audio

automotive

aerospace

communication devices

consumer appliances

consumer electronics

datacom

data storage

handheld devices

industrial

industrial equipment

instrumentation

medical

military

mobile phones

portable tools

pumps & motors

security alarms

telecom

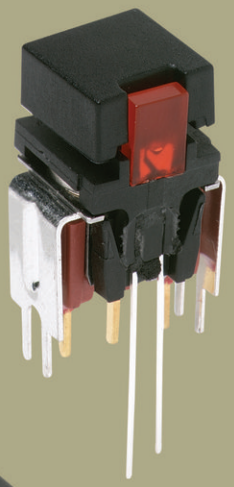
test equipment

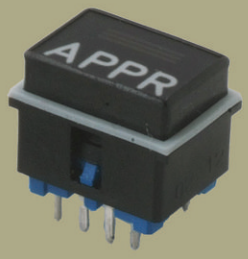
thermostatic controls

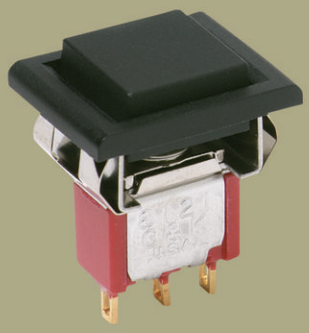
pushbutton













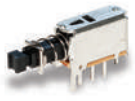




# pushbutton

# Pushbutton
# Product Selection Guide

| Pushbutton |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
| **Series** | **ELUM** | **EP** | **TP** | **E020** | **8020** | **E010** | **8060** | **8500** | **KM** |
| **Switch Type** | PCB Illuminated | Sub-miniature | Sub-miniature | Miniature | Miniature | Miniature | Miniature | 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** | | | | | | | | | |
| Thru-hole | • | • | • | • | • | • | • | • | • |
| Surface Mount | • | • | | | | | | | |
| **Panel Mount** | | | | | | | | | |
| Wire Wrap | | | | | | • | • | | |
| Solder Lug | | | • | | • | • | • | • | |
| Quick Connect | | | | | | | • | | • |
| **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/ultra-miniature | Sub-miniature | Micro/ultra-miniature | Sub-miniature | Miniature | Miniature | Miniature |
| **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** | | | | | | | |
| Thru-hole | • | • | • | • | • | • | • |
| Surface Mount | | | • | | | | |
| **Panel Mount** | | | | | | | |
| Wire Wrap | | | | | | | |
| Solder Lug | • | • | | | | | |
| Quick Connect | | | | | | | |
| **Page No.** | A-71 | A-74 | A-77 | A-82 | A-85 | A-88 | A-97 |

| Pushbutton |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| **Series** | **FP** | **AP** | **APB** | **NP** | **PNP** | **ATP** | **PBA** |
| **Switch Type** | Micro/ultra-miniature | Sealed/ Industrial | Sealed/ Industrial | Sealed/ Industrial | Sealed/ Industrial | Panel Illuminated | PCB Illuminated |
| **Poles/Throws** | SPST, SPDT, DPST, DPDT | SPST | SPST | SPDT | SPST, SPDT | SPDT, DPDT | DPDT, 4PDT |
| **Max. Current** | 0.4 VA | 400mA | 400mA | 5 Amp | 10mA / 3A / 5A | 3A / 5A | 0.3 / 1A |
| **Process Sealed** | • | • | • | | • | | |
| **PCB Mount** | | | | | | | |
| Thru-hole | • | • | • | • | • | | • |
| Surface Mount | | | | | | | |
| **Panel Mount** | | | | | | | |
| Wire Leads | | • | • | • | • | • | |
| Solder Lug | | • | • | • | • | • | |
| Quick Connect | | | | | | | |
| **Page No.** | A-106 | A-109 | A-115 | A-119 | A-126 | A-131 | A-149 |

| Pushbutton |  |  |  |  |
|---|---|---|---|---|
| **Series** | **PS** | **PVA** | **KLS** | **PLP** |
| **Switch Type** | Miniature | Miniature | PCB Illuminated | Panel Illuminated |
| **Poles/Throws** | SPST, DPDT | DPST, DPDT | SPST, DPDT | Pilot light, SPST, DPDT |
| **Max. Current** | 0.1 / 1A 0.3 / 2A | 100 mA | 0.5A / 25Vdc 0.1A / 28Vdc | 3A / 250Vac 1A / 30Vdc |
| **Process Sealed** | | | • | |
| **PCB Mount** | | | | |
| Thru-hole | • | • | • | |
| Surface Mount | | | | |
| **Panel Mount** | | | | |
| Wire Leads | • | | | • |
| Solder Lug | | | | • |
| Quick Connect | | | | |
| **Page No.** | A-151 | A-161 | A-164 | A-168 |

# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

**LEAD FREE COMPATIBLE OPTION**

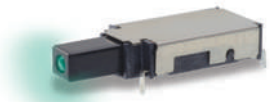
## Features/Benefits

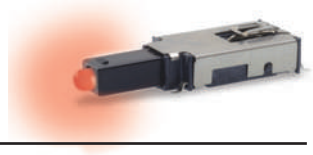
- *SPDT (N.O. & N.C.)*
- *Low height above PCB*
- *Reliable self-cleaning contact*
- *Surface-mount or thru-hole PCB*
- *Standard or custom actuator*
- *Central LED illumination*
- *Latching or Momentary*
- *Long travel. Smooth feel*
- *RoHS compliant and compatible*

## 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*

## STANDARD OPTIONS

### ELUMEESAQ7C12



SURFACE MOUNT




ACTUATOR SHOWN EXTENDED POSITION

### ELUMOATHQ6C12



PC THRU-HOLE

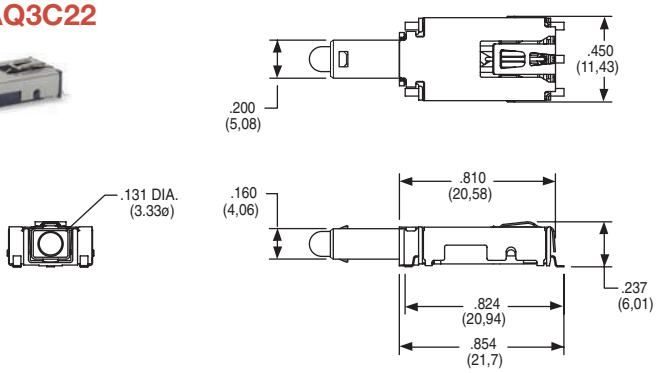



ACTUATOR SHOWN EXTENDED POSITION

### ELUMEESAQ3C22



SURFACE MOUNT




ACTUATOR SHOWN EXTENDED POSITION

## DESIGNATION

E L U M □□ □□ □ □ □□□

**ELUM** ELUM SERIES, Illuminated Latching Pushbutton

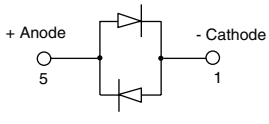
## SWITCH FUNCTION

| 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: 3 C, 4 NC, NO 2; 5, 1; + Anode – Cathode |
| 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



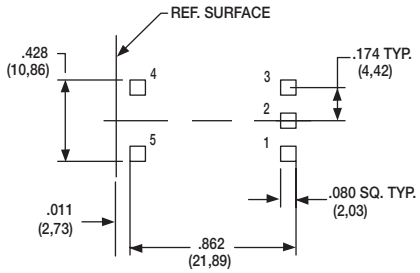

Third Angle Projection

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

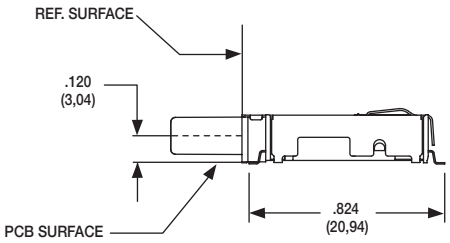
# ELUM™ Series
# Right Angle Illuminated Latching Pushbutton

## TERMINAL STYLE

### SA RIGHT ANGLE, SURFACE MOUNT

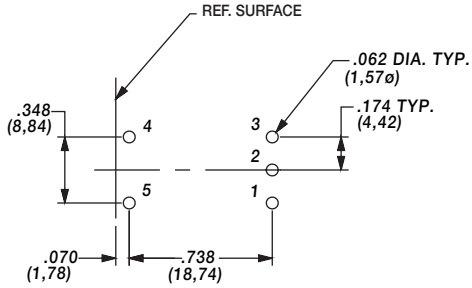


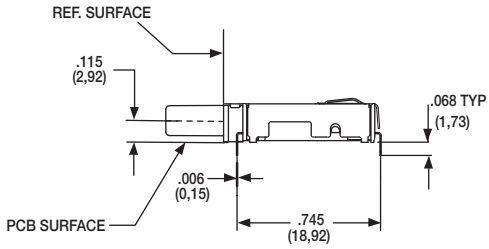

PCB MOUNTING




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

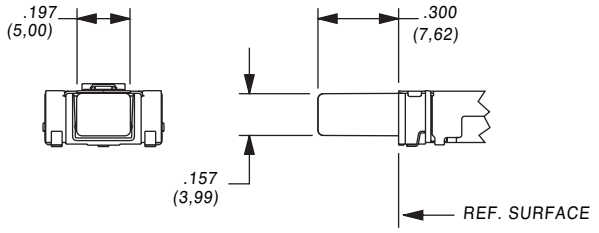
* For information on specific and custom LED, please contact Customer Service.

Third Angle Projection

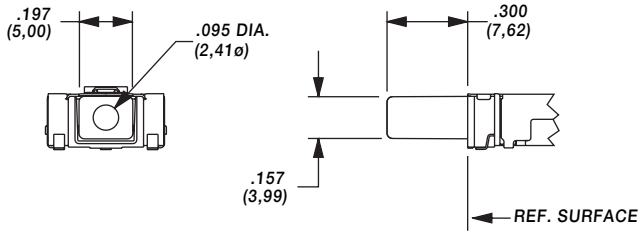
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## ACTUATOR STYLE*

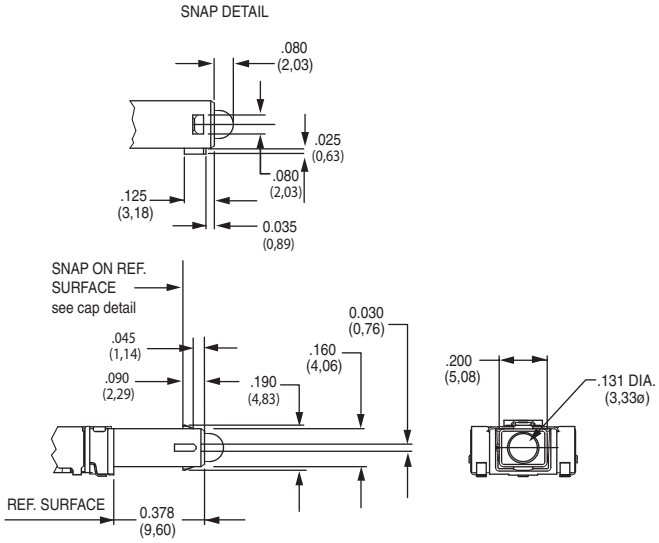
### C02 BLACK WITHOUT WINDOW




### C12 BLACK WITH WINDOW

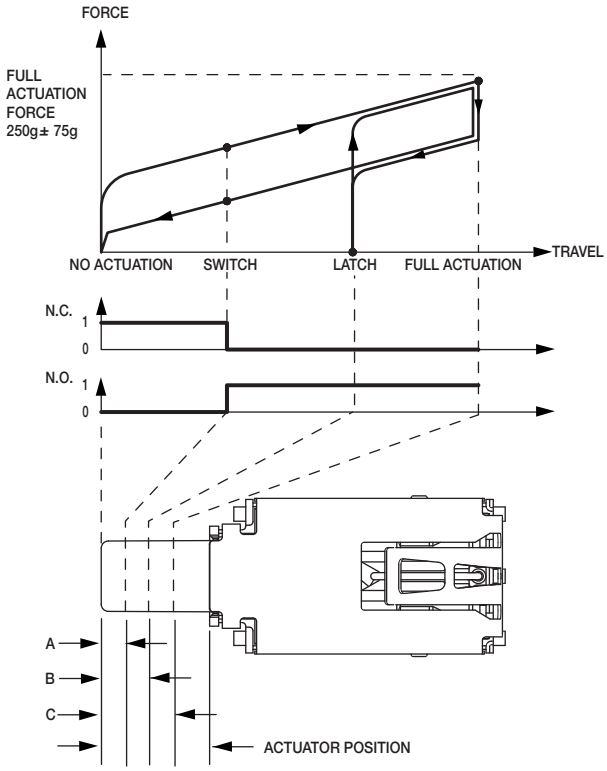



### C22 BLACK WITH WINDOW AND SNAP FEATURE TO ACCEPT CUSTOM CAP




* Custom actuators available, please contact Customer Service.

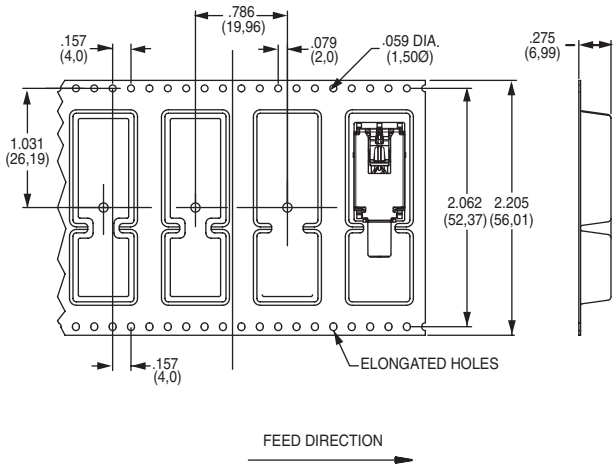
## FORCE TRAVEL DIAGRAM




| 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

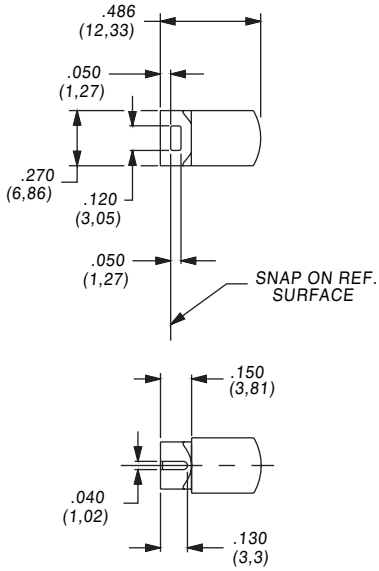
**Cap**



**PART NO.**

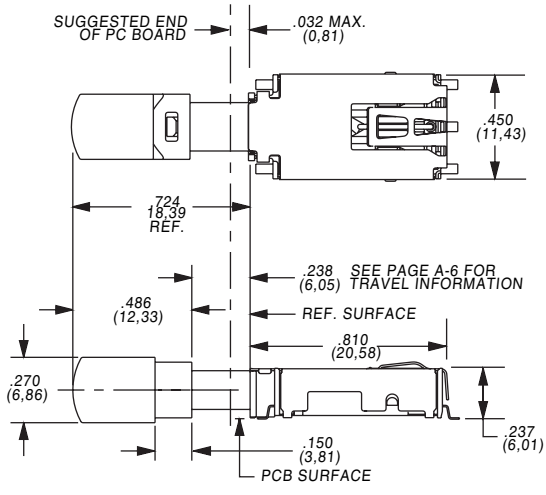
**181D00000** Paint and laser etched with white paint underlay and black paint with universal standby symbol.

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

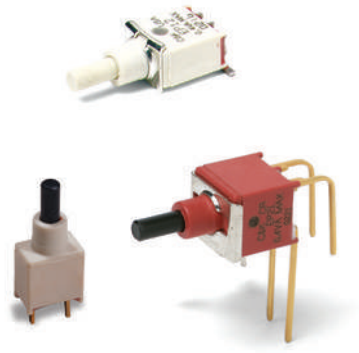
## Features/Benefits

- *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 mΩ9 typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: $10^9$ Ω9 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.

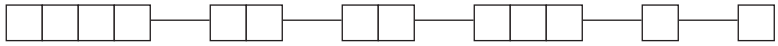
NOTE: Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

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 (not available with **EP12** version)

**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

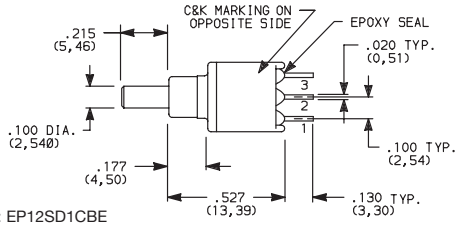
**Seal**
**E** Epoxy

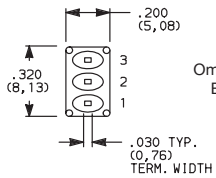
# EP Series
# Sealed Tiny Pushbutton Switches

## 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



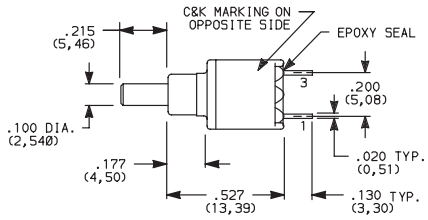

Omit terminal 2 for EP11 models.

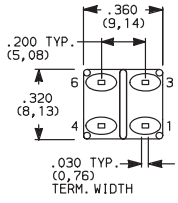
Terminal Nos. For Reference Only

Part number shown: EP12SD1CBE

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

### DPST




Terminal Nos. For Reference Only

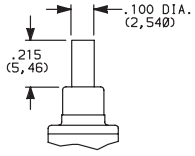
Part number shown: EP21SD1CBE

MOM. = Momentary

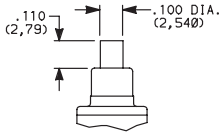
All models cULus with all options when ordered with G, Q, R or S contact material.

## PLUNGER

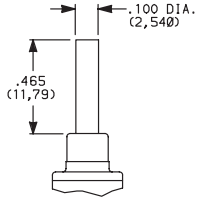
**S** .215" HIGH




**S1** .110" HIGH

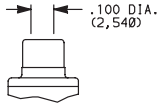



**S2** .465" HIGH

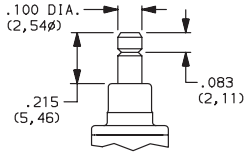



S1& S2 actuators are not available with EP12 & EP21 models.

**FP** FLUSH PLUNGER




**R** SNAP-FITTING

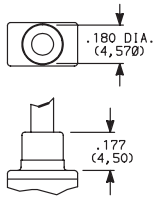



FP & R actuators are not available with EP21 model.
R actuators are not available with EP12 model.

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

## BUSHING

**D1** UNTHREADED



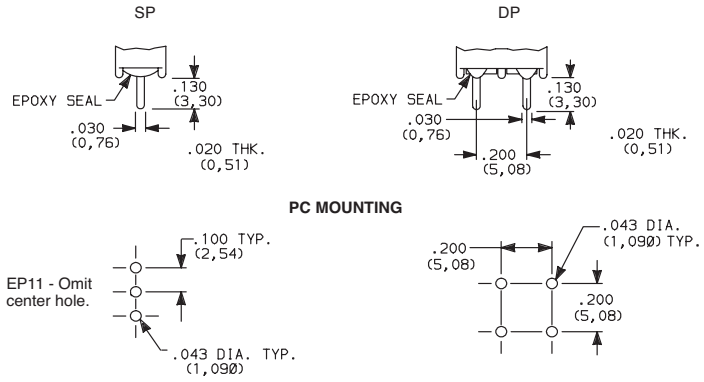

NOTE: Internal actuator o-ring standard.

Third Angle Projection

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

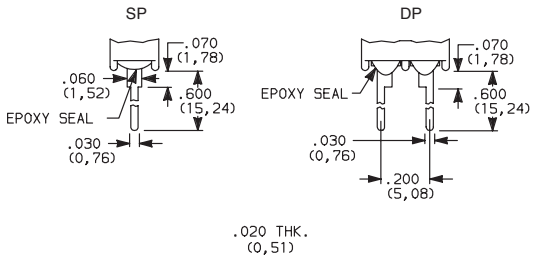
## TERMINATIONS

### C PC THRU-HOLE



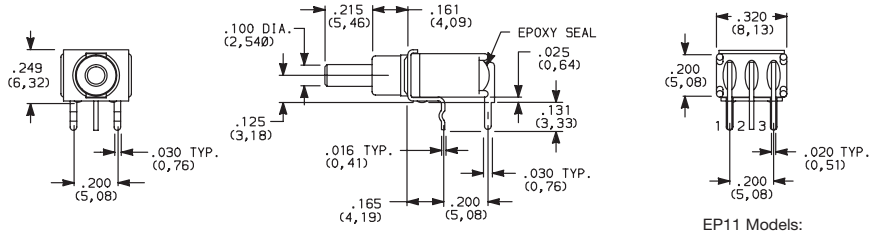

**SP and DP**

### W WIRE WRAP




**SP and DP**

### A RIGHT ANGLE, PC THRU-HOLE

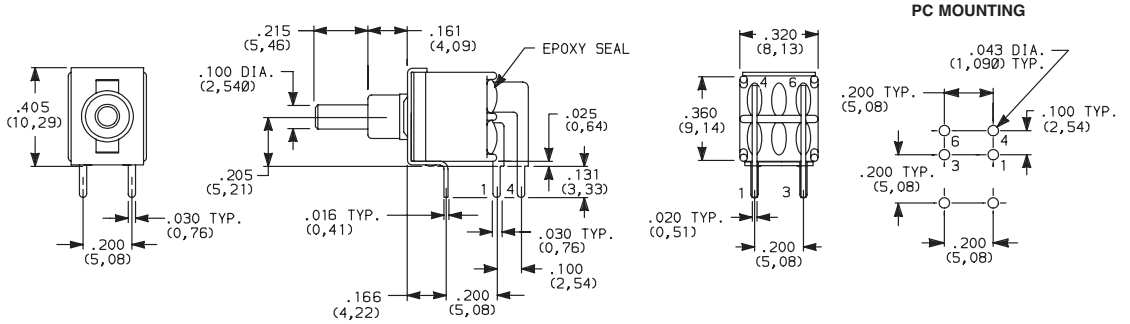



EP11 Models: omit terminal 2.

EP11 Models: omit thru-hole 2.

**EP12SD1ABE**
**SPDT**

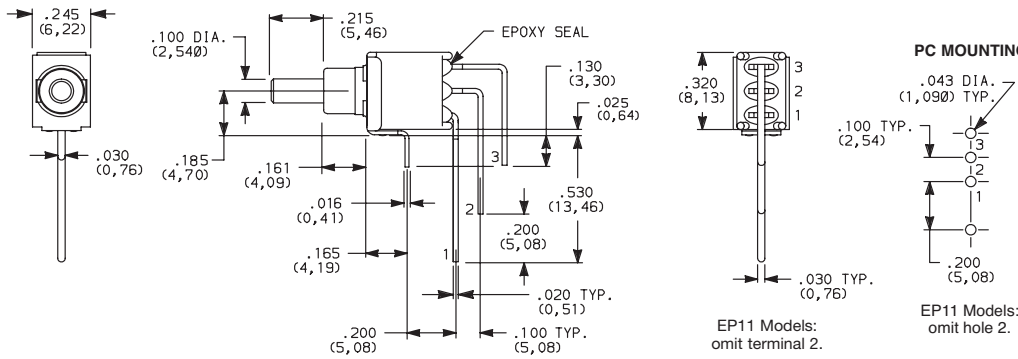
### A RIGHT ANGLE, PC THRU-HOLE






**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

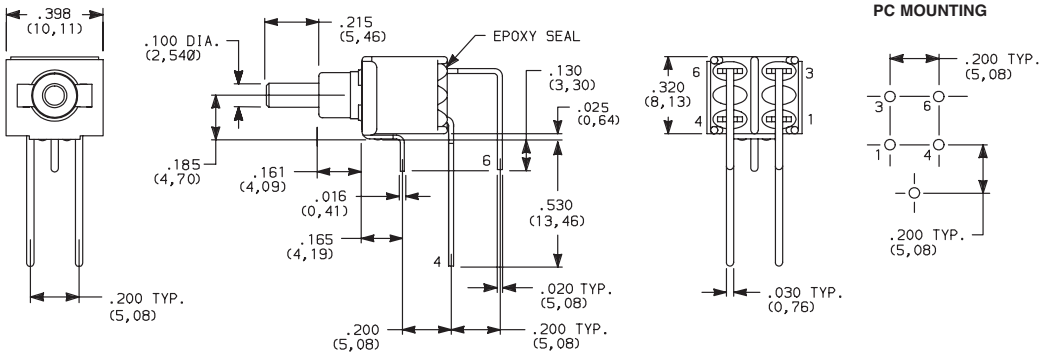
# EP Series
# Sealed Tiny Pushbutton Switches

## TERMINATIONS

### AV VERTICAL RIGHT ANGLE, THRU-HOLE



**EP21SD1AVBE**
**DPST**

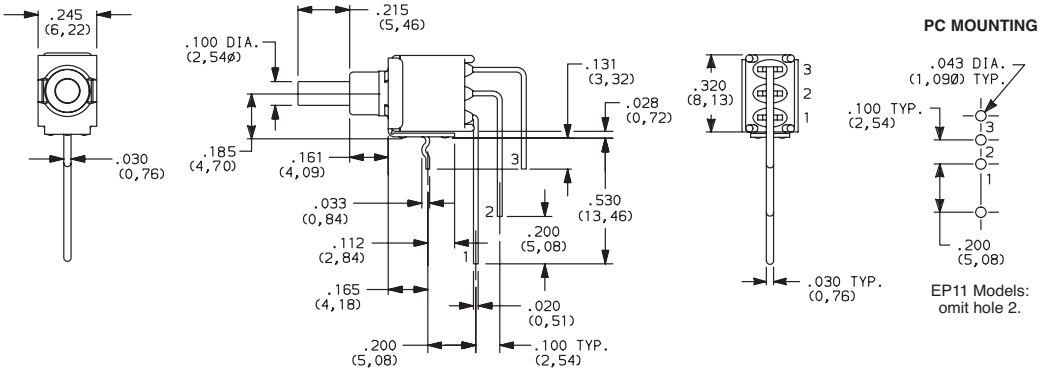



NOTE: Terminal bend radii and lead-in manufacturing option.

