# C&K Switches Catalog

Pushbutton

Tactile

Navigation

Keyswitch

Detect

Toggle

Rocker

Dip

Slides

Snap

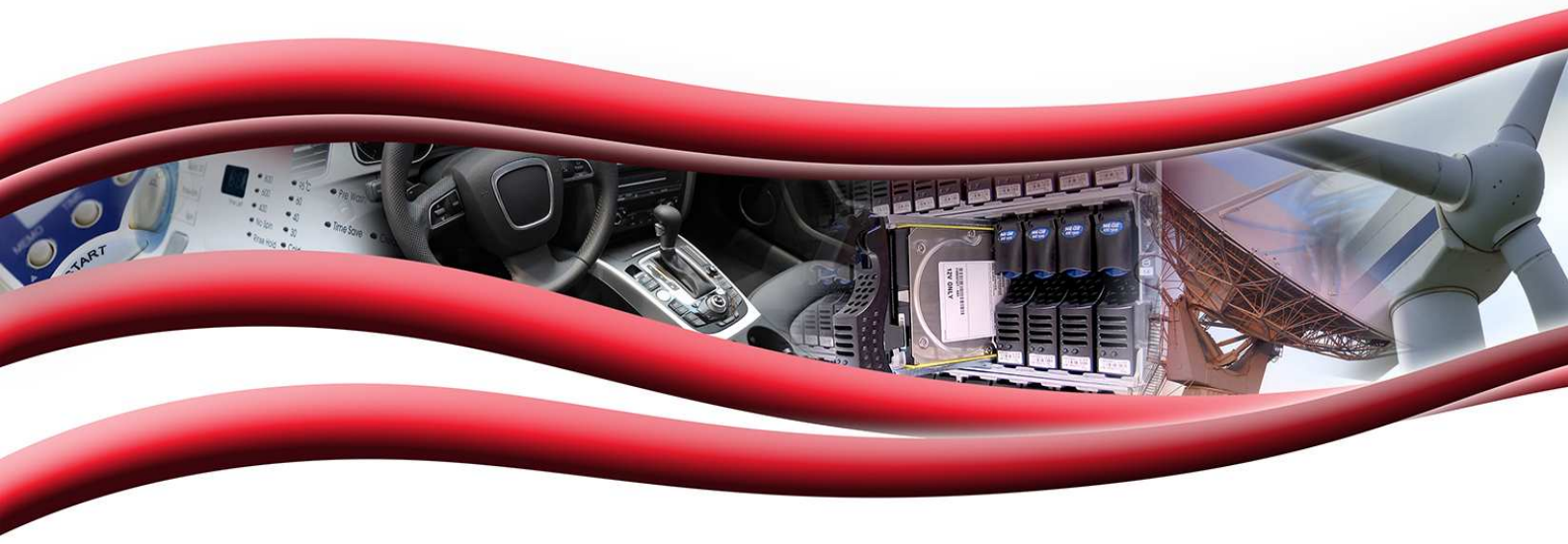
Rotary

Rotary (Encoder)

Switchlock

Thumbwheel

Smartcard Connector



# Pushbutton
# Product Selection Guide

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

| Pushbutton | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Series** | **8600** | **8700** | **GP** | **PN** | **PHB** | **F** | **NE-18** |
| **Switch Type** | Micro-miniature | Over Travel | Ultra-miniature | Alternate & Mom. Action | Short Stroke | Alternate & Mom. Action | Mains / Power |
| **Poles/Throws** | SPST | SPST | SPST, SPDT | SPDT, DPDT, 4PDT | DPDT, 4PDT | DPDT, 4PDT, 6PDT, 8PDT, 10PDT | DPST, DPDT Varied |
| **Max. Current** | 500 mA | 1 Amp | 0.4 VA | 200 mA | 100 mA | 500 mA | 6 A |
| **Process Sealed** | | | • | | | | |
| **PCB Mount Options** | | | | | | | |
| Thru-hole | • | • | • | • | • | • | • |
| Vertical | • | • | • | | | | |
| Right Angle | | | • | • | • | • | • |
| Surface Mount | | | • | | | | |
| **Panel Mount** | • | • | | | | • | • |
| **Page No.** | A-71 | A-74 | A-77 | A-81 | A-84 | A-87 | A-96 |

# Pushbutton
# Product Selection Guide

| Pushbutton | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Series** | **FP** | **AP** | **APB** | **HP** | **NP** | **PBA** | **PB** | **PS** |
| **Switch Type** | Ultra Miniature | Industrial | Industrial | Hall Effect | Sealed Power | Snap-acting Mom. | Miniature | Sub-miniature Microminiature |
| **Poles/Throws** | SPST | SPST | SPST | Linear Output | SPDT | DPST | DPDT 4PDT | SPDT DPDT |
| **Max. Current** | 0.4 VA | 400mA | 400mA | 10 mA | 5 Amp | 250mA | 0.3A / 1A | 0.1 / 1A 0.3 / 2A |
| **Process Sealed** | • | IP67 | IP67 | IP68 | IP68 | | | |
| **PCB Mount Options** | | | | | | | | |
| Thru-hole | • | • | • | | • | • | • | • |
| Vertical | • | • | • | • | • | | | • |
| Right Angle | • | | | | | • | • | • |
| Panel Mount | | • | • | • | • | | | • |
| Wire Leads | | • | • | • | • | | | |
| Solder Lug | | • | • | | | | | |
| Surface Mount | | | | | | | | |
| Quick Connect | | | | | | | | |
| **Page No.** | A-105 | A-108 | A-114 | A-118 | A-120 | A-127 | A-131 | A-139 |

# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

**LEAD FREE COMPATIBLE OPTION**

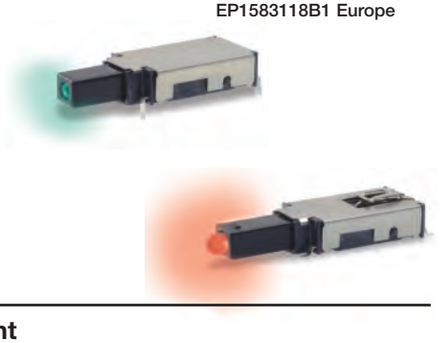
## Features/Benefits

- *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*

Patent Numbers
6,974,924 B2 US
EP1583118B1 Europe



## Materials

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

## 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: ≥ $10^9$ Ω
BOUNCE TIME: ≤1 ms
LED SPECIFICATIONS: See page A-5

## 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)

## 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

## 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

## 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.

| E | L | U | M | | | | | Q | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ELUM** ELUM Series

**Switch Function**
**OA** Momentary
**OC*** ** Momentary short travel
**EE** Latching (push-push)

**Terminal Style**
**TH** Right Angle, PC thru-hole
**SA** Right Angle, surface mount

**Contact Material***
**Q** Silver with gold flash

**Illumination**
**(NONE)** Models without illumination
**1** LED White
**2** LED Bi-color – Red (Green)
**3** LED Red
**5** LED Amber
**6** LED Green
**7** LED Blue
**8** LED Bi-Color – Amber (Green)

**Actuator Style****
**C02** Black without window
**C12** Black with window
**C22** Black with window and snap feature for custom actuators

* Other plating options available, please contact Customer Service.
** Custom actuators available, please contact Customer Service.
*** Short travel available in momentary only.

Third Angle Projection

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

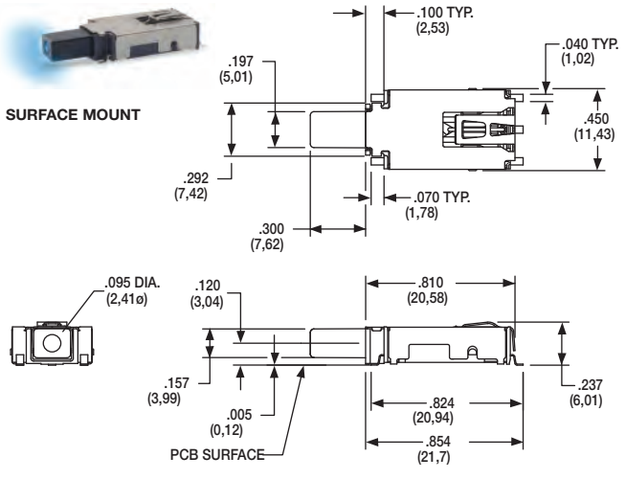
# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

## STANDARD OPTIONS

### ELUMEESAQ7C12



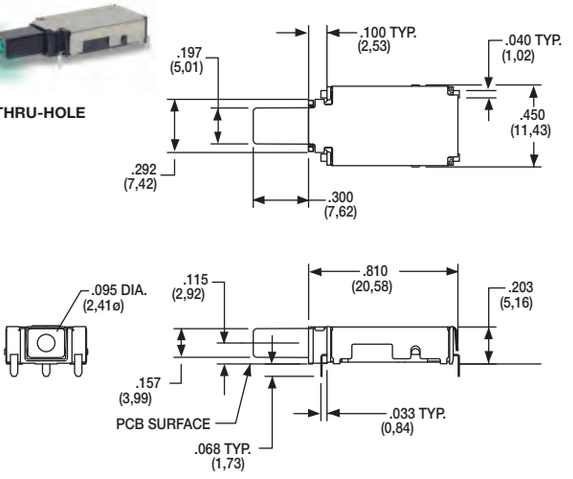
SURFACE MOUNT




ACTUATOR SHOWN EXTENDED POSITION

### ELUMOATHQ6C12

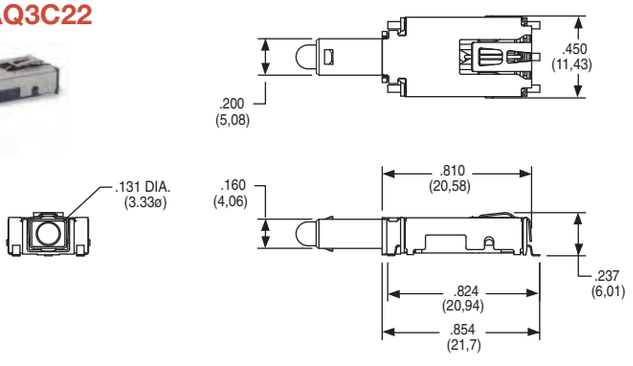
PC THRU-HOLE




ACTUATOR SHOWN EXTENDED POSITION

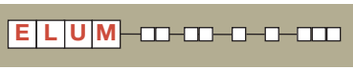
### ELUMEESAQ3C22

SURFACE MOUNT



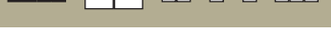

ACTUATOR SHOWN EXTENDED POSITION

## DESIGNATION

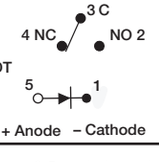



**ELUM** ELUM SERIES, Illuminated Latching Pushbutton

## SWITCH FUNCTION



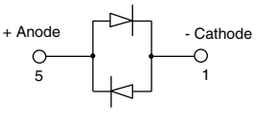
| OPTION CODE | NO. OF POLES | POSITION 1 SWITCH FUNCTION | POSITION 1 CONNECTED TERMINALS | POSITION 2 SWITCH FUNCTION | POSITION 2 CONNECTED TERMINALS | SCHEMATIC |
|---|---|---|---|---|---|---|
| OA / OC | SP Momentary | ON | 3 – 4 | ON (Mom.) | 3 – 2 | SPDT |
| EE | SP Latching (Push-Push) | ON |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



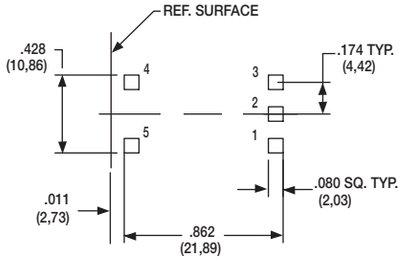

Third Angle Projection

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

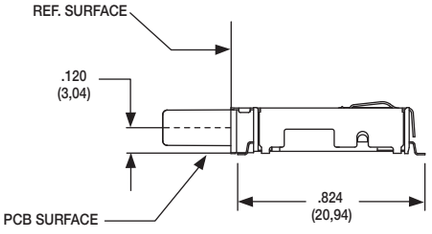
# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

## TERMINAL STYLE

**SA** RIGHT ANGLE, SURFACE MOUNT

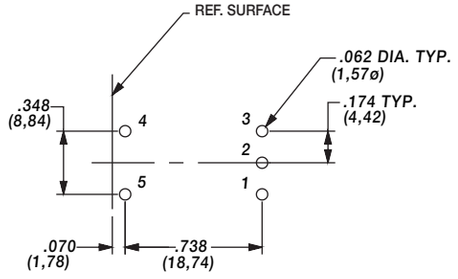


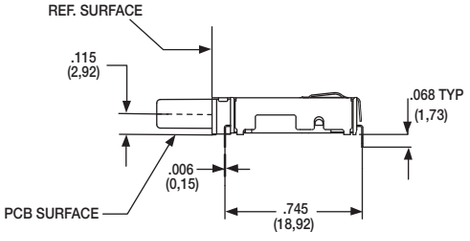

PCB MOUNTING




Terminal 5 = LED Anode

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




Terminal 5 = LED Anode

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL | TERMINAL PLATING | RATINGS |
|---|---|---|---|
| Q | SILVER WITH GOLD FLASH | SILVER | 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* MIN | MAX | PEAK WAVELENGTH | Vf Forward Voltage |
|---|---|---|---|---|---|
| | | (mcd) | | (nm) | |
| 0 | Model without illumination | N/A | | N/A | |
| 1 | LED Super White | 4,000 | 5,000 | N/A | 3.5 |
| 2 | LED Bi-Color – Red (Green) | 10 | 20 | 635/565 | 2.0 |
| 3 | LED Red | 4 | 8 | 700 | 2.0 |
| 5 | LED Amber | 35 | 50 | 610 | 2.0 |
| 6 | LED Green | 35 | 50 | 565 | 2.0 |
| 7 | LED Super Blue | 800 | 1,500 | 470 | 3.8 |
| 8 | 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.

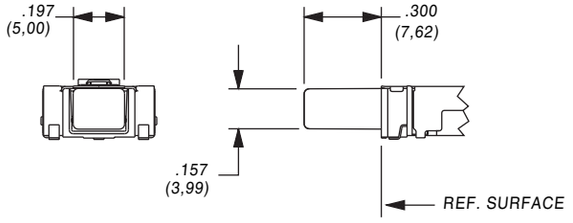
Third Angle Projection

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

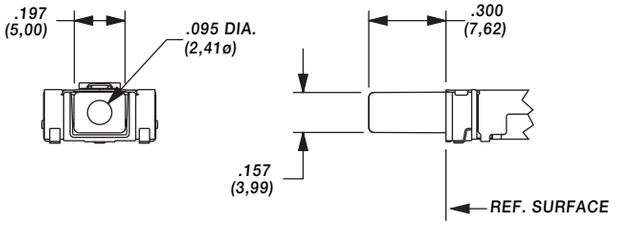
# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

## ACTUATOR STYLE*

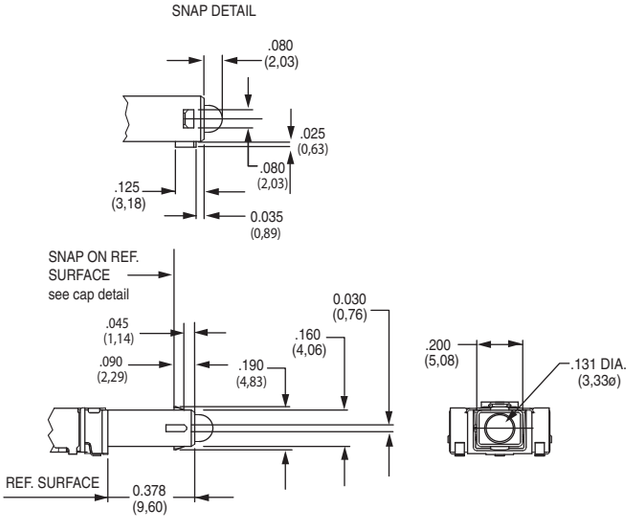
### C02 BLACK WITHOUT WINDOW




### C12 BLACK WITH WINDOW

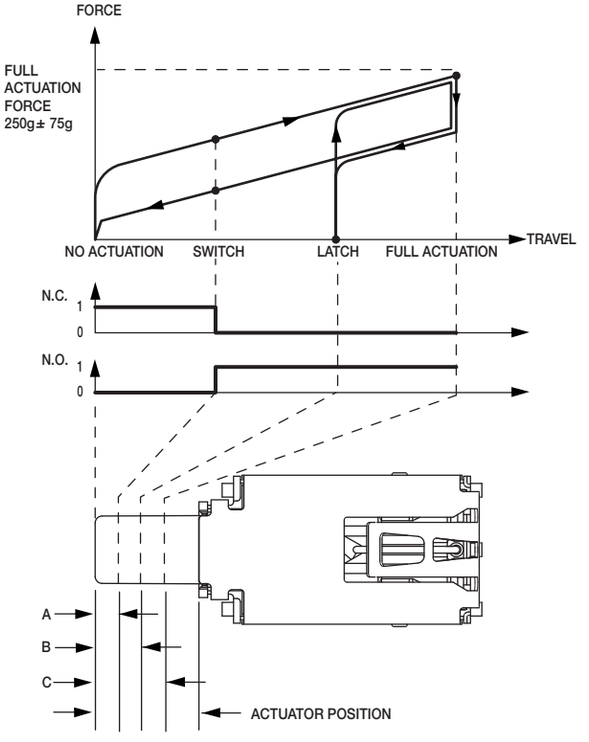



### C22 BLACK WITH WINDOW AND SNAP FEATURE TO ACCEPT CUSTOM CAP




* Custom actuators available, please contact Customer Service.

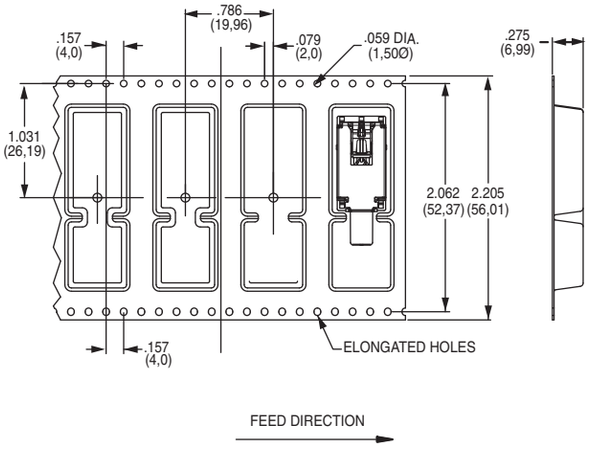
## FORCE TRAVEL DIAGRAM




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

| OC ACTUATOR POSITION | | | |
|---|---|---|---|
| A | SWITCH POINT | .067 ±.020 | 1,7 ± 0.5mm |
| C | FULL ACTUATION | .098 ±.020 | 2,5 ± 0.5mm |

## TAPE & REEL




Third Angle Projection

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

# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

## AVAILABLE HARDWARE

**Cap**

**PART NO.**

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

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

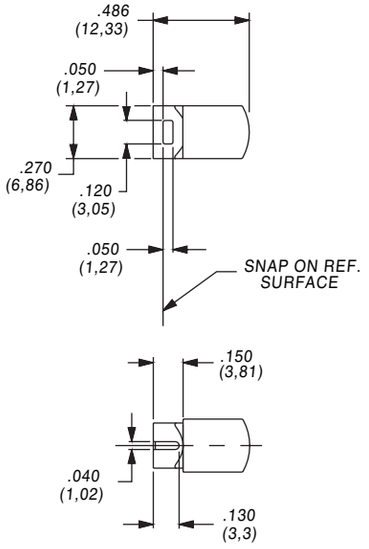
Material: 4/6 Nylon SMT compatible

**Cap**

**PART NO.**

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

Material: Clear polycarbonate




**Cap**

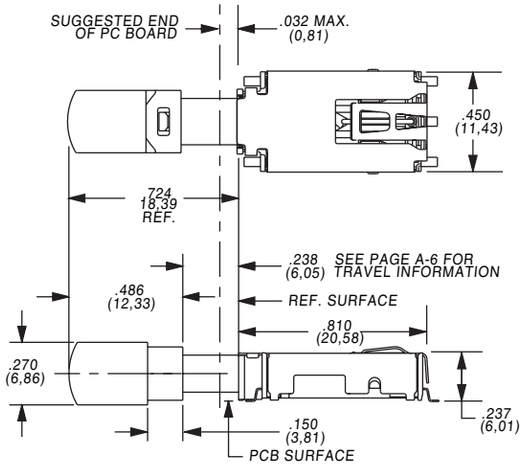
**PART NO.**

**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.

## CAP INSTALLATION




*VIEW WITH 957C CAP INSTALLED*

Third Angle Projection

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

# EP Series
# Sealed Tiny Pushbutton Switches

## *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***

c UL us
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. 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: $10^9$ 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 EP11 / EP12 models; glass filled nylon 6/6 on EP21.

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.

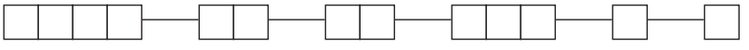
**NOTE:** Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

**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.



**Switch Function**
**EP11** SPST Off-Mom.
**EP12** SPDT On-Mom.
**EP21** DPST Off-Mom.

**Plunger**
**S** .215" high
**S1** .110" high
**S2** .465" high
**FP** Flush
**R** Snap-fitting, .215 high

**Bushing**
**D1** Unthreaded

**Terminations**
**A** Right angle, PC thru-hole
**C** PC Thru-hole
**AV** Vertical right angle, PC thru-hole
**AV3** Vertical right angle, snap-in, PC thru-hole
**SA** Right angle, surface mount
**SA1** Right angle, surface mount rear facing
**V3** Vertical mount, v-bracket
**V31** Vertical mount, v-bracket, snap-in (EP11 & EP12 only)
**W** Wire wrap

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

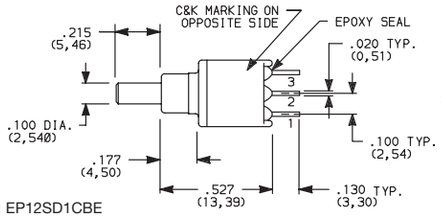
**Seal**
**E** Epoxy

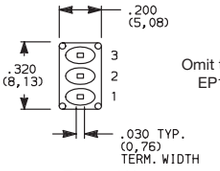
# EP Series
# Sealed Tiny Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking on opposite side) | SWITCH FUNCTION POS. 2 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 1 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 2 (C&K marking on opposite side) | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | EP11 | OFF | MOM. | OPEN | 1-3 | SPST 1 3 |
| | EP12 | ON | MOM. | 2-1 | 2-3 | SPDT NC 1, 2 (COMM), 3 NO |

### SPDT



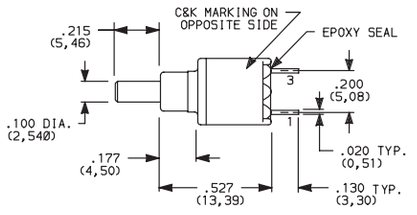

Omit terminal 2 for EP11 models.

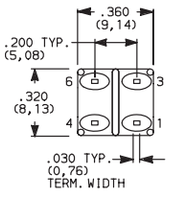
Terminal Nos. For Reference Only

Part number shown: EP12SD1CBE

| | | | | | | |
|---|---|---|---|---|---|---|
| DP | EP21 | OFF | MOM. | OPEN | 1-3,4-6 | DPST 1 3 4 6 |

### DPST




Terminal Nos. For Reference Only

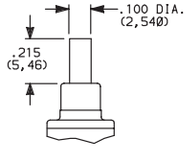
Part number shown: EP21SD1CBE

MOM. = Momentary

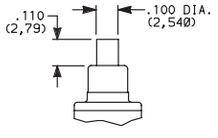
All models cULus with all options when ordered with G, Q, R or S contact material.

