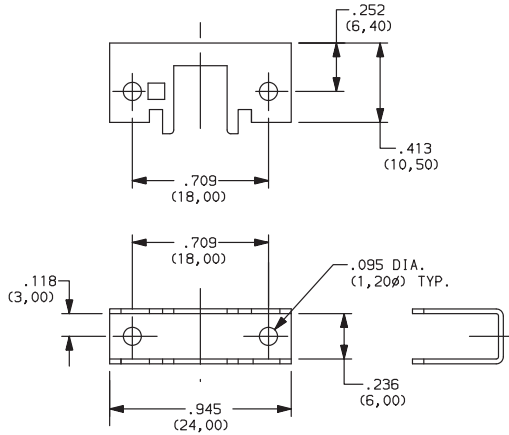
Pushbutton

## SINGLE STATION CHASSIS

01 WITH .094 MOUNTING HOLES

(NONE) NO CHASSIS

02 WITH 4-40 TAPPED MOUNTING HOLES



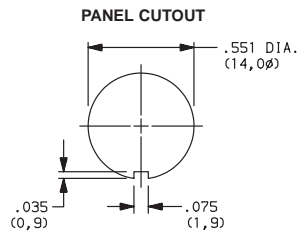
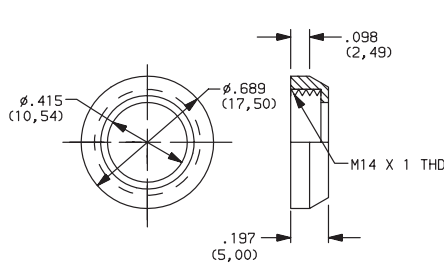
03 SPECIAL CHASSIS (CONSULT FACTORY)

## DRESS NUT

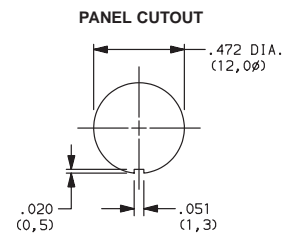
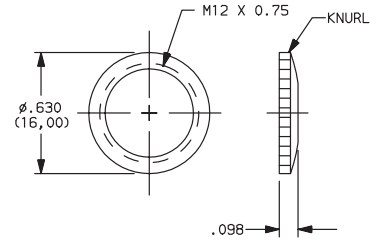
(NONE) NO DRESS NUT

B BLACK

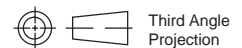
C CHROME



NOTE: Available with ZNE18 designation and FA200 buttons.



NOTE: Available with ZNE18 designation and FG button.