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



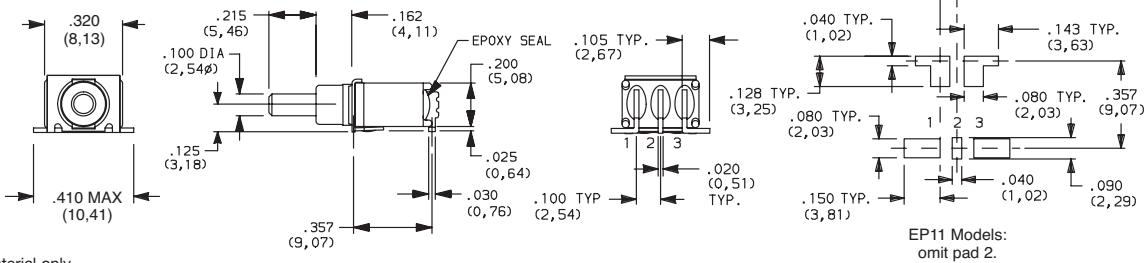
**EP12SD1AV3BE**
**SPST**




### SA RIGHT ANGLE, SURFACE MOUNT



**EP12SD1SAPE**
**SPDT**

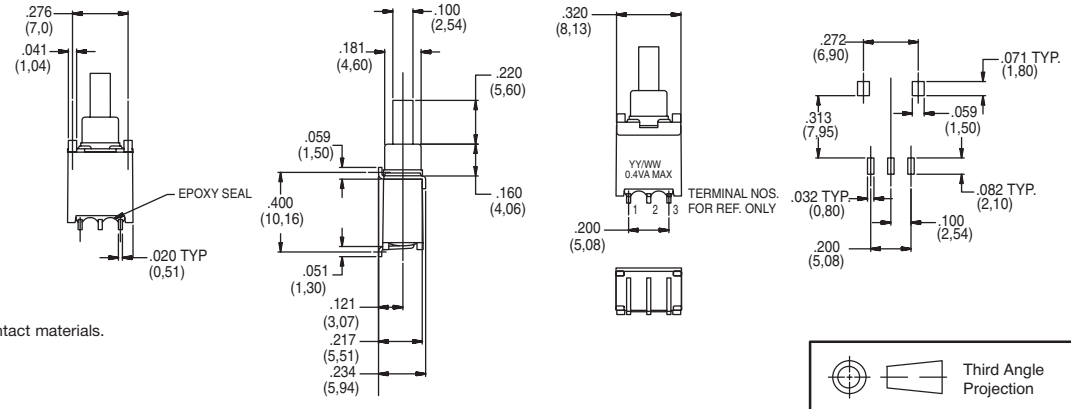



Available with P contact material only.
Not Available on DPST models.

### SA1 RIGHT ANGLE, SURFACE MOUNT



**EP12SD1SA1BE**
**SPDT**




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

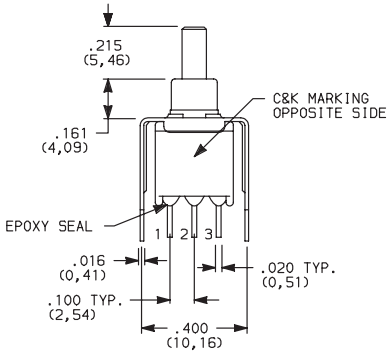
Third Angle Projection

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

## TERMINATIONS

**V3** VERTICAL MOUNT, V-BRACKET

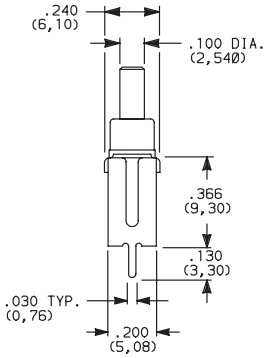
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN

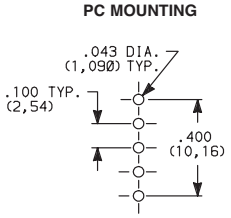



EP11 Models:
omit terminal 2.




V31 SNAP-IN



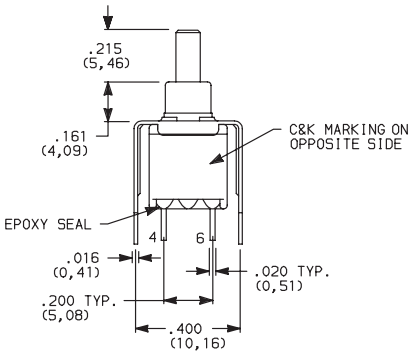

EP11 Models:
o e e ole

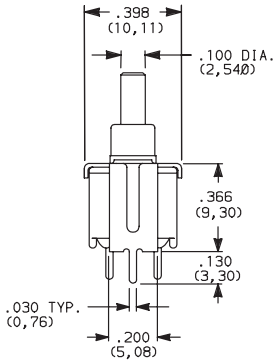


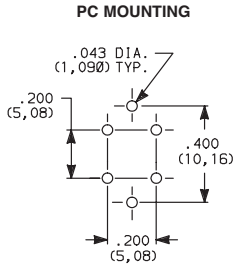
**EP12SD1V3BE**
**SPDT**

---

**V3** VERTICAL MOUNT, V-BRACKET






**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.

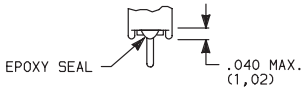
[6] TERMINALS: Copper alloy, with matte tin over nickel plate.

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

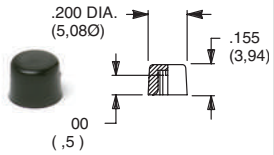



Third Angle Projection

# EP Series
# Sealed Tiny Pushbutton Switches

## AVAILABLE HARDWARE

**Cap**



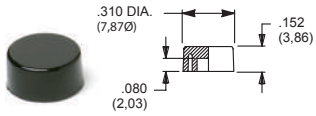

**PART NO.**

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

Material: Nylon
Finish: Gloss

Not for use on S1 plunger

**Cap**



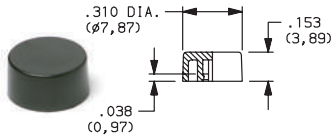

**PART NO.**

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

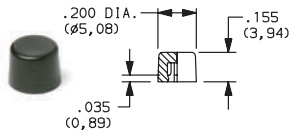



**PART NO.**

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

Material: Nylon
Finish: Gloss

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




**PART NO.**

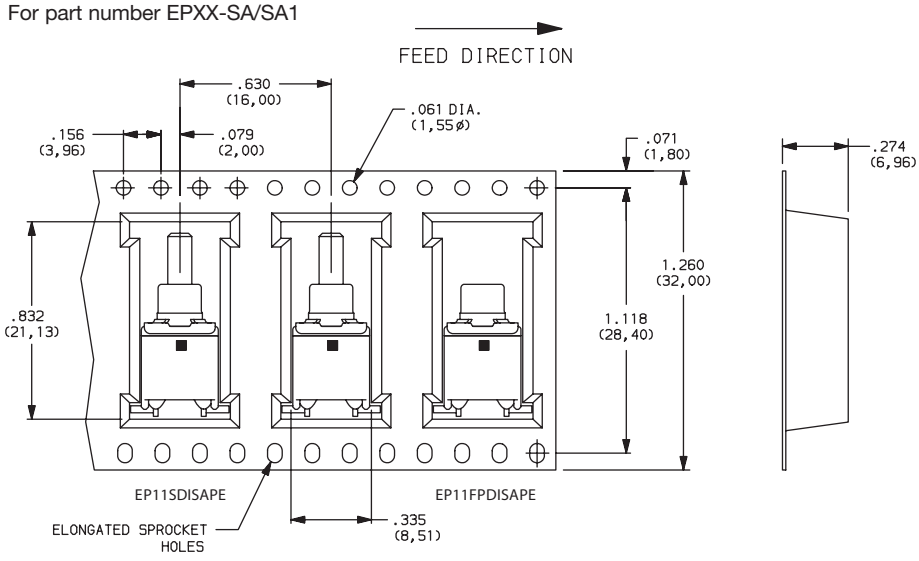
| | |
|---|---|
| 785A01000 | WHITE |
| 785A02000 | BLACK |
| 785A03000 | RED |

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

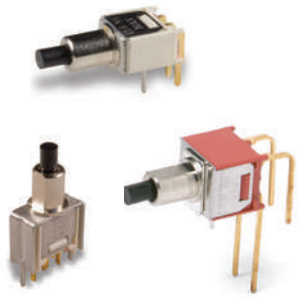
## Features/Benefits

- ***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 mΩ15 typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: $10^9\Omega$ 15min.

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.

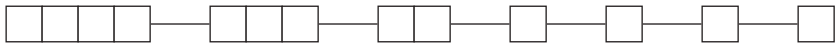
CENTER CONTACT & ALL TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page A-19 for additional contact materials.

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

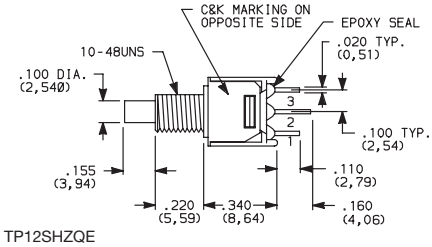
**Frame Color**
**2** Black
**NONE** Models with no frame

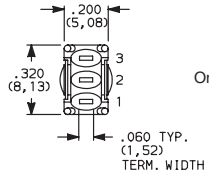
# TP Series
# Tiny Pushbutton Switches

## 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 2 (COMMON) NC 1 3 NO |

### SPDT



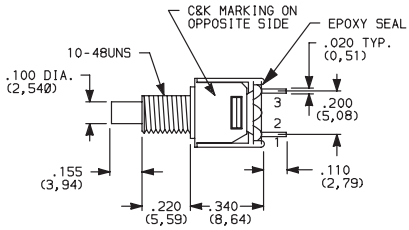

Omit terminal 2 for TP11 models.

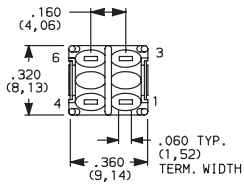
Terminal Nos. For Reference Only

Part number shown: TP12SHZQE

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

### DPST



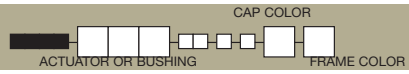

Terminal Nos. For Reference Only

Part number shown: TP21SHZQE

MOM. = Momentary

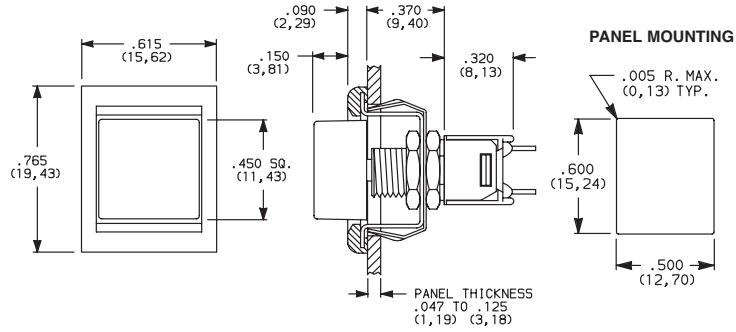
All models with all options when ordered with G, Q or R contact material.

## ACTUATOR—SNAP-IN FRONT MOUNT




### J81 SNAP-IN WITH FRAME






| 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*

## BUSHING

ACTUATOR OR BUSHING

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

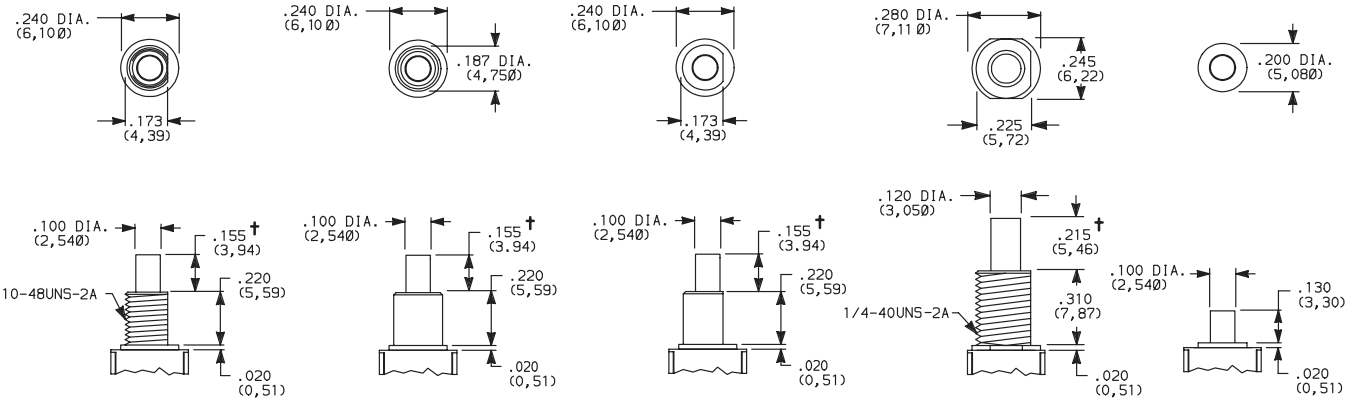
**SH8** .155" HIGH PLUNGER, .220" HIGH BUSHING, UNTHREADED

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

**LT** .21517" HIGH PLUNGER, .310" HIGH BUSHING, THREADED

**LT9** .215"17 HIGH PLUNGER, .310" HIGH BUSHING, UNTHREADED

**MS9** .130" HIGH PLUNGER




Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

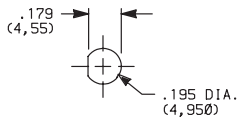
Not available with Z terminations.

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

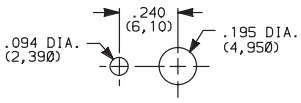
NOTE: Caps available for plunger options, see page A-20.

### PANEL MOUNTING

**10-48 BUSHING**

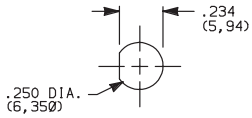



Without locking ring

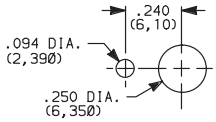



With standard locking ring

**1/4 IN. BUSHING**




Without locking ring

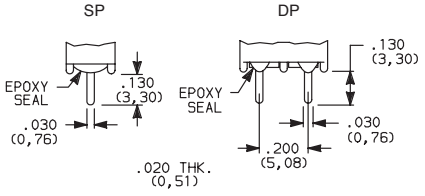



With standard locking rin

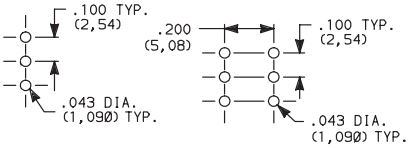
NOTE: One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see section "Technical Data and Additional Hardware".

## TERMINATIONS

**C** PC THRU-HOLE

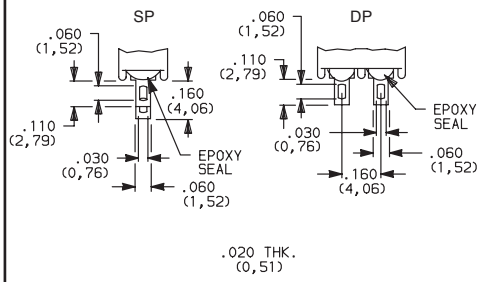



PC MOUNTING



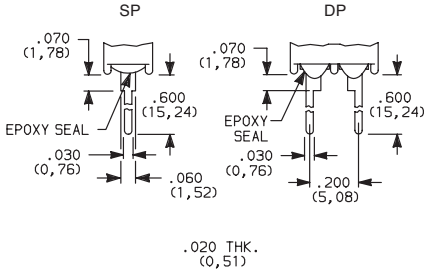

Omit center holes for TP11 models

**Z** SOLDER LUG




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

**W** WIRE WRAP




Third Angle Projection

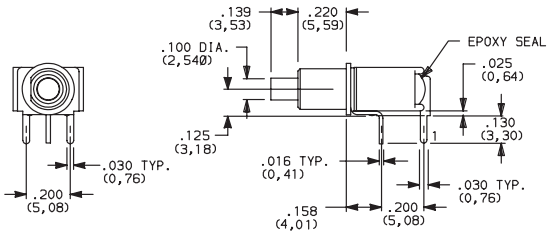
# TP Series
# Tiny Pushbutton Switches

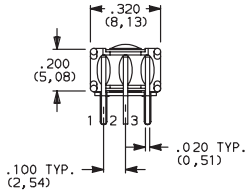
## TERMINATIONS

### A RIGHT ANGLE, PC THRU-HOLE



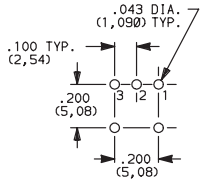
TP12SH9ABE
SPDT




TP11 Models:
omit terminal 2.

PC MOUNTING

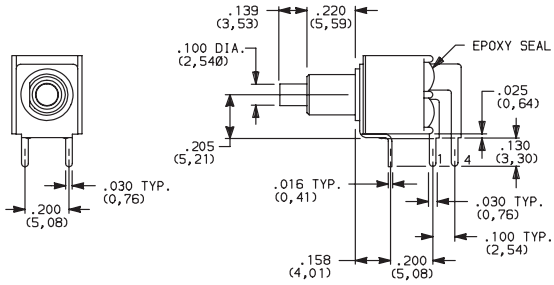


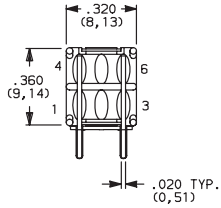

TP11 Models:
omit hole 2.

### A RIGHT ANGLE, PC THRU-HOLE

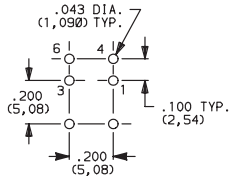


TP21SH9ABE
DPST

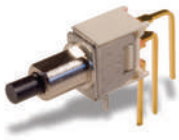


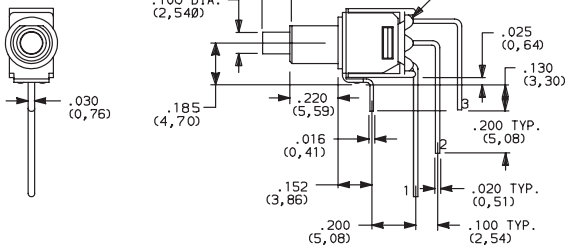

PC MOUNTING



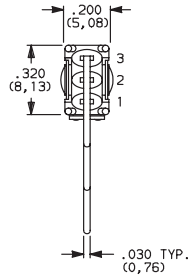

### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



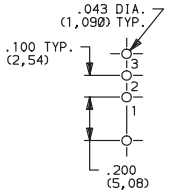
TP12SH9AVBE
SPDT




TP11 Models:
omit terminal 2.




PC MOUNTING



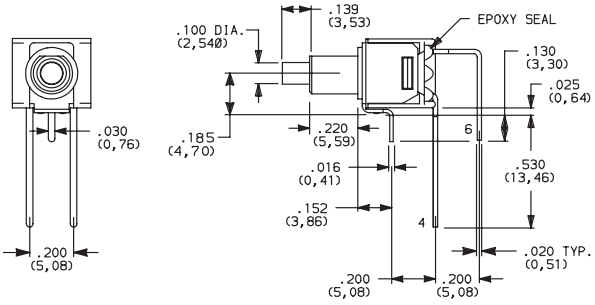

TP11 Models:
omit hole 2.

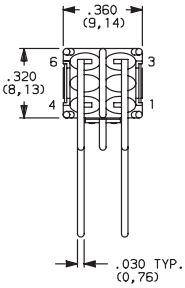
NOTE: Terminal bend radii and lead-in manufacturing option.

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

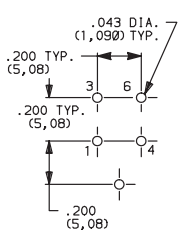


TP21SH9AVBE
DPST




PC MOUNTING



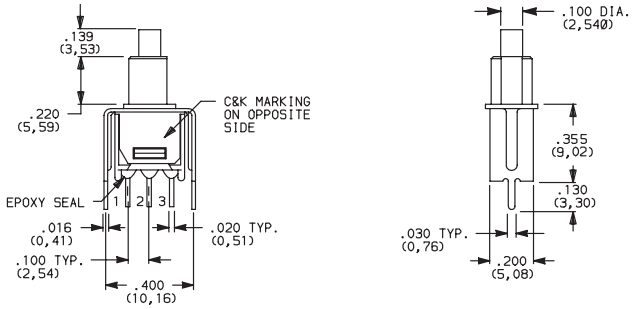

NOTE: Terminal bend radii and lead-in manufacturing option.

Third Angle Projection

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

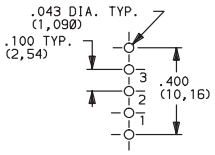
## TERMINATIONS

**V3** VERTICAL MOUNT, V-BRACKET




TP11 Models:
omit terminal 2.

**PC MOUNTING**

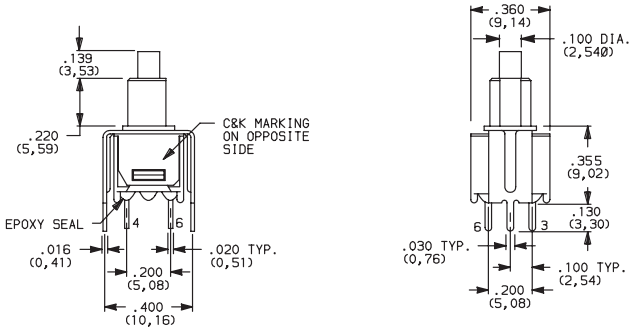



TP11 Models:
omit hole 2.

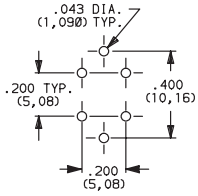


TP12SH9V3BE
SPDT

**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.

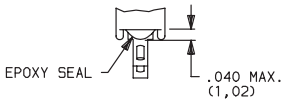
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: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

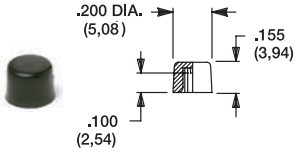



Third Angle Projection

# TP Series
# Tiny Pushbutton Switches

## AVAILABLE HARDWARE

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

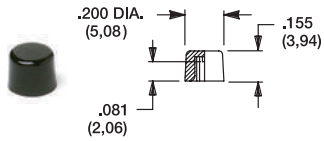



**PART NO.**

**508101000** WHITE
**508102000** BLACK

Material: Nylon
Finish: Gloss

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

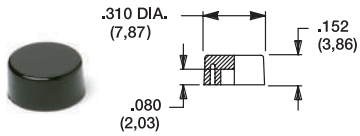



**PART NO.**

**538701000** WHITE
**538702000** BLACK

Material: Nylon
Finish: Gloss

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

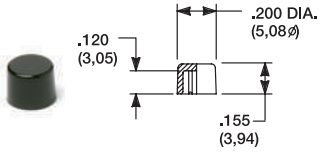



**PART NO.**

**465801000** WHITE
**465802000** BLACK

Material: Nylon
Finish: Gloss

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

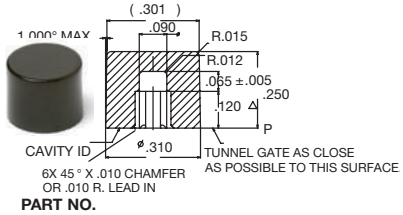



**PART NO.**

**708901000** WHITE
**708902000** BLACK

Material: Nylon
Finish: Gloss

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

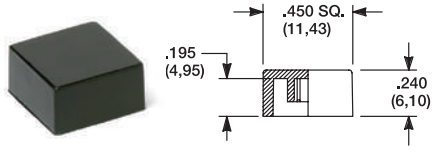



**PART NO.**

**891D01000** WHITE
**891D02000** BLACK

Material: Nylon
Finish: Gloss

**Cap, J81 option only**




**PART NO.**

**484601000** WHITE
**484602000** BLACK

Material: Nylon
Finish: Gloss

**PART NO.**

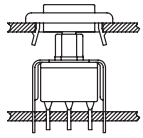
**798201000** WHITE
**798202263** BLACK

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**






.090" (2,29) PANEL THK.

**PART NO.**

**432702263**

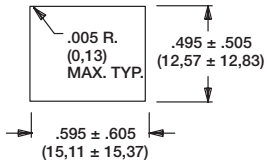
.125" (3,18) PANEL THK.

**PART NO.**

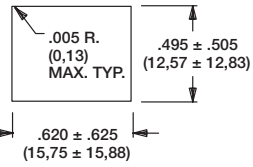
**432802263** BLACK

### PANEL MOUNTING

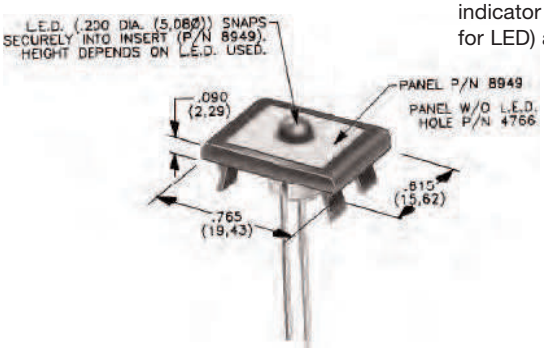
For part numbers
432502263, 432602263




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

**PART NO.**

**894902000**

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

**PART NO.**

**476602000** BLACK

Third Angle Projection

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

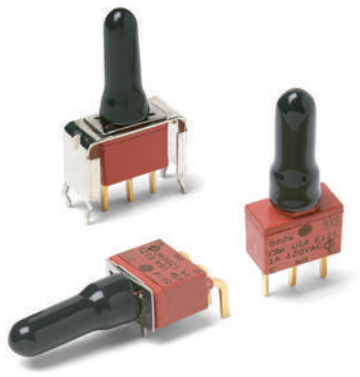
# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

## 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 m21Ω 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

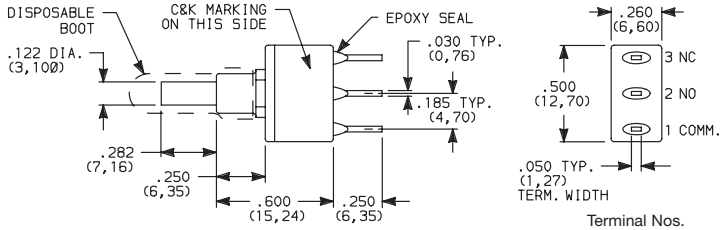
**Seal**
- **E** Epoxy and disposable splashproof boot

# 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 | CONNECTED TERMINALS POS. 1 (C&K marking this side) | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | E121 | ON | MOM. | 1-3 | 1-2 | SPDT: 1 (COMM), NC 3, 2 NO |
| | E125 | ON | MOM. | | | |

**SPDT**

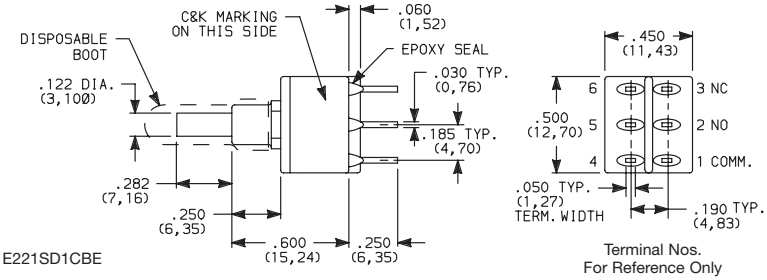



Part number shown: E121SD1CGE

Terminal Nos. For Reference Only

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

**DPDT**




Part number shown: E221SD1CBE

Terminal Nos. For Reference Only

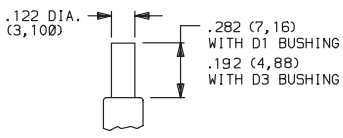
MOM. = Momentary

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

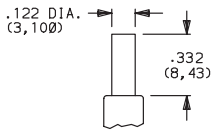
EX25 models must be ordered with B or P contact material.
EX21 models must be ordered with G or R contact material.