## PLUNGER

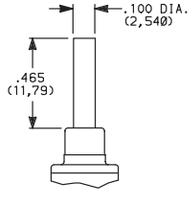
**S** .215" HIGH



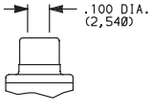

**S1** .110" HIGH



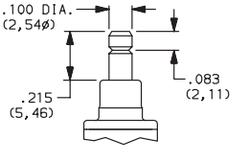

**S2** .465" HIGH




**FP** FLUSH PLUNGER




**R** SNAP-FITTING



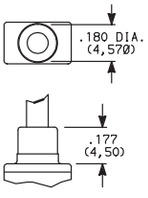

S1& S2 actuators are not available with EP12 & EP21 models.

FP & R actuators are not available with EP21 model.

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

## BUSHING

**D1** UNTHREADED



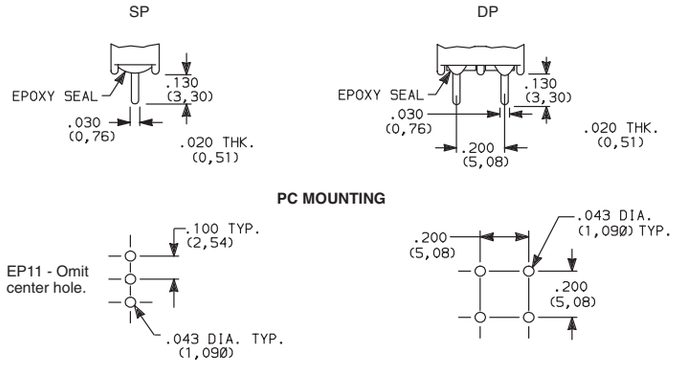

**NOTE:** Internal actuator o-ring standard.

Third Angle Projection

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

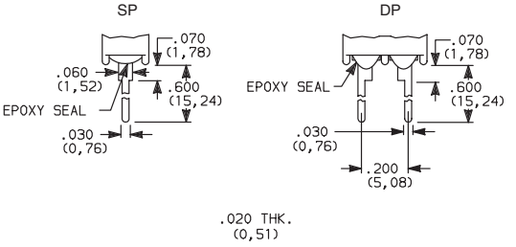
## TERMINATIONS

### C PC THRU-HOLE



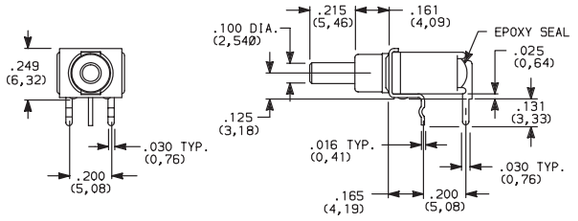

**SP and DP**

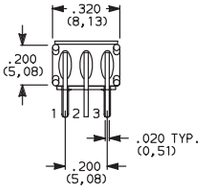
### W WIRE WRAP



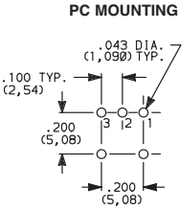

**SP and DP**

### A RIGHT ANGLE, PC THRU-HOLE



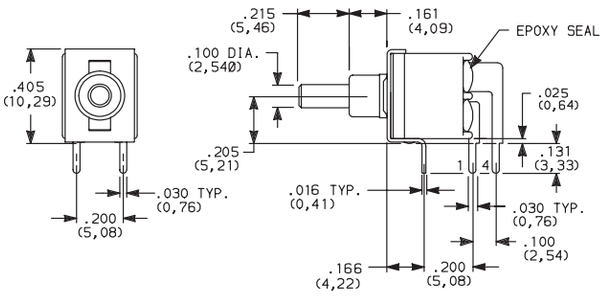

EP11 Models:
omit terminal 2.

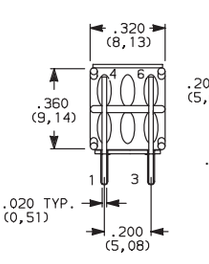


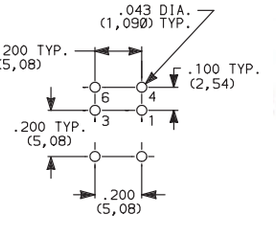

EP11 Models:
omit thru-hole 2.

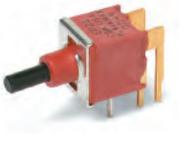
EP12SD1ABE
**SPDT**

### A RIGHT ANGLE, PC THRU-HOLE



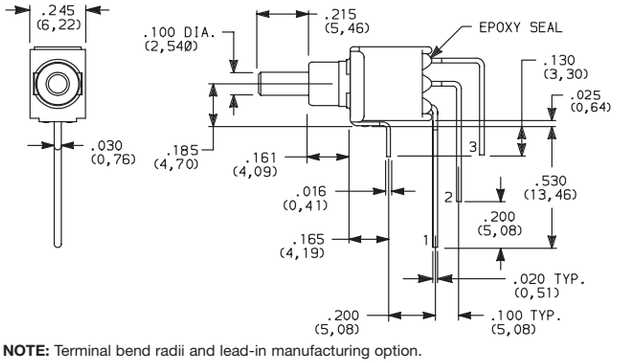



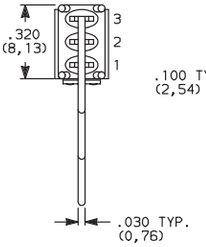



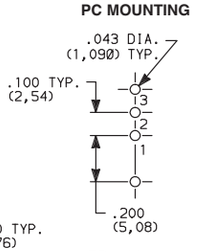
EP21SD1ABE
**DPST**

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




EP11 Models:
omit terminal 2.




EP11 Models:
omit hole 2.

EP12SD1AVBE
**SPDT**

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

Third Angle
Projection

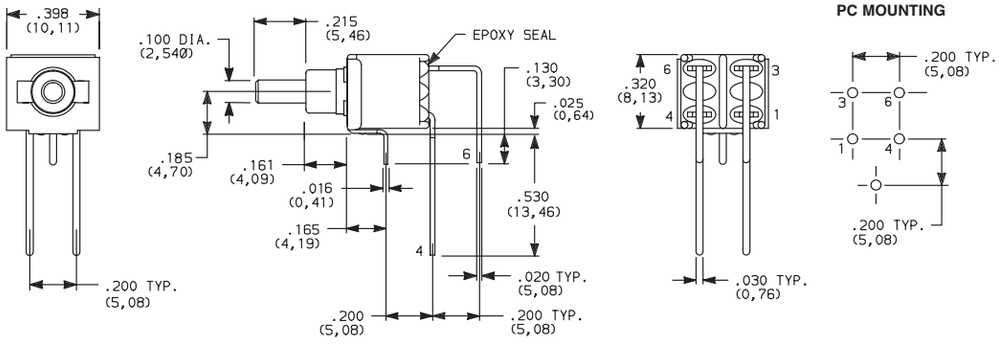
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# EP Series
# Sealed Tiny Pushbutton Switches

## TERMINATIONS

### AV VERTICAL RIGHT ANGLE, THRU-HOLE

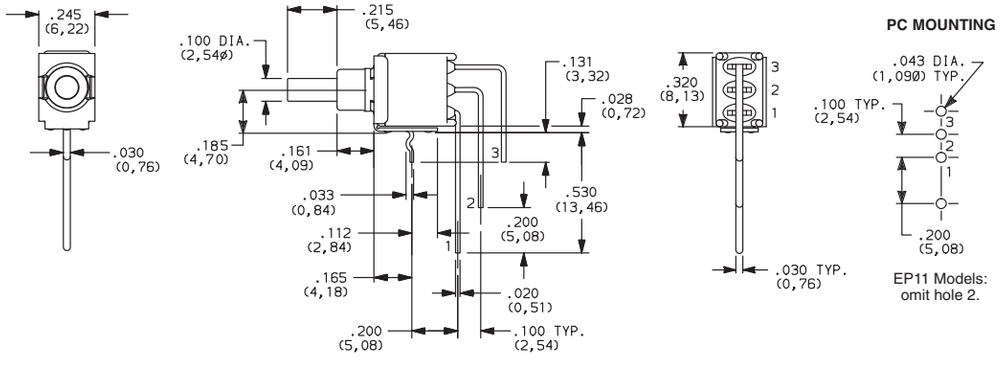
EP21SD1AVBE
**DPST**




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

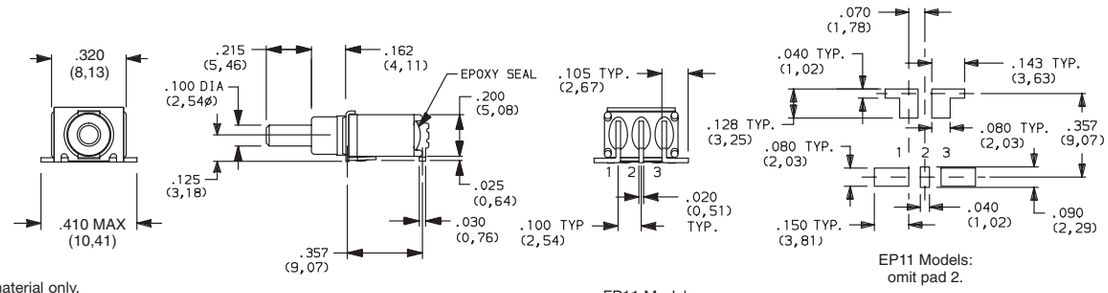
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

EP12SD1AV3BE
**SPST**




### SA RIGHT ANGLE, SURFACE MOUNT

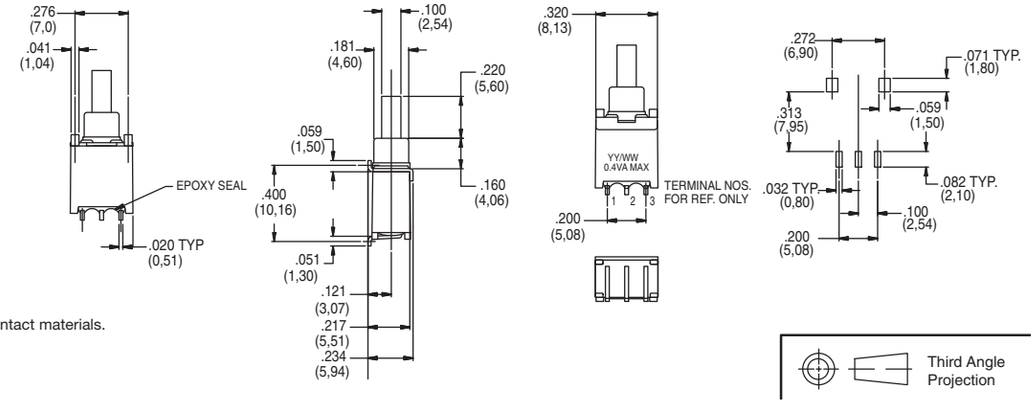
EP12SD1SAPE
**SPDT**




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

### SA1 RIGHT ANGLE, SURFACE MOUNT

EP12SD1SA1BE
**SPDT**




SA1 is only available with B and P contact materials.
Not Available on DPST models.

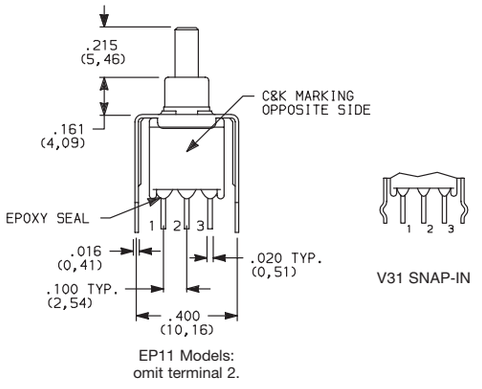
Third Angle Projection

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

## TERMINATIONS

**V3** VERTICAL MOUNT, V-BRACKET

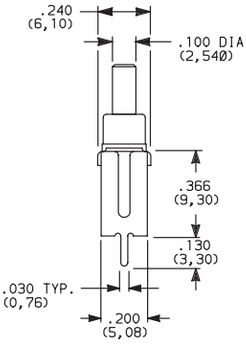
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN



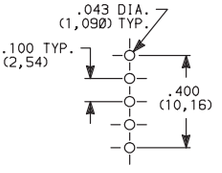

EP11 Models:
omit terminal 2.




V31 SNAP-IN




**PC MOUNTING**

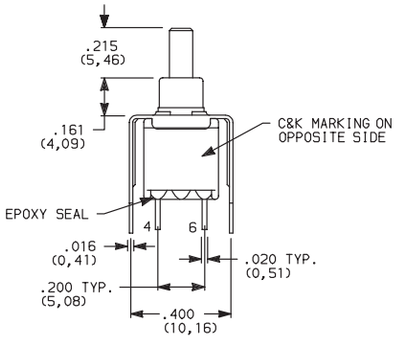


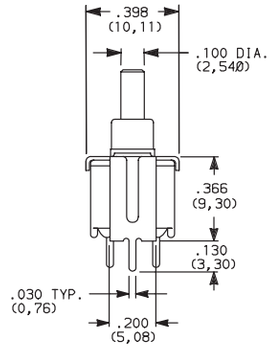

EP11 Models:
omit centerhole.

EP12SD1V3BE
**SPDT**

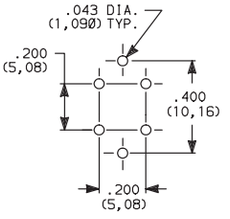
---

**V3** VERTICAL MOUNT, V-BRACKET




**PC MOUNTING**



EP21SD1V3BE
**DPST**

## CONTACT MATERIAL

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

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

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

[2] END CONTACTS: Coin silver, with gold plate over nickel plate.

[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

[4] END CONTACTS: Coin silver, silver plated.

[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

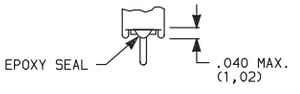
[6] TERMINALS: Copper alloy, with matte tin over nickel plate.

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

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

## SEAL

**E** EPOXY SEAL



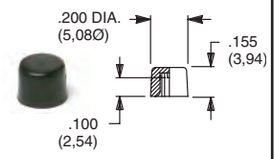

Third Angle Projection

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

# EP Series
# Sealed Tiny Pushbutton Switches

## AVAILABLE HARDWARE

**Cap**



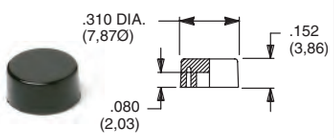

**PART NO.**

| | |
|---|---|
| 508101000 | WHITE |
| 508102000 | BLACK |
| 508103000 | RED |

Material: Nylon
Finish: Gloss

Not for use on S1 plunger

**Cap**



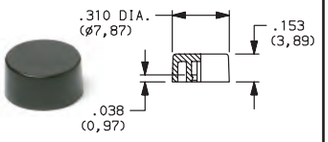

**PART NO.**

| | |
|---|---|
| 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.**

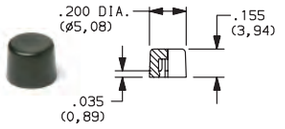



**PART NO.**

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

Material: Nylon
Finish: Gloss

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




**PART NO.**

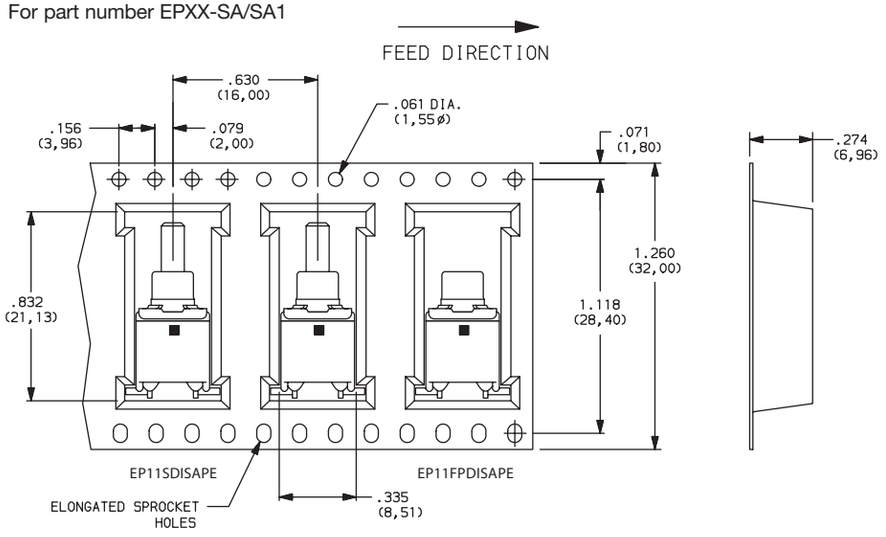
| | |
|---|---|
| 785A01000 | WHITE |
| 785A02000 | BLACK |
| 785A03000 | RED |

Material: Nylon
Finish: Gloss

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

## TAPE & REEL

For part number EPXX-SA/SA1




| 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*

# TP Series
# Tiny Pushbutton Switches

## 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: $10^9\Omega$ 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 4/6 or 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.

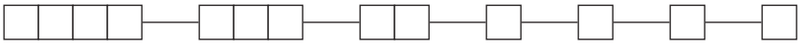
CENTER CONTACT & ALL TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page A-19 for additional contact materials.

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.



**Switch Function**
- **TP11** SPST Off-Mom.
- **TP12** SPDT On-Mom.
- **TP21** DPST Off-Mom.

**Actuator or Bushing**
- **SH** .155" high plunger, threaded, .220" high bushing, flat
- **SH8** .155" high plunger, unthreaded, .220" high bushing, round
- **SH9** .155" high plunger, unthreaded, .220" high bushing, flat
- **J81** Snap-in with frame
- **LT** .215" high plunger, threaded, .310" high bushing, flat
- **LT9** .215" high plunger, unthreaded, .310" high bushing, flat
- **MS9** .130" high plunger, .020" high bushing, round

**Terminations**
- **A** Right angle, PC thru-hole
- **C** PC Thru-hole
- **Z** Solder lug
- **AV** Vertical right angle, PC thru-hole
- **V3** Vertical mount, v-bracket
- **W** Wire wrap

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

**Seal**
- **E** Epoxy

**Cap Color**
- **2** Black
- **NONE** Models with no cap
- **1** White

**Frame Color**
- **2** Black
- **NONE** Models with no frame

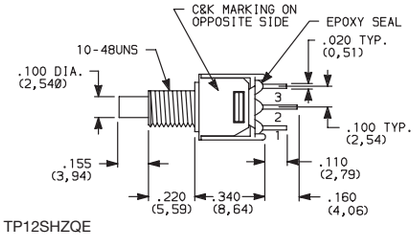
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

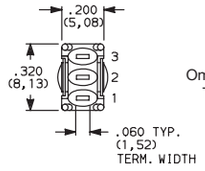
# TP Series
# Tiny Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking on opposite side) | SWITCH FUNCTION POS. 2 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 1 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 2 (C&K marking on opposite side) | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | TP11 | OFF | MOM. | OPEN | 1-3 | SPST 1 3 |
| | TP12 | ON | MOM. | 2-1 | 2-3 | SPDT NC 1, 2 (COMMON), 3 NO |

### SPDT



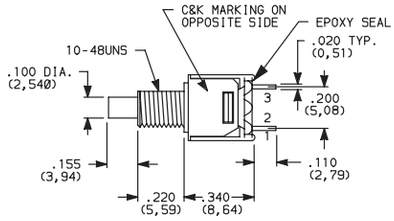

Omit terminal 2 for TP11 models.

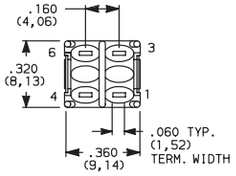
Part number shown: TP12SHZQE

Terminal Nos. For Reference Only

| | | | | | | |
|---|---|---|---|---|---|---|
| DP | TP21 | OFF | MOM. | OPEN | 1-3,4-6 | DPST 1 3 4 6 |

### DPST



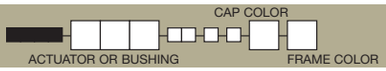

Terminal Nos. For Reference Only

Part number shown: TP21SHZQE

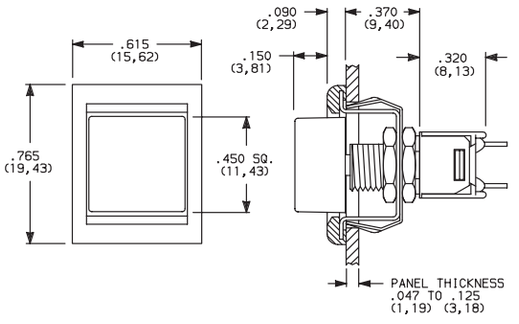
MOM. = Momentary

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

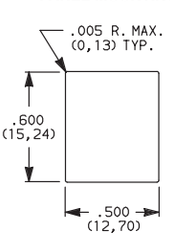
## ACTUATOR—SNAP-IN FRONT MOUNT




### J81 SNAP-IN WITH FRAME




**PANEL MOUNTING**




| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |

| OPTION CODE | FRAME COLOR |
|---|---|
| 2 | BLACK |
| NONE | 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-20.

Third Angle Projection

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

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

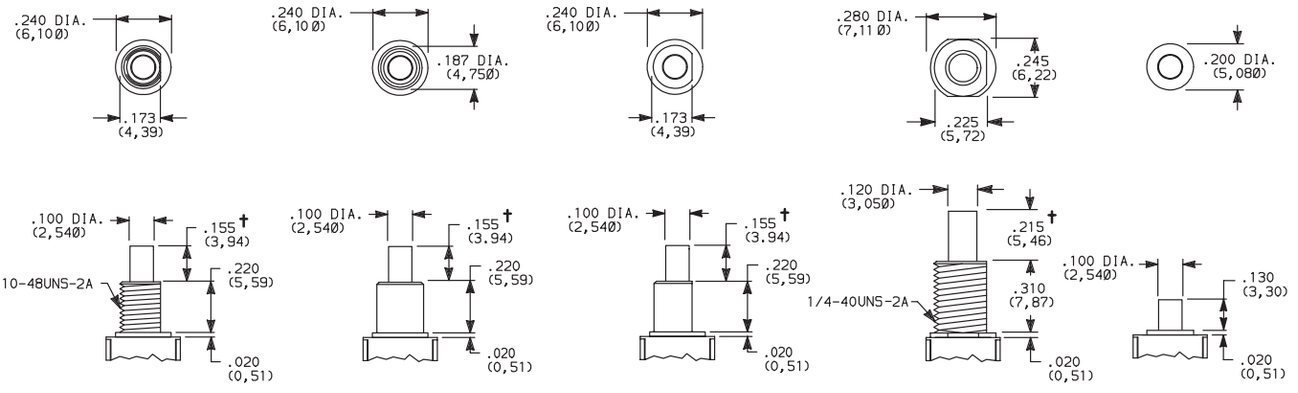
**SH8** .155" HIGH PLUNGER, .220" HIGH BUSHING, UNTHREADED

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

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

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

**MS9** .130" HIGH PLUNGER




Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

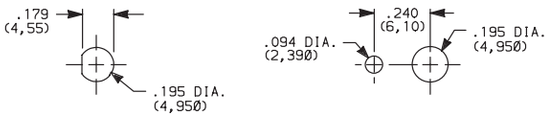
Not available with Z terminations.

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

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

**PANEL MOUNTING**

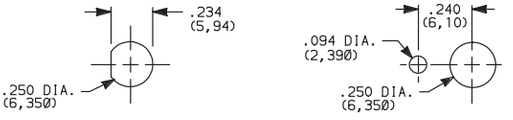
**10-48 BUSHING**




Without locking ring

With standard locking ring

**1/4 IN. BUSHING**



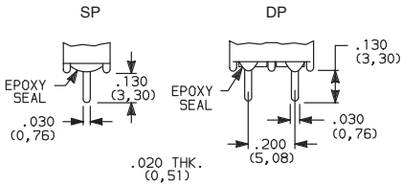

Without locking ring

With standard locking rin

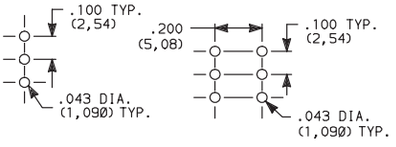
**NOTE:** One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see section "Technical Data and Additional Hardware".