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



# NE-18 Series Mains / Power Switches

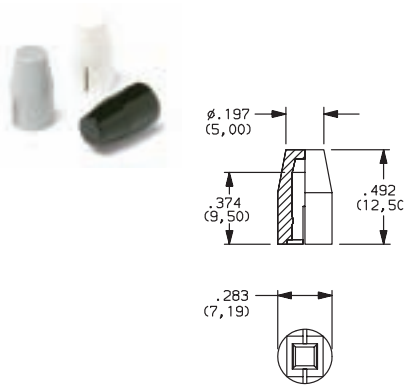
SOLID BUTTON

Pushbutton

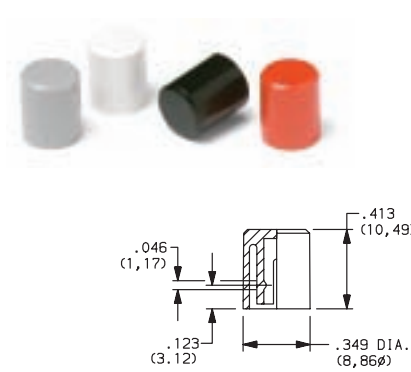
A

## STYLE

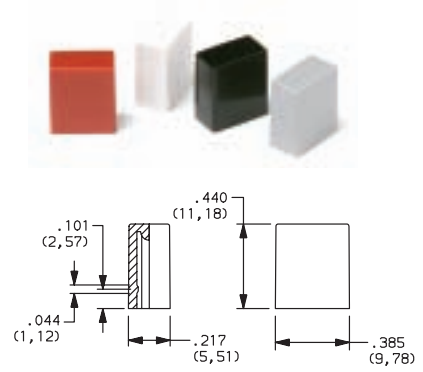
**F01** FMR



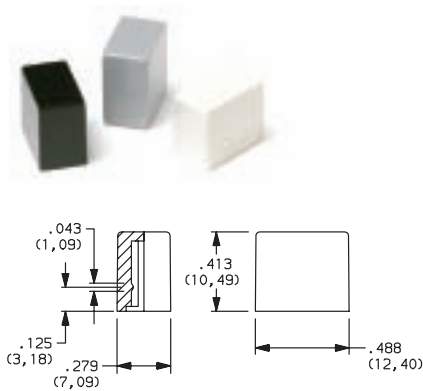
**F02** FG



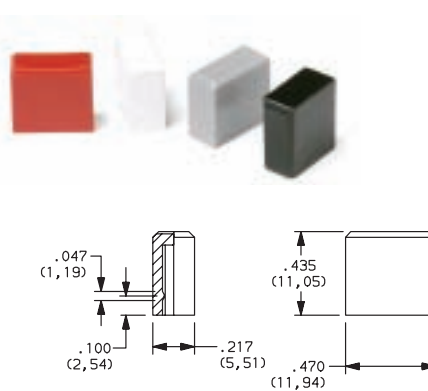
**F12** FSC



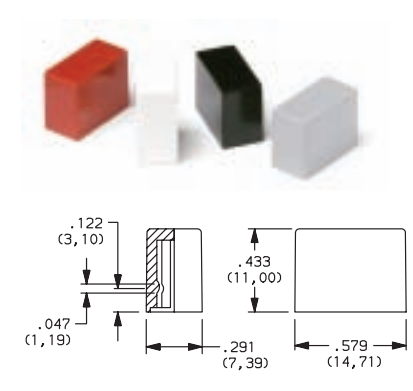
**F13** FSD



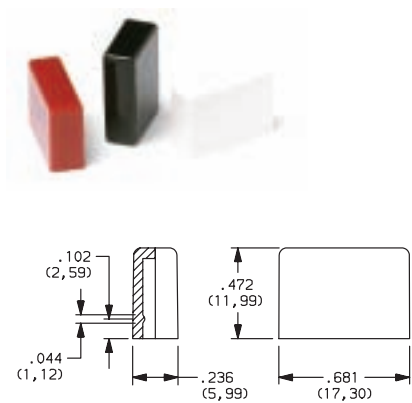
**F14** FU12



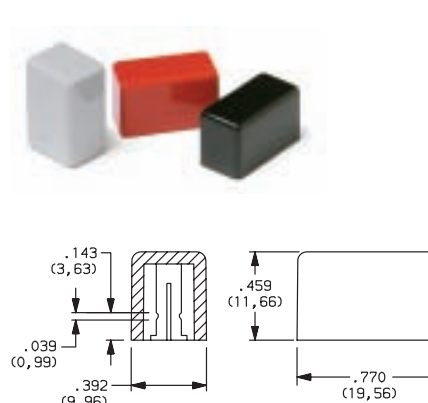
**F15** FSB



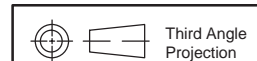
**F16** FE



**F19** FA



| OPTION CODE | COLOR    |
|-------------|----------|
| 01          | BLACK    |
| 02          | WHITE    |
| 03          | RED      |
| 04          | LT. GRAY |



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

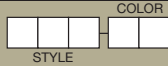
**C&K**

# NE-18 Series Mains / Power Switches



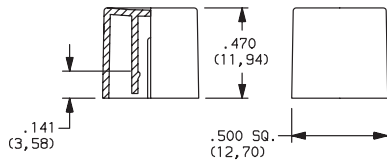
A  
Pushbutton

## SOLID BUTTON



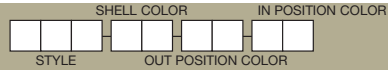
### STYLE

**F21** F001



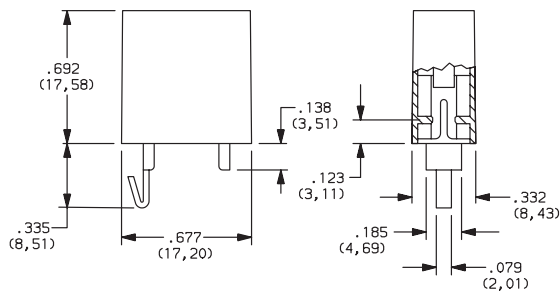
| OPTION CODE | COLOR   |
|-------------|---|
| <b>01</b>   | BLACK   |
| <b>02</b>   | WHITE   |
| <b>03</b>   | RED   |
| <b>04</b>   | LT. GRAY                                      |
| <b>09</b>   | BLACK/CHROME<br>(F03, F06 & F07 buttons only) |

## MECHANICAL BUTTON

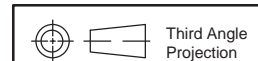
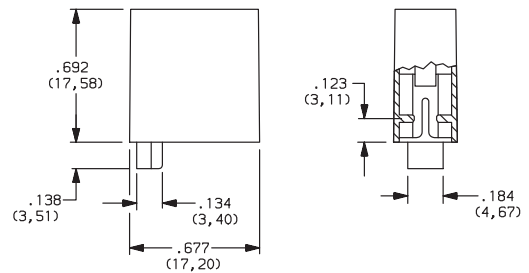


### STYLE

**F01** FA100



**F02** FA101



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

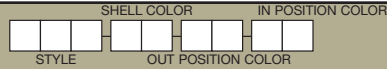




# NE-18 Series Mains / Power Switches

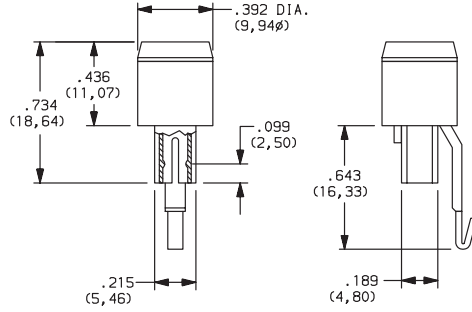
A  
Pushbutton

## MECHANICAL BUTTON

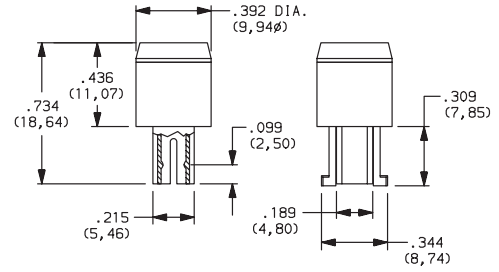


### STYLE

**F08** FA201



**F11** FA200



### SHELL COLOR

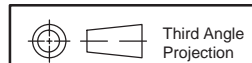
**01** BLACK

### OUT POSITION COLOR

**01** BLACK

### IN POSITION COLOR

| OPTION CODE | COLOR  |
|-------------|--------|
| <b>02</b>   | WHITE  |
| <b>06</b>   | YELLOW |
| <b>07</b>   | BLUE   |
| <b>08</b>   | GREEN  |
| <b>12</b>   | ORANGE |



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