## PLUNGER

**S** .282" HIGH

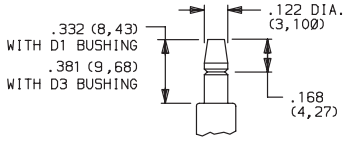



**S1** .332" HIGH




Not Available with D1 bushing.

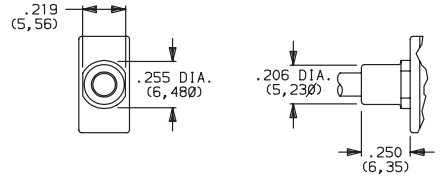
**M** .332" HIGH SNAP-FITTING




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

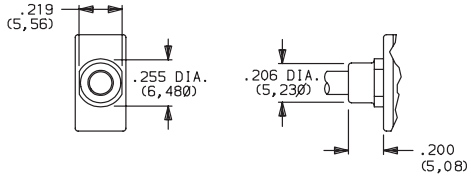
## BUSHING

**D1** UNTHREADED




Not available with S1 actuator.

**D3** .180" HIGH UNTHREADED



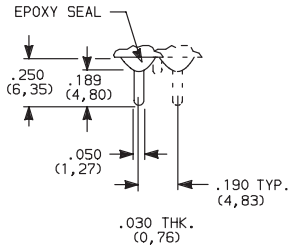

NOTE: Disposable splashproof vinyl over actuator and bushing supplied std., see page A-26.

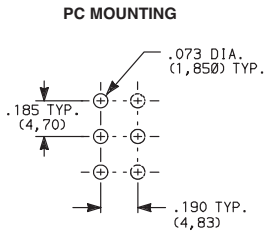
Third Angle Projection

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

## TERMINATIONS

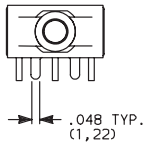
### C PC THRU-HOLE

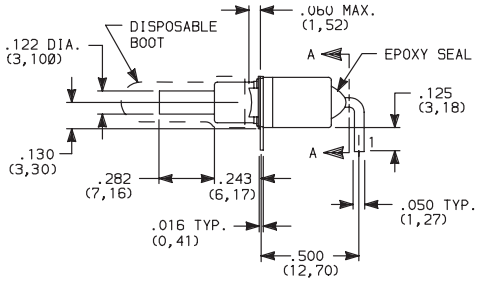


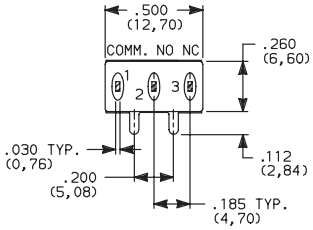




SPDT and DPDT

### A RIGHT ANGLE, PC THRU-HOLE



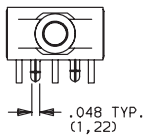



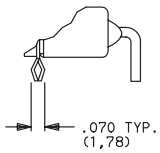

SECTION A-A

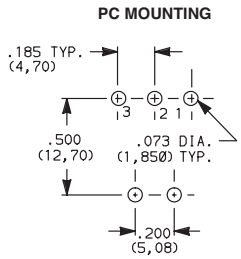


E121SD1AGE
SPDT

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

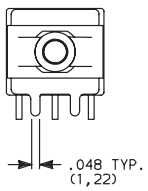


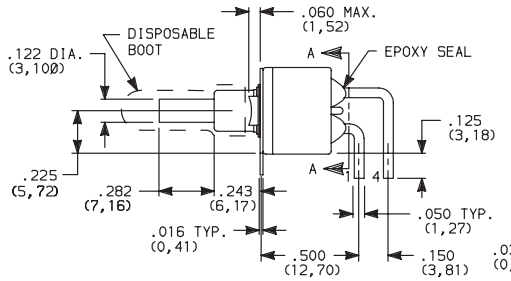



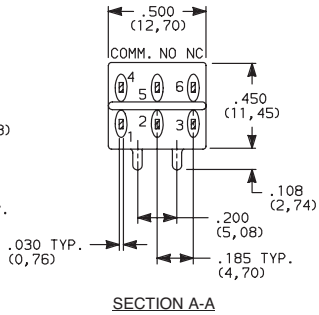




NOTE: Terminal bend radii and lead-in manufacturing option.

### A RIGHT ANGLE, PC THRU-HOLE



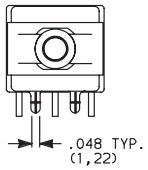



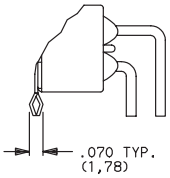

SECTION A-A

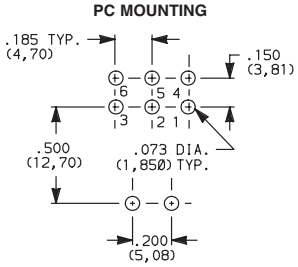


E221SD1AGE
DPDT

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



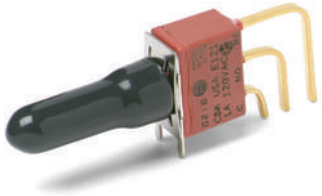

NOTE: Terminal bend radii and lead-in manufacturing option.

Third Angle Projection

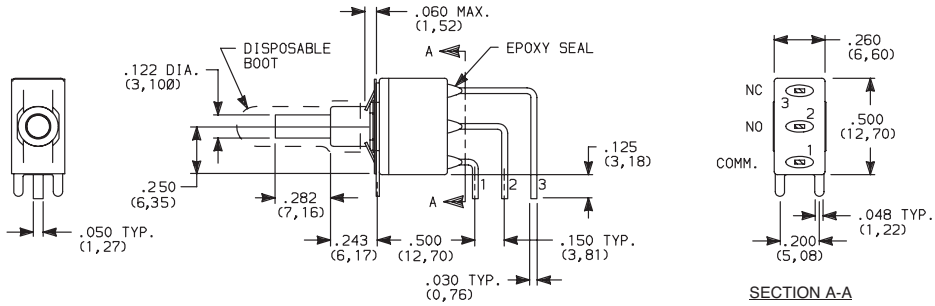
# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

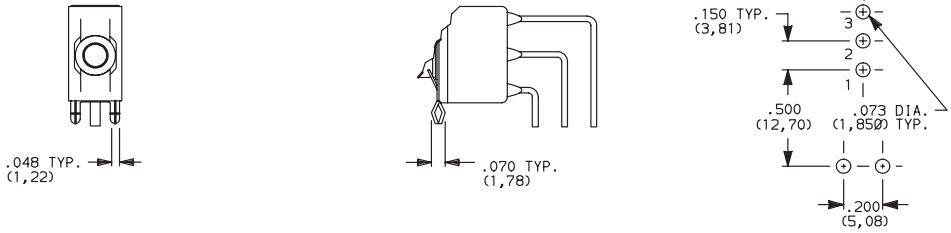
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



E121SD1AV2GE
SPDT




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

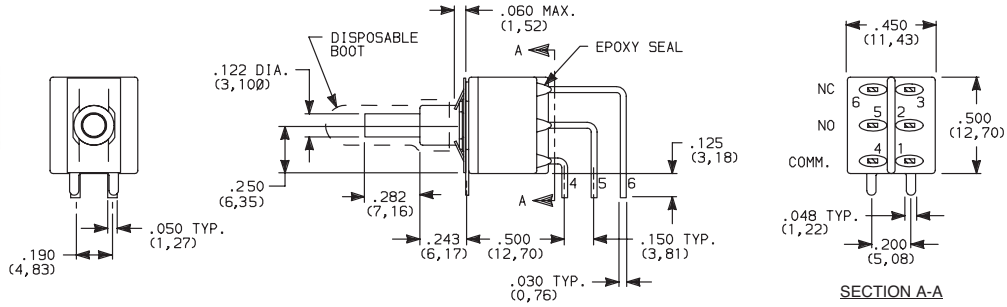



NOTE: Terminal bend radii and lead-in manufacturing option.

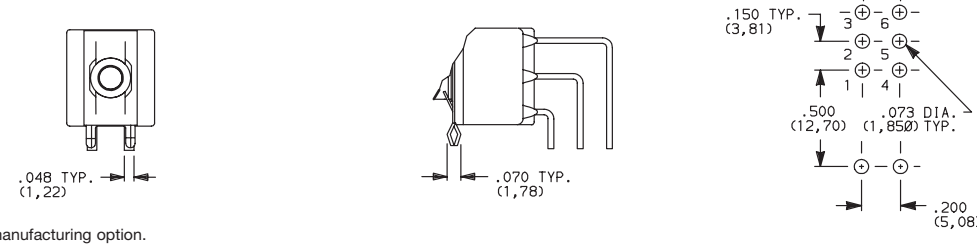
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



E221SD1AV2GE
DPDT




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



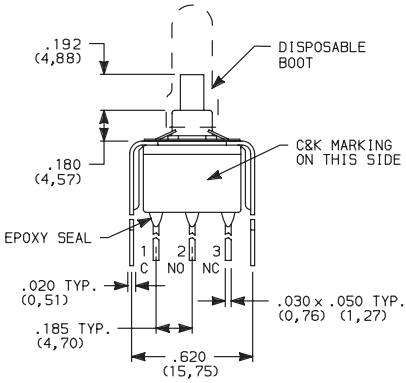

NOTE: Terminal bend radii and lead-in manufacturing option.

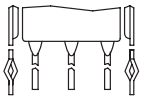
Third Angle Projection

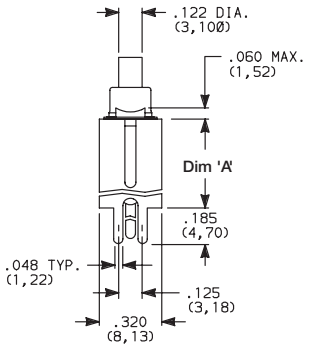
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

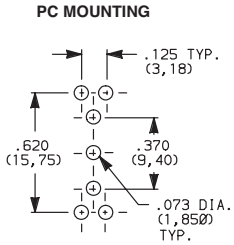
## TERMINATIONS

### V3, V4 VERTICAL MOUNT, V-BRACKET
### V31, V41 VERTICAL MOUNT, V-BRACKET, SNAP-IN



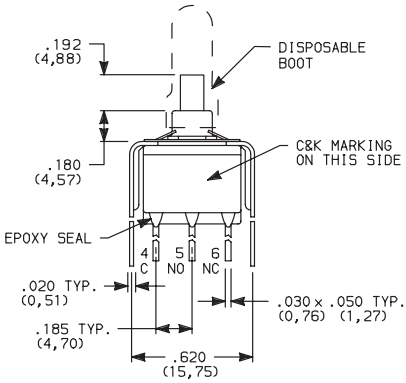



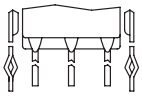


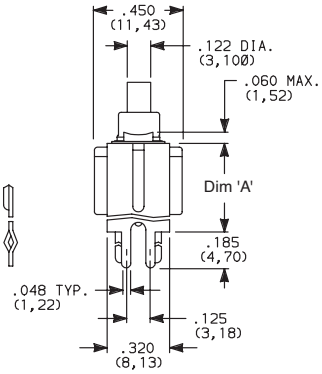

E121SD3__GE
SPDT

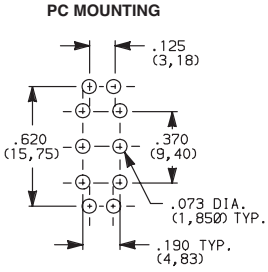
| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4, V41 | .630 (16,00) |

### V3, V4 VERTICAL MOUNT, V-BRACKET
### V31, V41 VERTICAL MOUNT, V-BRACKET, SNAP-IN



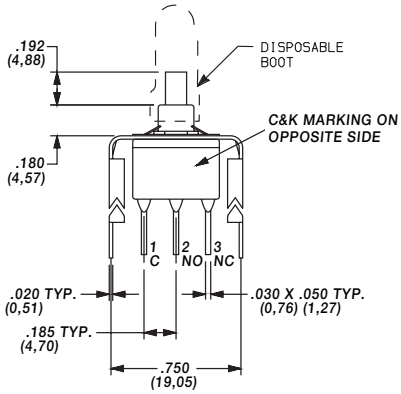



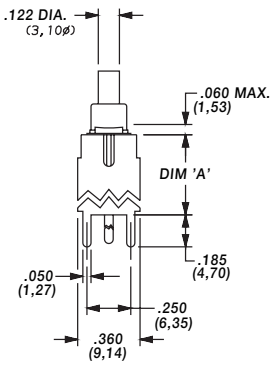


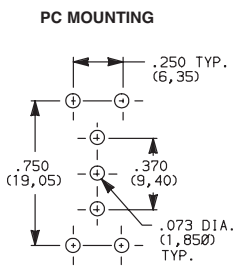

E221SD3__GE
DPDT

| 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

# E020 Series
# Sealed Snap-acting Momentary Pushbutton Switches

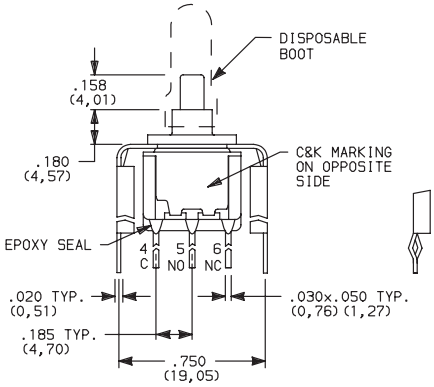
## TERMINATIONS

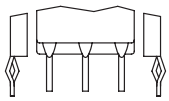
**V6, V8** VERTICAL MOUNT, V-BRACKET

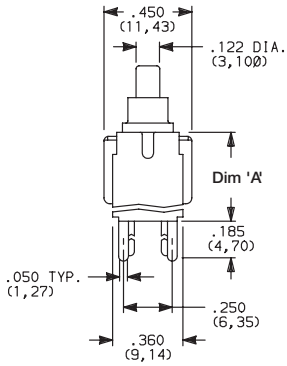
**V61, V81** VERTICAL MOUNT, V-BRACKET, SNAP-IN



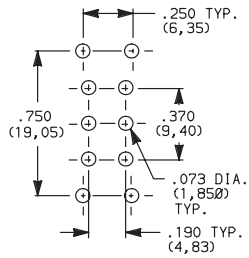
E221SD3V6GE
DPDT




**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.

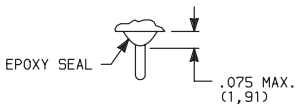
E121, E221 models c UL us with all options when ordered with mandatory G, or R contact material.

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

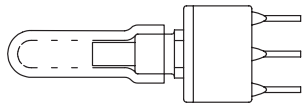
R or G contact material must be ordered with EX21 models.

## 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.

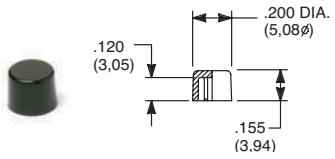


Third Angle Projection

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

## AVAILABLE HARDWARE

**Cap**

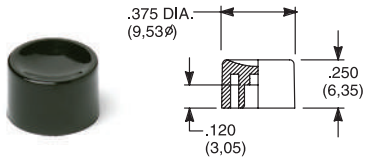



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

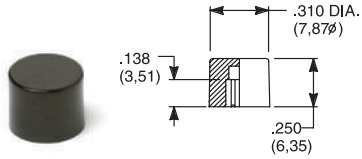



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

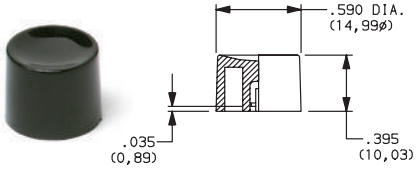



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

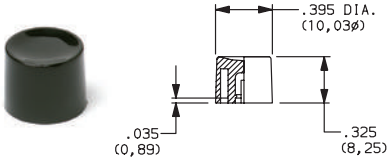



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

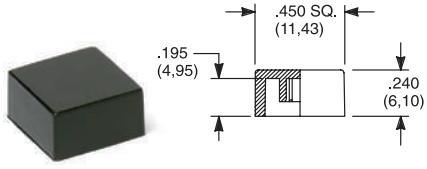



**PART NO.**

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

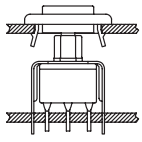
| | |
|---|---|
| 798201000 | WHITE |
| 798202263 | BLACK |
| 798203000 | RED |

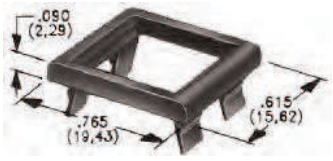
Material: Nylon
Finish: Matte

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**






.090" (2,29) PANEL THK.

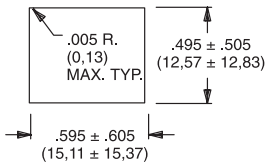
**PART NO.**
432702263

.125" (3,18) PANEL THK.

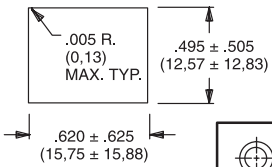
**PART NO.**
432802263 BLACK

**PANEL MOUNTING**

For part numbers
4325xxxxx, 4326xxxxx




For part numbers
4327xxxxx, 4328xxxxx



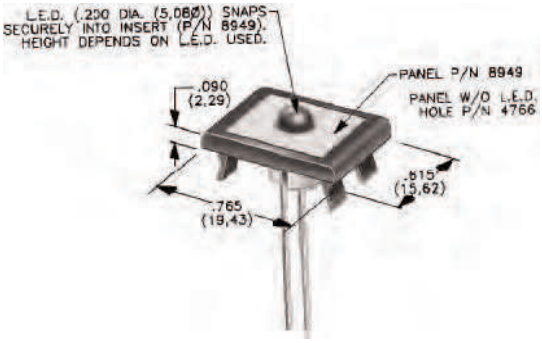

Third Angle Projection

# 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.

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

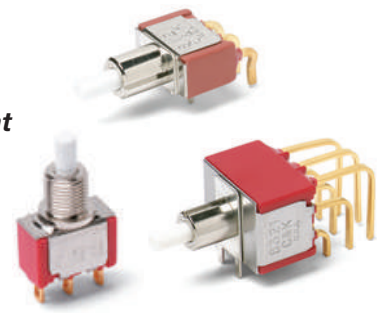
## Features/Benefits

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

c UL us
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.

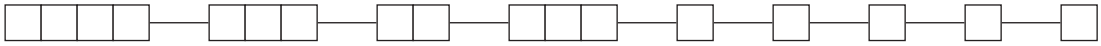
COMMON CONTACT & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

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

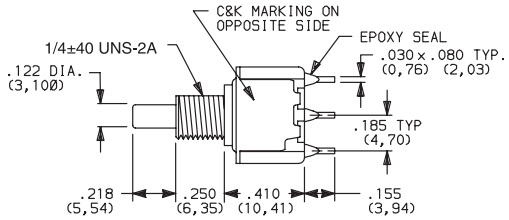
**Terminations**
- **A** Right angle, PC thru-hole
- **AV2** Vertical right angle, PC thru-hole
- **C** PC Thru-hole
- **Z** Solder lug
- **A2** Right angle, PC thru-hole
- **A3** Right angle, snap-in, PC thru-hole
- **A4** Right angle, PC thru-hole, reversed terminals
- **A6** Right angle, PC thru-hole
- **AV1** Vertical right angle, PC thru-hole
- **AV3** Vertical right angle, snap-in, PC thru-hole
- **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

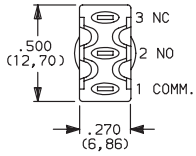
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## 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



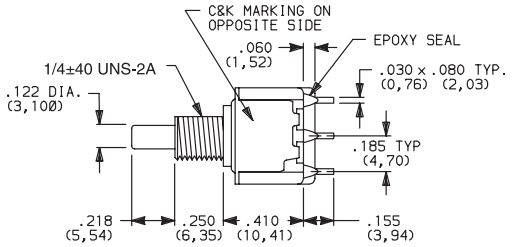



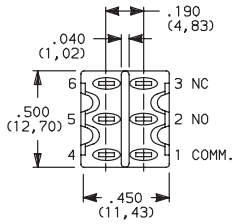

Terminal Nos.
For Reference Only

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



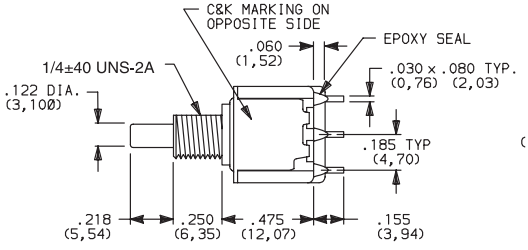



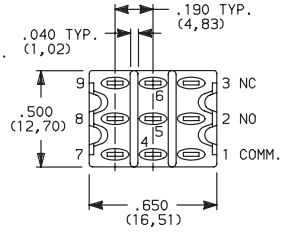

Terminal Nos.
For Reference Only

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 c UL us with all options (except R, R2 terminations) when ordered with G or R contact material.

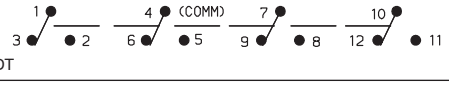
8X25 models must be ordered with B or P contact material.

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

Third Angle Projection

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

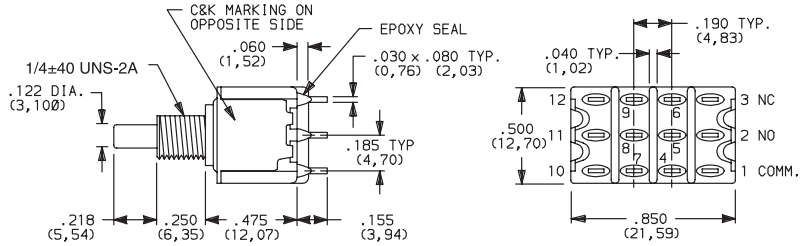
## SWITCH FUNCTION

| 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 |  |
| | 8425 | | ON | MOM. | | | |



4PDT

### 4PDT




Part number shown: 8421SHZGE

Terminal Nos.
For Reference Only

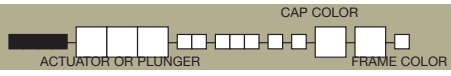
MOM. = Momentary

* 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.

## ACTUATOR—SNAP-IN FRONT MOUNT

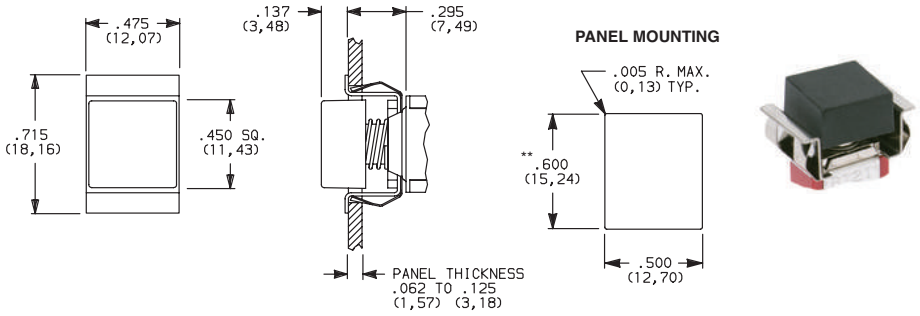



| OPTION CODE | CAP AND FRAME COLOR |
|---|---|
| 2 | BLACK |
| NONE | No Frame Color (J80 option) |
| 1 | WHITE |
| 3 | RED |
| 4 | ORANGE |
| 5 | YELLOW |
| 6 | GREEN |
| 7 | BLUE |
| 9 | GRAY |

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

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

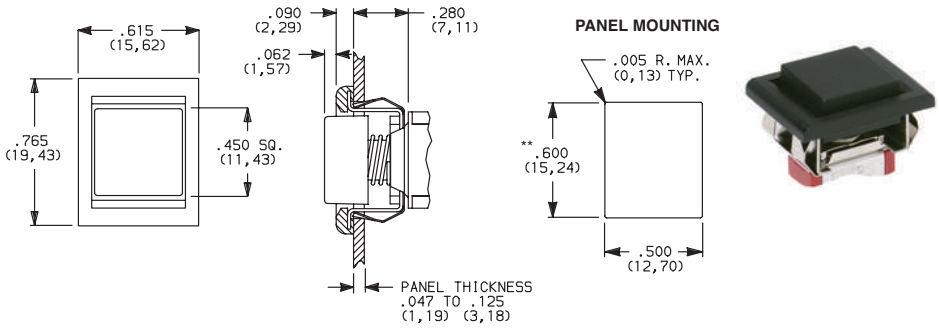
### J80 SNAP-IN




NOTE: No frame color choice required.