## TERMINATIONS

**C** PC THRU-HOLE

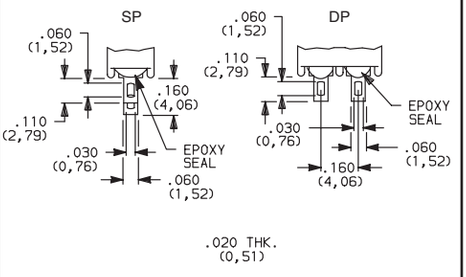



**PC MOUNTING**



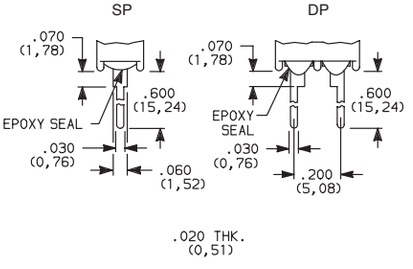

Omit center holes for TP11 models

**Z** SOLDER LUG




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

**W** WIRE WRAP




Third Angle Projection

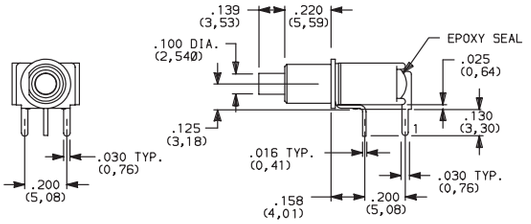
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

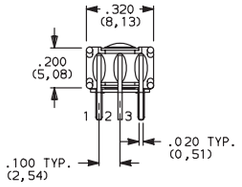
# TP Series
# Tiny Pushbutton Switches

## TERMINATIONS

### A RIGHT ANGLE, PC THRU-HOLE

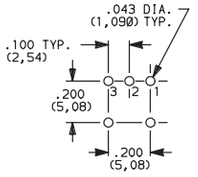
TP12SH9ABE
**SPDT**



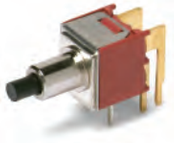

TP11 Models:
omit terminal 2.

PC MOUNTING

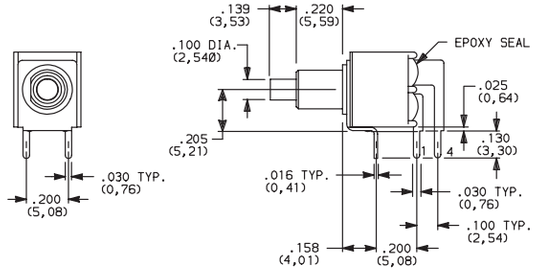


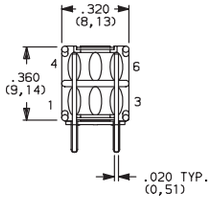

TP11 Models:
omit hole 2.

### A RIGHT ANGLE, PC THRU-HOLE

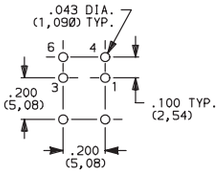


TP21SH9ABE
**DPST**



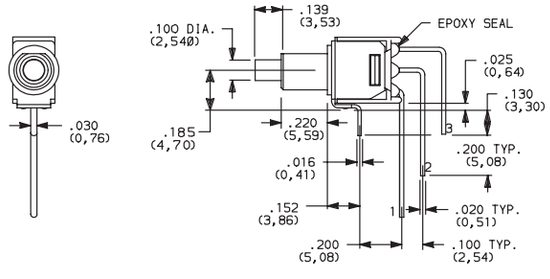




PC MOUNTING

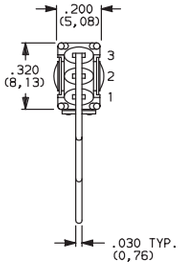



### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE

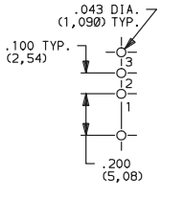
TP12SH9AVBE
**SPDT**




TP11 Models:
omit terminal 2.




PC MOUNTING

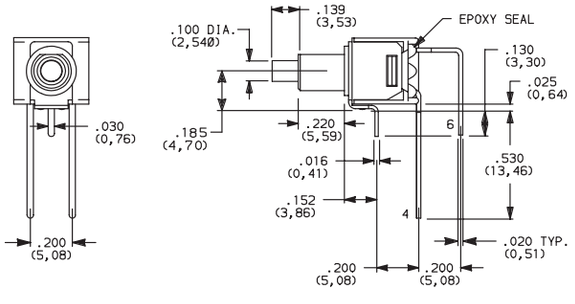


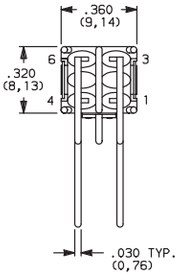

TP11 Models:
omit hole 2.

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

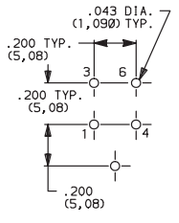
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE

TP21SH9AVBE
**DPST**




PC MOUNTING



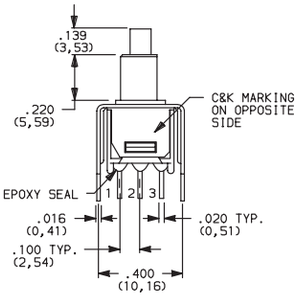

**NOTE:** Terminal bend radii and lead-in manufacturing option.

Third Angle Projection

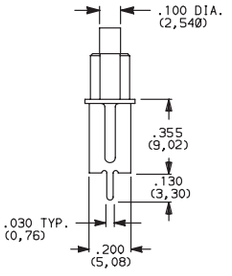
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

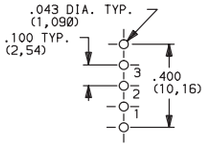
**V3** VERTICAL MOUNT, V-BRACKET




**TP11 Models:**
**omit terminal 2.**



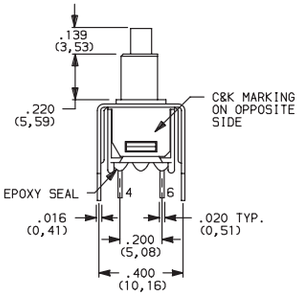

**PC MOUNTING**

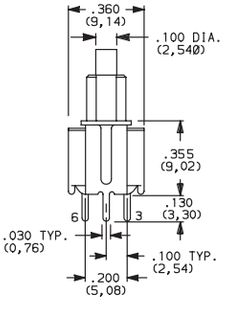



TP11 Models:
omit hole 2.

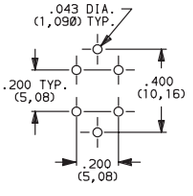
TP12SH9V3BE
**SPDT**

**V3** VERTICAL MOUNT, V-BRACKET




**PC MOUNTING**



TP21SH9V3BE
**DPST**

## CONTACT MATERIAL

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

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

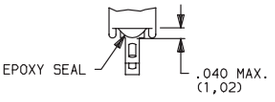
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] 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, 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.

## SEAL

**E** EPOXY SEAL



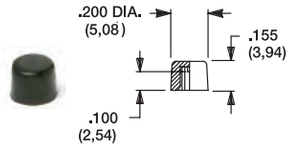

Third Angle Projection

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

# TP Series
# Tiny Pushbutton Switches

## AVAILABLE HARDWARE

**Cap, .100" DIA. Plungers**

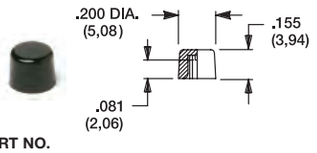



**PART NO.**

508101000 WHITE
508102000 BLACK

Material: Nylon
Finish: Gloss

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

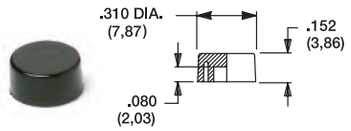



**PART NO.**

538701000 WHITE
538702000 BLACK

Material: Nylon
Finish: Gloss

**Cap, .100" DIA. Plungers**

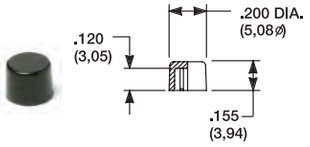



**PART NO.**

465801000 WHITE
465802000 BLACK

Material: Nylon
Finish: Gloss

**Cap, .120" DIA. Plungers**

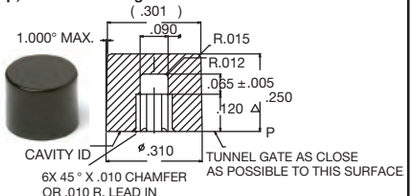



**PART NO.**

708901000 WHITE
708902000 BLACK

Material: Nylon
Finish: Gloss

**Cap, .120" DIA. Plungers**

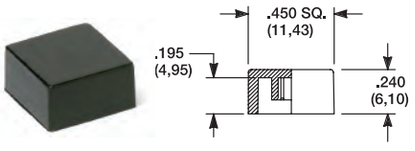



**PART NO.**

891D01000 WHITE
891D02000 BLACK

Material: Nylon
Finish: Gloss

**Cap, J81 option only**




**PART NO.**

484601000 WHITE
484602000 BLACK

Material: Nylon
Finish: Gloss

**PART NO.**

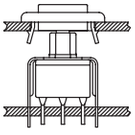
798201000 WHITE
798202263 BLACK

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.

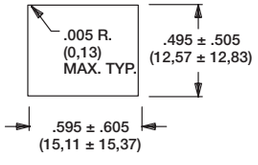
**TYPICAL APPLICATION**



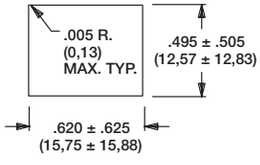
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

### PANEL MOUNTING

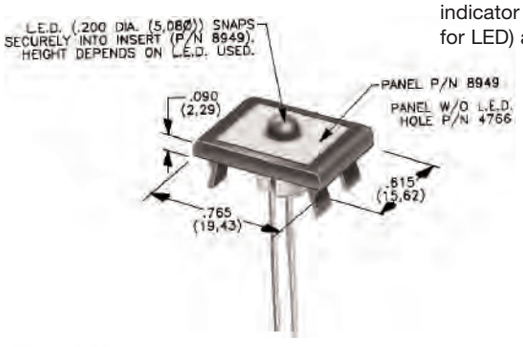
For part numbers
432502263, 432602263




For part numbers
432702263, 432802263




**Panel Inserts**




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.** | **PART NO.** |
| 894902000 | 476602000 BLACK |

Third Angle Projection

*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***

c UL us
Models Available

## 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: $10^9\Omega$ 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.

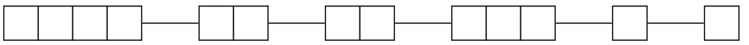
COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate. See page A-26 for additional contact materials.

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.



**Switch Function**
**E121** SPDT On-Mom. 1 Amp
**E221** DPDT On-Mom. 1 Amp
**E125** SPDT On-Mom. 0.4VA
**E225** DPDT On-Mom. 0.4VA

**Plunger**
**S** .282" high
**M** .331" high, snap-fitting
**S1** .332" high

**Bushing**
**D1** Unthreaded
**D3** .180" high, unthreaded

**Terminations**
**A** Right angle, PC thru-hole
**AV2** Vertical right angle, PC thru-hole
**C** PC Thru-hole
**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
**V8** .953" high, V-bracket
**V31** .460" high, snap-in V-bracket
**V41** .630" high, snap-in V-bracket
**V61** .460" high, snap-in V-bracket

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

**Seal**
**E** Epoxy and disposable splashproof boot

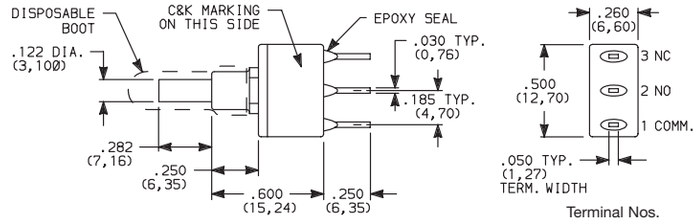
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking this side) | SWITCH FUNCTION POS. 2 (C&K marking this side) | CONNECTED TERMINALS POS. 1 (C&K marking this side) | CONNECTED TERMINALS POS. 2 (C&K marking this side) | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | E121 | ON | MOM. | 1-3 | 1-2 | SPDT |
| | E125 | ON | MOM. | | | |

**SPDT**

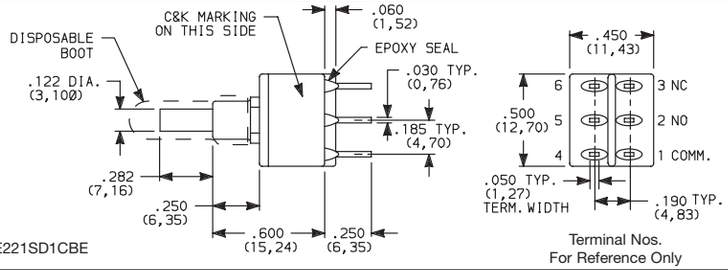



Part number shown: E121SD1CGE

Terminal Nos. For Reference Only

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking this side) | SWITCH FUNCTION POS. 2 (C&K marking this side) | CONNECTED TERMINALS POS. 1 (C&K marking this side) | CONNECTED TERMINALS POS. 2 (C&K marking this side) | SCHEMATIC |
|---|---|---|---|---|---|---|
| DP | E221 | ON | MOM. | 1-3,4-6 | 1-2,4-5 | DPDT |
| | E225 | ON | MOM. | | | |

**DPDT**




Part number shown: E221SD1CBE

Terminal Nos. For Reference Only

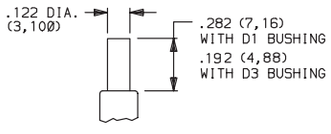
MOM. = Momentary

E121, E221 models c UL us with all options when ordered with G or R contact material.

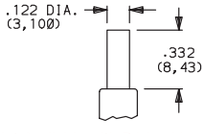
EX25 models must be ordered with B or P contact material.
EX21 models must be ordered with G or R contact material.

## PLUNGER

**S** .282" HIGH

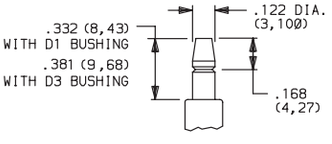



**S1** .332" HIGH




Not Available with D1 bushing.

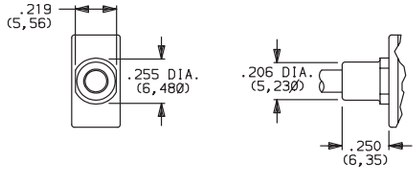
**M** .332" HIGH SNAP-FITTING




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

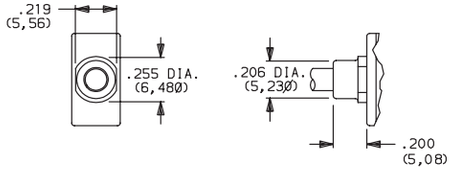
## BUSHING

**D1** UNTHREADED




Not available with S1 actuator.

**D3** .180" HIGH UNTHREADED



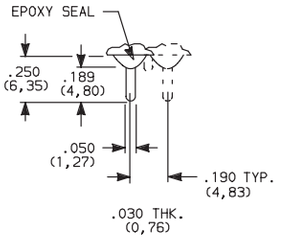

**NOTE:** Disposable splashproof vinyl over actuator and bushing supplied std., see page A-26.

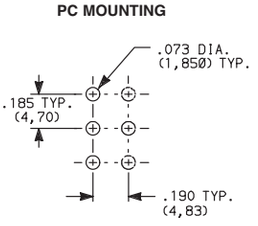
Third Angle Projection

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

## TERMINATIONS

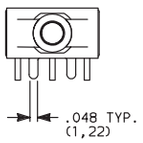
### C PC THRU-HOLE

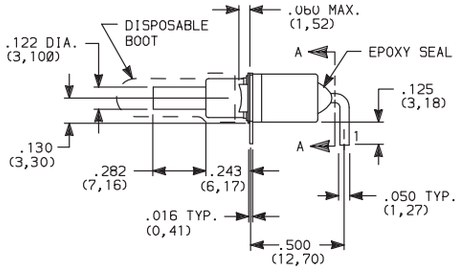


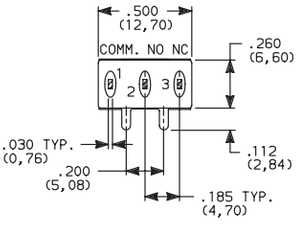




## SPDT and DPDT

### A RIGHT ANGLE, PC THRU-HOLE



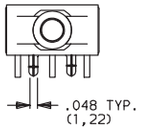



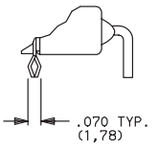



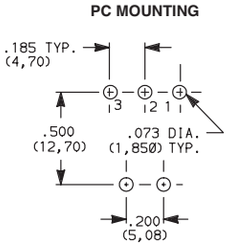

SECTION A-A

E121SD1AGE
**SPDT**

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

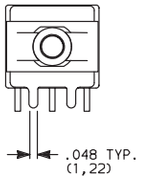


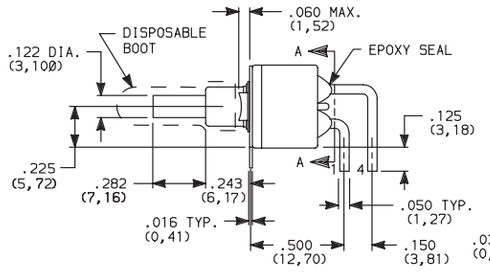



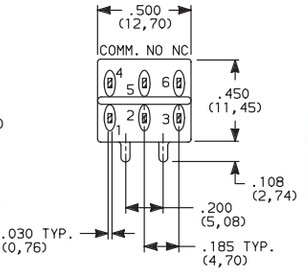




**NOTE:** Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE



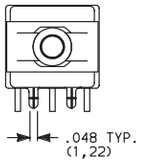



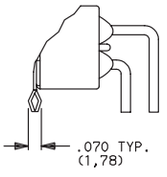



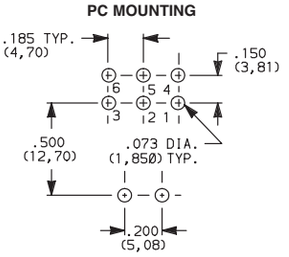

SECTION A-A

E221SD1AGE
**DPDT**

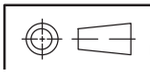
### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE




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

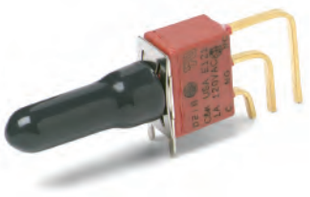



*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

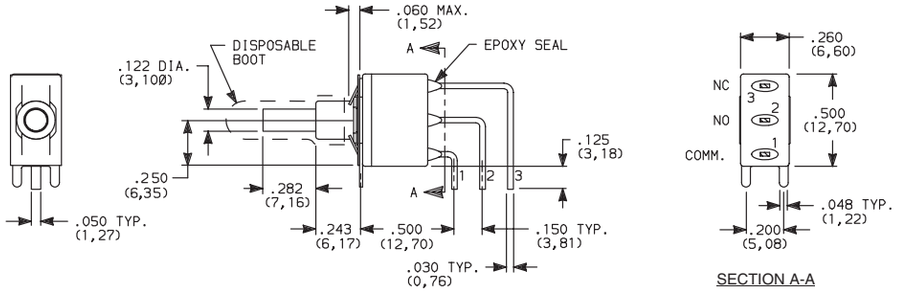
# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

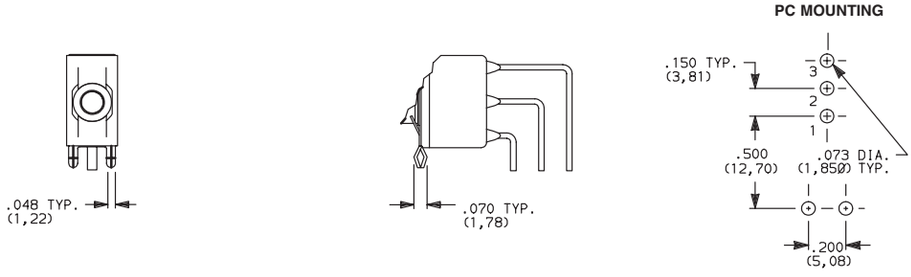
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



E121SD1AV2GE
**SPDT**



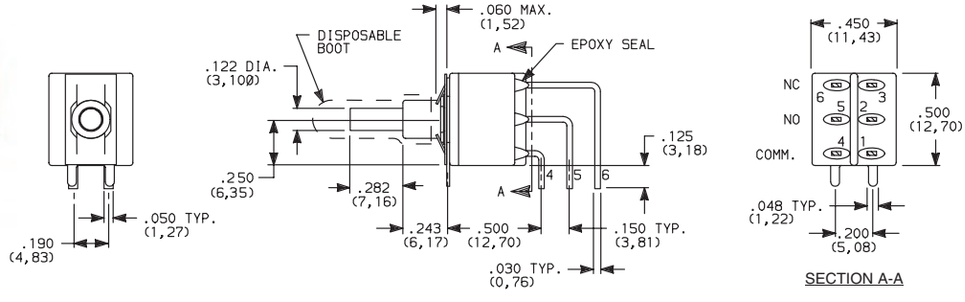

### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



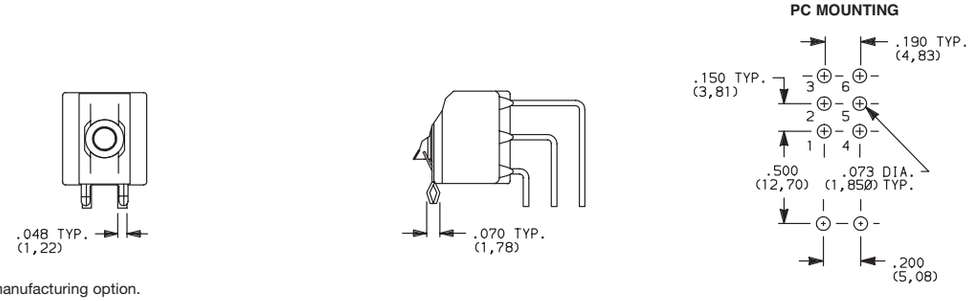

**NOTE:** Terminal bend radii and lead-in manufacturing option.

### 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.

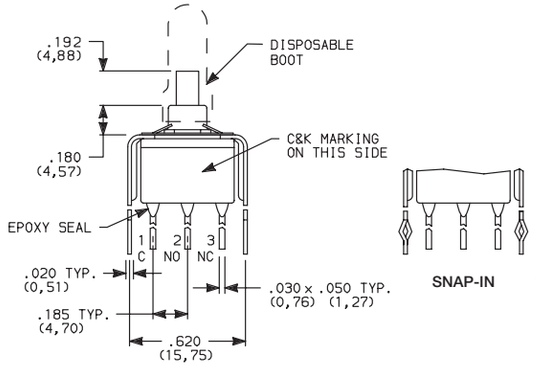
Third Angle Projection

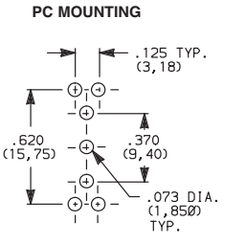
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

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

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



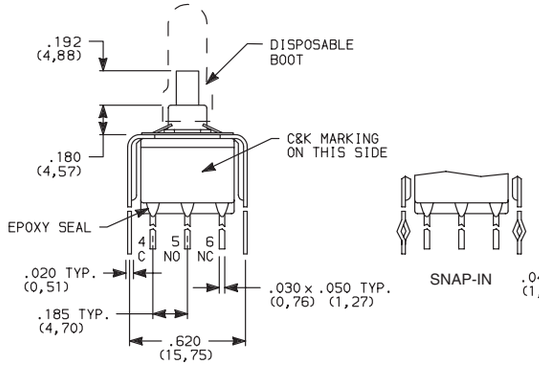



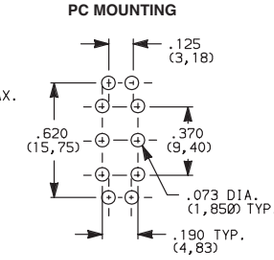
E121SD3__GE
**SPDT**

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

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

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



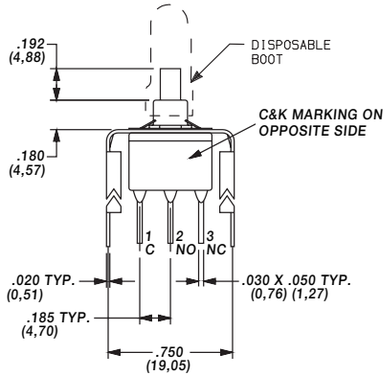



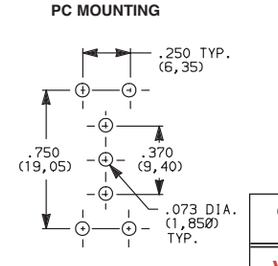
E221SD3__GE
**DPDT**

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

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

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



E121SD3__GE
**SPDT**

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

Third Angle Projection

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

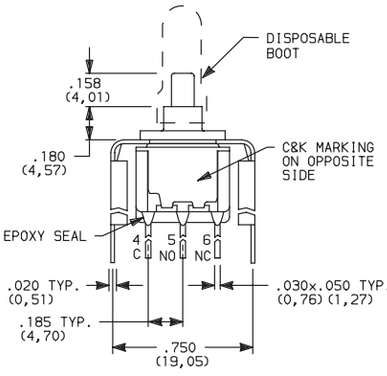
# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

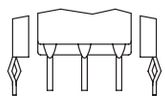
## TERMINATIONS

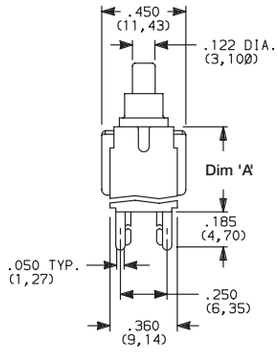
**V6, V8** VERTICAL MOUNT, V-BRACKET

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

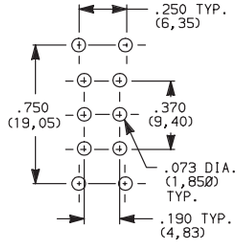
E221SD3V6GE
**DPDT**




**PC MOUNTING**




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

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL | TERMINAL PLATING | RATINGS | |
|---|---|---|---|---|
| B | GOLD [1] | GOLD [1] | LOW LEVEL/DRY CIRCUIT | EX25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX. |
| P | | MATTE-TIN [4] | | |
| G | GOLD OVER SILVER [2,3] | GOLD [3] | 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. |
| R | | MATTE-TIN [4] | | |

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

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

[2] N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.