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

### J81 SNAP-IN WITH FRAME



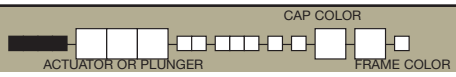

NOTE: Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

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

Third Angle Projection

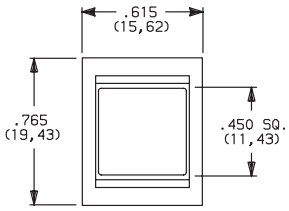
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

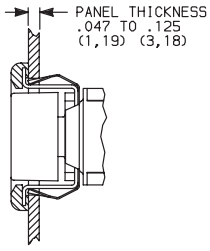
## ACTUATOR—SNAP-IN FRONT MOUNT



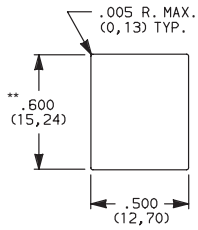

### J83 SNAP-IN WITH FRAME AND FLUSH CAP





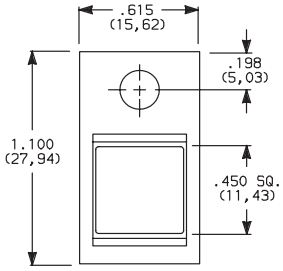



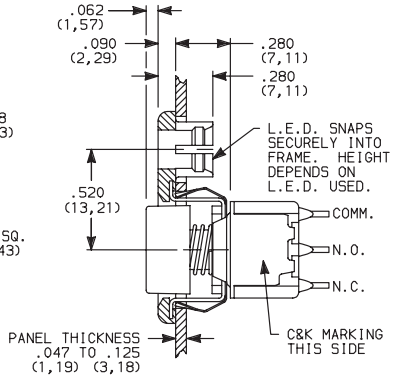

**PANEL MOUNTING**



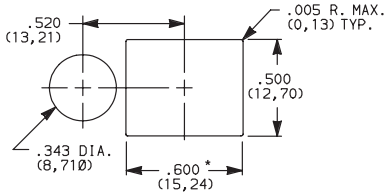

### J82 SNAP-IN WITH FRAME FOR LED






**PANEL MOUNTING**

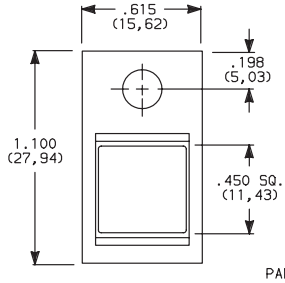


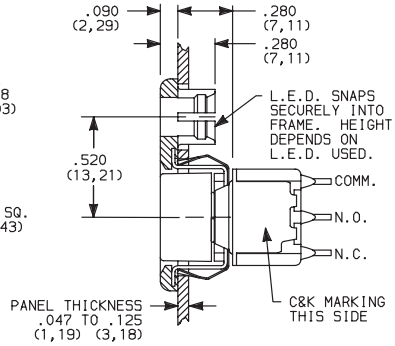

* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

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

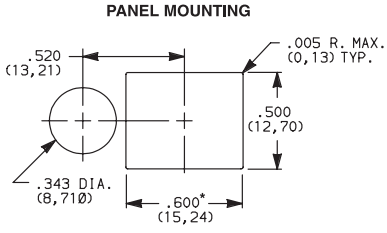
### J84 SNAP-IN WITH FRAME FOR LED, FLUSH CAP






**PANEL MOUNTING**




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

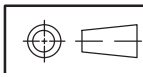
LED not included.
For LED information, see page A-45.

| 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.

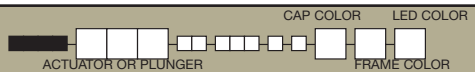
Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

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

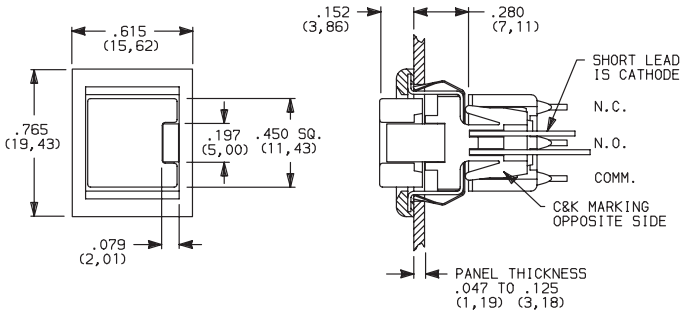



*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

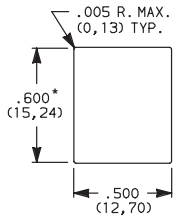
## ACTUATOR—SNAP-IN FRONT MOUNT




### 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 |

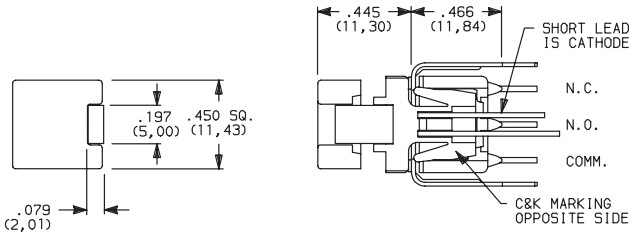
| OPTION CODE | LED COLOR |
|---|---|
| 3 | RED |
| 5 | YELLOW |
| 6 | GREEN |

For LED information see page A-45.

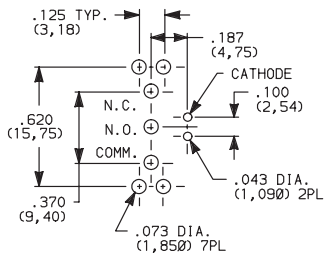
## ACTUATOR—PC MOUNT




### 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

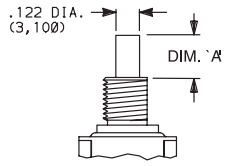
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## PLUNGER

ACTUATOR OR PLUNGER

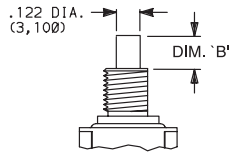
**S** PLUNGER




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

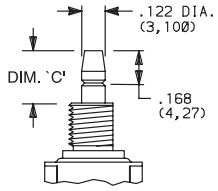
| AVAILABLE BUSHINGS | DIM. 'A' FOR C, W-W4, Z & Z3 TERMINATIONS | DIM. 'A' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS | DIM. 'A' FOR V3-V61 TERMINATIONS |
|---|---|---|---|
| D, D9 | .244 (6,20) | .228 (5,79) | .224 (5,69) |
| H, H9 | .218 (5,54) | .202 (5,13) | .198 (5,03) |
| Y, Y9 | .203 (5,16)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

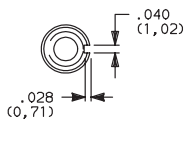
**D9** .28034" HIGH UNTHREADED, KEYWAY

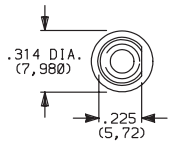
**H** .250"34 HIGH THREADED, FLAT

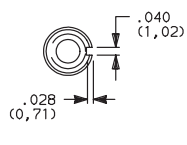
**H9** .250"34 HIGH UNTHREADED, FLAT

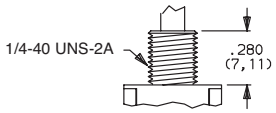
**Y** .350" HIGH THREADED, KEYWAY

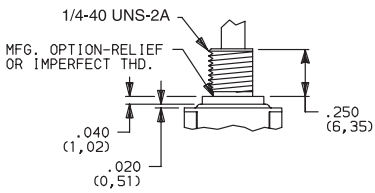
**Y9** .350" HIGH UNTHREADED, KEYWAY

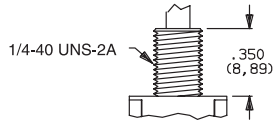



D9 bushing standard with A-A6, R, R2 AV-AV3 terminations.

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.

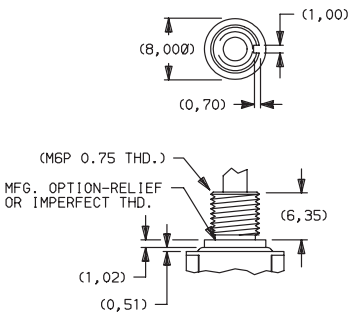
Will withstand 12 in./lbs. of torque with no distortion.

Third Angle Projection

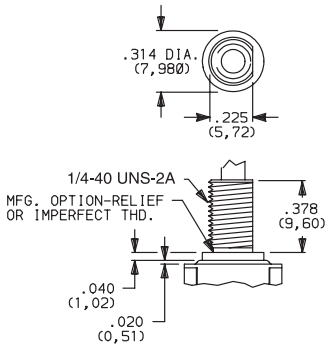
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## BUSHING

### Y3 6.35mm THREADED, KEYWAY

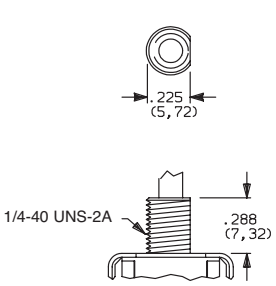



### Y4 .378" HIGH THREADED, FLAT



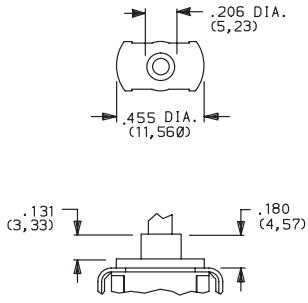

Y3 & Y4 bushings not available on single pole models with A3-A6, R, R2 terminations. Will withstand 12 in./lbs. of torque with no distortion.

### 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

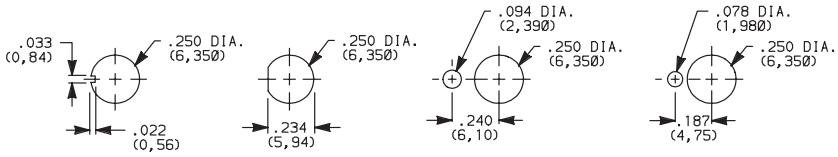



D3 bushing available with A, A2, A3, AV, AV2, AV3 and V2-V61 terminations only.

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.

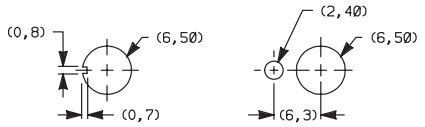
### PANEL MOUNTING

1/4 INCH BUSHING




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

METRIC BUSHING

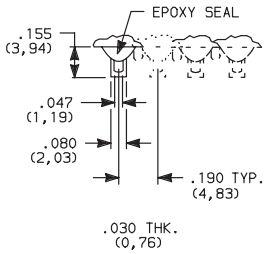



Without locking ring | With locking ring

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

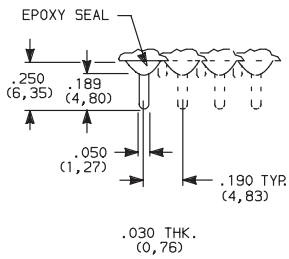
### Z SOLDER LUG



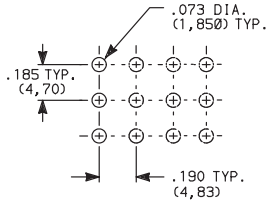

**SPDT thru 4PDT**

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

### C PC THRU-HOLE



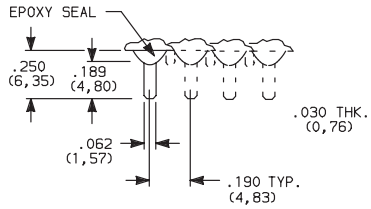

**PC MOUNTING**




**SPDT thru 4PDT**

Not available with J95 actuator option.

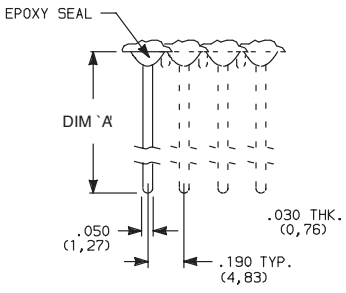
### Z3 QUICK CONNECT




**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) |

Not available with J95 actuator option.

**SPDT thru 4PDT**

Third Angle Projection

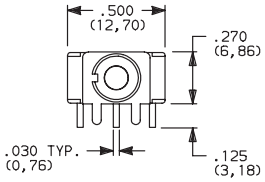
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

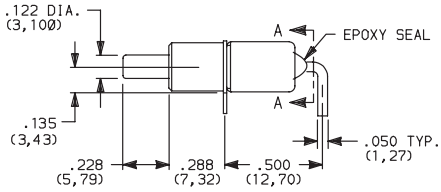
## TERMINATIONS

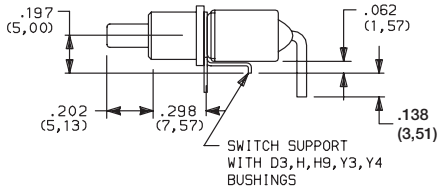
### A RIGHT ANGLE, PC THRU-HOLE

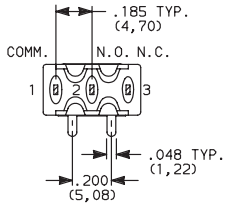


8121SD9AGE
SPDT



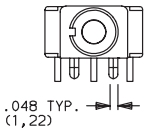



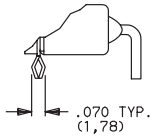

SECTION A-A

Terminal Nos.
For Reference Only.

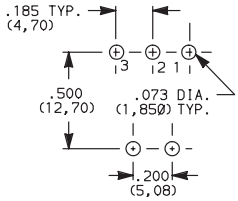
Part Number 8121SH9AGE

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




**PC MOUNTING**

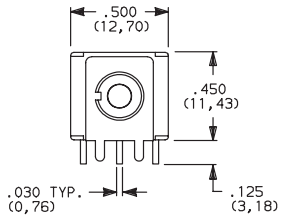


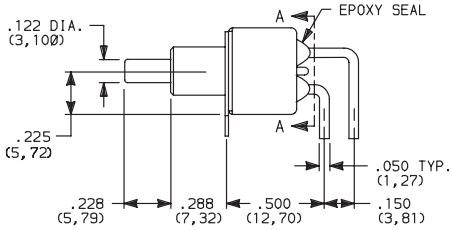

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

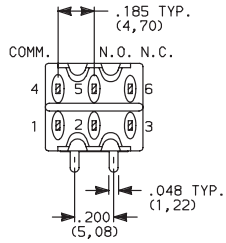
### A RIGHT ANGLE, PC THRU-HOLE



8221SD9AGE
DPDT

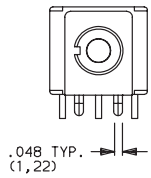


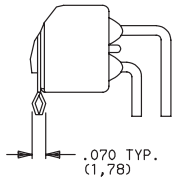



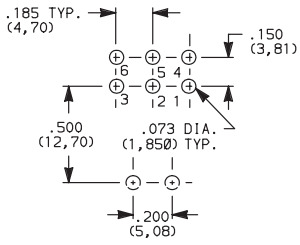

SECTION A-A

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




**PC MOUNTING**



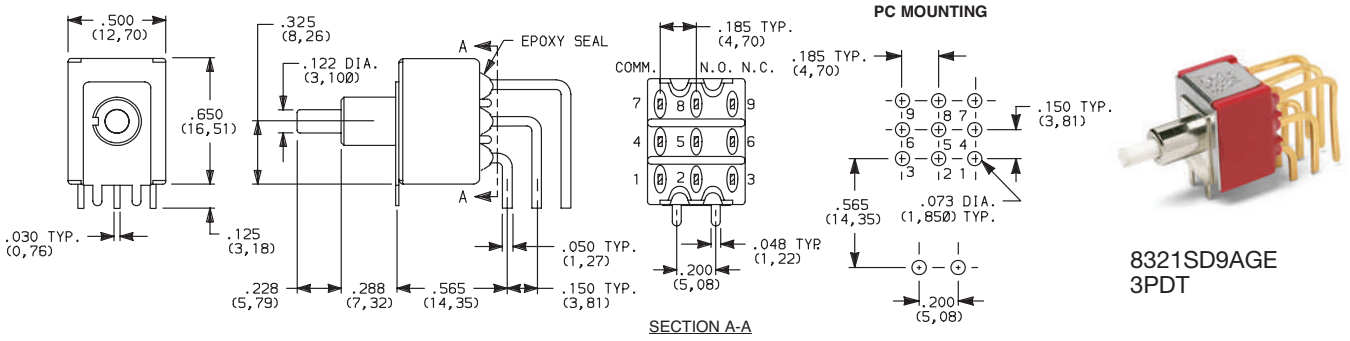

Not available with JXX actuators and I seal option.
Terminal bend radii and lead-in manufacturing option.

Third Angle Projection

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

## TERMINATIONS

### A RIGHT ANGLE, PC THRU-HOLE



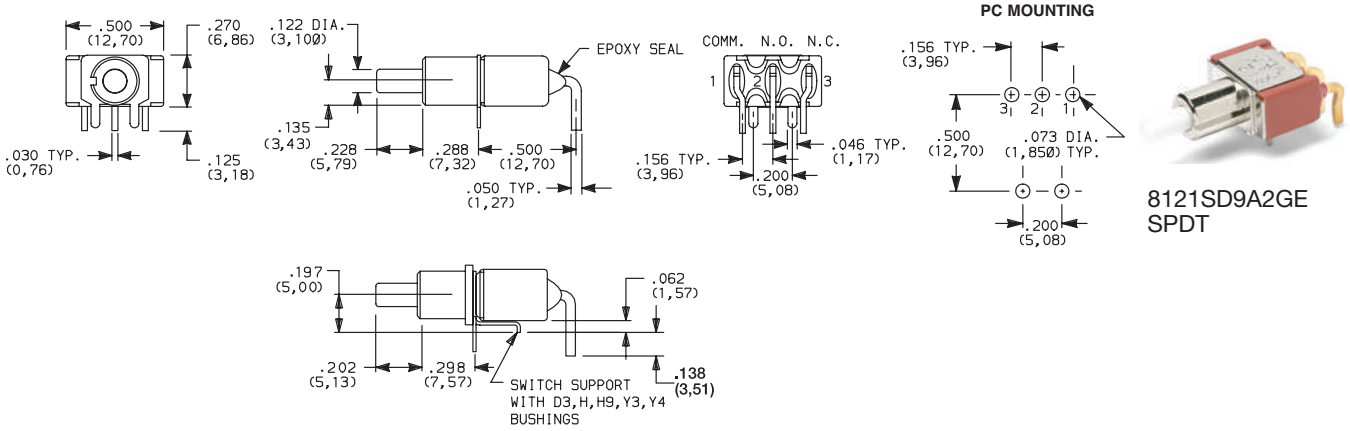

SECTION A-A



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



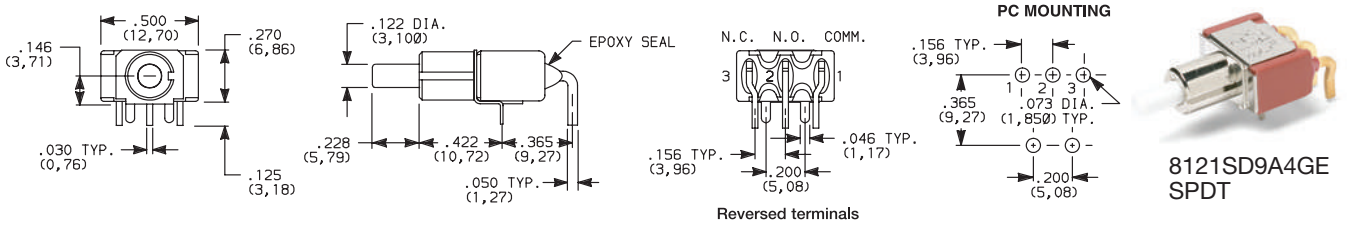

Part Number 8121SH9A2GE



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.

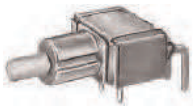
The A4 and R2 termination options are functionally identical and fit the same PC mounting pattern. The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R2, the A4 option is available with UL/CSA.

Third Angle Projection

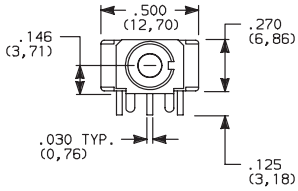
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

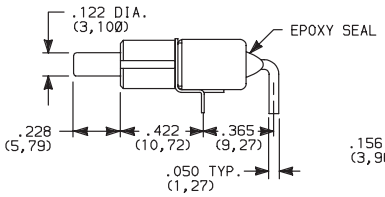
## TERMINATIONS

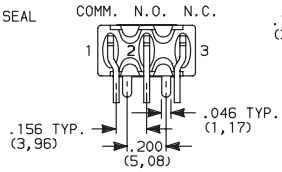
### A6 RIGHT ANGLE, PC THRU-HOLE



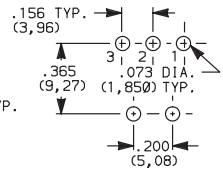
8121SD9A6GE
SPDT




**PC MOUNTING**




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

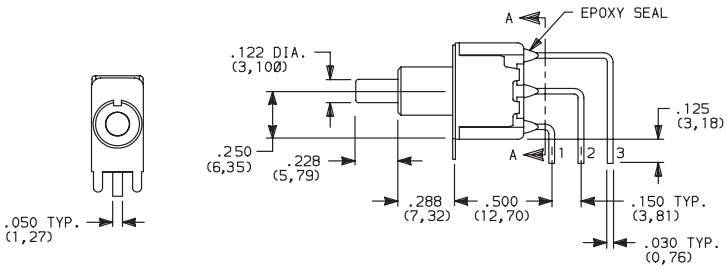
The A6 and R termination options are functionally identical and fit the same PC mounting pattern, The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R, the A6 option is available with UL/CSA.

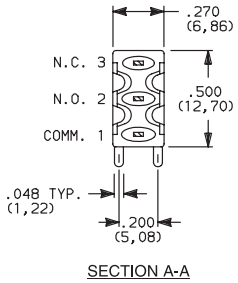
Third Angle Projection

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

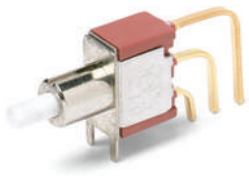
## TERMINATIONS

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



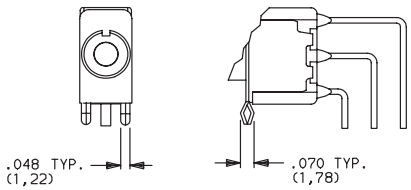




SECTION A-A

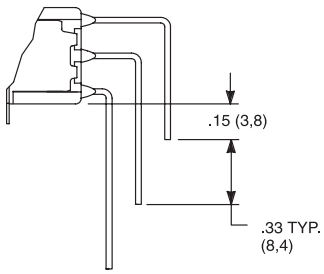


8121SD9AV2GE
SPDT

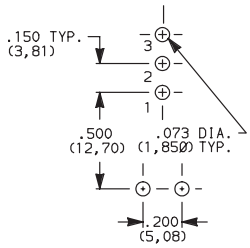
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN,, PC THRU-HOLE, .150" PITCH




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

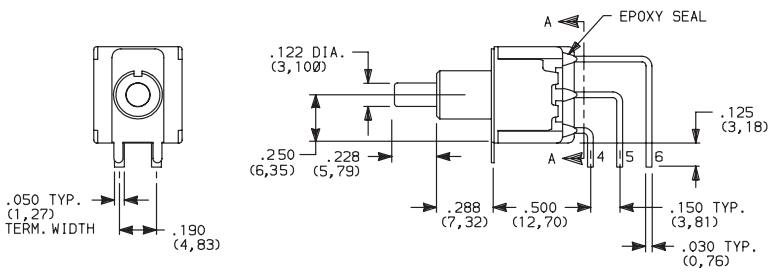


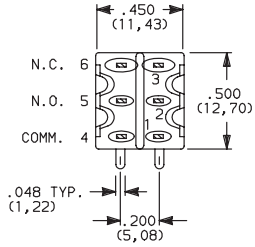

**PC MOUNTING**



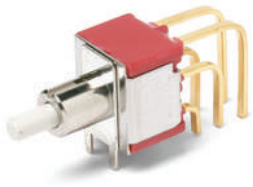

Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

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



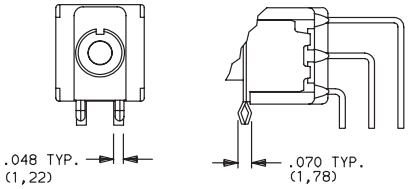




SECTION A-A

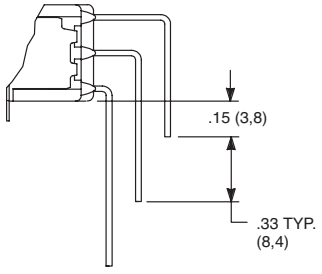


8221SD9AV2GE
DPDT

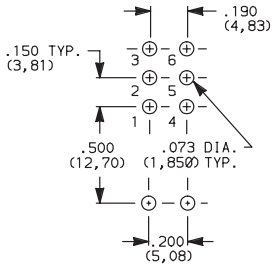
### AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH




### 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*

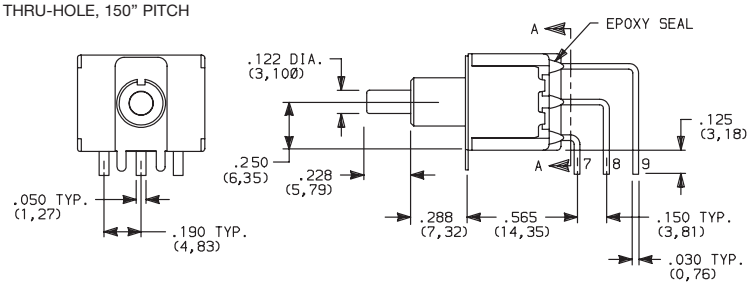
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