[3] COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

[4] 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.

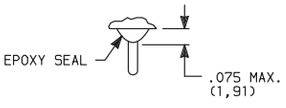
E121, E221 models c UL us with all options when ordered with mandatory G, or R contact material.

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

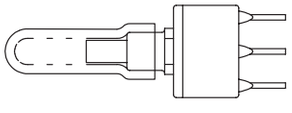
R or G contact material must be ordered with EX21 models.

## 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.

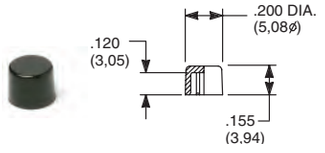


Third Angle Projection

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

## AVAILABLE HARDWARE

**Cap**

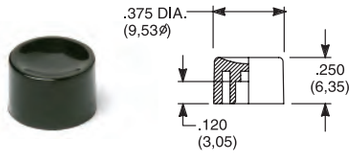



**PART NO.**

| | |
|---|---|
| 708901000 | WHITE |
| 708902000 | BLACK |
| 708903000 | RED |

Material: Nylon
Finish: Gloss

**Cap**

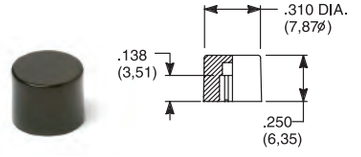



**PART NO.**

| | |
|---|---|
| 752701000 | WHITE |
| 752702000 | BLACK |
| 752703000 | RED |

Material: Nylon
Finish: Gloss

**Cap**

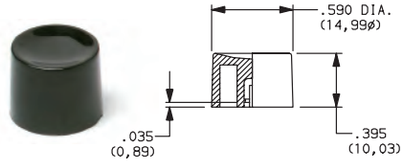



**PART NO.**

| | |
|---|---|
| 801801000 | WHITE |
| 801802000 | BLACK |
| 801803000 | RED |

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

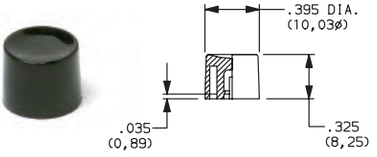



**PART NO.**

| | |
|---|---|
| 452D01000 | WHITE |
| 452D02000 | BLACK |
| 452D03000 | RED |

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

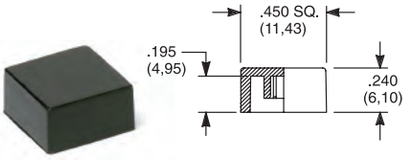



**PART NO.**

| | |
|---|---|
| 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.**

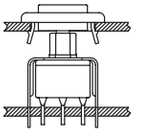
| | |
|---|---|
| 798201000 | WHITE |
| 798202263 | BLACK |
| 798203000 | RED |

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.

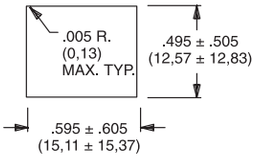
**TYPICAL APPLICATION**



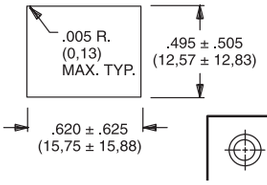
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

**PANEL MOUNTING**

For part numbers
4325xxxxx, 4326xxxxx




For part numbers
4327xxxxx, 4328xxxxx




Third Angle Projection

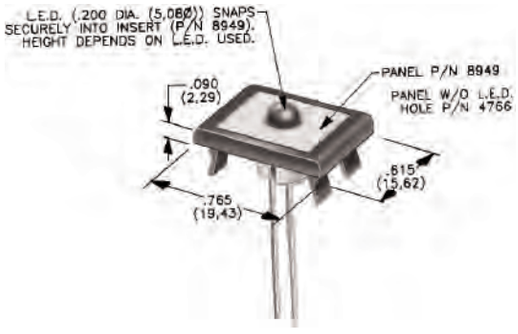
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

## AVAILABLE HARDWARE

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.** | **PART NO.** | |
| 894902000 | 476602000 | BLACK |

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

Third Angle Projection

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

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

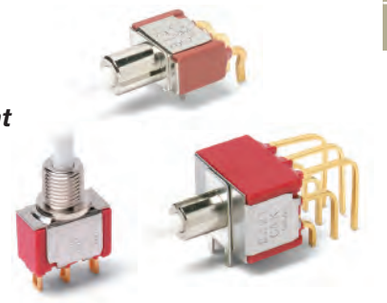
## *Features/Benefits*

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

Models Available

## *Typical Applications*

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



## 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-makecontacts. 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: $10^9\Omega$ 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.

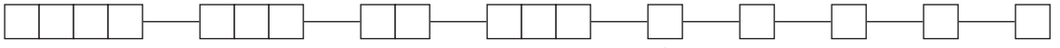
COMMON CONTACT & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

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 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
- **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

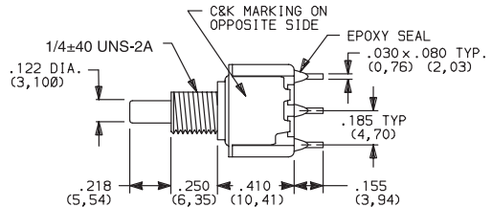
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

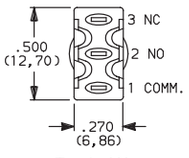
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | UL/CSA* MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking on opposite side) | SWITCH FUNCTION POS. 2 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 1 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 2 (C&K marking on opposite side) | SCHEMATIC |
|---|---|---|---|---|---|---|---|
| SP | 8121 | U811 | ON | MOM. | 1-3 | 1-2 | SPDT |
| | 8125 | | ON | MOM. | | | |

### SPDT



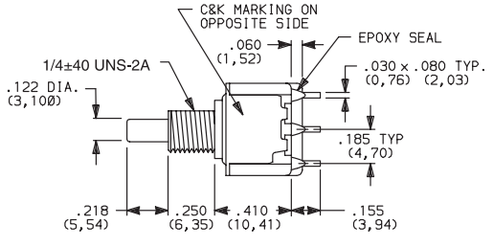



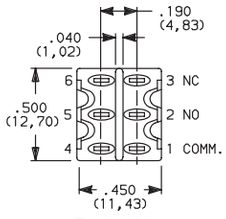

Terminal Nos.
For Reference Only

Part number shown: 8121SHZGE

| NO. POLES | MODEL NO. | UL/CSA* MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking on opposite side) | SWITCH FUNCTION POS. 2 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 1 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 2 (C&K marking on opposite side) | SCHEMATIC |
|---|---|---|---|---|---|---|---|
| DP | 8221 | U821 | ON | MOM. | 1-3,4-6 | 1-2,4-5 | DPDT |
| | 8225 | | ON | MOM. | | | |

### DPDT



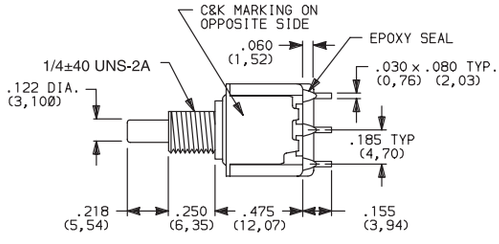



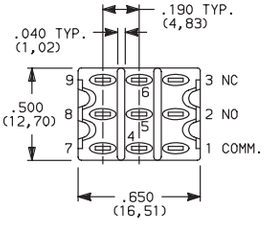

Terminal Nos.
For Reference Only

Part number shown: 8221SHZGE

| NO. POLES | MODEL NO. | UL/CSA* MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking on opposite side) | SWITCH FUNCTION POS. 2 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 1 (C&K marking on opposite side) | CONNECTED TERMINALS POS. 2 (C&K marking on opposite side) | SCHEMATIC |
|---|---|---|---|---|---|---|---|
| 3P | 8321 | U831 | ON | MOM. | 1-3,4-6,7-9 | 1-2,4-5,7-8 | 3PDT |
| | 8325 | | ON | MOM. | | | |

### 3PDT




Terminal Nos.
For Reference Only

Part number shown: 8321SHZGE

MOM. = Momentary

*U811 thru U841 model numbers cULus with all options (except R, R2 terminations) when ordered with G 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.

Third Angle Projection

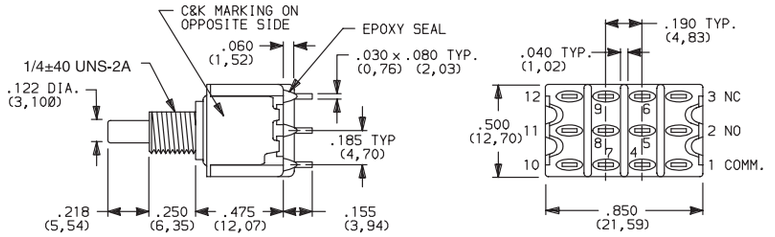
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## SWITCH FUNCTION

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

### 4PDT




Part number shown: 8421SHZGE

Terminal Nos.
For Reference Only

MOM. = Momentary

* U811 thru U841 model numbers c UL us with all options (except R, R2 terminations) when ordered with G 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

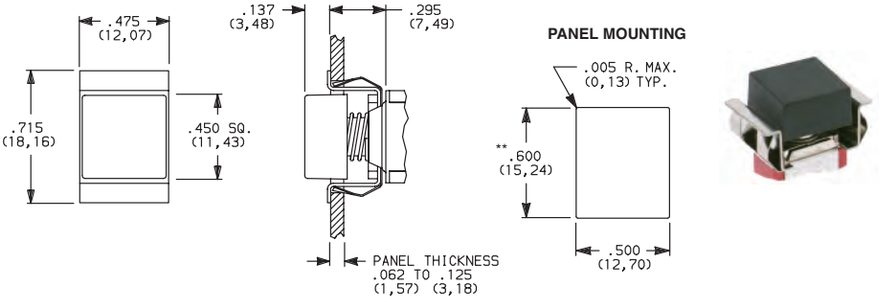
CAP COLOR
ACTUATOR OR PLUNGER
FRAME COLOR

| 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.

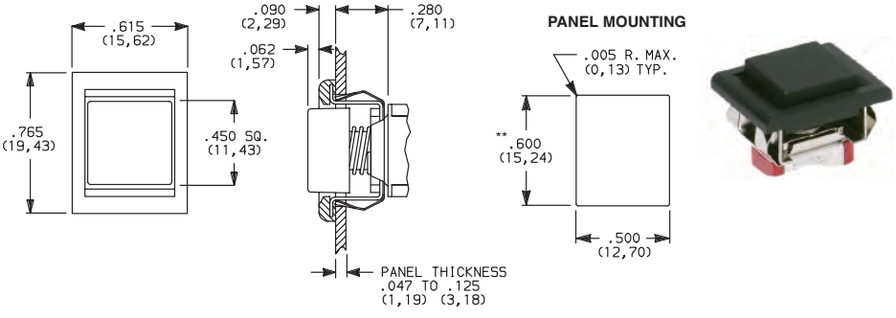
### J80 SNAP-IN




**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.

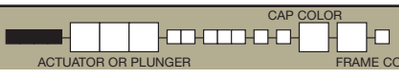
** Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

Third Angle Projection

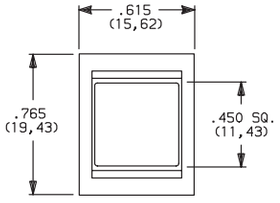
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

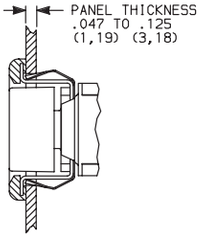
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## ACTUATOR—SNAP-IN FRONT MOUNT

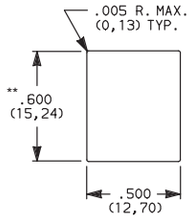



### J83 SNAP-IN WITH FRAME AND FLUSH CAP

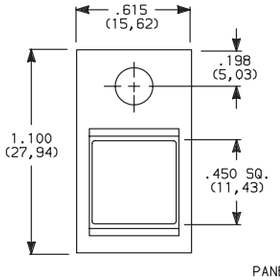


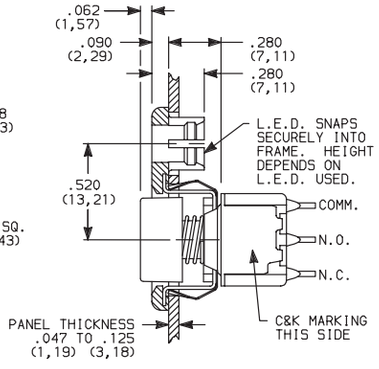




**PANEL MOUNTING**

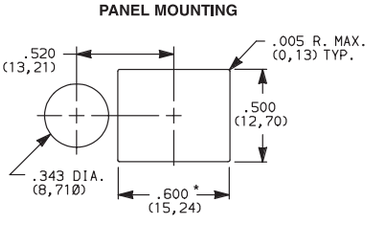



### J82 SNAP-IN WITH FRAME FOR LED



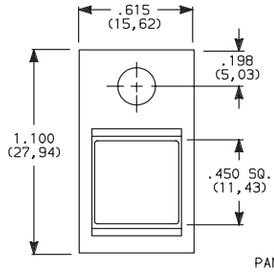

**PANEL MOUNTING**

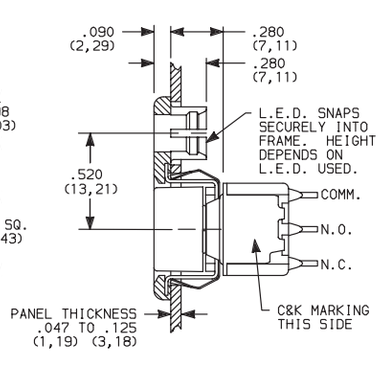



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

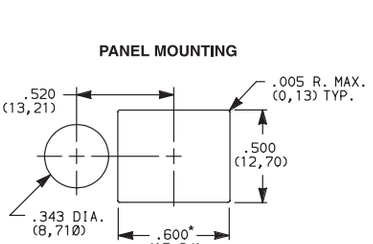
**LED not included.**
For LED information, see page A-45.

### 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.

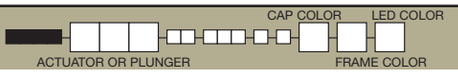
Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

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

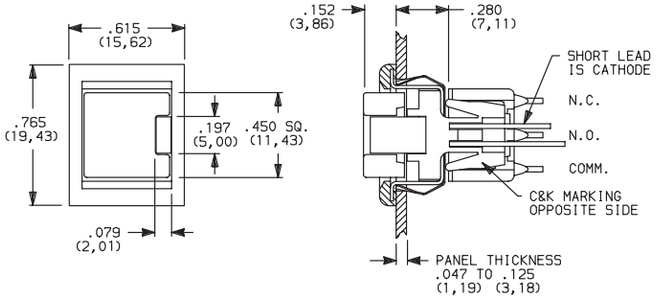
Third Angle Projection

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

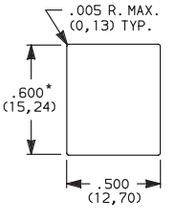
## ACTUATOR—SNAP-IN FRONT MOUNT




### J85 SNAP-IN WITH FRAME AND LED




**PANEL MOUNTING**




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

8121J85ZGE223
**SPST**

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

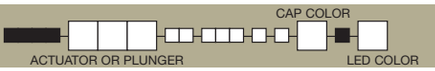
**NOTE:** Caps & frames available separately, see pages A-44 and A-45.

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

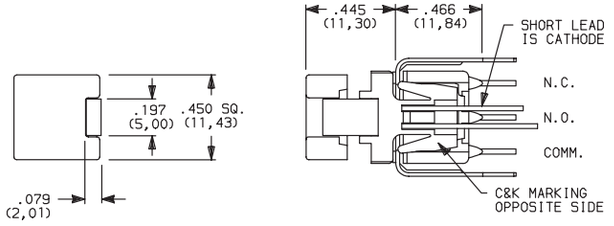
| OPTION CODE | LED COLOR |
|---|---|
| 3 | RED |
| 5 | YELLOW |
| 6 | GREEN |

For LED information see page A-45.

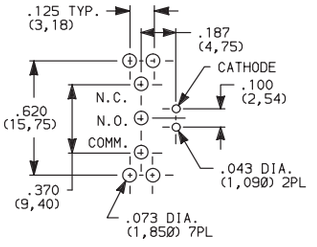
## ACTUATOR—PC MOUNT




### J95 PC WITH V-BRACKET AND LED




**PC MOUNTING**



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.

Third Angle Projection

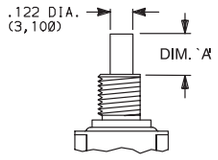
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## PLUNGER

ACTUATOR OR PLUNGER

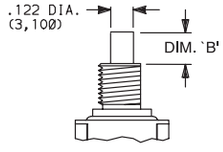
**S** PLUNGER




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

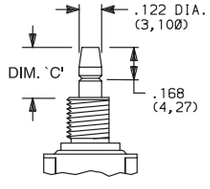
| AVAILABLE BUSHINGS | DIM. 'A' FOR C, W-W4, Z & Z3 TERMINATIONS | DIM. 'A' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS | DIM. 'A' FOR V3-V61 TERMINATIONS |
|---|---|---|---|
| D, D9 | .244 (6,20) | .228 (5,79) | .224 (5,69) |
| H, H9 | .218 (5,54) | .202 (5,13) | .198 (5,03) |
| Y, Y9 | .203 (5,16) | .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' FOR C, W-W4, Z & Z3 TERMINATIONS | DIM. 'B' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS | DIM. 'B' FOR V3-V61 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' FOR C, W-W4, Z & Z3 TERMINATIONS | DIM. 'C' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS | DIM. 'C' FOR V3-V61 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

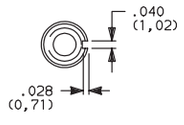
**D9** .280" HIGH UNTHREADED, KEYWAY

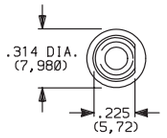
**H** .250" HIGH THREADED, FLAT

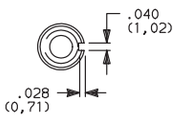
**H9** .250" HIGH UNTHREADED, FLAT

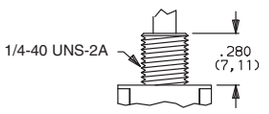
**Y** .350" HIGH THREADED, KEYWAY

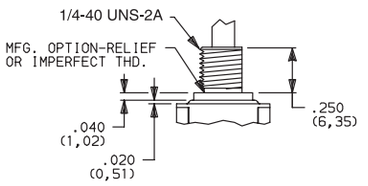
**Y9** .350" HIGH UNTHREADED, KEYWAY

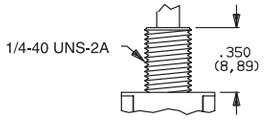



D9 bushing standard with A-A6, R, R2 AV-AV3 terminations.

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.

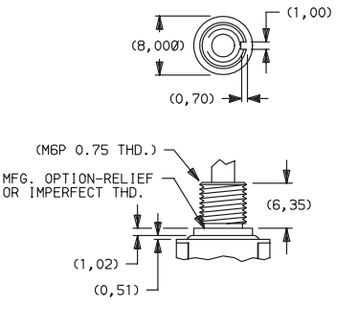
**Will withstand 12 in./lbs. of torque with no distortion.**

Third Angle Projection

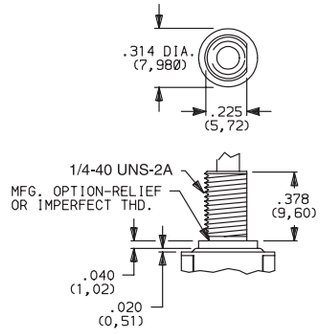
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## BUSHING

**Y3** 6.35mm THREADED, KEYWAY



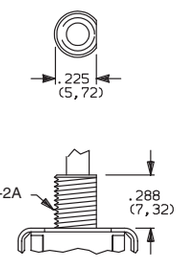

**Y4** .378" HIGH THREADED, FLAT




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.

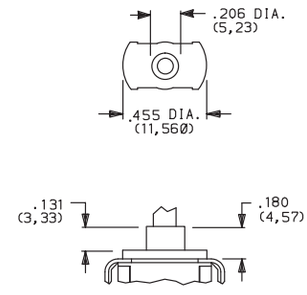
**D2** .288" HIGH THREADED, FLAT

**D8** .288" HIGH UNTHREADED, FLAT




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

**D3** .180" HIGH UNTHREADED

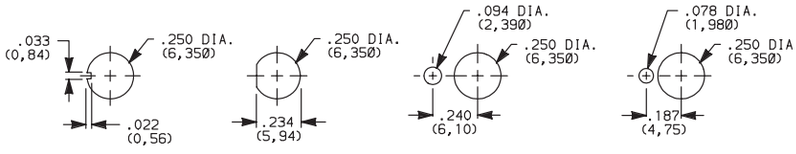



D3 bushing available with A, A2, A3, AV, AV2, AV3 and V2-V61 terminations only.

**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.

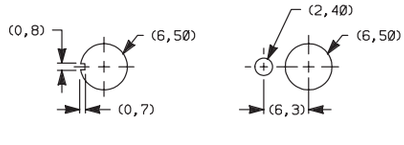
**PANEL MOUNTING**

1/4 INCH BUSHING




Without locking ring | With standard locking ring | With small locking ring

METRIC BUSHING

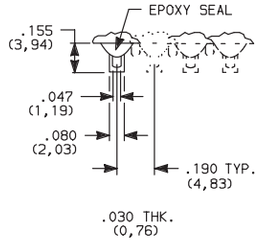



Without locking ring | With locking ring

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

## TERMINATIONS

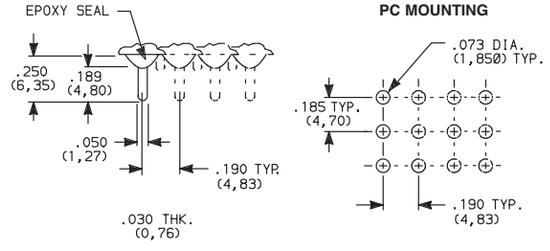
**Z** SOLDER LUG




**SPDT thru 4PDT**

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

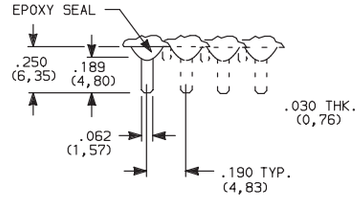
**C** PC THRU-HOLE




**SPDT thru 4PDT**

Not available with J95 actuator option.

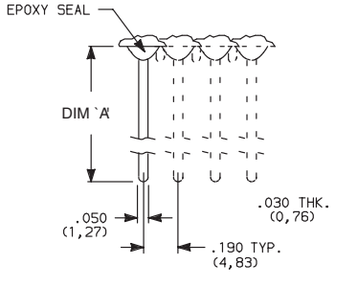
**Z3** QUICK CONNECT




**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




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

**SPDT thru 4PDT**

Not available with J95 actuator option.

Third Angle Projection

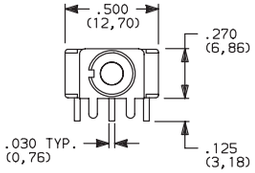
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

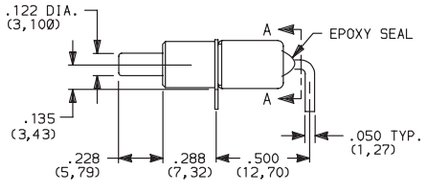
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

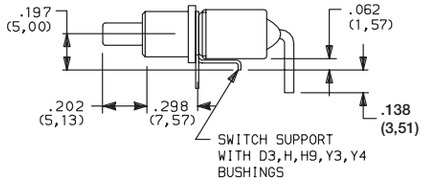
## TERMINATIONS

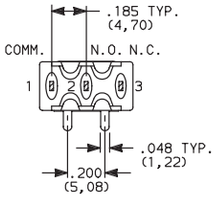
### A RIGHT ANGLE, PC THRU-HOLE

8121SD9AGE
**SPDT**



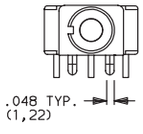



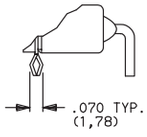

SECTION A-A

Terminal Nos.
For Reference Only.

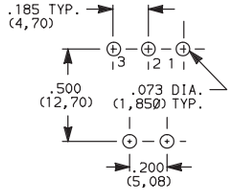
Part Number 8121SH9AGE

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



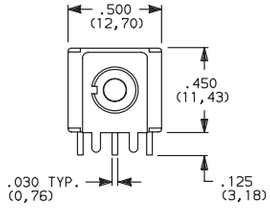

**PC MOUNTING**

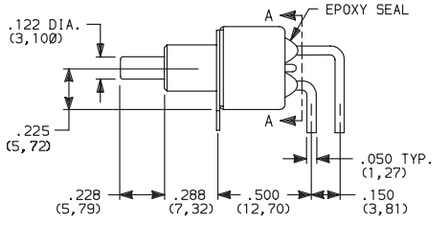


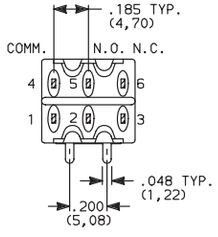

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE

8221SD9AGE
**DPDT**

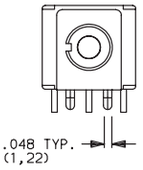


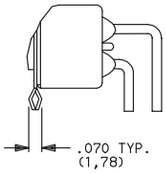



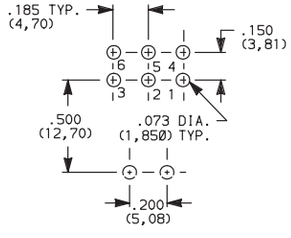

SECTION A-A

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




**PC MOUNTING**



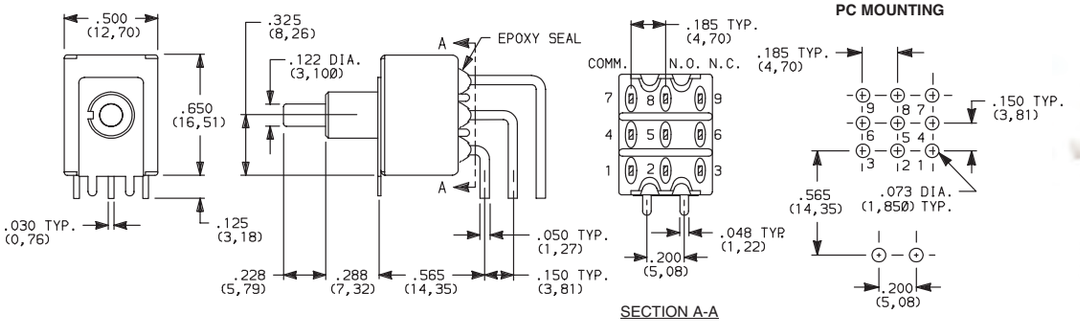

Not available with JXX actuators and I seal option.
Terminal bend radii and lead-in manufacturing option.

Third Angle Projection

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

## TERMINATIONS

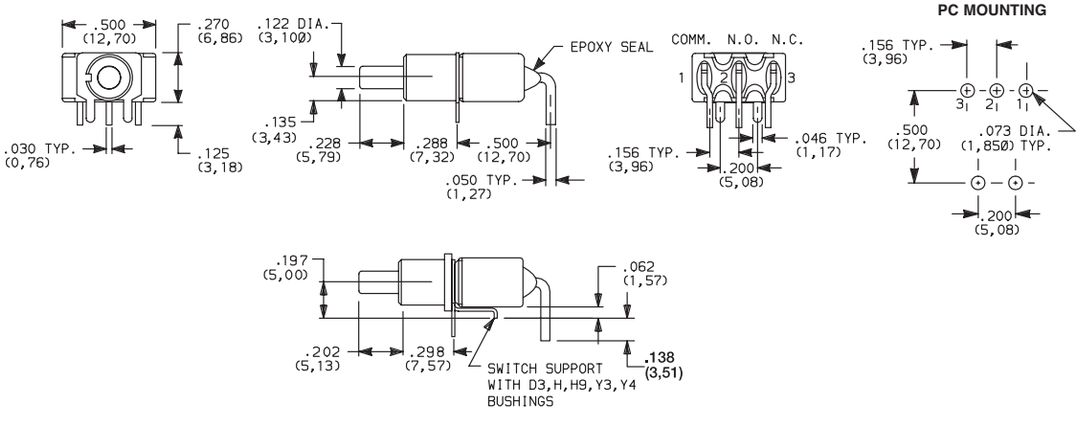
### A RIGHT ANGLE, PC THRU-HOLE



8321SD9AGE
**3PDT**

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

### A2 RIGHT ANGLE, PC THRU-HOLE

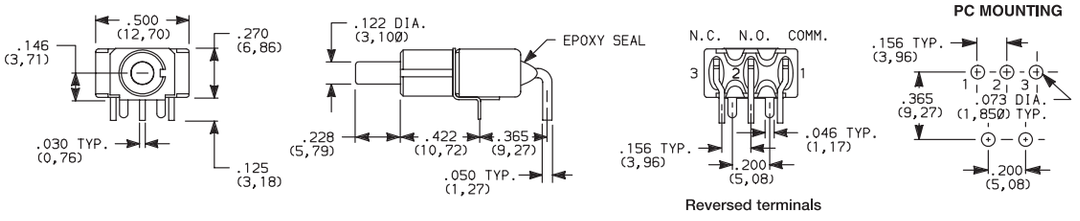



Part Number 8121SH9A2GE

8121SD9A2GE
**SPDT**

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

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




Reversed terminals

8121SD9A4GE
**SPDT**

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.

Third Angle Projection

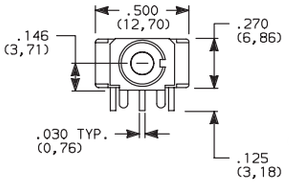
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

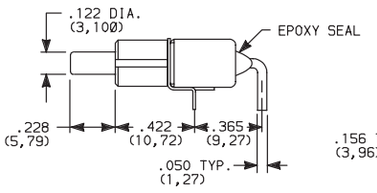
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

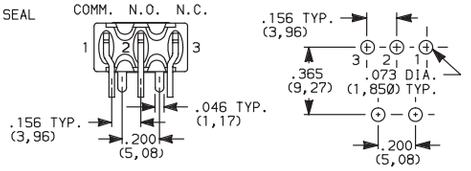
### A6 RIGHT ANGLE, PC THRU-HOLE

8121SD9A6GE
**SPDT**




PC MOUNTING

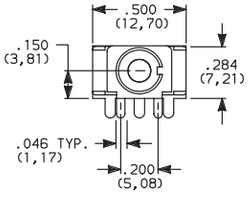


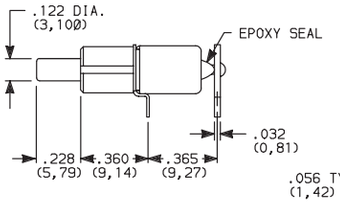

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings and I seal.
Terminal bend radii and lead-in manufacturing option.

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.

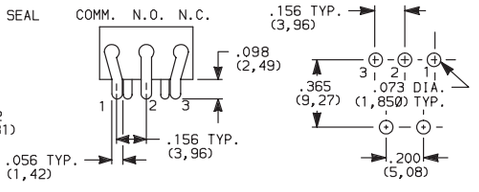
### R RIGHT ANGLE WITH PCB

8121SD9RGE
**SPDT**



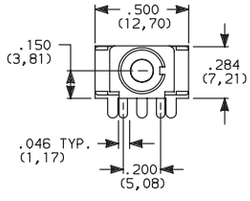

PC MOUNTING

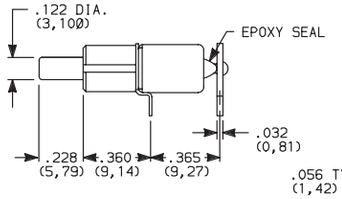



Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.
R termination not UL/CSA approved.

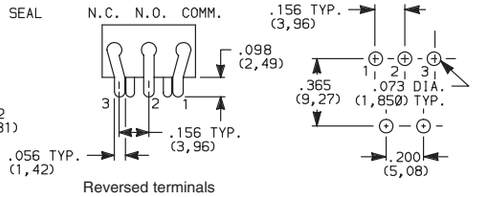
### R2 RIGHT ANGLE WITH PCB, REVERSED TERMINALS

8121SD9R2GE
**SPDT**




PC MOUNTING




Reversed terminals

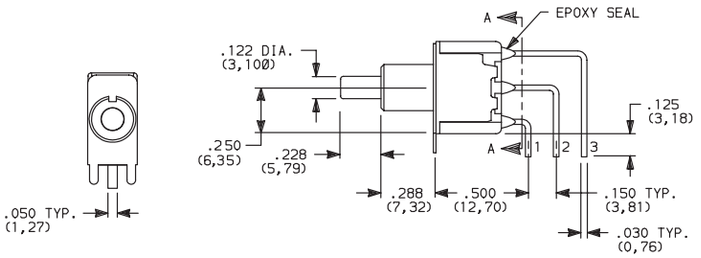
Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.
R2 termination not UL/CSA approved.

Third Angle Projection

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

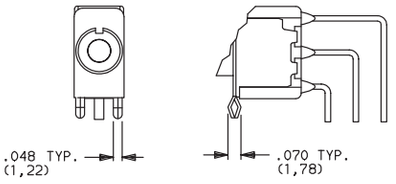
## TERMINATIONS

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

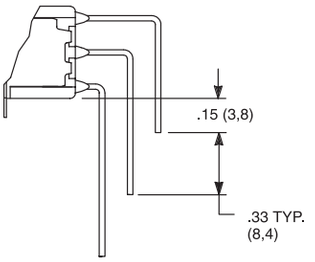


8121SD9AV2GE
**SPDT**

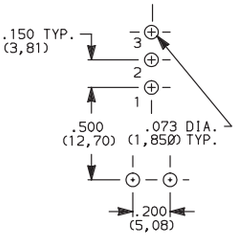
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN,, PC THRU-HOLE, .150" PITCH




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

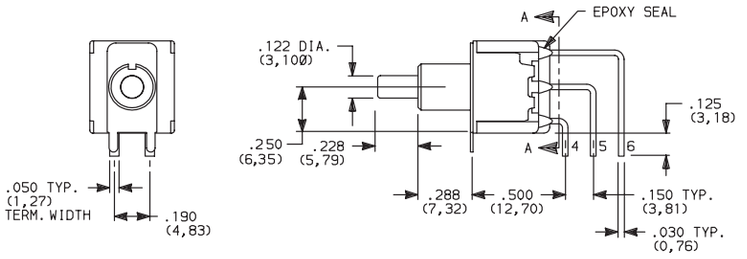



**PC MOUNTING**



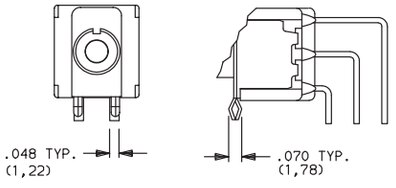

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

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

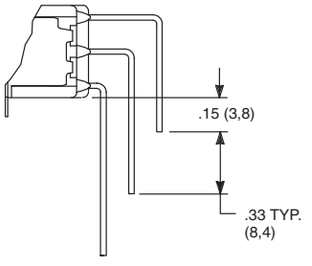


8221SD9AV2GE
**DPDT**

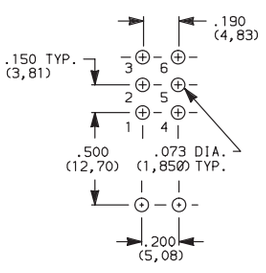
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH




### 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.

Third Angle Projection

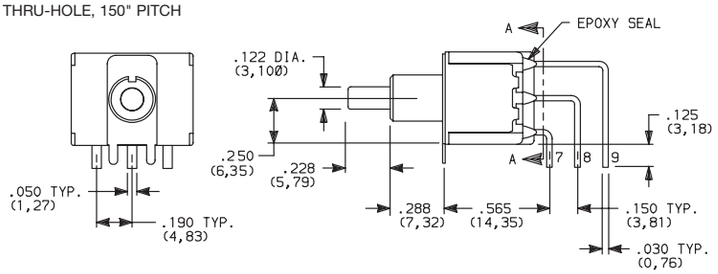
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

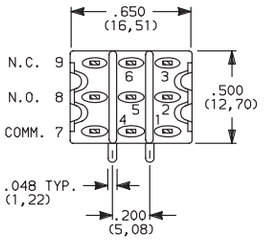
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

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

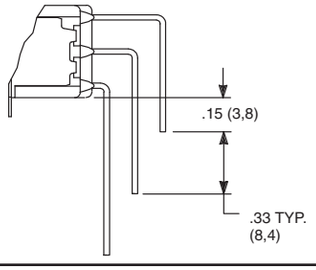
8321SD9AV2GE
**3PDT**



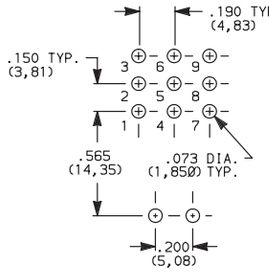




SECTION A-A

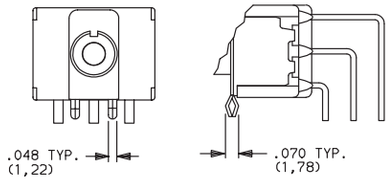
### AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH




**PC MOUNTING**




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

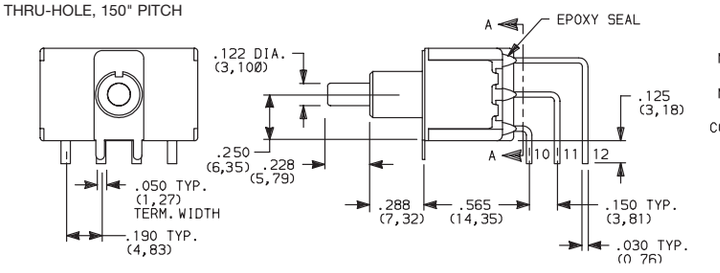


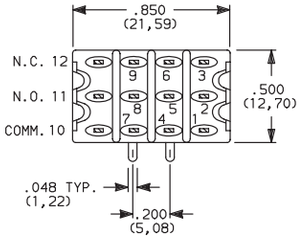

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

---

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

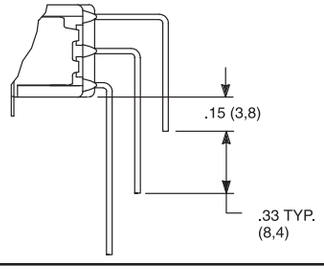
8421SD9AV2GE
**4PDT**



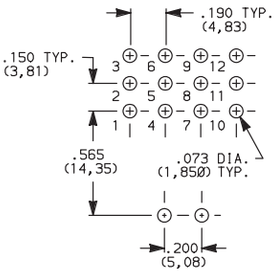




SECTION A-A

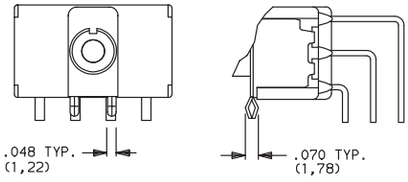
### AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH




**PC MOUNTING**




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



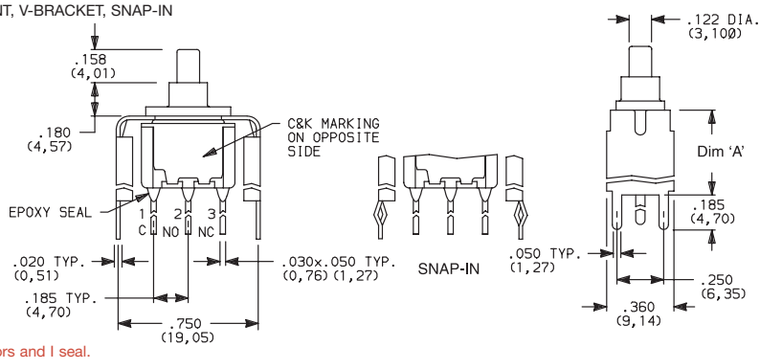

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

---

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

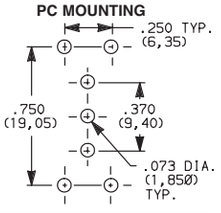
### V61 VERTICAL MOUNT, V-BRACKET, SNAP-IN

8121SD3__GE
**SPDT**




Not available with JXX actuators and I seal.

**PC MOUNTING**



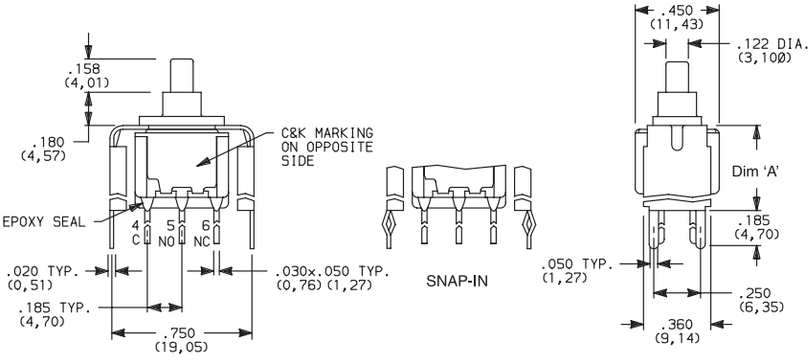

| OPTION CODE | DIM 'A' |
|---|---|
| V2 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7 | .630 (16,00) |
| V8 | .953 (24,21) |

Third Angle Projection

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

## TERMINATIONS

### V2, V6, V7, V8 VERTICAL MOUNT, V-BRACKET
### V61 VERTICAL MOUNT, V-BRACKET, SNAP-IN

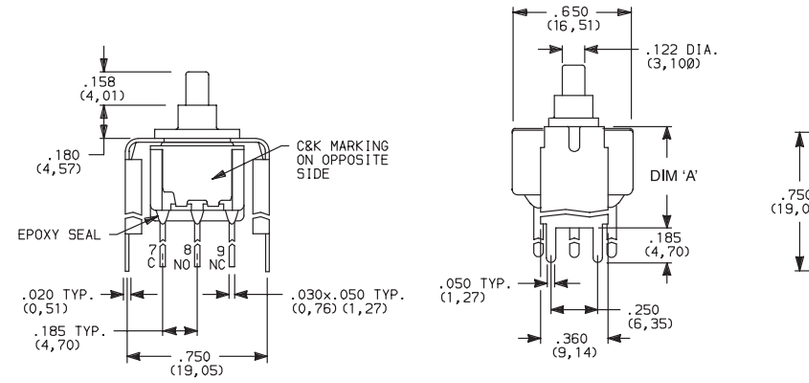


8221SD3__GE
**DPDT**

| 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.

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

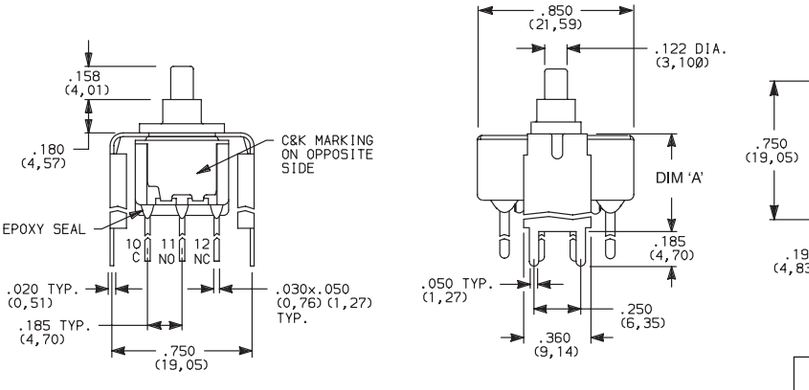


8321SD3__GE
**3PDT**

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

Not available with JXX actuators and I seal.

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



8421SD3__GE
**4PDT**

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

Not available with JXX actuators and I seal.

Third Angle Projection

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

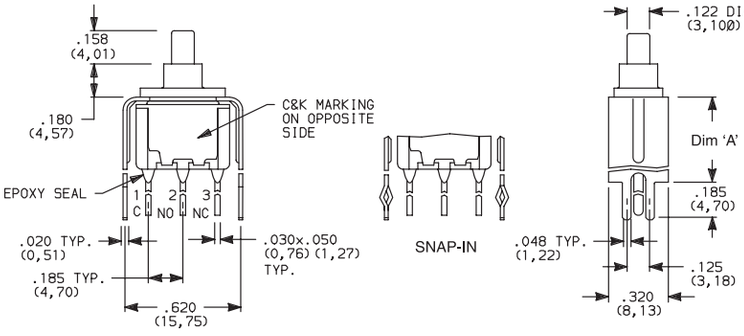
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

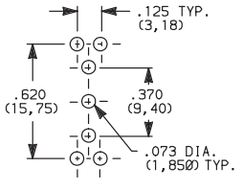
**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

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

8121SD3__GE
**SPDT**




PC MOUNTING



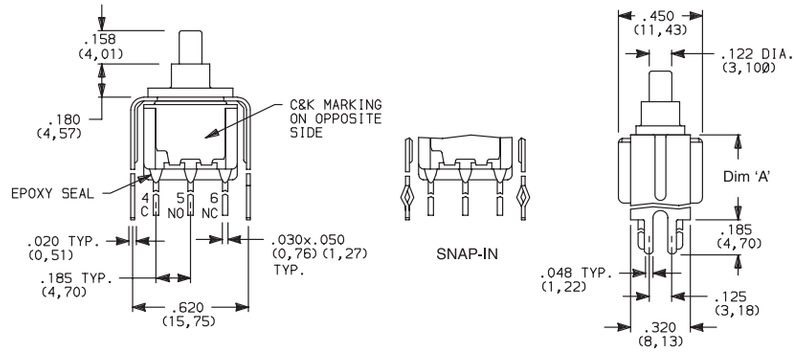

| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |
| V9 | 1.150 (29,21) |

Not available with J8X actuators and I seal.