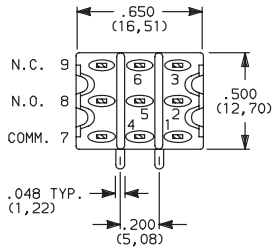
## TERMINATIONS

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



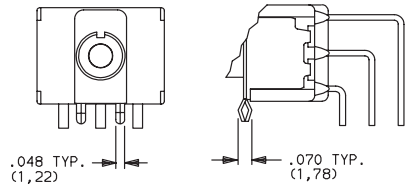
8321SD9AV2GE
3PDT



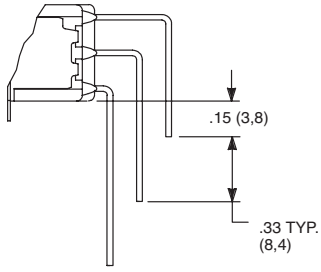

SECTION A-A

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

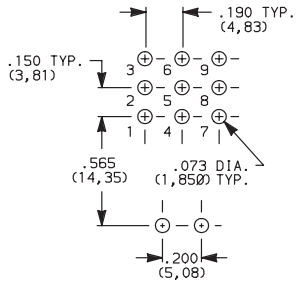



Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

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




**PC MOUNTING**

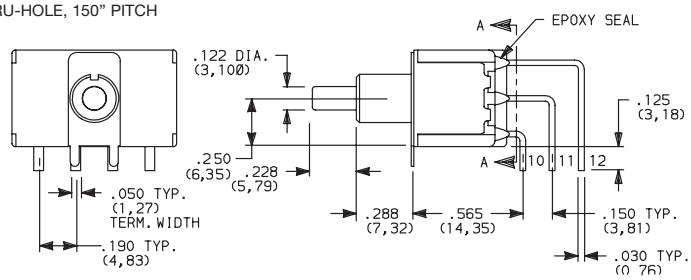


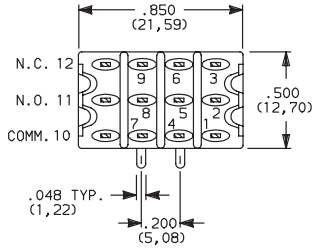

---

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



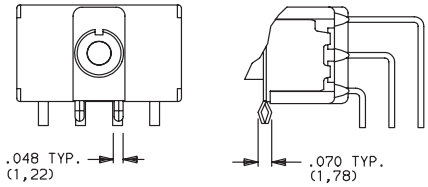
8421SD9AV2GE
4PDT



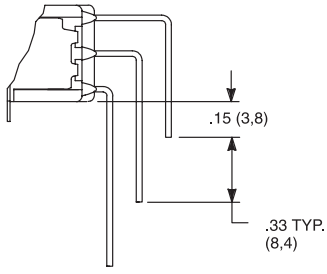

SECTION A-A

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

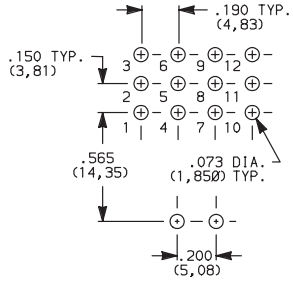



Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

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



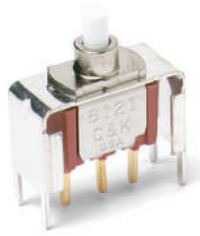

**PC MOUNTING**




---

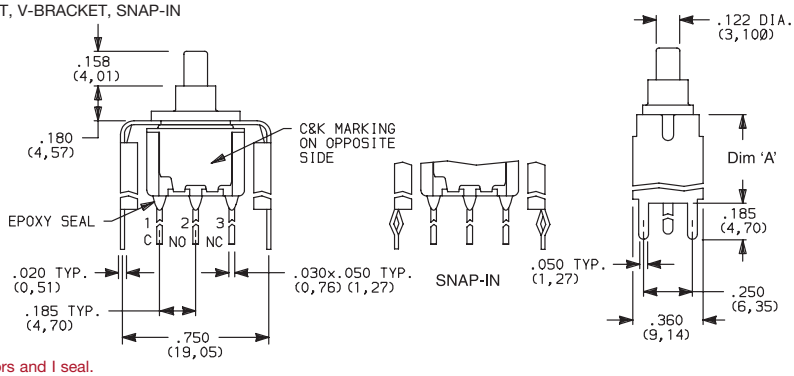
### V2, V6, V7, V8 VERTICAL MOUNT, V-BRACKET

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

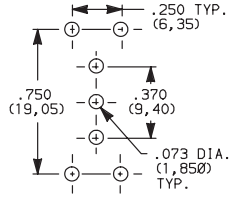


8121SD3__GE
SPDT

Not available with JXX actuators and I seal.




**PC MOUNTING**



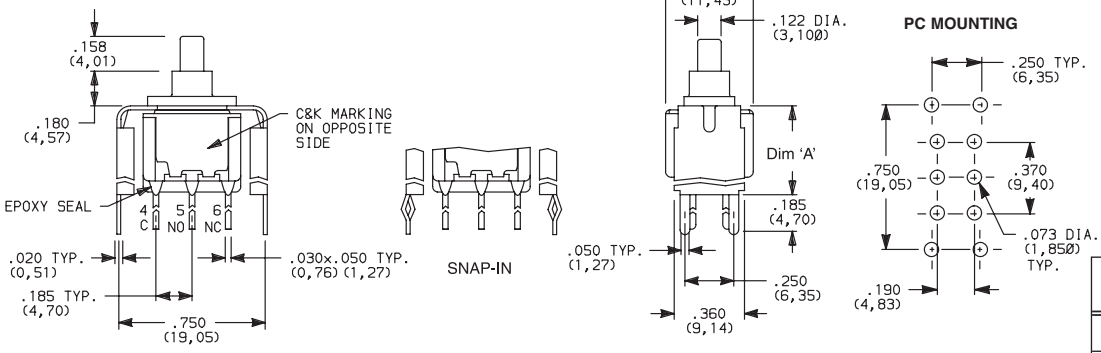

| OPTION CODE | DIM 'A' |
|---|---|
| V2 | .555 (14,10) |
| V6, V61 | .460 (11,68) |
| V7 | .630 (16,00) |
| V8 | .953 (24,21) |

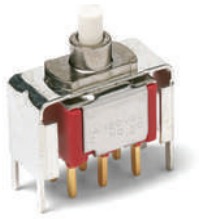
Third Angle Projection

*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



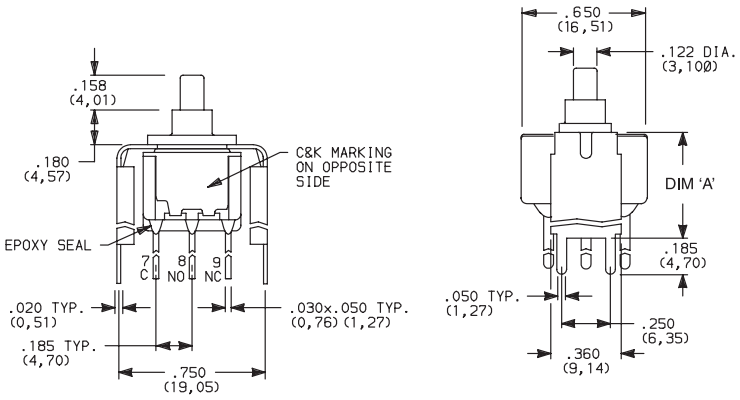



8221SD3__GE
DPDT

| 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



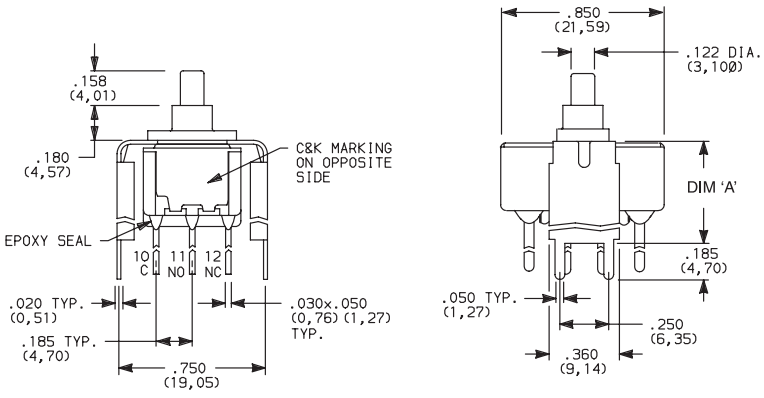



8321SD3__GE
3PDT

| 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

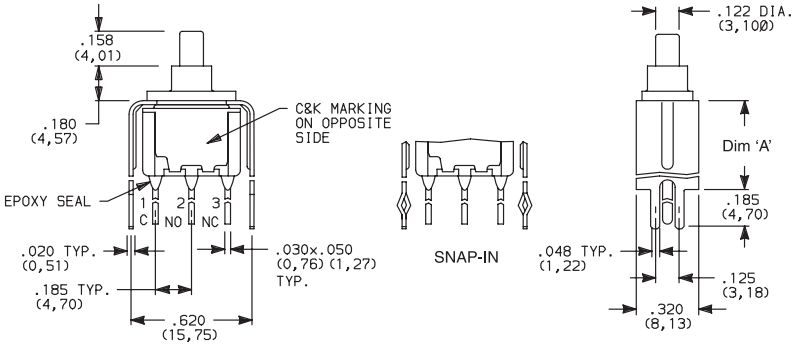
# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## TERMINATIONS

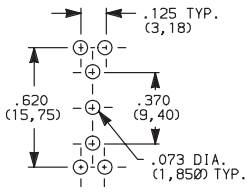
### V3, V4, V9 VERTICAL MOUNT, V-BRACKET
### V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8121SD3__GE
SPDT




PC MOUNTING



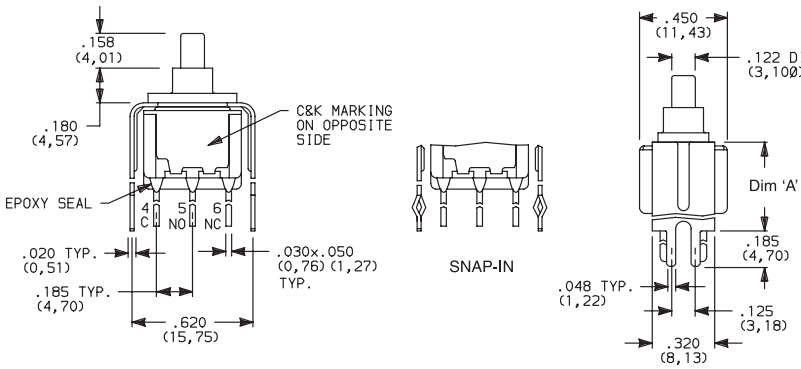

| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |
| V9 | 1.150 (29,21) |

Not available with J8X actuators and I seal.

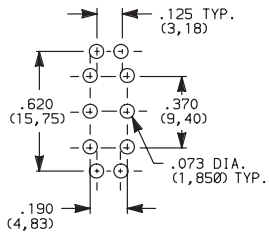
### V3, V4, V9 VERTICAL MOUNT, V-BRACKET
### V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8221SD3__GE
DPDT




PC MOUNTING



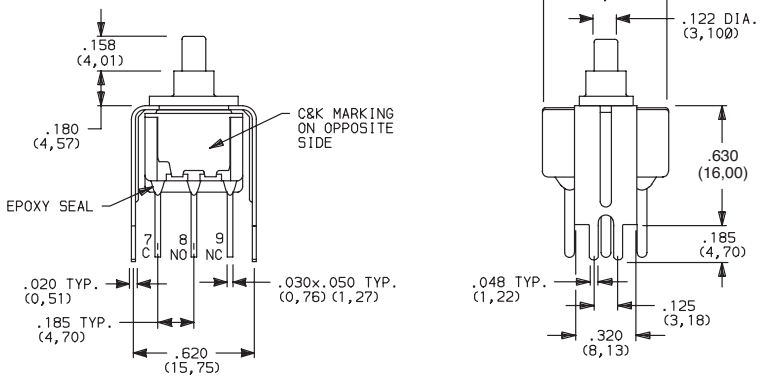

| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |
| V9 | 1.150 (29,21) |

Not available with J8X actuators and I seal.

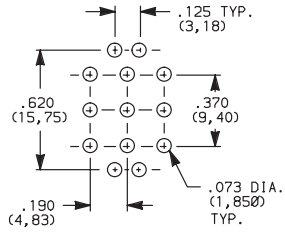
### V4, V9 VERTICAL MOUNT, V-BRACKET



8321SD3V4GE
3PDT




PC MOUNTING




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

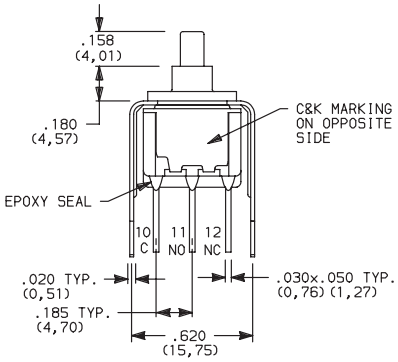
Not available with JXX actuators and I seal.

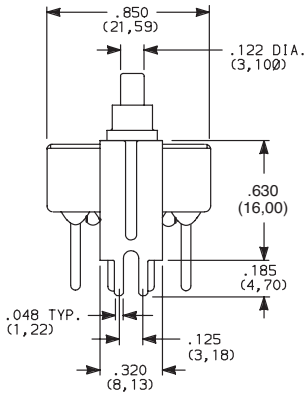
Third Angle Projection

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

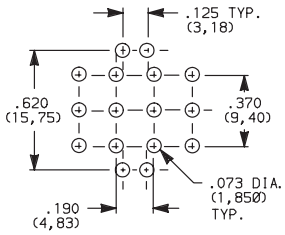
## TERMINATIONS

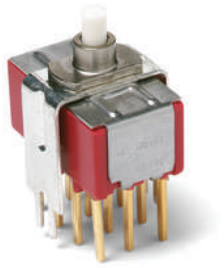
**V4, V9** VERTICAL MOUNT, V-BRACKET




PC MOUNTING



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.

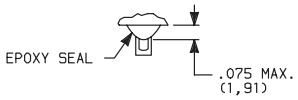
B or P contact material must be ordered with 8X25 models.

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

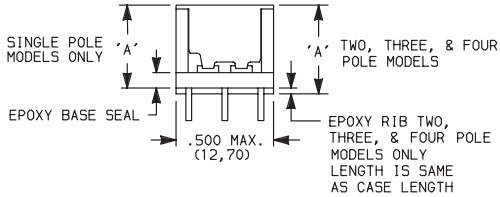
P or R contact material not available with Z, Z3 terminations.

## 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) |

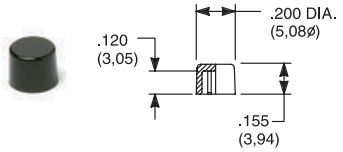
**NOTE:** Available with C, W-W4, Z, Z3 terminations only.

Third Angle Projection

# 8020 Series
# Snap-acting Momentary Pushbutton Switches

## AVAILABLE HARDWARE

**Cap**

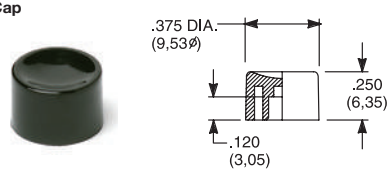



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

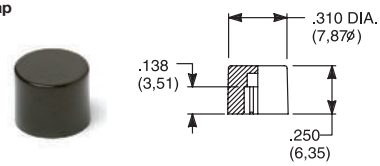



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

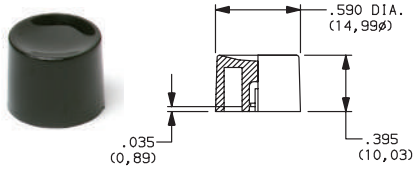



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

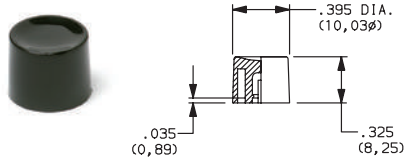



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

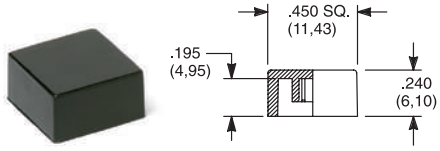



**PART NO.**

| | |
|---|---|
| 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**

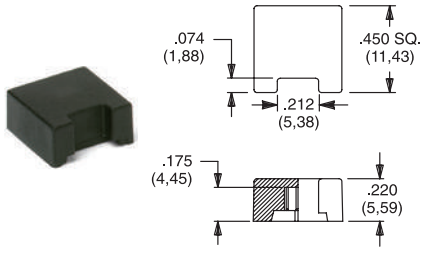


**PART NO.**

| | |
|---|---|
| 613302263 | BLACK |

Material: Nylon
Finish: Matte

**Cap, J85 & J95 options only**




**PART NO.**

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

Material: Nylon
Finish: 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.

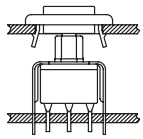
Third Angle Projection

*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**

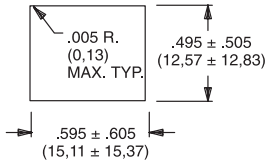




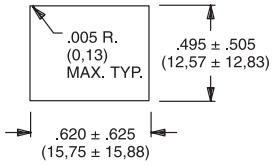

| .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|
| **PART NO.** | **PART NO.** |
| 432702263 | 432802263 BLACK |

**PANEL MOUNTING**

For part numbers
4325xxxxx, 4326xxxxx

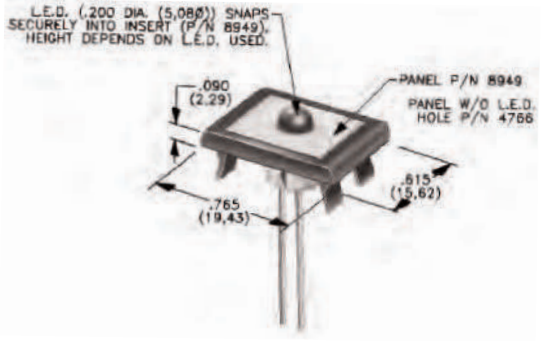



For part numbers
4327xxxxx, 4328xxxxx




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.



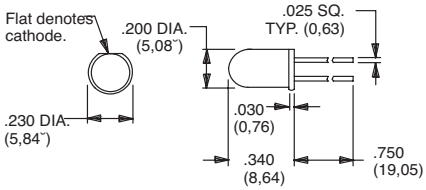

| PANEL INSERT WITH HOLE FOR LED | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| 894902000 | 476602000 BLACK |

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 |



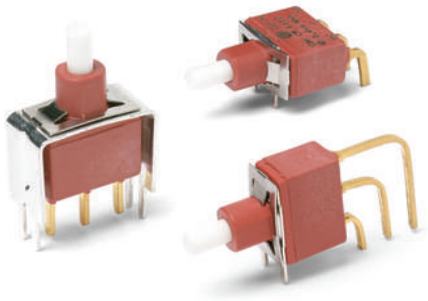

Suggested LED for J82 & J84 options.
Dimensions for reference only.

**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.

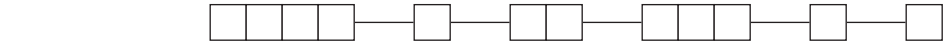
CENTER CONTACTS & ALL TERMINALS: Q contact material: Copper alloy, silver plated. See page A-50 for additional ratings.

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
**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

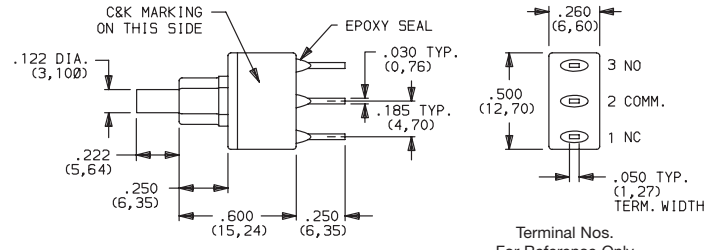
**Contact Material**
**B** Gold
**P** Gold, matte-tin
**Q** Silver
**G** Gold over silver

**Seal**
**E** Epoxy

## 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**



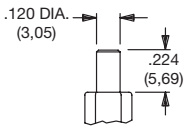

Part number shown: E112SD1CQE

MOM. = Momentary

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

## PLUNGER

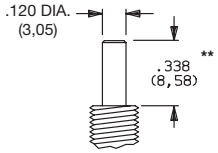
**S** .218" HIGH




Standard with D1 bushing (as shown).

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

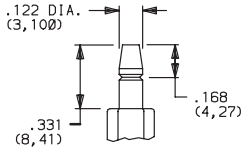
**L** .338" HIGH




Standard with Y bushing (as shown).

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

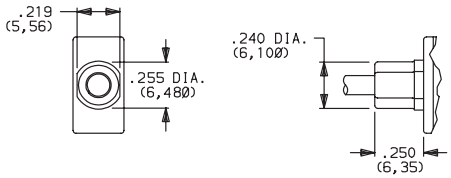
**M** .331" HIGH, SNAP-FITTING




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

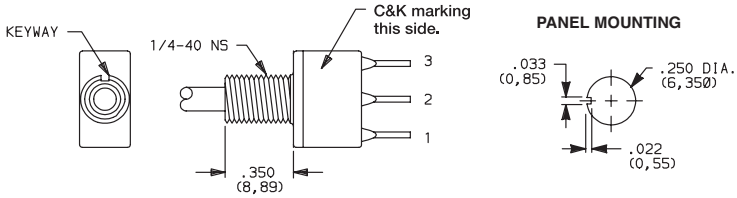
## BUSHING

**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.

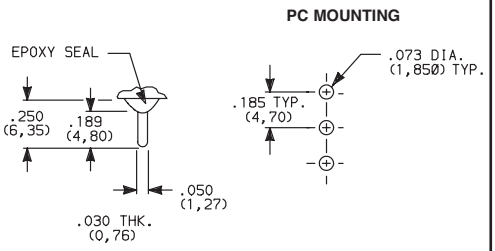
Third Angle Projection

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

# E010 Series
# Sealed Momentary Pushbutton Switches

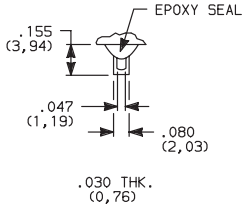
## TERMINATIONS

### C PC THRU-HOLE



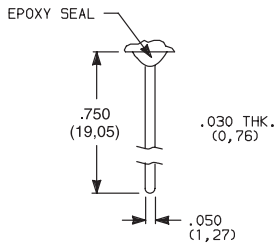

**SPDT**

### Z SOLDER LUG




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

### W WIRE WRAP

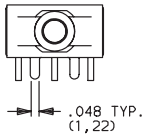


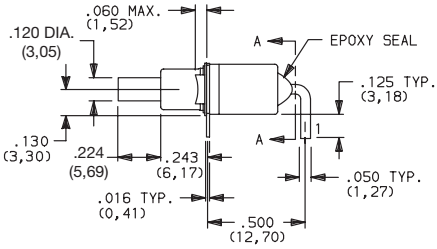

**SPDT**

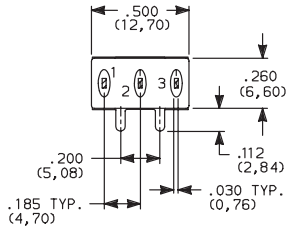
### A RIGHT ANGLE, PC THRU-HOLE



E112SD1ABE
SPDT

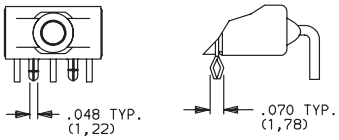


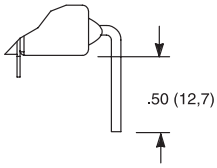



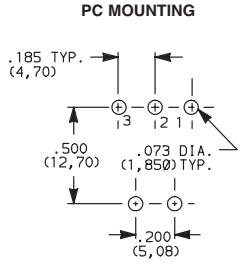

SECTION A-A

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



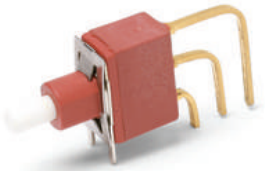

### AW RIGHT ANGLE, EXTENDED, PC THRU-HOLE



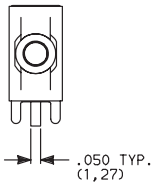



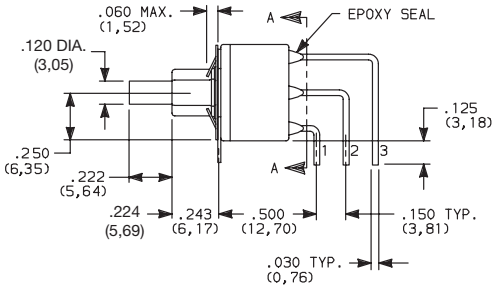

**NOTE:** Terminal bend radii and lead-in manufacturing option.
Available with D1 bushing only.

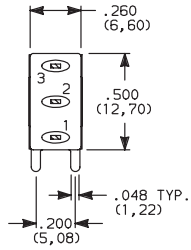
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



E112SD1AV2BE
SPDT

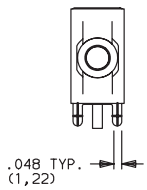


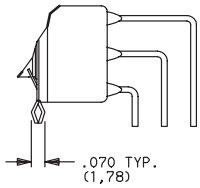



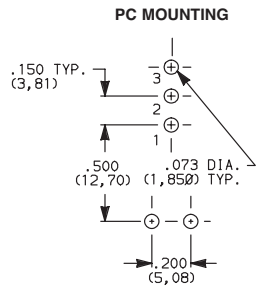




SECTION A-A

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



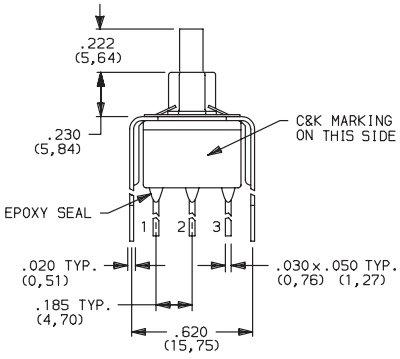

**NOTE:** Terminal bend radii and lead-in manufacturing option.
Available with D1 bushing only.

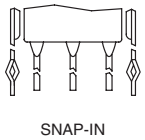
Third Angle Projection

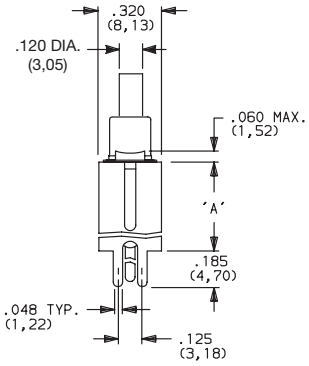
## TERMINATIONS

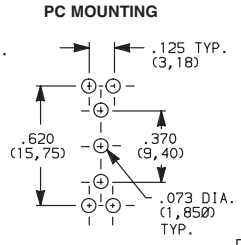
**V3, V4** VERTICAL MOUNT, V-BRACKET

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





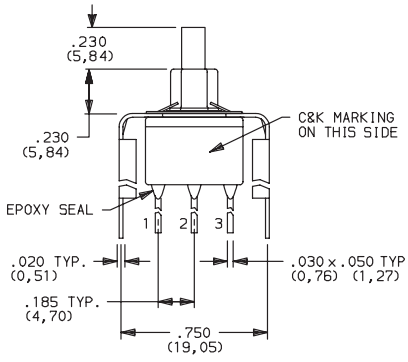

E112SD1__BE
SPDT

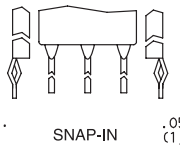
| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |
| V91 | 1.150 (29,21) |

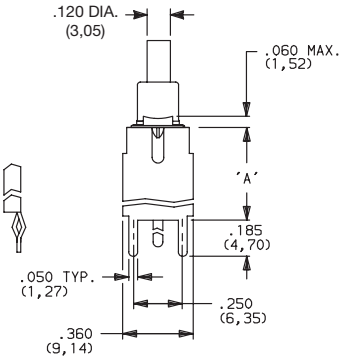
**NOTE:** Available with D1 bushing only.