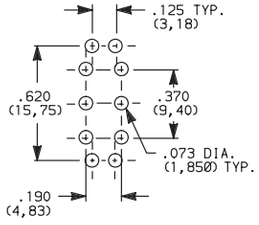
**V3, V4, V9** VERTICAL MOUNT, V-BRACKET

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

8221SD3__GE
**DPDT**




PC MOUNTING

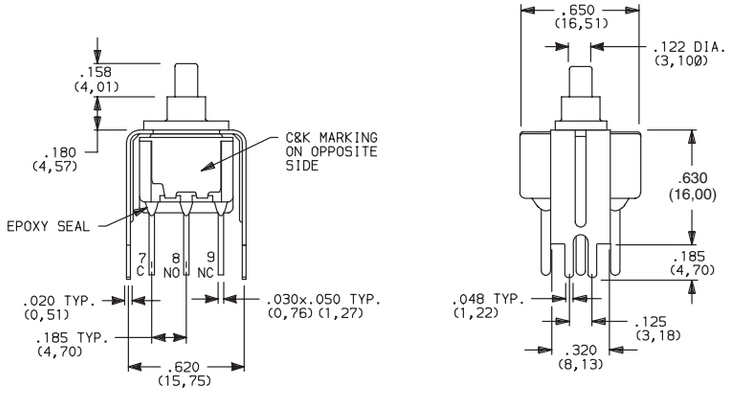



| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |
| V9 | 1.150 (29,21) |

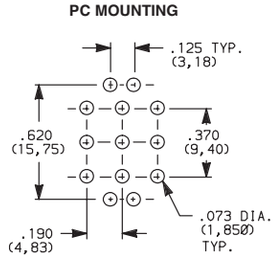
Not available with J8X actuators and I seal.

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

8321SD3V4GE
**3PDT**




PC MOUNTING




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

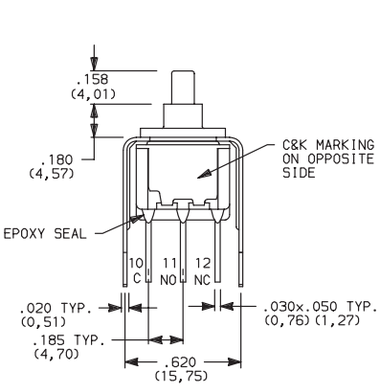
Not available with JXX actuators and I seal.

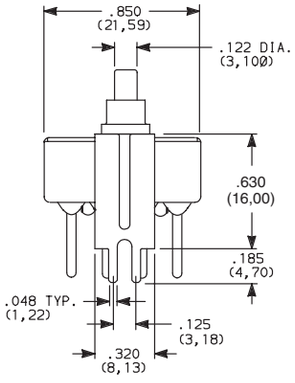
Third Angle Projection

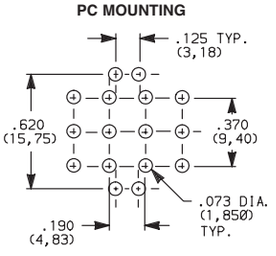
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

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



8421SD3V4GE
**4PDT**

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

Not available with JXX actuators and I seal.

## CONTACT MATERIAL

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

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

[1] ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

[2] N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.

[3] COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

[4] 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 or R contact material.

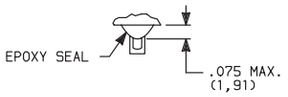
B or P contact material must be ordered with 8X25 models.

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

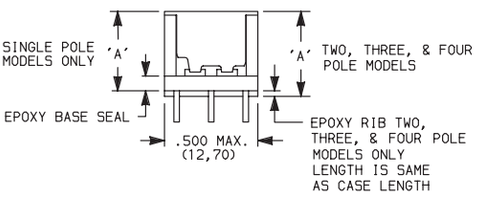
P or R contact material not available with Z, Z3 terminations.

## 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.

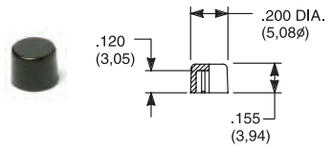
Third Angle Projection

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

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## AVAILABLE HARDWARE

**Cap**

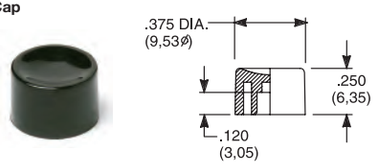



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

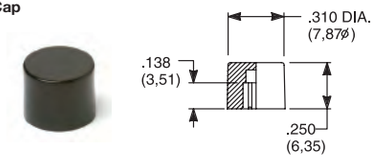



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

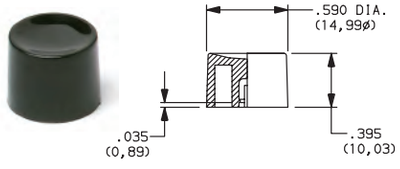



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

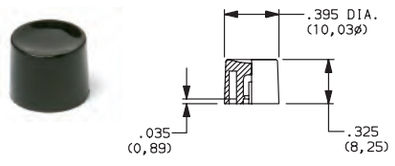



**PART NO.**

| | |
|---|---|
| 452D01000 | WHITE |
| 452D02000 | BLACK |
| 452D03000 | RED |
| 452D04000 | ORANGE |
| 452D05000 | YELLOW |
| 452D06000 | GREEN |
| 452D07000 | BLUE |
| 452D09000 | GRAY |

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

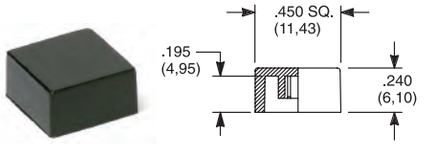



**PART NO.**

| | |
|---|---|
| 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.**

615602263 BLACK

Material: Nylon
Finish: Matte

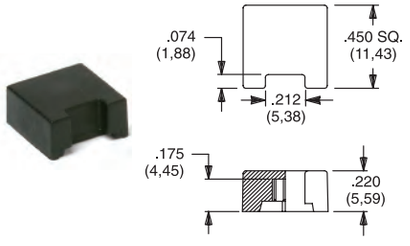
**Frame**

**PART NO.**

613302263 BLACK

Material: Nylon
Finish: Matte

**Cap, J85 & J95 options only**




**PART NO.**

| | |
|---|---|
| 459701000 | |
| 459702000 | |
| 459703000 | |
| 459704000 | |
| 459705000 | |
| 459706000 | |
| 459707000 | |
| 459709000 | |

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.

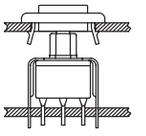
Third Angle Projection

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

## 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.

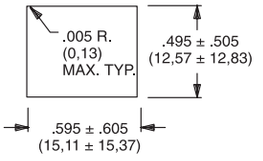
**TYPICAL APPLICATION**



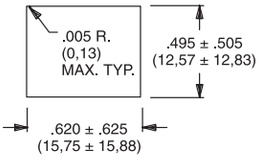
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

**PANEL MOUNTING**

For part numbers
4325xxxxx, 4326xxxxx

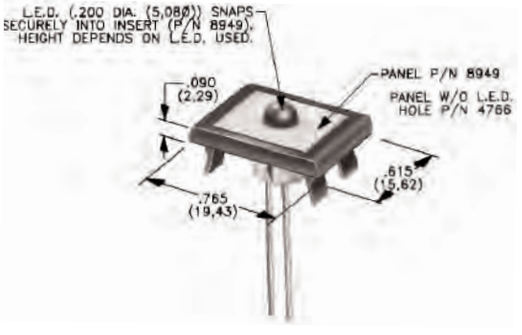



For part numbers
4327xxxxx, 4328xxxxx




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.**



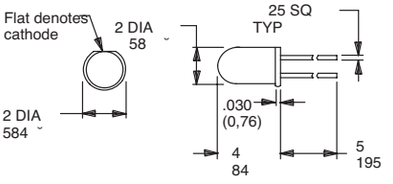

| PANEL INSERT WITH HOLE FOR LED | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| 894902000 | 476602000 BLACK |

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 |



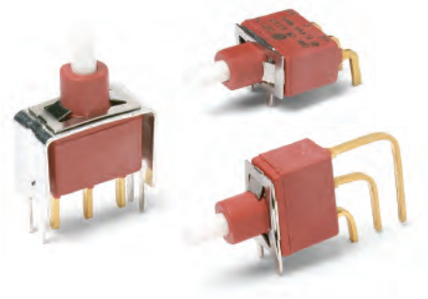

Suggested LED for J82 & J84 options
Dimensions for reference only

**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.

Third Angle Projection

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

# E010 Series
# Sealed Momentary Pushbutton Switches



## 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*

c UL us
Models Available

## 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: $10^9\Omega$ 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.

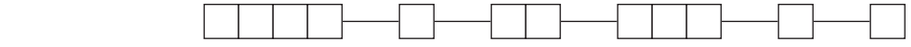
CENTER CONTACTS & ALL TERMINALS: Q contact material: Copper alloy, silver plated. See page A-50 for additional ratings.

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.



**Switch Function**
**E112** SPDT On-Mom.

**Plunger**
**S** .222" high
**L** .338" high
**M** .331" high, snap-fitting

**Bushing**
**D1** Unthreaded
**Y** Threaded, keyway

**Terminations**
**A** Right angle, PC thru-hole
**AV2** Vertical right angle, PC thru-hole
**C** PC Thru-hole
**A3** Right angle, snap-in, PC thru-hole
**AV3** Vertical right angle, snap-in, PC thru-hole
**R2** Right angle with PCB
**V3** .460" high, V-bracket
**V4** .630" high, V-bracket
**V6** .460" high, V-bracket
**V8** .953" high, V-bracket
**V31** .460" high, snap-in V-bracket
**V81** .953" high, snap-in V-bracket
**V91** 1.150" high, snap-in V-bracket
**W** .750" long, wire wrap
**Z** Solder lug

**Contact Material**
**B** Gold
**P** Gold, matte-tin
**Q** Silver
**G** Gold over silver

**Seal**
**E** Epoxy

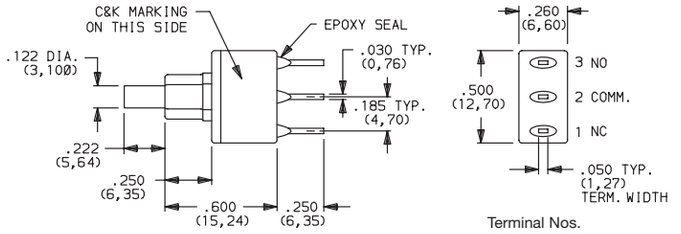
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# E010 Series
# Sealed Momentary Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking this side) | SWITCH FUNCTION POS. 2 (C&K marking this side) | CONNECTED TERMINALS POS. 1 | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | E112 | ON | MOM. | 2-1 | 2-3 | SPDT: 2 (COMM), NC 1, 3 NO |

**SPDT**



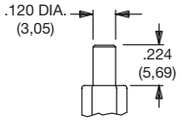

Part number shown: E112SD1CQE

MOM. = Momentary

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

## PLUNGER

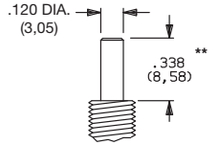
**S** .218" HIGH




Standard with D1 bushing (as shown).

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

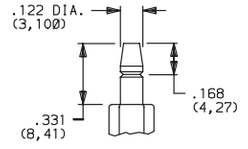
**L** .338" HIGH




Standard with Y bushing (as shown).

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

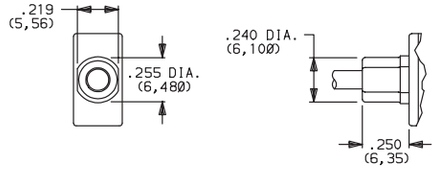
**M** .331" HIGH, SNAP-FITTING




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

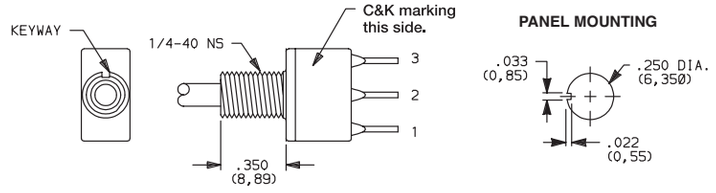
## BUSHING

**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 299D01201, one hex nut and lockwasher supplied standard.

**Withstands 4 in./lbs. without distortion.**

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

Third Angle Projection

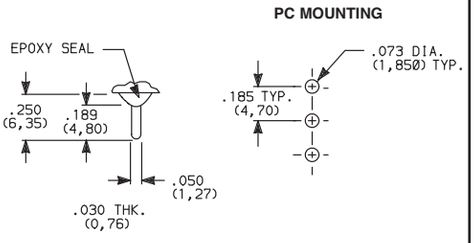
*Dimensions are shown: Inches (mm)*

*Specifications and dimensions subject to change*

# E010 Series
# Sealed Momentary Pushbutton Switches

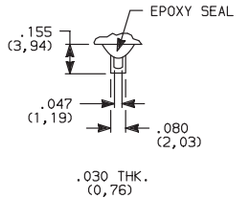
## TERMINATIONS

**C** PC THRU-HOLE



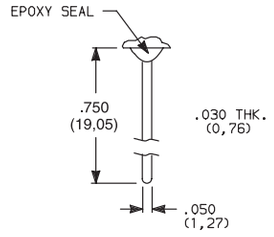

**SPDT**

**Z** SOLDER LUG




**SPDT** Not available with P contact materials.

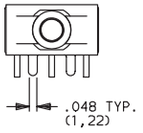
**W** WIRE WRAP

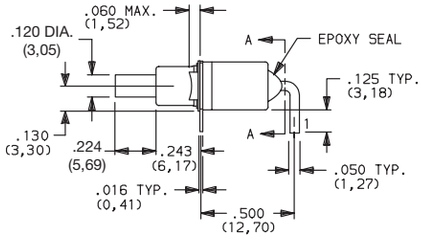


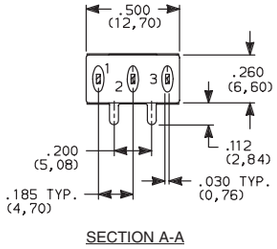

**SPDT**

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

E112SD1ABE
**SPDT**

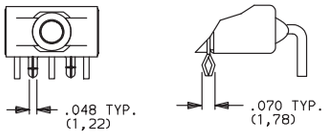


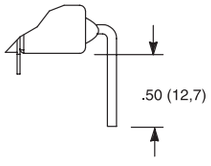



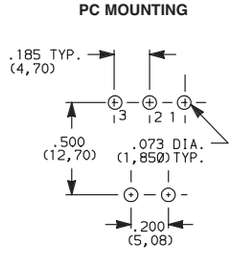

SECTION A-A

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



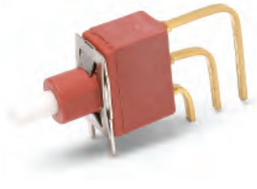

**AW** RIGHT ANGLE, EXTENDED, PC THRU-HOLE



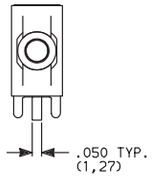



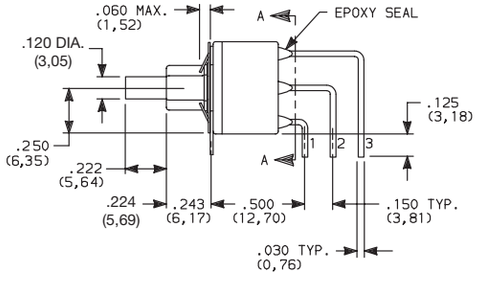

**NOTE:** Terminal bend radii and lead-in manufacturing option.
Available with D1 bushing only.

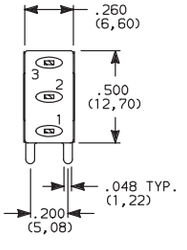
**AV2** VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



E112SD1AV2BE
**SPDT**

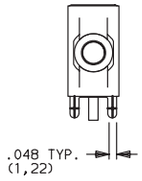


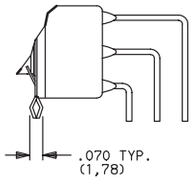



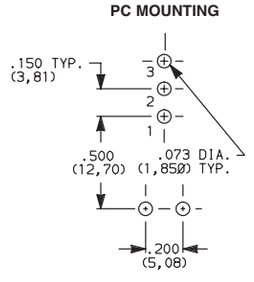




SECTION A-A

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



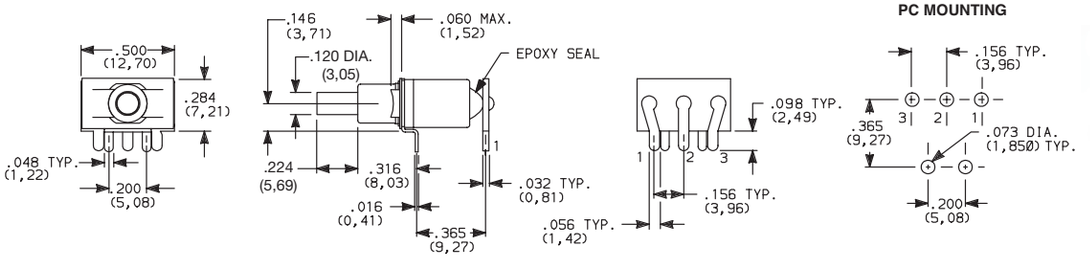

**NOTE:** Terminal bend radii and lead-in manufacturing option.
Available with D1 bushing only.

Third Angle Projection

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

## TERMINATIONS

### R2 RIGHT ANGLE WITH PCB

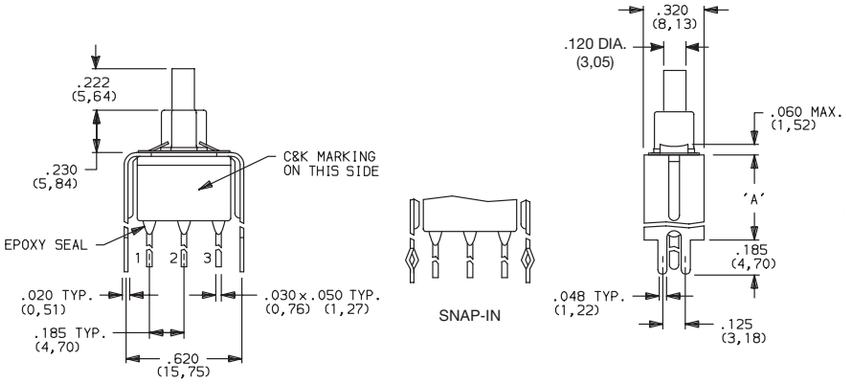


E112SD1R2BE
**SPDT**

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

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

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



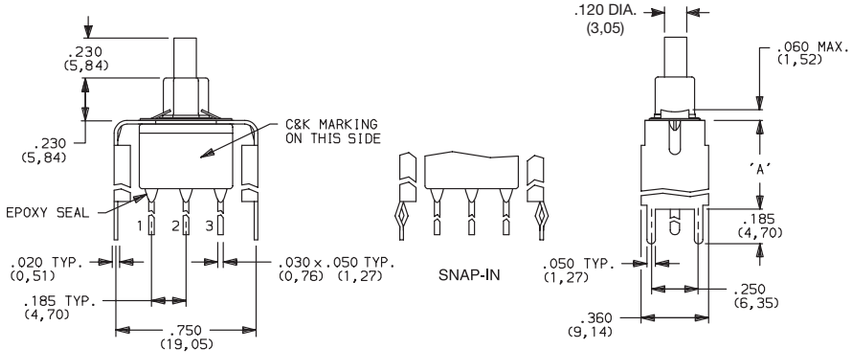
E112SD1__BE
**SPDT**

| 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



E112SD1__BE
**SPDT**

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

**NOTE:** Available with D1 bushing only.

Third Angle Projection

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

# E010 Series
# Sealed Momentary Pushbutton Switches

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL | TERMINAL PLATING | RATINGS | |
|---|---|---|---|---|
| B | GOLD [1] | GOLD [1] | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC MAX. |
| P | | MATTE-TIN [6] | | |
| Q | SILVER [4,5] | SILVER [5] | POWER | 4 AMPS @ 125 V AC 0R 28 V DC. |
| G | GOLD OVER SILVER [2,3] | GOLD [3] | LOW LEVEL/DRY CIRCUIT OR POWER | 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 4 AMPS @ 125 V AC 0R 28 V DC. |

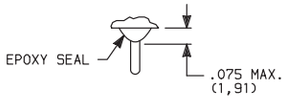
* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Coin silver, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
[6] 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 cULus 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.

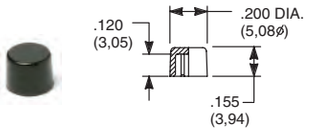
## SEAL

**E** EPOXY SEAL




## AVAILABLE HARDWARE

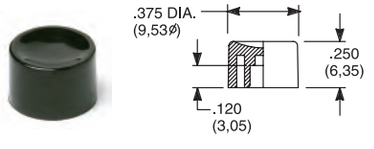
**Cap**




**PART NO.**
708901000 WHITE
708902000 BLACK
708903000 RED

Material: Nylon
Finish: Gloss

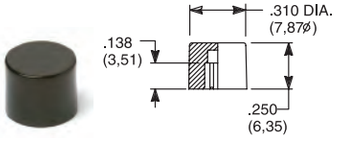
**Cap**




**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

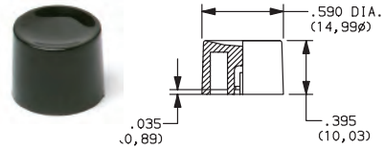
**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".
Other cap colors available, consult Customer Service Center.

Third Angle Projection

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

## AVAILABLE HARDWARE

**Cap, Snap-fitting plunger**

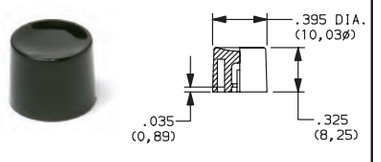



**PART NO.**

| | |
|---|---|
| 452D01000 | WHITE |
| 452D02000 | BLACK |
| 452D03000 | RED |

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

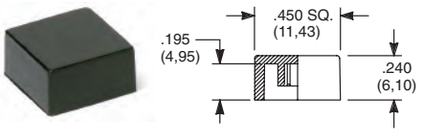



**PART NO.**

| | |
|---|---|
| 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.**

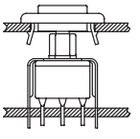
| | |
|---|---|
| 798201000 | WHITE |
| 798202263 | BLACK |
| 798203000 | RED |

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.

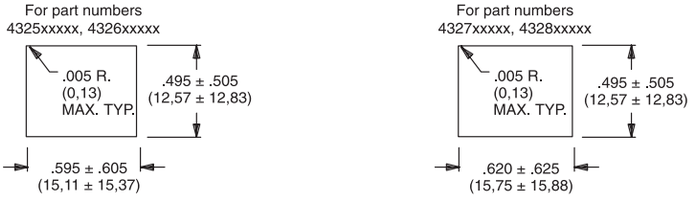
Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon.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

**TYPICAL APPLICATION**



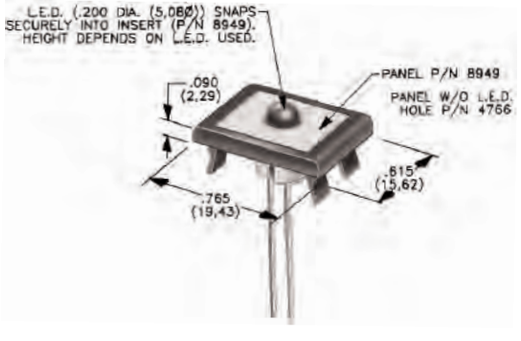
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

**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 | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| 894902000 | 476602000 BLACK |

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

Third Angle Projection

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

# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## Features/Benefits

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

## Typical Applications

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

c UL us
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: $10^9\Omega$ 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

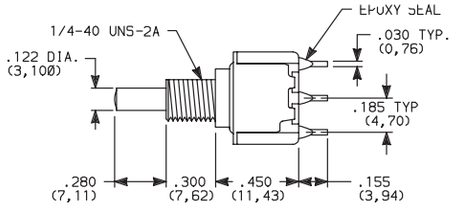
**LED Color**
- **3** Red
- **NONE** Models without LED

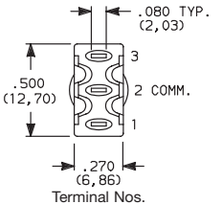
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (C&K marking this side) | SWITCH FUNCTION POS. 2 (C&K marking this side) | CONNECTED TERMINALS POS. 1 (C&K marking this side) | CONNECTED TERMINALS POS. 2 (C&K marking this side) | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | 8161 | ON | ON | 2-3 | 2-1 | SPDT |
| | 8168 | ON | MOM. | 2-3 | 2-1 | |

### SPDT



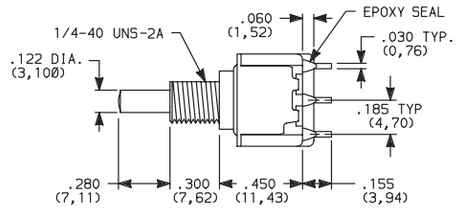



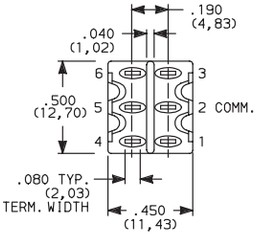

Terminal Nos.
For Reference Only

Part number shown: 8161SHZQE

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | CONNECTED TERMINALS POS. 1 | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| DP | 8261 | ON | ON | 2-3,5-6 | 2-1,5-4 | DPDT |

### DPDT



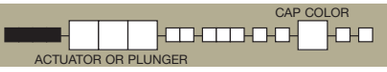

Terminal Nos.
For Reference Only

Part number shown: 8261SHZQE

MOM. = Momentary

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

## ACTUATOR—SNAP-IN FRONT MOUNT



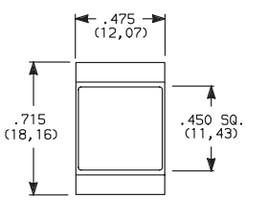

| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |
| 3 | RED |
| 4 | ORANGE |
| 5 | YELLOW |
| 9 | GRAY |

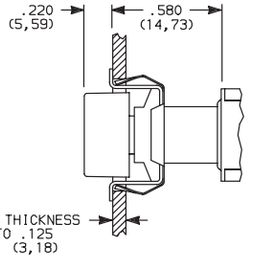
Cap Finish: matte.
Other colors available, consult Customer Service Center.

Available with C, W, Z or Z3 terminations.

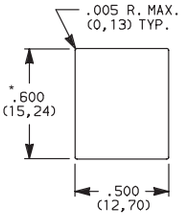
**NOTE:** Caps & frames available separately, see pages A-60 and A-61.

### J80 SNAP-IN



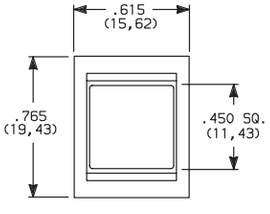



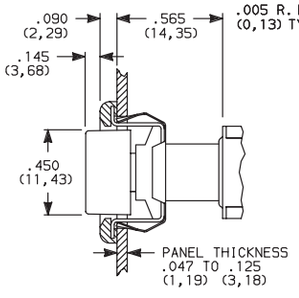

**PANEL MOUNTING**



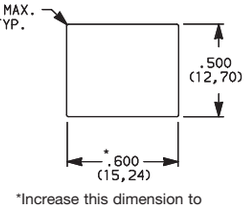

*Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,41/2,18) thick panels.

### J81 SNAP-IN WITH BLACK FRAME




**PANEL MOUNTING**



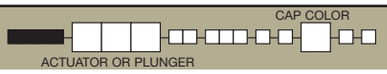

*Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,41/2,18) thick panels.

Third Angle Projection

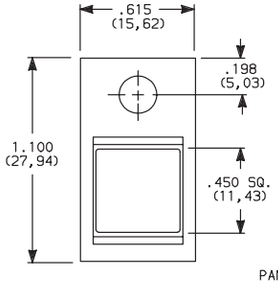
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

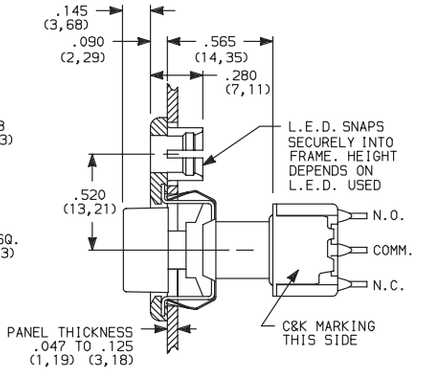
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## ACTUATOR—SNAP-IN FRONT MOUNT

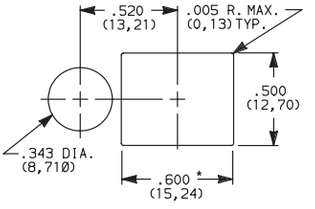



### J82 SNAP-IN WITH BLACK FRAME FOR LED




**PANEL MOUNTING**




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

Available with C, W, Z or Z3 terminations.

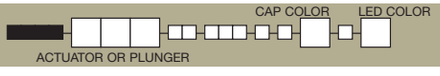
**LED not included.**
For LED information, see page A-61.

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

Other colors available, consult Customer Service Center.

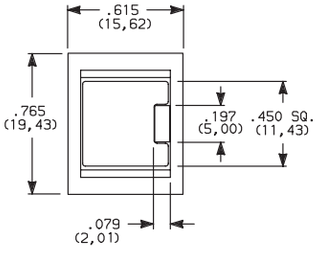
| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |
| 3 | RED |
| 4 | ORANGE |
| 5 | YELLOW |
| 9 | GRAY |

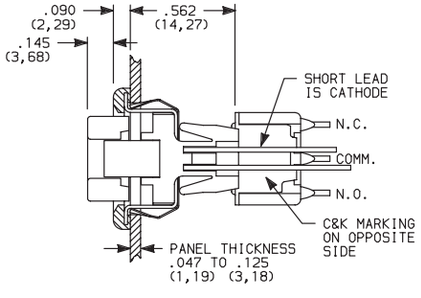
## ACTUATOR—SNAP-IN FRONT MOUNT



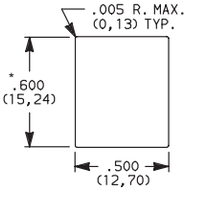

### J86 SNAP-IN WITH BLACK FRAME AND LED

8161J86ZQE223
**SPDT**




**PANEL MOUNTING**




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

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 |

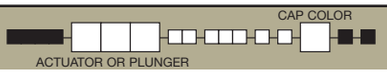
| OPTION CODE | LED COLOR |
|---|---|
| 3 | RED |

For LED information, see page A-61.

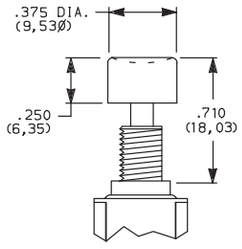
Third Angle Projection

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

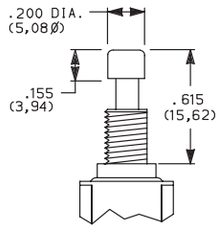
## PLUNGER



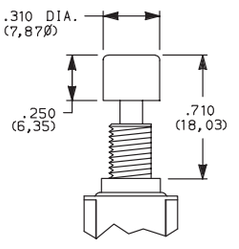

**S** PLUNGER WITH CAP P/N 7527



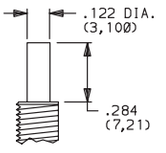

**S1** PLUNGER WITH CAP P/N 7089




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

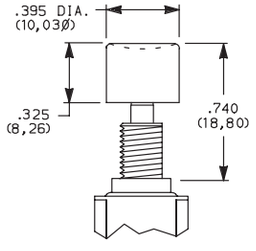



**S, S1, S2 plunger dimensions.**

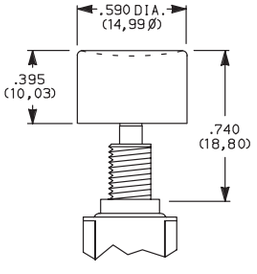



Plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

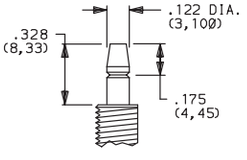
**L** PLUNGER WITH CAP P/N 8941




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




**L, L1 plunger dimensions.**



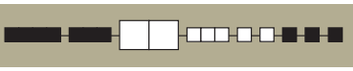

Plunger Material: Brass, chrome plated.

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

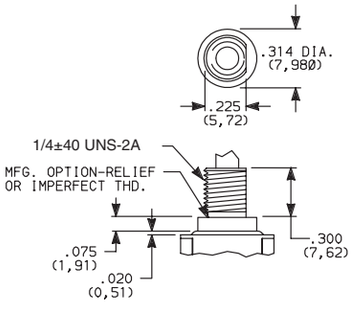
Cap Finish: gloss. Cap supplied not installed. Other colors available, consult Customer Service Center.

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

## BUSHING



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

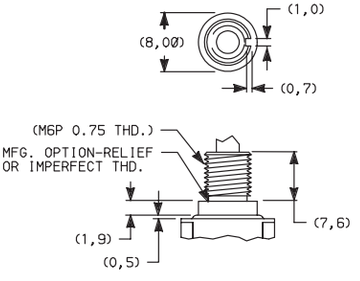



H bushing standard with C, W, Z or Z3 terminations.
H9 bushing standard with A, A3, AV2, AV3, or V3-V31 terminations.

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

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

**Y3** 7.6mm THREADED, KEYWAY

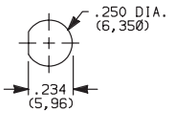



**Withstands 12 in./lbs. of torque with no distortion.**

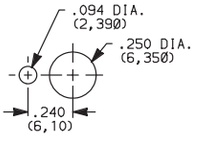
**NOTE:** When selecting bushing option, plunger selection must also be made, see above. No bushing option choice required when any JXX actuator option is selected.

**PANEL MOUNTING**

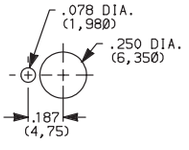
1/4 IN. BUSHING




Without Locking Ring

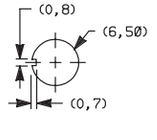



With Standard Locking Ring

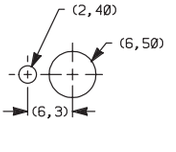



With Small Locking Ring

METRIC BUSHING

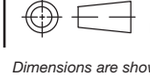



Without Locking Ring




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".

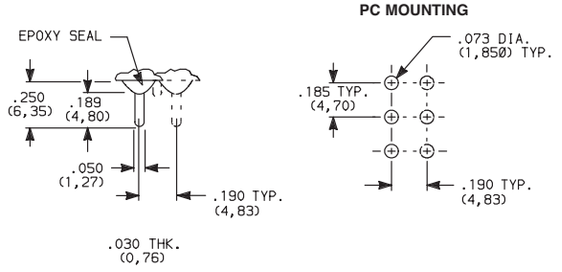



*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

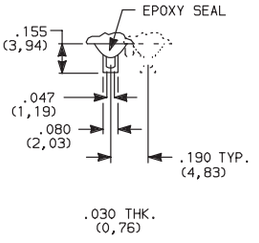
## TERMINATIONS

### C PC THRU-HOLE




**SPDT and DPDT**

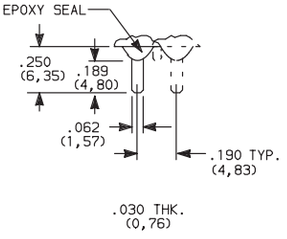
### Z SOLDER LUG




**SPDT and DPDT**

Not available with P, S or R contact material.

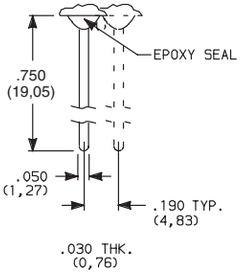
### Z3 QUICK CONNECT




**SPDT and DPDT**

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

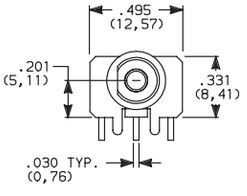
### W WIRE WRAP

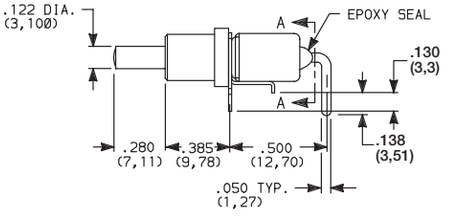


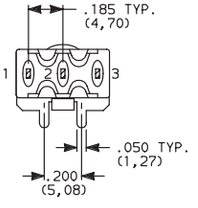

**SPDT and DPDT**

### A RIGHT ANGLE, PC THRU-HOLE

8161SH9ABE2
**SPDT**

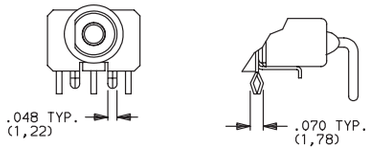


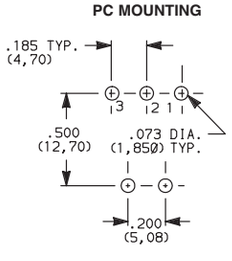




SECTION A-A

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




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



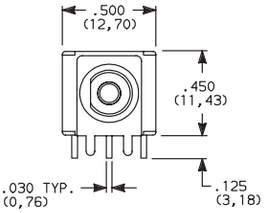

**NOTE:** PC pattern must clear switch support leg.

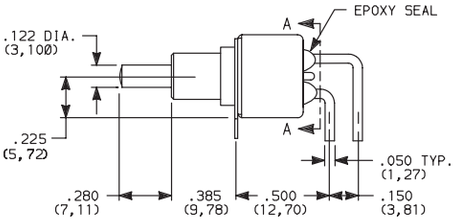
Third Angle Projection

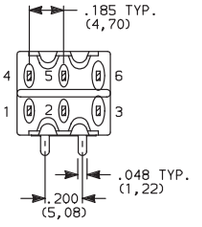
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

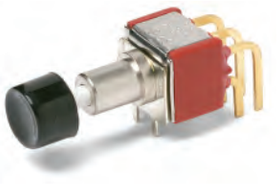
### A RIGHT ANGLE, PC THRU-HOLE



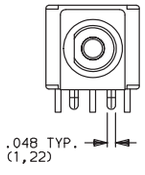



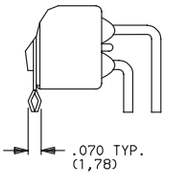

SECTION A-A



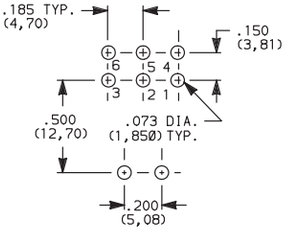
8261SH9ABE2
**DPDT**

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



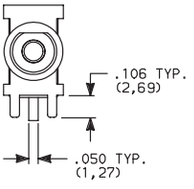



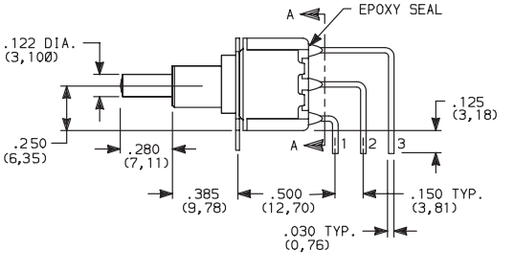

**PC MOUNTING**

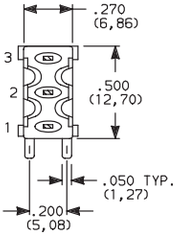



Not available with I seal.
Terminal bend radii and lead-in manufacturing option.

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



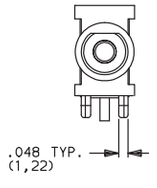



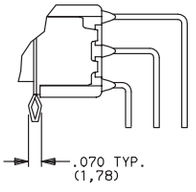




SECTION A-A

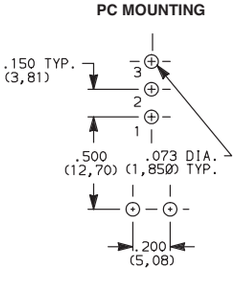
8161SH9AV2BE2
**SPDT**

### 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.

Third Angle Projection

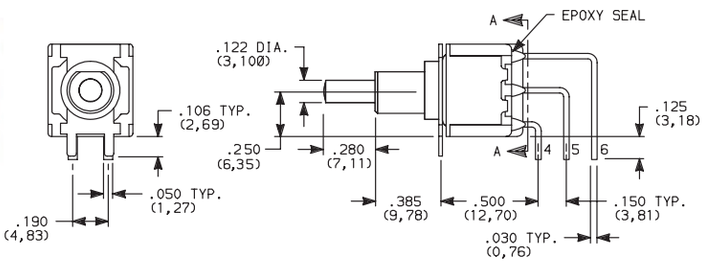
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

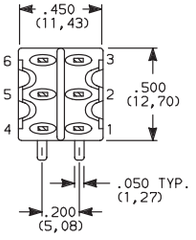
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## TERMINATIONS

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

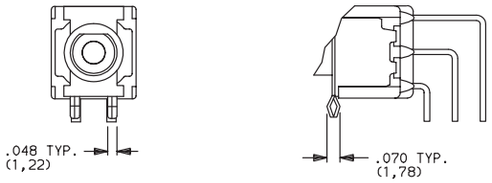
8261SH9AV2BE2
**DPDT**



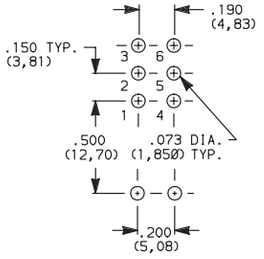




SECTION A-A

### 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.

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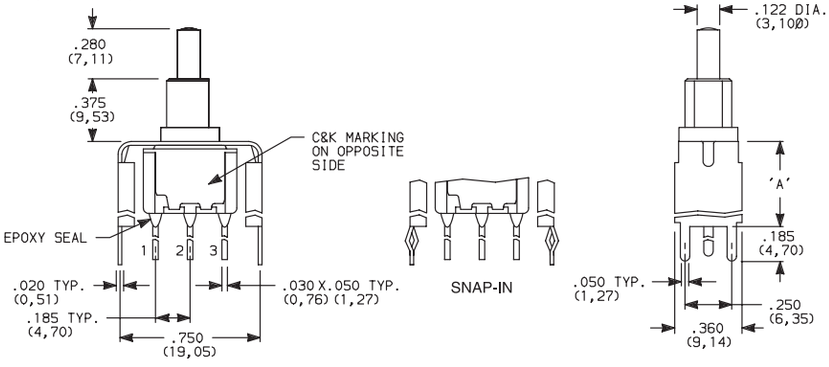
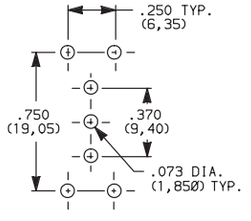
### V6 VERTICAL MOUNT, V-BRACKET
### V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN

8161SH9__BE2
**SPDT**




**PC MOUNTING**




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

Not available with I seal.

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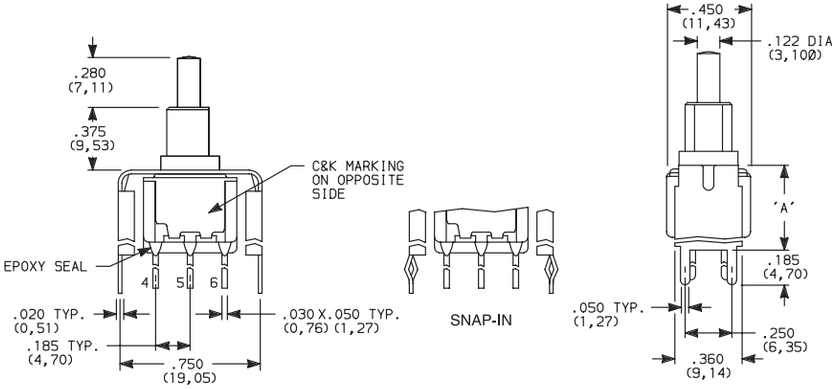
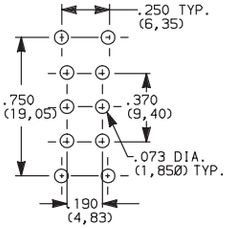
### V6 VERTICAL MOUNT, V-BRACKET
### V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN

8261SH9__BE2
**DPDT**




**PC MOUNTING**




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

Not available with I seal.

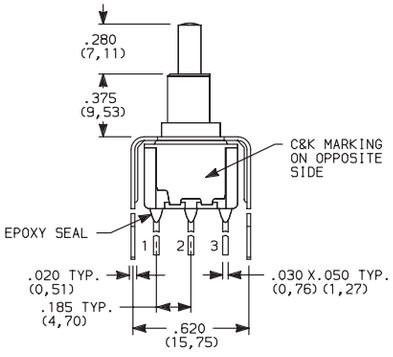
Third Angle Projection

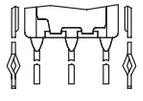
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

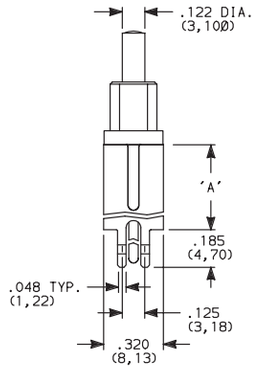
## TERMINATIONS

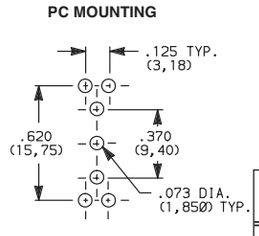
**V3, V4** VERTICAL MOUNT, V-BRACKET

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



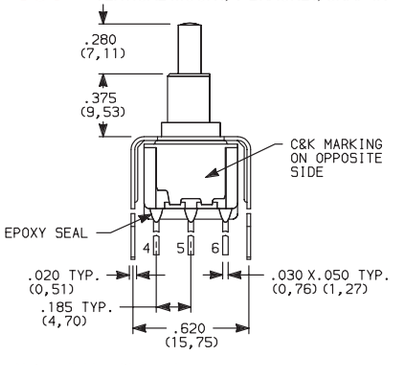
8161SH9__BE2
**SPDT**

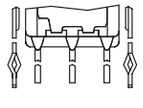
| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |

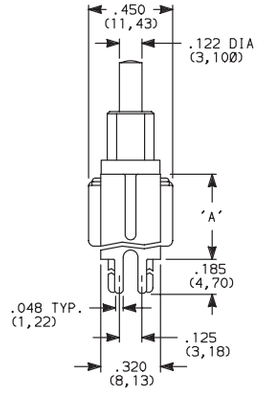
Not available with I seal.

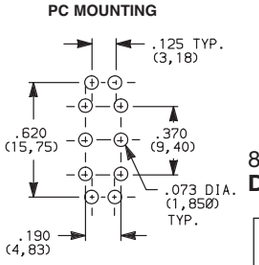
**V3, V4** VERTICAL MOUNT, V-BRACKET

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



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 | GOLD [1] | GOLD [1] | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC MAX. |
| P | | MATTE-TIN [6] | | |
| Q | SILVER [4,5] | SILVER [5] | POWER | 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC. |
| S | | MATTE-TIN [6] | | |
| G | GOLD OVER SILVER [2,3] | GOLD [3] | LOW LEVEL/DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC. |
| R | | MATTE-TIN [6] | | |

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

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

[2] END CONTACTS: Coin silver, with gold plate over nickel plate.