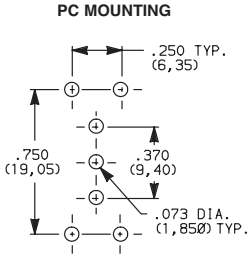
**V6, V8** VERTICAL MOUNT, V-BRACKET

**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

# 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. |

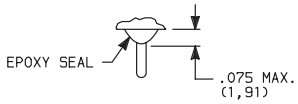
* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

[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.
Q contact material standard with C, Z terminations.
P contact materials not available with Z terminations.

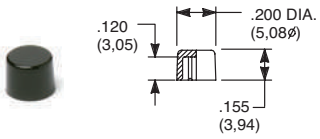
## SEAL

**E** EPOXY SEAL




## AVAILABLE HARDWARE

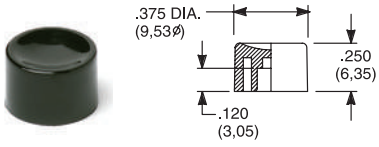
**Cap**




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

Material: Nylon
Finish: Gloss

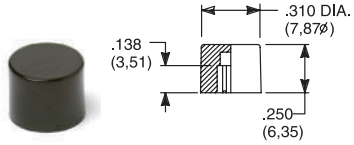
**Cap**




**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

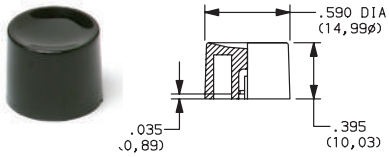
**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".
Other cap colors available, consult Customer Service Center.

Third Angle Projection

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

## AVAILABLE HARDWARE

**Cap, Snap-fitting plunger**

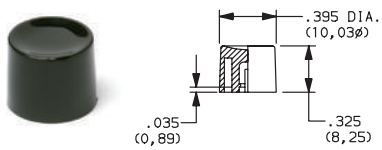



**PART NO.**

**452D01000** WHITE
**452D02000** BLACK
**452D03000** RED

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

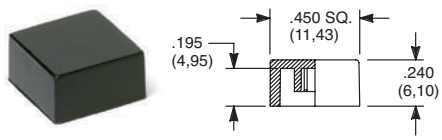



**PART NO.**

**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.**

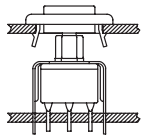
**798201000** WHITE
**798202263** BLACK
**798203000** RED

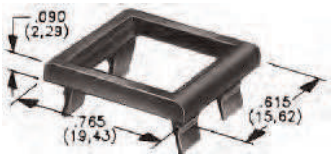
Material: Nylon
Finish: Matte

**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**






.090" (2,29) PANEL THK.

**PART NO.**

**432702263**

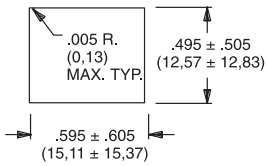
.125" (3,18) PANEL THK.

**PART NO.**

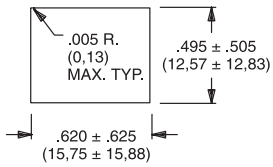
**432802263** BLACK

**PANEL MOUNTING**

For part numbers
4325xxxxx, 4326xxxxx

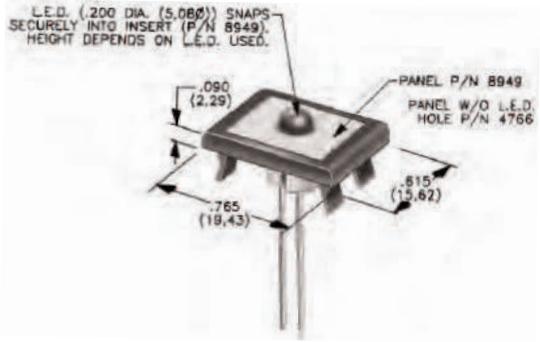



For part numbers
4327xxxxx, 4328xxxxx




**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

**PART NO.**

**894902000**

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

**PART NO.**

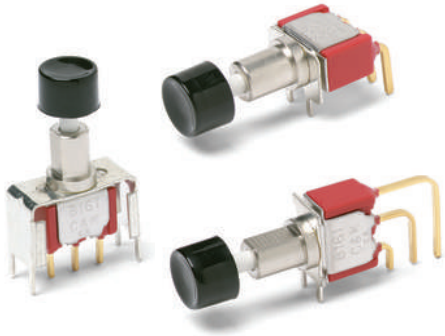
**476602000** BLACK

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

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

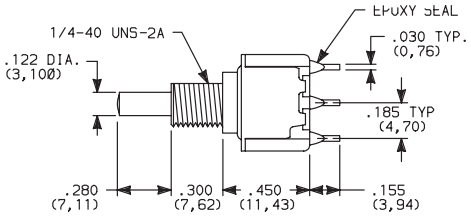
**Frame Color**
- **2** Black

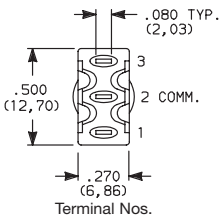
**LED Color**
- **3** Red
- **NONE** Models without LED

## 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



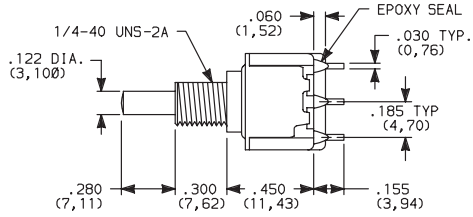



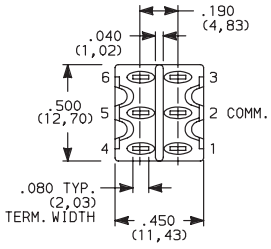

Terminal Nos.
For Reference Only

Part number shown: 8161SHZQE

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 (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 | 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

CAP COLOR
ACTUATOR OR PLUNGER

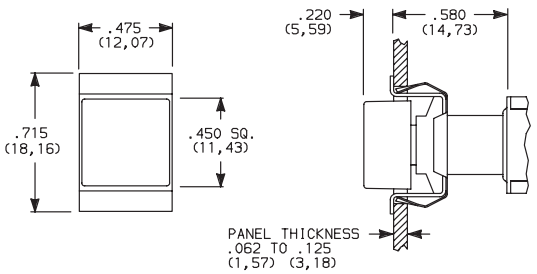
| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |
| 3 | RED |
| 4 | ORANGE |
| 5 | YELLOW |
| 9 | GRAY |

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

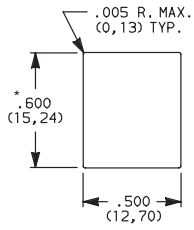
Available with C, W, Z or Z3 terminations.

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

### J80 SNAP-IN



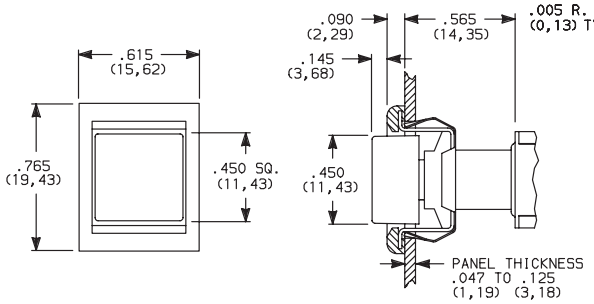

PANEL MOUNTING



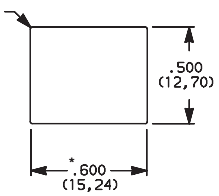

*Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,41/2,18) thick panels.



### J81 SNAP-IN WITH BLACK FRAME




PANEL MOUNTING



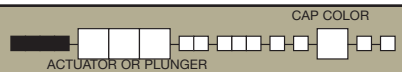

*Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,41/2,18) thick panels.



Third Angle Projection

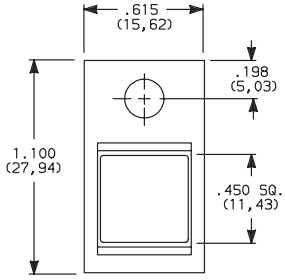
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

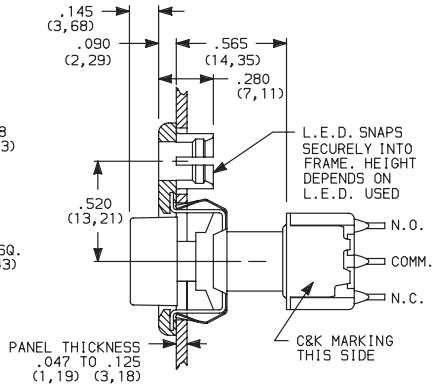
## ACTUATOR—SNAP-IN FRONT MOUNT



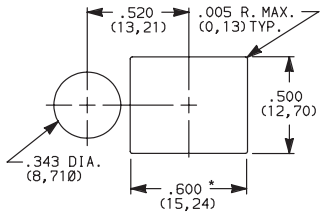

### J82 SNAP-IN WITH BLACK FRAME FOR LED






**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.

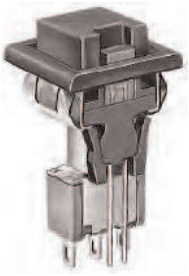
Other colors available, consult Customer Service Center.

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

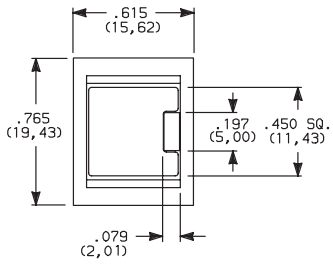
## ACTUATOR—SNAP-IN FRONT MOUNT

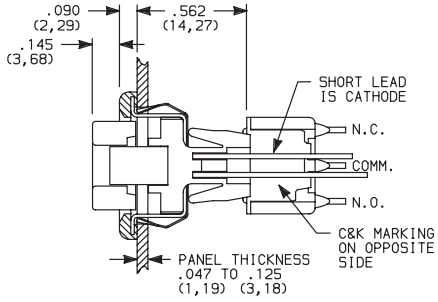



### J86 SNAP-IN WITH BLACK FRAME AND LED

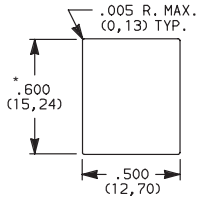


8161J86ZQE223
SPDT




**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 |

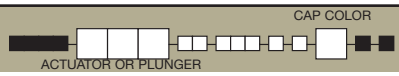
| OPTION CODE | LED COLOR |
|---|---|
| 3 | RED |

For LED information, see page A-61.

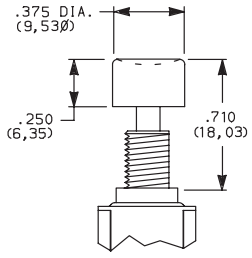
Third Angle Projection

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

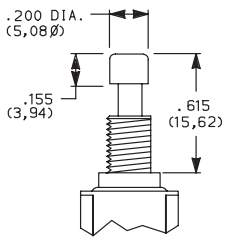
## PLUNGER



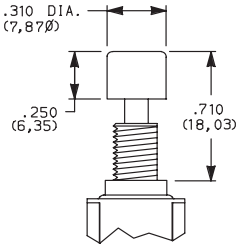

**S** PLUNGER WITH CAP P/N 7527



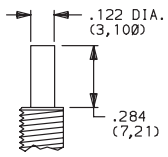

**S1** PLUNGER WITH CAP P/N 7089




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

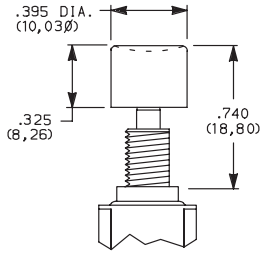



**S, S1, S2 plunger dimensions.**

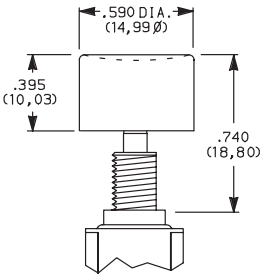



Plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

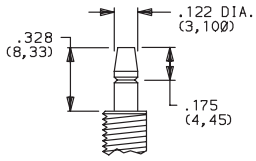
**L** PLUNGER WITH CAP P/N 8941




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




**L, L1 plunger dimensions.**



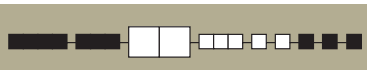

Plunger Material: Brass, chrome plated.

| 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.

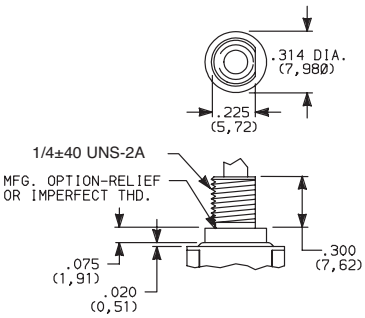
**NOTE:** When selecting plunger and cap option, bushing selection must also be made, see below.

## BUSHING



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

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

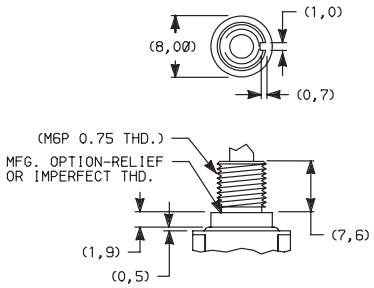



H bushing standard with C, W, Z or Z3 terminations.
H9 bushing standard with A, A3, AV2, AV3, or V3-V31 terminations.

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

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

**Y3** 7.6mm THREADED, KEYWAY

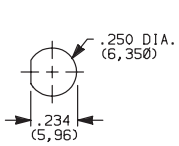



Withstands 12 in./lbs. of torque with no distortion.

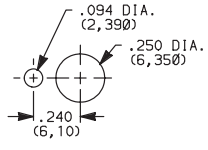
**NOTE:** When selecting bushing option, plunger selection must also be made, see above. No bushing option choice required when any JXX actuator option is selected.

**PANEL MOUNTING**

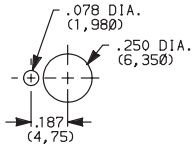
1/4 IN. BUSHING




Without Locking Ring

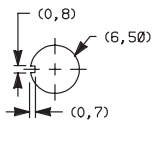



With Standard Locking Ring

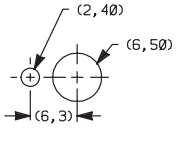



With Small Locking Ring

METRIC BUSHING

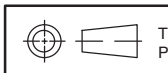



Without Locking Ring




With Locking Ring

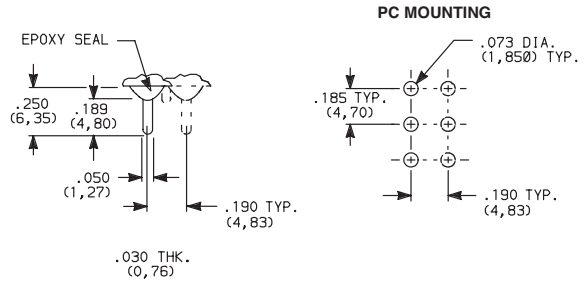
**NOTE.** Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see section "Technical Data and Additional Hardware".



# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

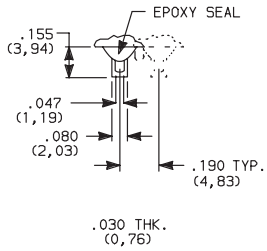
## TERMINATIONS

### C PC THRU-HOLE




**SPDT and DPDT**

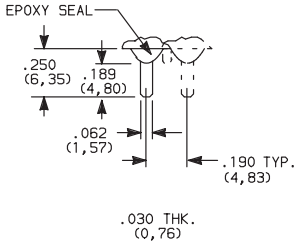
### Z SOLDER LUG




**SPDT and DPDT**

Not available with P, S or R contact material.

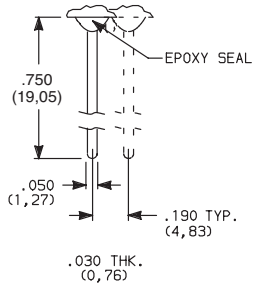
### Z3 QUICK CONNECT




**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

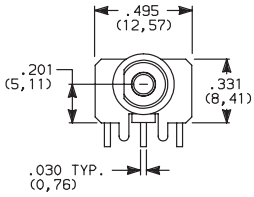


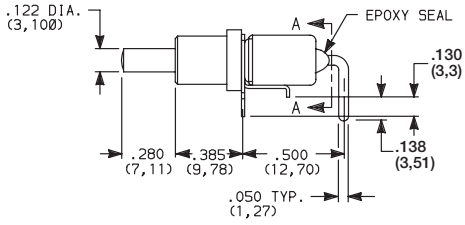

**SPDT and DPDT**

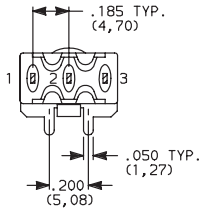
### A RIGHT ANGLE, PC THRU-HOLE



8161SH9ABE2
SPDT

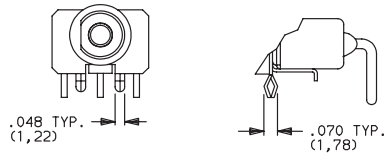


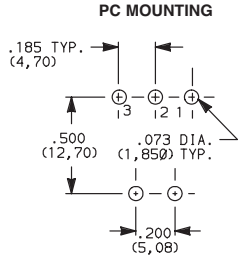




SECTION A-A

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




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



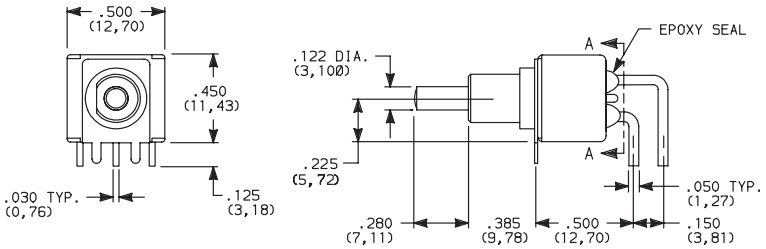

**NOTE:** PC pattern must clear switch support leg.

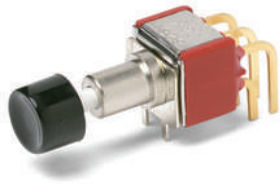
Third Angle Projection

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

## TERMINATIONS

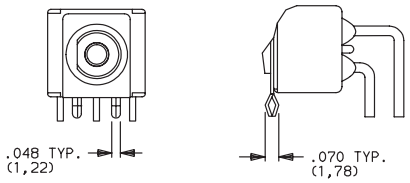
### A RIGHT ANGLE, PC THRU-HOLE



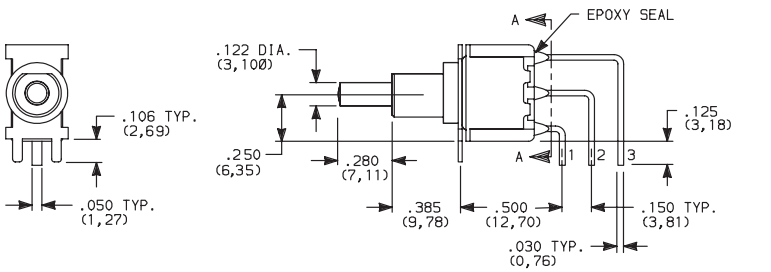
8261SH9ABE2
DPDT

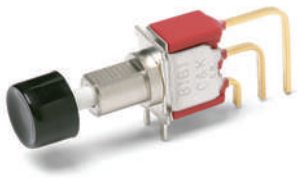
### A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE




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

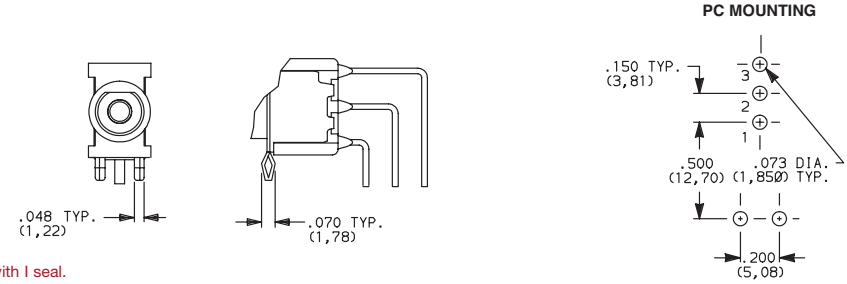
### AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



8161SH9AV2BE2
SPDT

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




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

Third Angle Projection

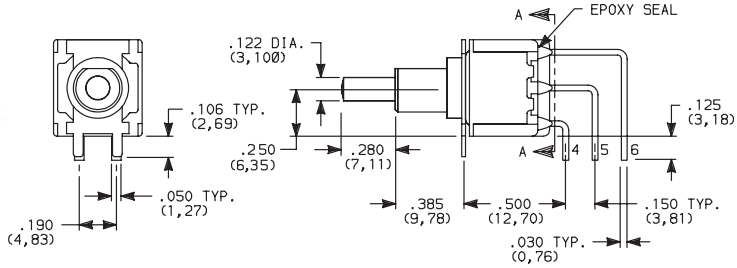
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

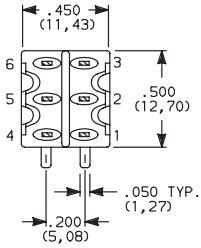
## TERMINATIONS

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



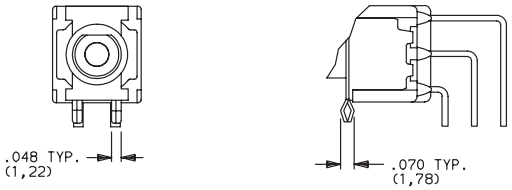
8261SH9AV2BE2
DPDT



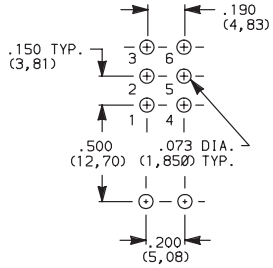




SECTION A-A

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




PC MOUNTING

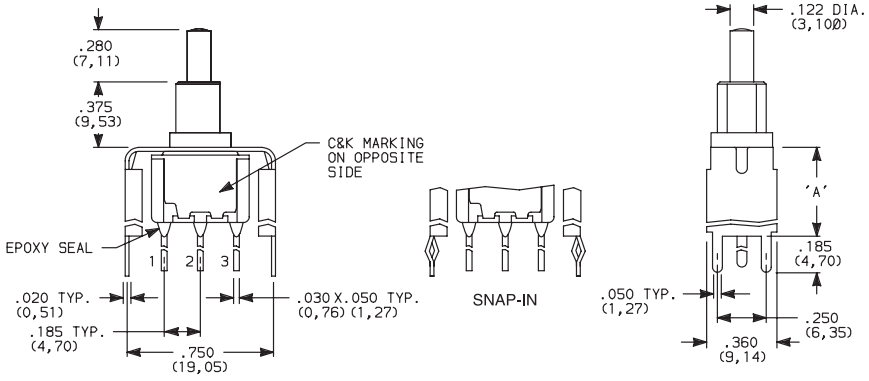



Not available with I seal.
Terminal bend radii and lead-in manufacturing option.

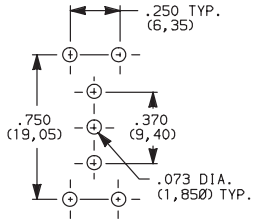
### V6 VERTICAL MOUNT, V-BRACKET
### V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8161SH9__BE2
SPDT




PC MOUNTING



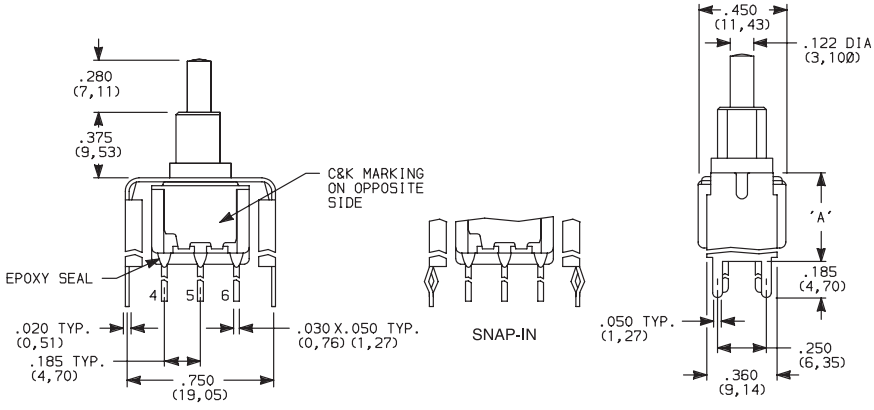

| OPTION CODE | DIM 'A' |
|---|---|
| V21 | .555 (14,10) |
| V6 | .460 (11,68) |

Not available with I seal.

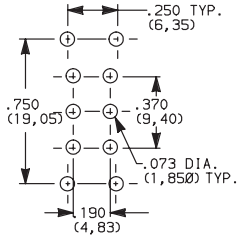
### V6 VERTICAL MOUNT, V-BRACKET
### V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8261SH9__BE2
DPDT




PC MOUNTING




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

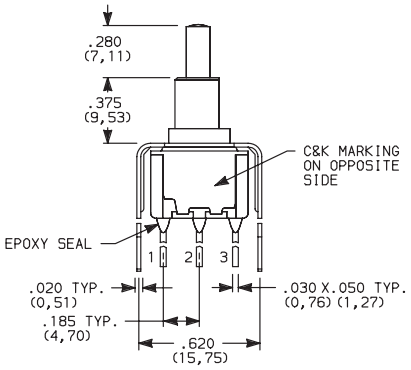
Not available with I seal.

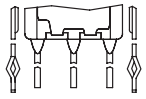
Third Angle Projection

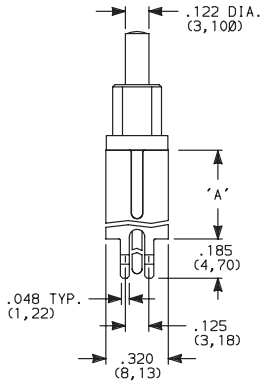
## TERMINATIONS

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

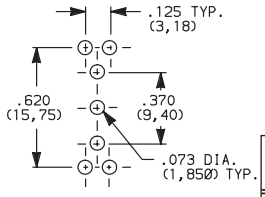
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN




**PC MOUNTING**





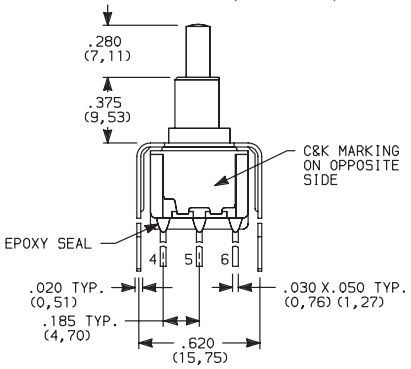

8161SH9__BE2
SPDT

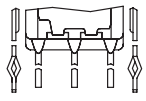
| OPTION CODE | DIM 'A' |
|---|---|
| V3, V31 | .460 (11,68) |
| V4 | .630 (16,00) |

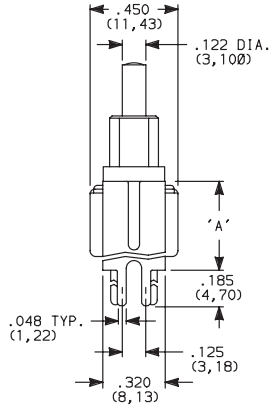
Not available with I seal.

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

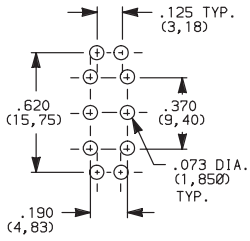
**V31** VERTICAL MOUNT, V-BRACKET, SNAP-IN




**PC MOUNTING**






8261SH9__BE2
DPDT

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

Not available with I seal.

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL | TERMINAL PLATING | RATINGS | |
|---|---|---|---|---|
| B | 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.

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.

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

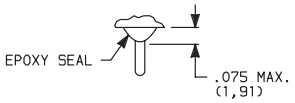
Third Angle Projection

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

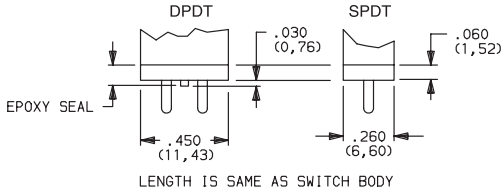
# 8060 Series
# Alternate Action and Momentary Pushbutton Switches

## SEAL

**E** EPOXY SEAL



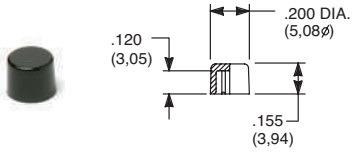

**I** EPOXY POTTED BASE




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

## AVAILABLE HARDWARE

**Cap**

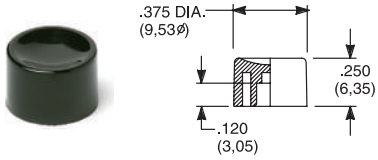



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

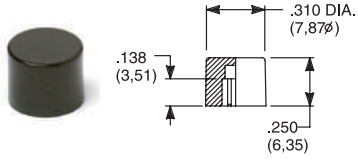



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap**

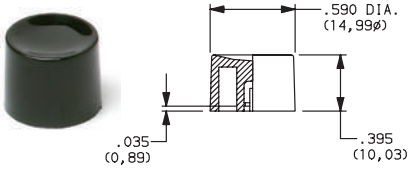



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

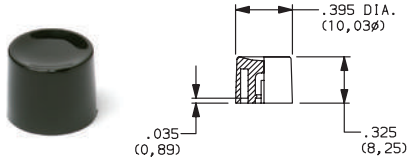



**PART NO.**

| | |
|---|---|
| 452D01000 | WHITE |
| 452D02000 | BLACK |
| 452D03000 | RED |
| 452D04000 | ORANGE |
| 452D05000 | YELLOW |
| 452D09000 | GRAY |

Material: Nylon
Finish: Gloss

**Cap, Snap-fitting plunger**

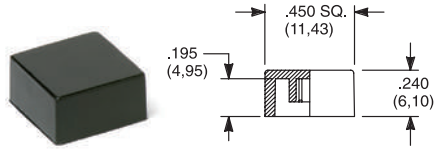



**PART NO.**

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

Material: Nylon
Finish: Gloss

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




**PART NO.**

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

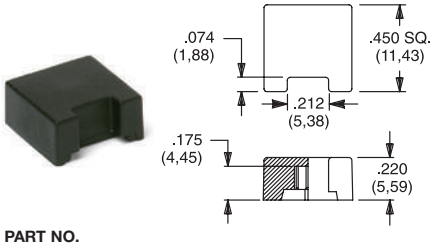
Material: Nylon
Finish: Gloss

**PART NO.**

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

Material: Nylon
Finish: Matte

**Cap, J86 & J96 options only**




**PART NO.**

459701000
459702000
459703000
459704000
459705000
459709000

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

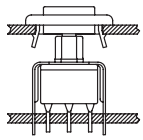
**Fits Z3 Termination female connector**



**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**

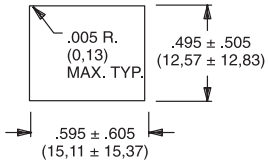




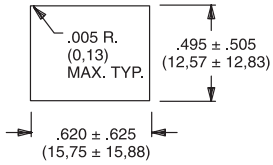

| .090" (2,29) PANEL THK. | .125" (3,18) PANEL THK. |
|---|---|
| **PART NO.** | **PART NO.** |
| **432702263** | **432802263** BLACK |

**PANEL MOUNTING**

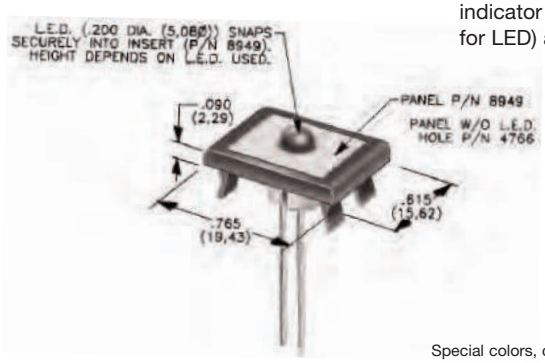
For part numbers 4325xxxxx, 4326xxxxx




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.**

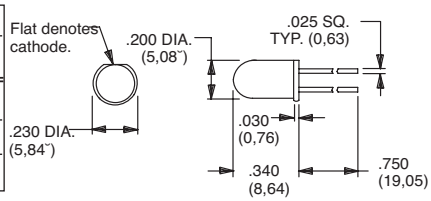
| PANEL INSERT WITH HOLE FOR LED | BLANK PANEL INSERT WITHOUT HOLE FOR LED |
|---|---|
| **PART NO.** | **PART NO.** |
| **894902000** | **476602000** BLACK |

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

## LED INFORMATION

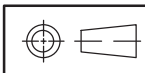
SWITCHES WITH LED SUPPLIED: J86 OPTION:
Rectangular LEDs are supplied on 8060 Series pushbutton switches with J86 option. These LEDs are factory installed and are not replaceable. The following specifications apply:

| 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.

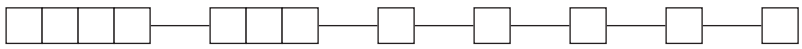
HARDWARE: Nut: Brass, nickel plated; Lockwasher: Steel, bright nickel plated.

**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

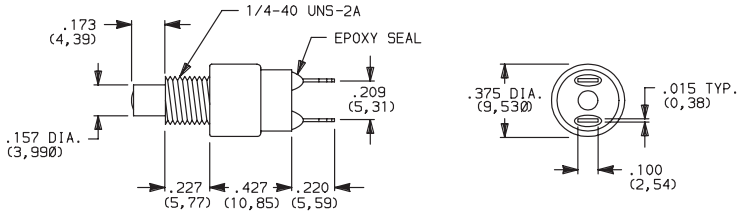
* Available with M or S plunger models, and B contact material only.

*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 | | | | | |

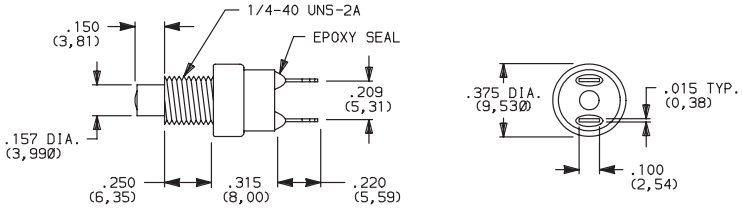
### SPST




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 | | | | | |

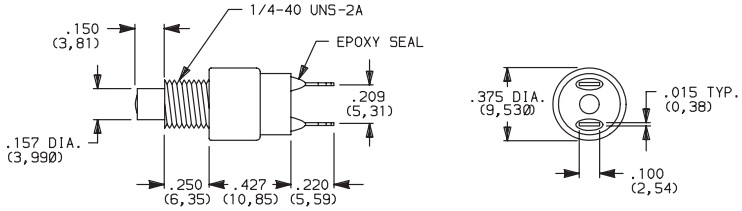
### SPST




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

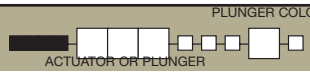
All models with all options when ordered with G or Q contact material.

Third Angle Projection

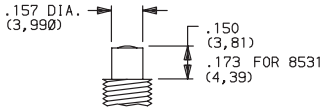
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# 8500 Series
# Subminiature Pushbutton Switches

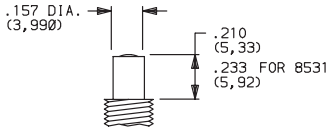
## PLUNGER



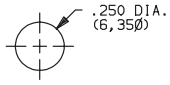

**M** .150" HIGH PLUNGER




**S** .210" HIGH PLUNGER




**PANEL MOUNTING**

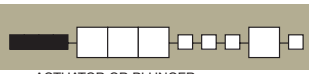



CAP COLOR

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

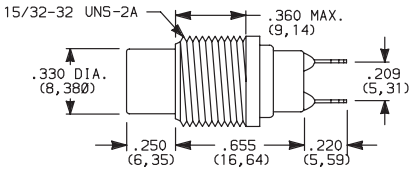
**NOTE:** One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

## ACTUATOR




**T** 15/32 BUSHING

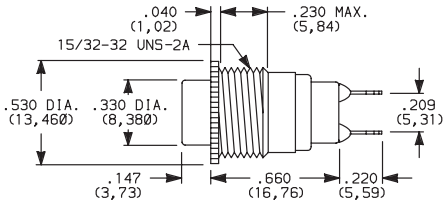





**NOTE:** No frame color choice required.

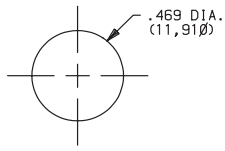
**T1** 15/32 BUSHING WITH FRAME






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

**PANEL MOUNTING**



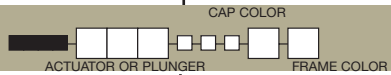

| OPTION CODE | CAP COLOR |
|---|---|
| 2 | BLACK |
| 1 | WHITE |
| 3 | RED |
| 9 | GRAY |

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).

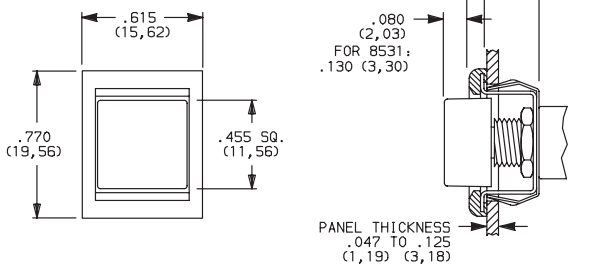
**NOTE:** Caps available for plunger options, see page A-65.

## ACTUATOR—SNAP-IN FRONT MOUNT




**J81** SNAP-IN WITH FRAME





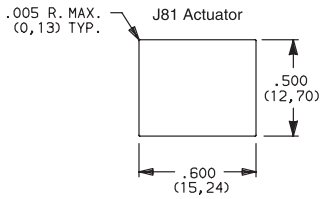

| OPTION CODE | CAP AND FRAME COLOR |
|---|---|
| 2 | BLACK |

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

One mounting nut and lockwasher supplied with all actuators.

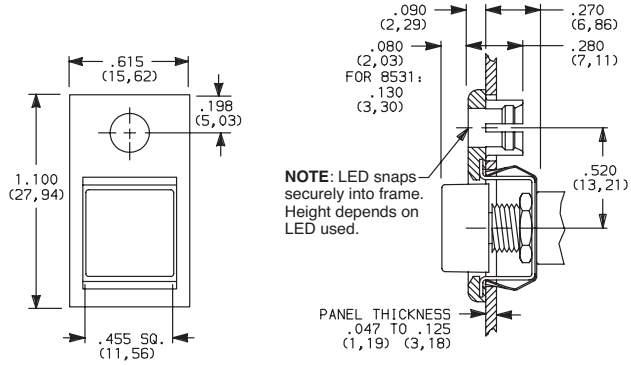
**NOTE:** Caps & frames available separately, see pages A-65 and A-66.

**PANEL MOUNTING**



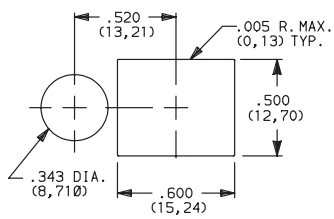

**J82** SNAP-IN WITH FRAME FOR LED






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

J82 Actuator

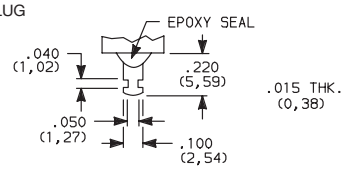



Third Angle Projection

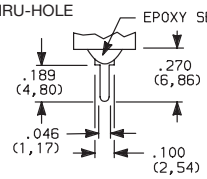
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## TERMINATIONS

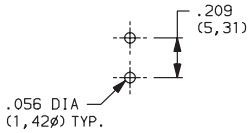
**Z** SOLDER LUG



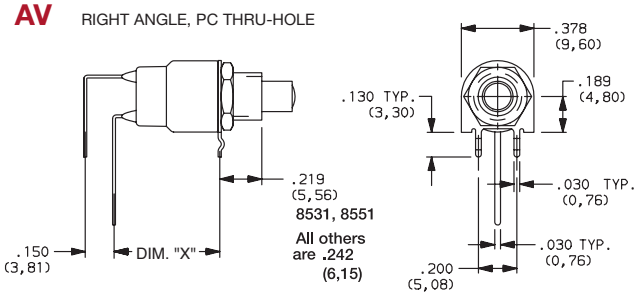

**C** PC THRU-HOLE

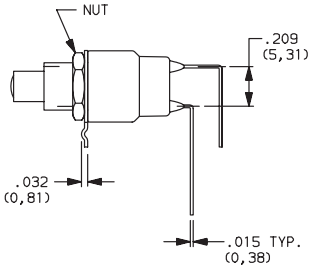



PC MOUNTING

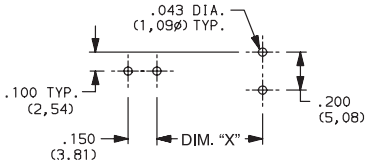



**AV** RIGHT ANGLE, PC THRU-HOLE




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. |

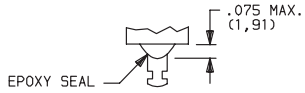
* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

[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.

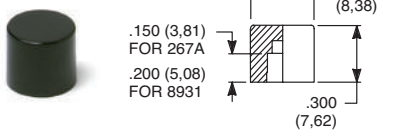
## SEAL

**E** EPOXY SEAL



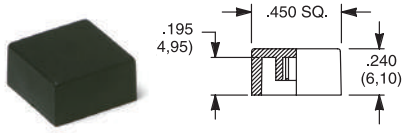

## REPLACEMENT HARDWARE

**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<br>Finish: Gloss or matte | |

Other colors available, consult Customer Service Center.

**Frame**



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

Third Angle Projection

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

# 8500 Series
# Subminiature Pushbutton Switches

## AVAILABLE HARDWARE

**Frame**



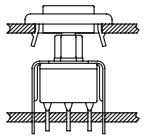
**PART NO.**
**615602263** BLACK

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**






.090" (2,29) PANEL THK.

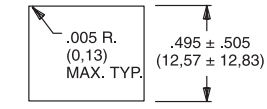
**PART NO.**
**432702263**

.125" (3,18) PANEL THK.

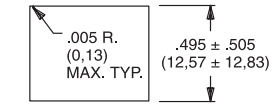
**PART NO.**
**432802263** BLACK

**PANEL MOUNTING**

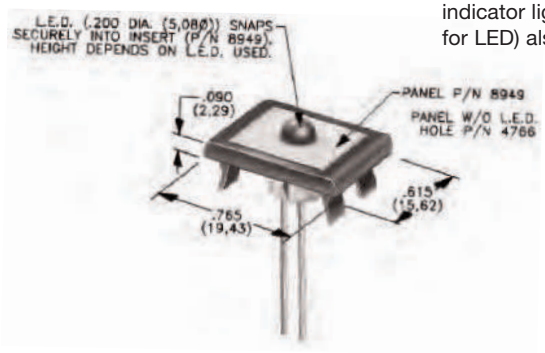
For part numbers
4325xxxxx, 4326xxxxx




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

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

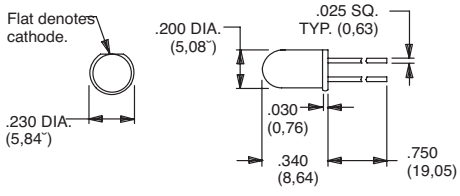
BLANK PANEL INSERT
WITHOUT HOLE FOR LED

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

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

## LED INFORMATION

**Process Information:** Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.
LEDs are not supplied with J82 option. LED snaps into switch frame surrounding actuator and is wired externally.




Suggested LED for J82 option.
Dimensions for reference only.

Third Angle Projection

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

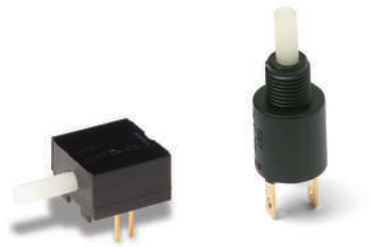
# KM Series
# Subminiature Pushbutton Switches

## *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). See following pages 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 models

MOVABLE CONTACT: B contact material: Bronze or copper, with gold plate over nickel plate. See following pages for additional contact materials.

STATIONARY CONTACTS & TERMINALS: B contact material: Copper, with gold plate over nickel plate. See following pages for additional contact materials.

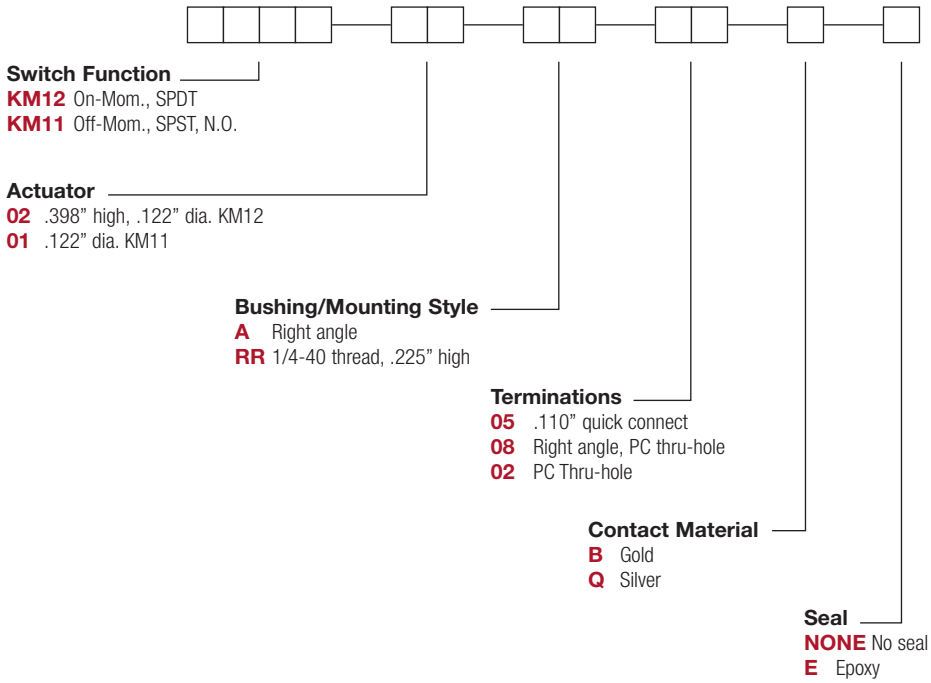
RETURN SPRING: Music wire, phosphor coated

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 following pages. For additional options not shown in catalog, consult Customer Service Center.

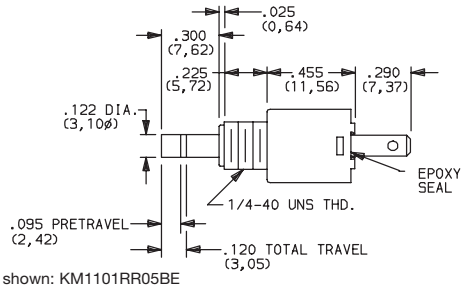


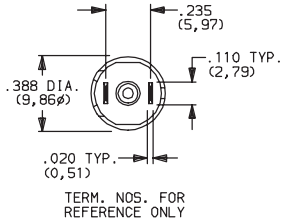
# KM Series
# Subminiature Pushbutton Switches

## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | CONNECTED TERMINALS POS. 1 | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | KM11 | OFF | MOM. | OPEN | 2-1 | SPST N.O. |

### SPST

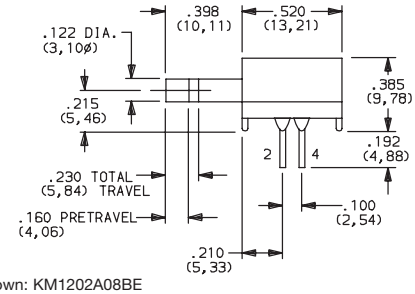


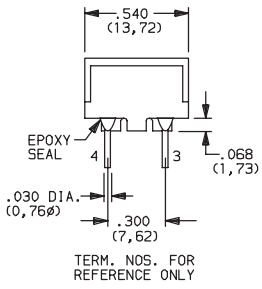




Part number shown: KM1101RR05BE

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | CONNECTED TERMINALS POS. 1 | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | KM12 | ON | MOM. | 2-1 | 4-3 | SPDT |

### SPDT

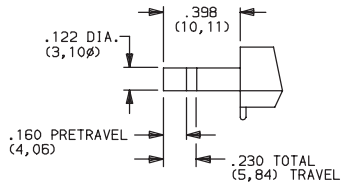



Part number shown: KM1202A08BE

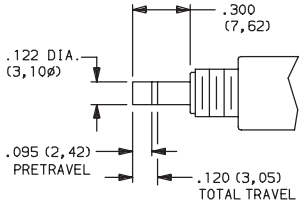
## ACTUATOR

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




KM12 models only

**01** .122" DIA.



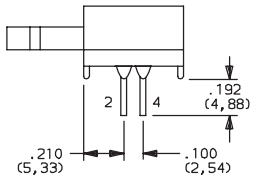

KM11 models only

**NOTE:** Caps available for plunger options

Third Angle Projection

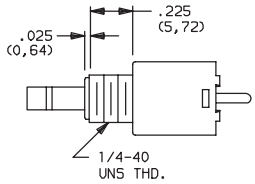
## BUSHING/ MOUNTING STYLE

**A** RIGHT ANGLE



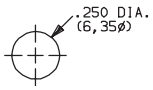

KM12 models only

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



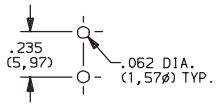

KM11 models only

**PANEL MOUNTING**

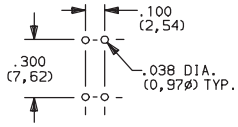



KM11 models

**PC MOUNTING**



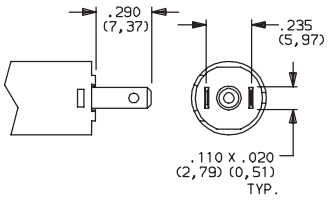

KM11 models only



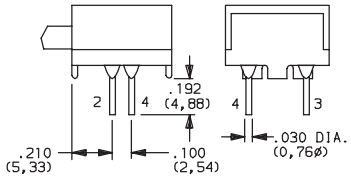

KM12 models only.

## TERMINATIONS

**05** .110" QUICK CONNECT

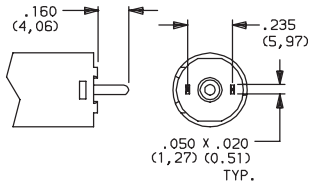



**08** RIGHT ANGLE, PC THRU-HOLE




KM12 models only

**02** PC THRU-HOLE




KM11 models only

## CONTACT MATERIAL

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

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

[1] STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate.
MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate.