[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

[4] END CONTACTS: Coin silver, silver plated.

[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

[6] TERMINALS: Copper alloy, with matte-tin over nickel plate.

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

All models c UL us with all options when ordered with S, R, G, 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.

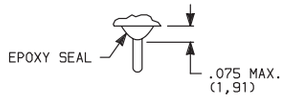
Third Angle Projection

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

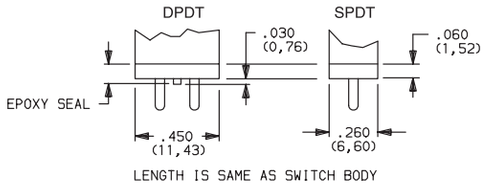
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## SEAL

**E** EPOXY SEAL



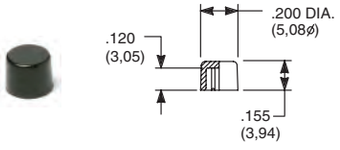

**I** EPOXY POTTED BASE




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

## AVAILABLE HARDWARE

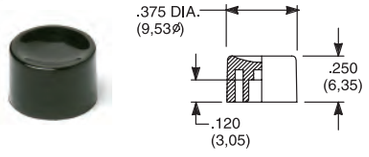
**Cap**




| PART NO. | |
|---|---|
| 708901000 | WHITE |
| 708902000 | BLACK |
| 708903000 | RED |
| 708904000 | ORANGE |
| 708905000 | YELLOW |
| 708909000 | GRAY |

Material: Nylon
Finish: Gloss

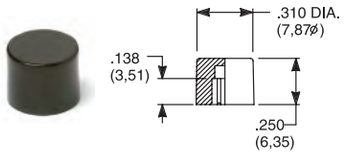
**Cap**




| PART NO. | |
|---|---|
| 752701000 | WHITE |
| 752702000 | BLACK |
| 752703000 | RED |
| 752704000 | ORANGE |
| 752705000 | YELLOW |
| 752709000 | GRAY |

Material: Nylon
Finish: Gloss

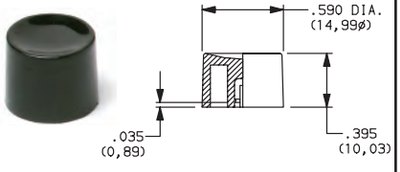
**Cap**




| PART NO. | |
|---|---|
| 801801000 | WHITE |
| 801802000 | BLACK |
| 801803000 | RED |
| 801804000 | ORANGE |
| 801805000 | YELLOW |
| 801809000 | GRAY |

Material: Nylon
Finish: Gloss

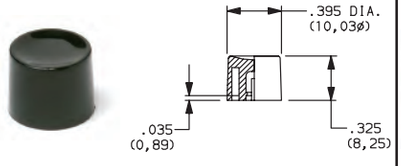
**Cap, Snap-fitting plunger**




| PART NO. | |
|---|---|
| 452D01000 | WHITE |
| 452D02000 | BLACK |
| 452D03000 | RED |
| 452D04000 | ORANGE |
| 452D05000 | YELLOW |
| 452D09000 | GRAY |

Material: Nylon
Finish: Gloss

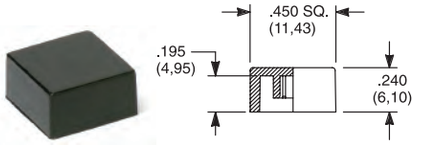
**Cap, Snap-fitting plunger**




| PART NO. | |
|---|---|
| 894101000 | WHITE |
| 894102000 | BLACK |
| 894103000 | RED |
| 894104000 | ORANGE |
| 894105000 | YELLOW |
| 894109000 | GRAY |

Material: Nylon
Finish: Gloss

**Cap, J80, J81 & J82 options only**

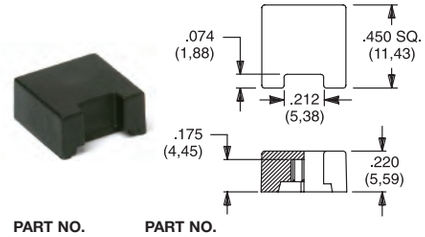



| PART NO. | | PART NO. | |
|---|---|---|---|
| 484601000 | WHITE | 798201000 | WHITE |
| 484602000 | BLACK | 798202263 | BLACK |
| 484603000 | RED | 798203000 | RED |
| 484604000 | ORANGE | 798204000 | ORANGE |
| 484605000 | YELLOW | 798205000 | YELLOW |
| 484609000 | GRAY | 798209000 | GRAY |

Material: Nylon
Finish: Gloss

Material: Nylon
Finish: Matte

**Cap, J86 & J96 options only**




| PART NO. | PART NO. | |
|---|---|---|
| 459701000 | 476801000 | WHITE |
| 459702000 | 476802000 | BLACK |
| 459703000 | 476803000 | RED |
| 459704000 | 476804000 | ORANGE |
| 459705000 | 476805000 | YELLOW |
| 459709000 | 476809000 | GRAY |

Material: Nylon
Finish: Gloss

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.

Third Angle Projection

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

## AVAILABLE HARDWARE

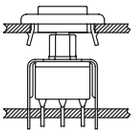
**Fits Z3 Termination female connector**

**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.

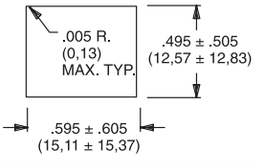
**TYPICAL APPLICATION**



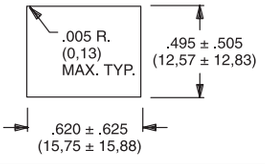
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

**PANEL MOUNTING**

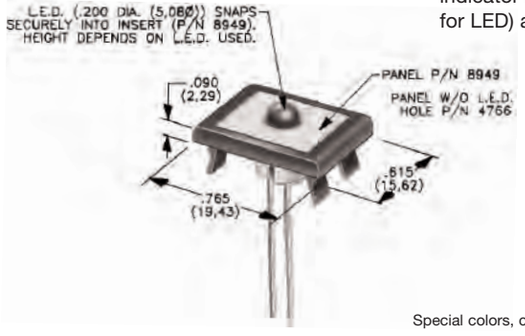
For part numbers 4325xxxxx, 4326xxxxx




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.**

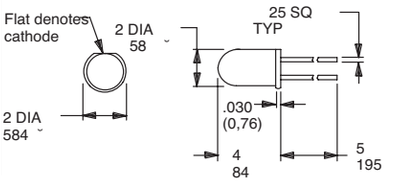
| PANEL INSERT WITH HOLE FOR LED | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| 894902000 | 476602000 BLACK |

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

## LED INFORMATION

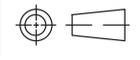
SWITCHES WITH LED SUPPLIED: J86 OPTION:
Rectangular LEDs are supplied on 8060 Series pushbutton switches with J86 option. These LEDs are factory installed and are not replaceable. The following specifications apply:

| 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

## Features/Benefits

- *Pre-travel or over-travel models available*
- *Ratings up to 3 AMPS*
- *Reliable contact design*
- *RoHS compliant*

## Typical Applications

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

Models Available

## Specifications

CONTACT RATING: Q contact material (853X Models): 1 AMP @ 120 V AC or 28 V DC; (855X Models): 3 AMPS @ 120 V AC or 28 V DC. See page A-65 for additional ratings.

ELECTRICAL LIFE:
853X MODELS: 250,000 actuations at full load.
855X MODELS: 10,000 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: $10^9\Omega$ min.

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

OPERATING TEMPERATURE: –30°C to 65°C.

TORQUE SPECS: T, T1 15/32" bushings - 50 in. lbs max. All other 1/4 -40 bushing types 12 in. lbs max.

## Materials

CASE: Glass filled phenolic or diallyl phthalate (DAP) (UL 94V-0).

PLUNGER: Phenolic or glass filled polyester, black standard(UL94V-0).

CAP & FRAME: Nylon, black, standard.

BUSHING: Brass, nickel plated.

CONTACTS: Q contact material: Coin silver, silver plated. See page A-65 for additional contact materials.

TERMINALS: Q contact material: Copper alloy, silver plated. See page A-65 for additional contact materials.

TERMINAL SEAL: Epoxy.

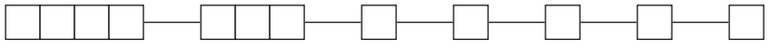
HARDWARE: Nut: Brass, nickel plated; Lockwasher: Steel, bright nickel plated.

**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-63 thru A-66. 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**
- **8531** SPST Off-Mom. 1 Amp
- **8532** SPST Off-Mom. 1 Amp
- **8533** SPST On-Mom. 1 Amp
- **8534** SPST On-Mom. 1 Amp
- **8551** SPST Off-Mom. 3 Amps
- **8552** SPST Off-Mom. 3 Amps

**Actuator or Plunger**
- **M** .150" high
- **J81** Snap-in with frame
- **J82** Snap-in with frame for LED
- **S** .210" high
- **T** 15/32 bushing
- **T1** 15/32 bushing with frame (8532 and 8534 only)

**Terminations**
- **Z** Solder lug
- **AV*** Right angle, PC thru-hole
- **C** PC Thru-hole

**Contact Material**
- **Q** Silver
- **B** Gold
- **G** Gold over silver

**Seal**
- **E** Epoxy
- **D** No epoxy seal

**Cap or Plunger Color**
- **2** Black
- **1** White
- **3** Red
- **9** Gray

**Frame Color**
- **2** Black
- **NONE** Models without frame

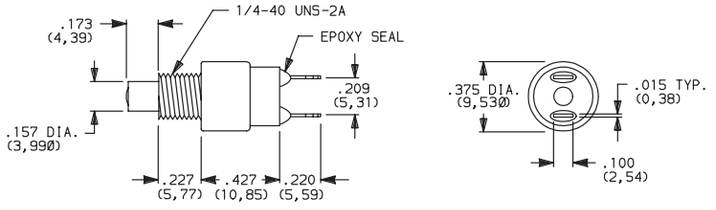
* Available with M or S plunger models, and B contact material only.

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

## SWITCH FUNCTION

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

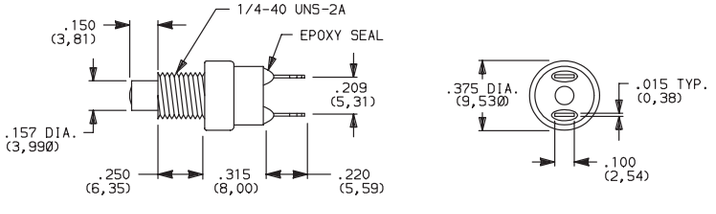
### SPST




Part number shown: 8531MZQE2

| NO. POLES | MODEL NO. | RATING | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | TOTAL TRAVEL | ACTUATION FORCE | SCHEMATIC |
|---|---|---|---|---|---|---|---|
| SP | 8532 | 1 AMP | OFF | MOM. | .050 (1,27) TYP. | 6 oz (170g) TYP. | N.O. |
| | 8552 | 3 AMPS | | | | | |

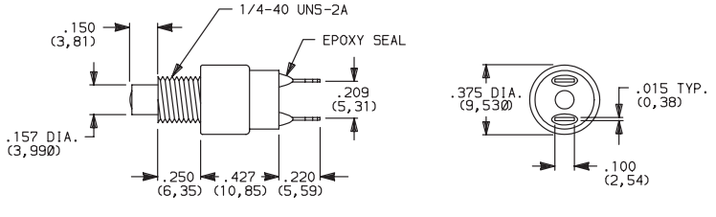
### SPST




Part number shown: 8532MZQE2

| NO. POLES | MODEL NO. | RATING | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | TOTAL TRAVEL | ACTUATION FORCE | SCHEMATIC |
|---|---|---|---|---|---|---|---|
| SP | 8533 | 1 AMP | ON | MOM. | .080 (2,03) TYP. with pretravel .057 (1,45) TYP. | 11.5 oz (456 g) TYP. | N.C. with pretravel |
| | 8534 | 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.

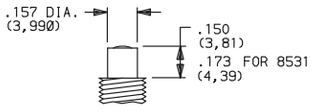
Third Angle Projection

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

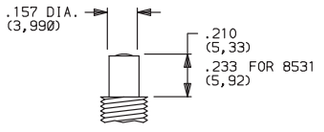
# 8500 Series
# Subminiature Pushbutton Switches

## PLUNGER

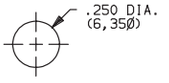
**M** .150" HIGH PLUNGER




**S** .210" HIGH PLUNGER



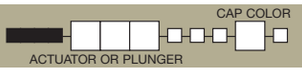

**PANEL MOUNTING**



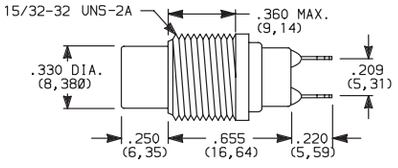

| OPTION CODE | PLUNGER COLOR |
|---|---|
| 2 | BLACK |
| 3 | RED |

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

## ACTUATOR

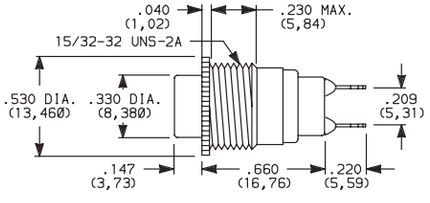



**T** 15/32 BUSHING



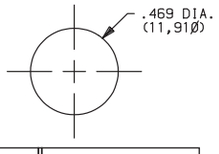

**NOTE:** No frame color choice required.

**T1** 15/32 BUSHING WITH FRAME




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

**PANEL MOUNTING**



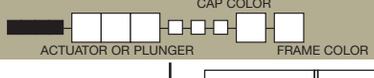

| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |
| 3 | RED |
| 9 | GRAY |

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

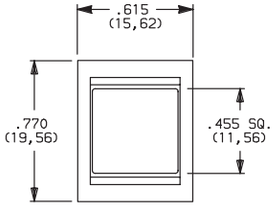
One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

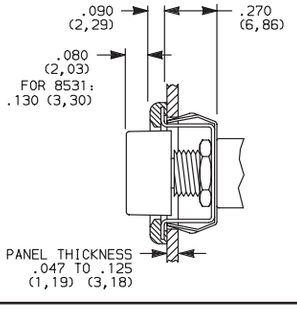
**NOTE:** Caps available for plunger options, see page A-65.

## ACTUATOR—SNAP-IN FRONT MOUNT




**J81** SNAP-IN WITH FRAME



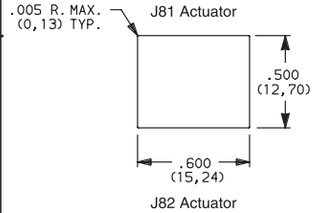

| OPTION CODE | CAP AND FRAME COLOR |
|---|---|
| 2 | BLACK |

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

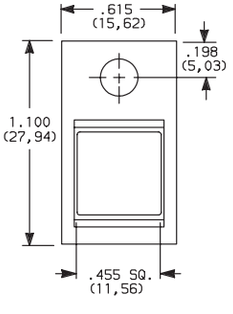
One mounting nut and lockwasher supplied with all actuators.

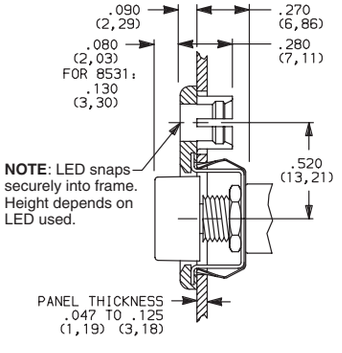
**NOTE:** Caps & frames available separately, see pages A-65 and A-66.

**PANEL MOUNTING**




**J82** SNAP-IN WITH FRAME FOR LED

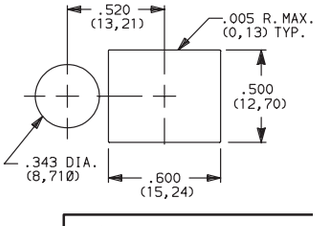



**NOTE**: LED snaps securely into frame. Height depends on LED used.

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

J82 Actuator

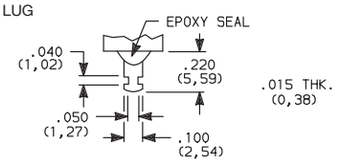



Third Angle Projection

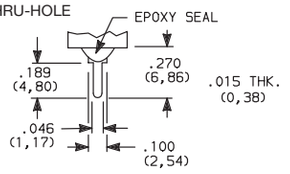
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

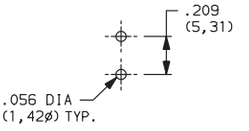
**Z** SOLDER LUG



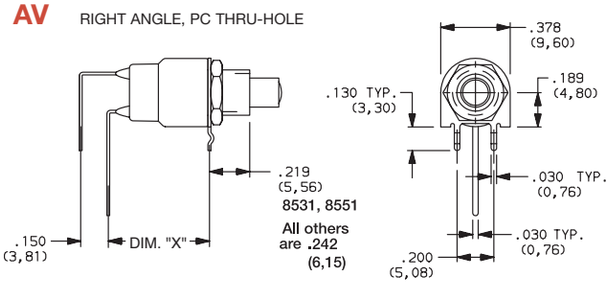

**C** PC THRU-HOLE



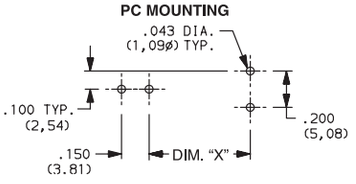

**PC MOUNTING**




**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 | YES | YES | GOLD [1] | GOLD | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC MAX. |
| Q | YES | YES | SILVER [4] | SILVER [5] | POWER | 853X MODELS: 1 AMP @ 120 V AC OR 28 V DC.<br>855X MODELS: 3 AMPS @ 120 V AC OR 28 V DC. |
| G | YES | YES | GOLD OVER SILVER [2] | GOLD [3] | 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. |

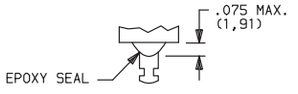
* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] CONTACTS: Coin silver, with gold plate over nickel plate.
[3] TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] CONTACTS: Coin silver, silver plated.
[5] 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.

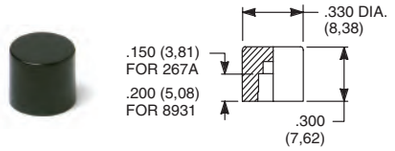
## SEAL

**E** EPOXY SEAL



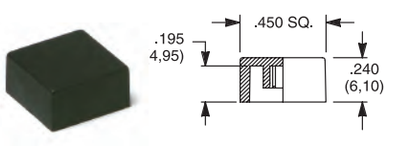

## REPLACEMENT HARDWARE

**Cap for 0.157" dia. plungers**




| PART NO. | | PART NO. | |
|---|---|---|---|
| 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<br>Finish: Gloss | | Material: Nylon<br>Finish: Gloss | |

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




**PART NO.**

| | |
|---|---|
| 448901000 | WHITE |
| 448902000 | BLACK |
| 448903000 | RED |
| 448909000 | GRAY |

Material: Nylon
Finish: Gloss or matte

**Frame**

**PART NO.**

613302263 BLACK

Material: Nylon
Finish: Matte

Other colors available, consult Customer Service Center.

Third Angle Projection

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

# 8500 Series
# Subminiature Pushbutton Switches

## AVAILABLE HARDWARE

**Frame**

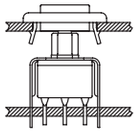
**PART NO.**
615602263 BLACK

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.

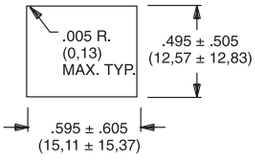
**TYPICAL APPLICATION**



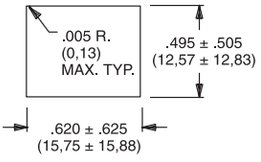
| .047" (1,19) PANEL THK. | .062" (1,57) PANEL THK. | .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|---|---|
| **PART NO.** | **PART NO.** | **PART NO.** | **PART NO.** |
| 432502263 | 432602263 | 432702263 | 432802263 BLACK |

**PANEL MOUNTING**

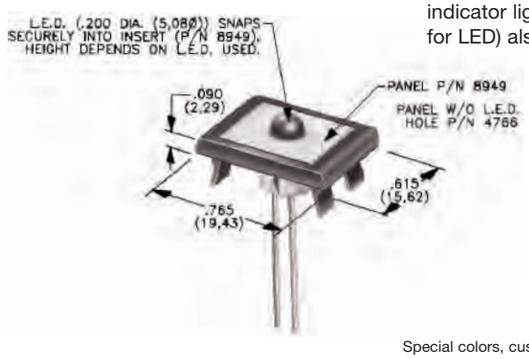
For part numbers
4325xxxxx, 4326xxxxx




For part numbers
4327xxxxx, 4328xxxxx




**Panel Inserts**



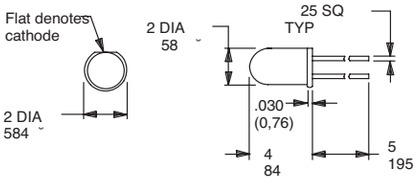

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. **LED not included.**

| PANEL INSERT WITH HOLE FOR LED | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| 894902000 | 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

Third Angle Projection

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

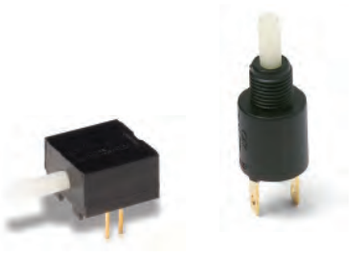
# KM Series
# Subminiature Pushbutton Switches

## *Features/Benefits*

- ***Reliable contact design***
- ***Available with pretravel and overtravel***
- ***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: $10^9\Omega$ 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.

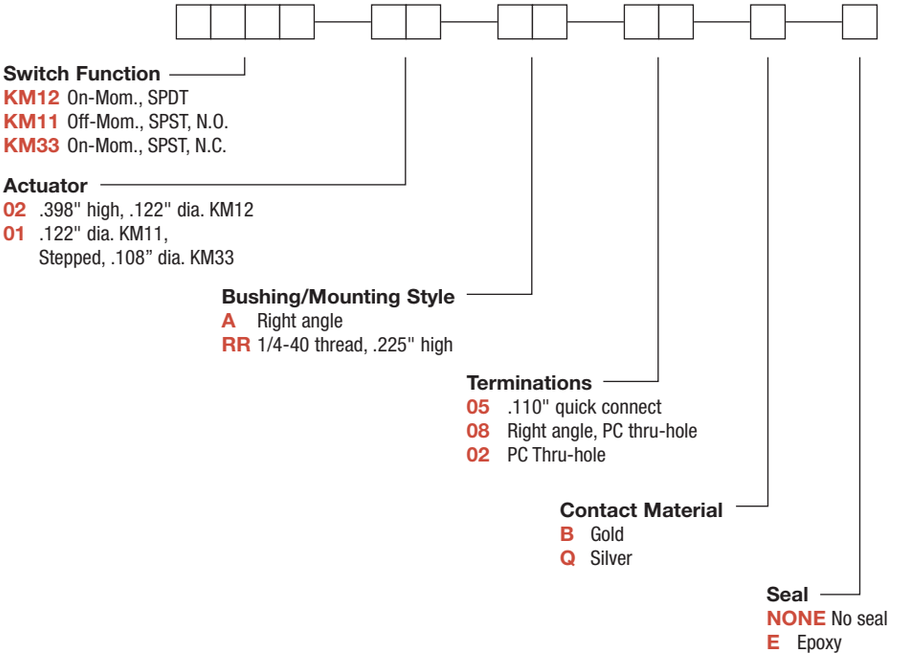
RETURN SPRING: Music wire, phosphor coated.

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.

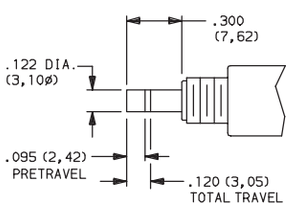


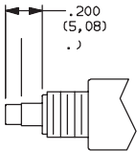

*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# KM Series
# Subminiature Pushbutton Switches

## SWITCH FUNCTION

## ACTUATOR




Third Angle Projection

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