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

[3] STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate over silver plate.
MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate over silver plate.

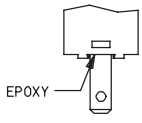
**NOTE:** Any models supplied with Q or B contact material are RoHS compliant.

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

## SEAL

**NONE** NO SEAL

**E** EPOXY SEAL

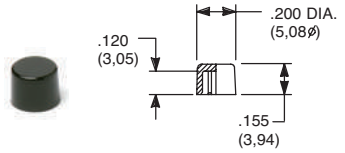



Third Angle Projection

# KM Series
# Subminiature Pushbutton Switches

## AVAILABLE HARDWARE

**Cap, KM11 and KM12 models**

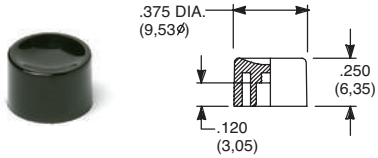



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, KM11 and KM12 models**

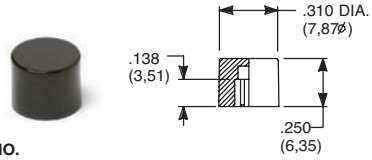



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, KM11 and KM12 models**

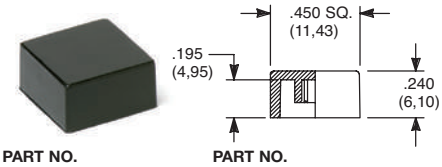



**PART NO.**

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

Material: Nylon
Finish: Gloss

**Cap, KM11 models**




**PART NO.**

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

Material: Nylon
Finish: Gloss

**PART NO.**

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

Material: Nylon
Finish: Matte

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

# 8600 Series
# Microminiature Pushbutton Switches

## Features/Benefits

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

## Typical Applications

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



Models Available

## Specifications

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

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

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

INSULATION RESISTANCE: 109 Ω min.

DIELECTRIC STRENGTH: 500 Vrms min. @ sea level.

OPERATING TEMPERATURE: –30°C to 65°C.

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

## Materials

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

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

BUSHING: Brass, nickel plated.

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

TERMINALS:
8631, 8632 MODELS: Copper alloy, silver plated.
8633 MODEL: Q contact material: Coin silver.
See page A-73 for additional contact materials.

TERMINAL SEAL:
8633 MODEL: Epoxy.
8631, 8632 MODELS: Terminals insert molded.

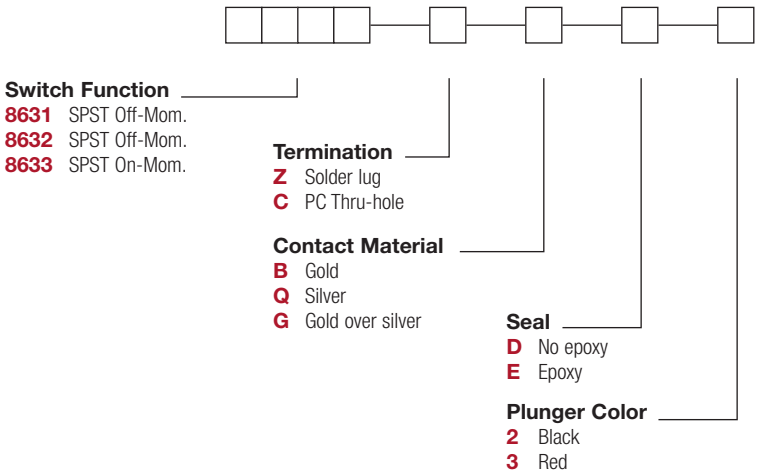
HARDWARE: Nut: Brass, nickel plated.

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

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

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-72 and A-73. For additional options not shown in catalog, consult Customer Service Center.

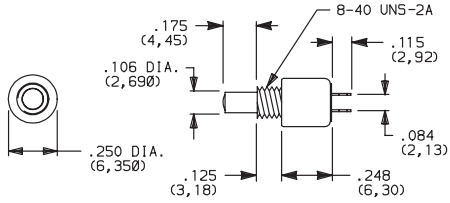


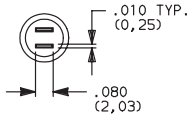
# 8600 Series
# Microminiature Pushbutton Switches

## SWITCH FUNCTION

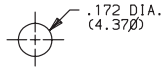
| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | TOTAL TRAVEL | ACTUATION FORCE | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | 8631 | OFF | MOM. | .040 (1,02) TYP. | 5 oz (140g) TYP. | N.O. |

**SPST**




PANEL MOUNTING

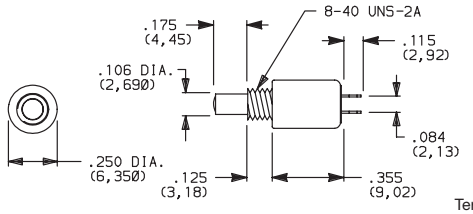


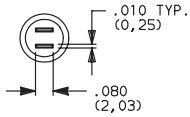

Part number shown: 8631ZQD2

Terminals Insert Molded

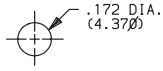
| SP | 8632 | OFF | MOM. | .106 (2,69) TYP. with overtravel .024 (0,61) TYP. | 6.25 oz (177g) TYP. | N.O. with overtravel |
|---|---|---|---|---|---|---|

**SPST**




PANEL MOUNTING

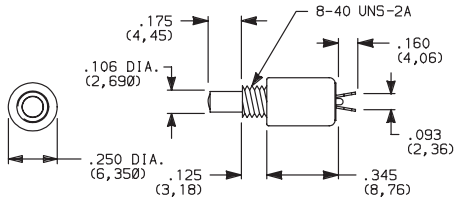


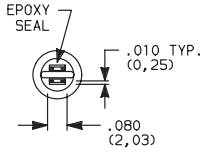

Part number shown: 8632ZQD2

Terminals Insert Molded

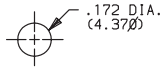
| SP | 8633 | ON | MOM. | .048 (1,22) TYP. | 5 oz (140g) TYP. | N.C. |
|---|---|---|---|---|---|---|

**SPST**




PANEL MOUNTING




Part number shown: 8633ZQE2

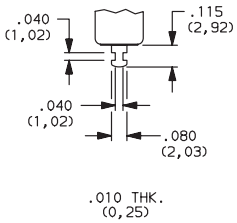
MOM. = Momentary

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

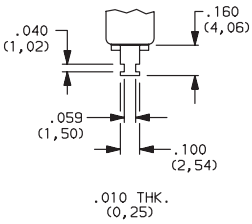
## TERMINATIONS

**Z** SOLDER LUG

8631, 8632 models only.

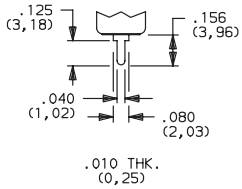



8633 models only.

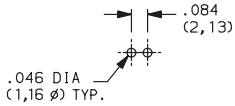



**C** PC THRU-HOLE

8631, 8632 models only.




**PC MOUNTING**




Third Angle Projection

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

## CONTACT MATERIAL

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

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

[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.
8633 model only: Coin silver, with gold plate over nickel plate.

[4] CONTACTS: Coin silver, silver plated.

[5] TERMINALS: Copper alloy, silver plated. 8633 model only: coin silver.

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

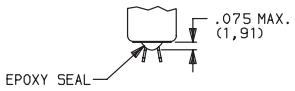
8631, 8632 models with all options when ordered with G or Q contact material.
Q contact material standard with C, Z terminations.

## SEAL

**D** NO EPOXY SEAL

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

**E** EPOXY SEAL




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

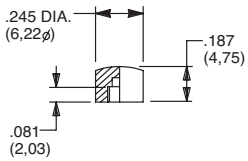
## PLUNGER COLOR

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

## AVAILABLE HARDWARE

**Cap**






**PART NO.**

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

Material: Nylon
Finish: Gloss

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

Third Angle Projection

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

# 8700 Series
# Overtravel Pushbutton Switches



## Features/Benefits

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

## Typical Applications

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

## Specifications

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

ELECTRICAL LIFE: 100,000 actuations at full load.

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

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

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

OPERATING TEMPERATURE: –30°C to 65°C.

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

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

## Materials

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

PLUNGER:
8731 – .39074" brass, nickel plated.
8732 – .390"74 PBT polyester, black.

BUSHING: brass, nickel plated.

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

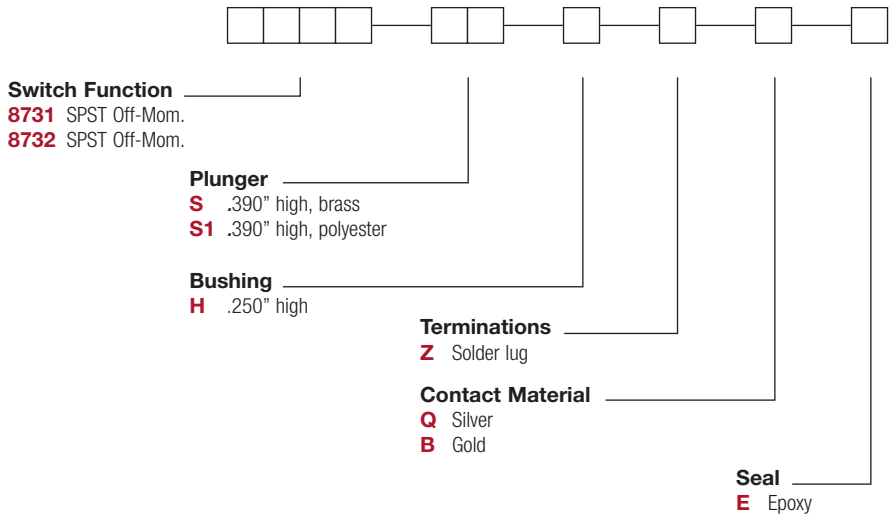
TERMINALS: Q contact material: Copper alloy, silver plated. See page A-76 for additional contact materials.

TERMINAL SEAL: Epoxy.

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

## Build-A-Switch

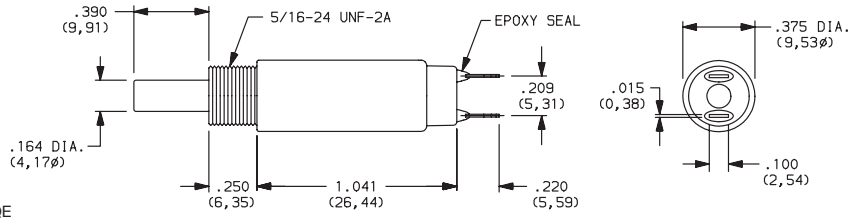
To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-75 and A-76. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



## SWITCH FUNCTION

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | TOTAL TRAVEL | ACTUATION FORCE | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | 8731 | OFF | MOM. | .390 (9,91) TYP. with overtravel .311 TYP. | 4.7 oz TYP. | N.O. with overtravel SPST |

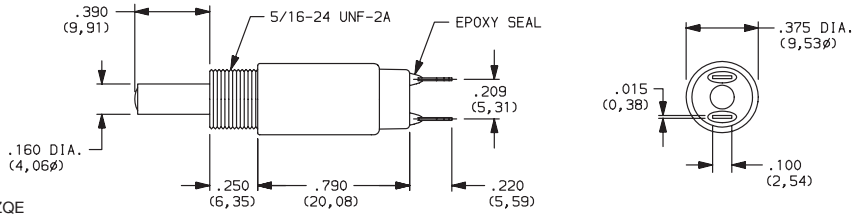
**SPST**




Part number shown: 8731SHZQE

| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | TOTAL TRAVEL | ACTUATION FORCE | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | 8732 | OFF | MOM. | .390 (9,91) TYP. with overtravel .350 TYP. | 2.2 oz TYP. | N.O. with overtravel SPST |

**SPST**

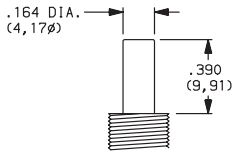



Part number shown: 8732S1HZQE

MOM. = Momentary

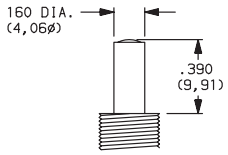
## PLUNGER

**S** .390" HIGH, BRASS




Available with 8731 model only.

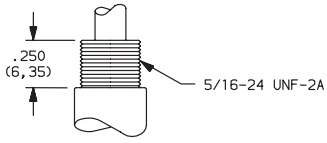
**S1** .390" HIGH, PBT POLYESTER



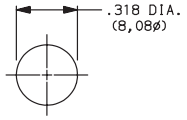

Available with 8732 model only.

## BUSHING

**H** .250" HIGH




**PANEL MOUNTING**



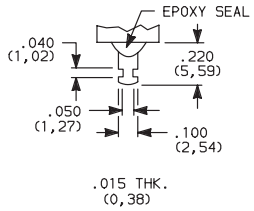

Third Angle Projection

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

# 8700 Series
# Overtravel Pushbutton Switches

## TERMINATIONS

**Z** SOLDER LUG




## CONTACT MATERIAL

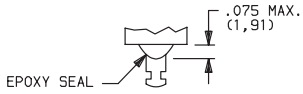
| OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | CONTACT MATERIAL | TERMINAL PLATING | RATINGS | |
|---|---|---|---|---|---|---|
| **Q** | YES | YES | SILVER | SILVER | POWER | 1 AMP @ 125 V AC OR 28 V DC. |
| **B** | YES | YES | GOLD | GOLD | LOW LEVEL/DRY CIRCUIT | 0.4 VA MAX. @ 20 V AC OR DC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

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

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

## SEAL

**E** EPOXY SEAL




Third Angle Projection

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

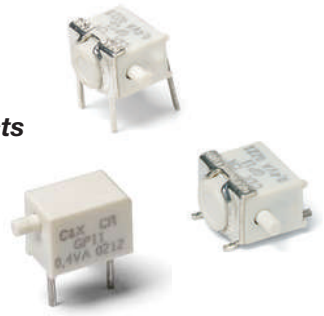
# GP Series
# Sealed Ultraminiature Pushbutton Switches

## *Features/Benefits*

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

## *Typical Applications*

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



## Specifications

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

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

CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: $10^9\Omega$ min.

DIELECTRIC STRENGTH: 500 Vrms min. @ sea level.

OPERATING TEMPERATURE: –40°C to 85°C.

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

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

PACKAGING: Surface mount switches standard in anti-static tape and reel packaging per EIA 481-3, see page A-80 for drawings and reel information. Thru-Hole parts are shipped in trays.

All models are RoHS compliant and compliant.

## Materials

HOUSING & BASE: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Glass filled nylon 4/6, flame retardant (UL 94V-0) with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

MOVABLE CONTACT: Copper alloy, with gold plate over nickel plate.

STATIONARY CONTACTS Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with gold flash over nickel plate.

TERMINAL SEAL: Epoxy/Urethane. All terminals insert molded.

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

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

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

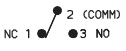
## How To Order

Part number list is shown below. For individual part details, please refer to the following pages.

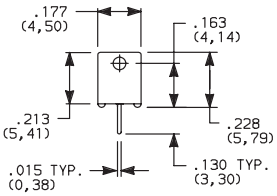
| Part Number (Part Description) | Product Details |
|---|---|
| GP11MCBE | SPST Mom. PC Thru-hole, without support bracket |
| GP12MCBE | SPDT Mom. PC Thru-hole, without support bracket |
| GP11MABE | SPST Mom. PC Thru-hole, with vertical support bracket |
| GP12MABE | SPDT Mom. PC Thru-hole, with vertical support bracket |
| GP11MSABE | SPST Mom. SMT, with vertical support bracket |
| GP12MSABE | SPDT Mom. SMT, with vertical support bracket |
| GP11MSA1BE | SPST Mom. SMT, Half-Pitch, with vertical support bracket |
| GP12MSA1BE | SPDT Mom. SMT, Half-Pitch, with vertical support bracket |
| GP12MSCBE | SPDT Mom. SMT, without support bracket |
| GP11MSV1BE | SPST Mom. SMT, with horizontal support bracket |
| GP12MSV1BE | SPDT Mom. SMT, with horizontal support bracket |

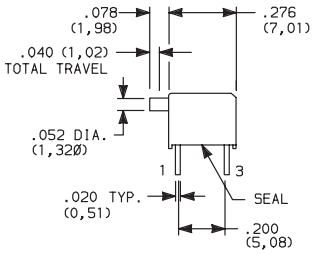
MOM. = Momentary

# GP Series
# Sealed Ultraminiature Pushbutton Switches

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

MOM. = Momentary



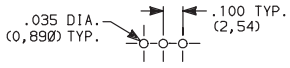




Terminal nos.
for reference only.

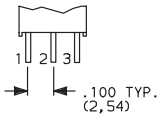


GP11MCBE
SPST

**PC MOUNTING**



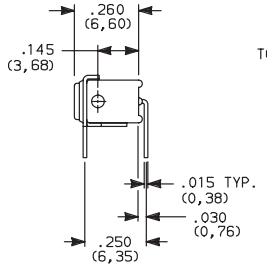

GP11– omit center hole.

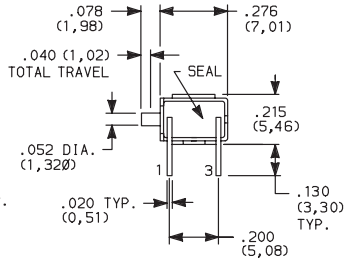



GP12 Model



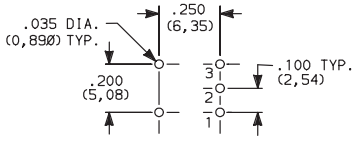
**GP11MABE**
**SPST**



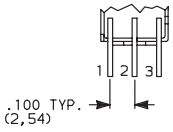




Terminal nos.
for reference only.

**PC MOUNTING**




GP11– omit hole 2.




GP12 Model

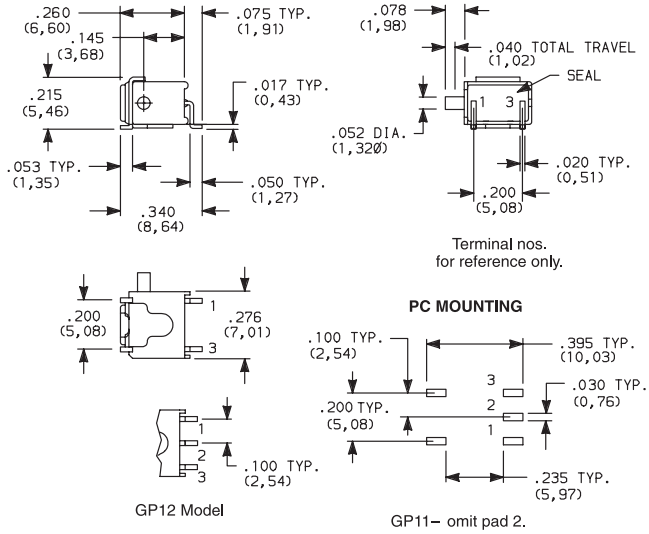
| PART NUMBER | SWITCH FUNCTION POS.1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|
| **GP11MABE** | OFF | MOM. |  SPST |
| Conn. Terms. | OPEN | 1-3 | |
| **GP12MABE** | ON | MOM. |  SPDT |
| Conn. Terms. | 2-1 | 2-3 | |

MOM. = Momentary

# GP Series
# Sealed Ultraminiature Pushbutton Switches



GP11MSABE
SPST

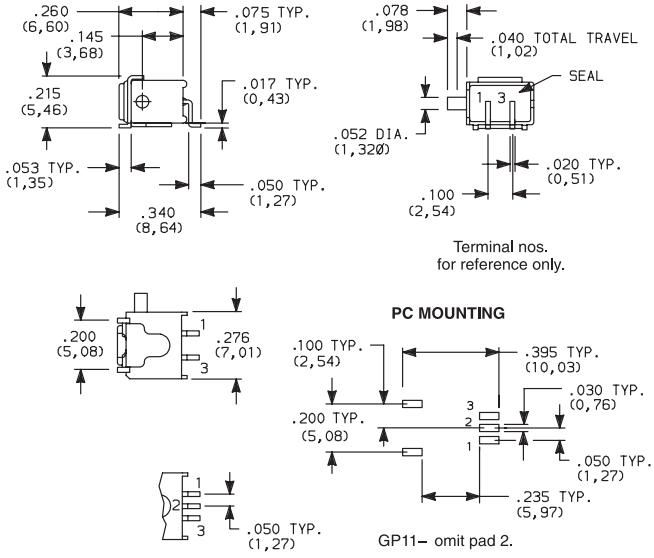



| PART NUMBER | SWITCH FUNCTION POS.1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|
| **GP11MSABE** | OFF | MOM. |  |
| Conn. Terms | OPEN | 1-3 | SPST |
| **GP12MSABE** | ON | MOM. |  |
| Conn. Terms | 2-1 | 2-3 | SPDT |

MOM. = Momentary

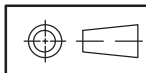


GP11MSA1BE
SPST




| PART NUMBER | SWITCH FUNCTION POS.1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|
| **GP11MSA1BE** | OFF | MOM. |  |
| Conn. Terms. | OPEN | 1-3 | SPST |
| **GP12MSA1BE** | ON | MOM. |  |
| Conn. Terms | 2-1 | 2-3 | SPDT |

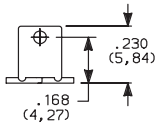
MOM. = Momentary

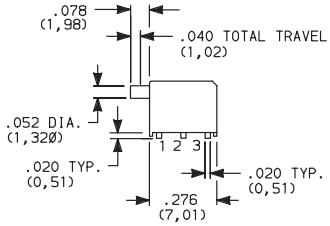



*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

| PART NUMBER | SWITCH FUNCTION POS.1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|
| **GP12MSCBE** | ON | MOM. | 2 (COMM) NC 1 3 NO SPDT |
| Conn. Terms | 2-1 | 2-3 | |

MOM. = Momentary



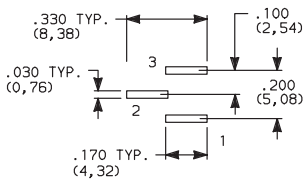



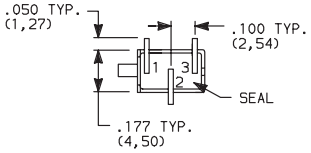

Terminal nos.
for reference only.



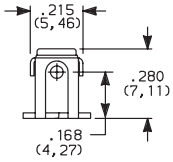
GP12MSCBE
SPDT

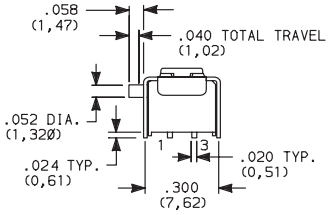
PC MOUNTING




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



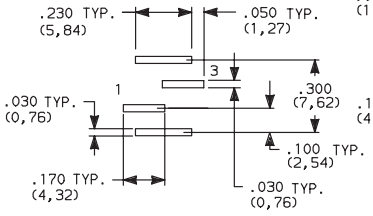


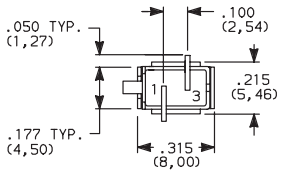

GP11MSV1BE
SPST

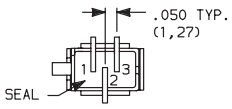
| PART NUMBER | SWITCH FUNCTION POS.1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|
| **GP11MSV1BE** | OFF | MOM. | 1 3 SPST |
| Conn. Terms. | OPEN | 1-3 | |
| **GP12MSV1BE** | ON | MOM. | 2 (COMM) NC 1 3 NO SPDT |
| Conn. Terms. | 2-1 | 2-3 | |

MOM. = Momentary

PC MOUNTING
GP11 MODELS



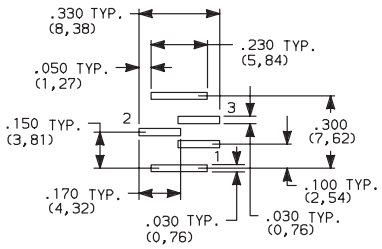




GP12 Model

Terminal nos.
for reference only.

PC MOUNTING
GP12 Models



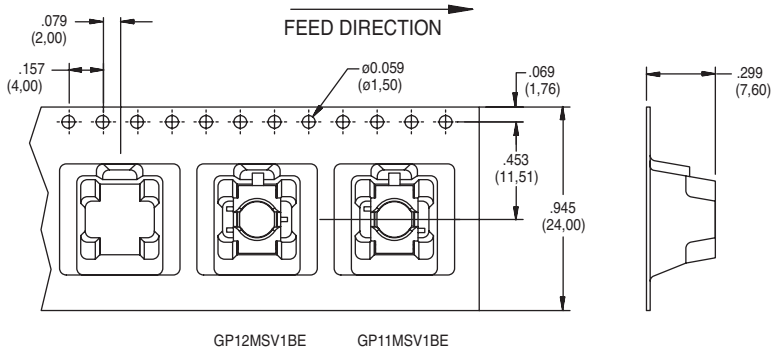

Third Angle Projection

# GP Series
# Sealed Ultraminiature Pushbutton Switches

## TAPE & REEL

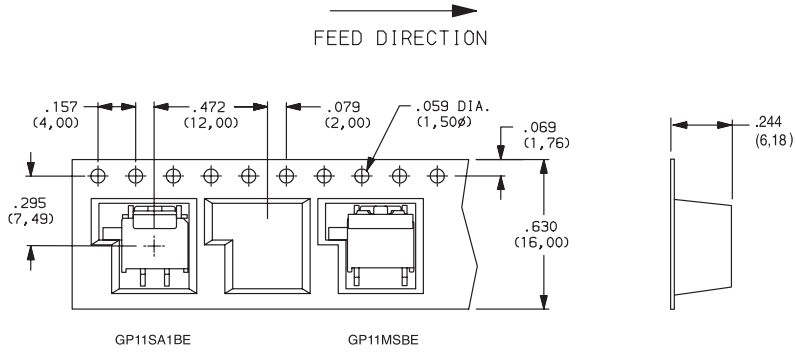
For part numbers GP11MSV1BE, GP12MSV1BE

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



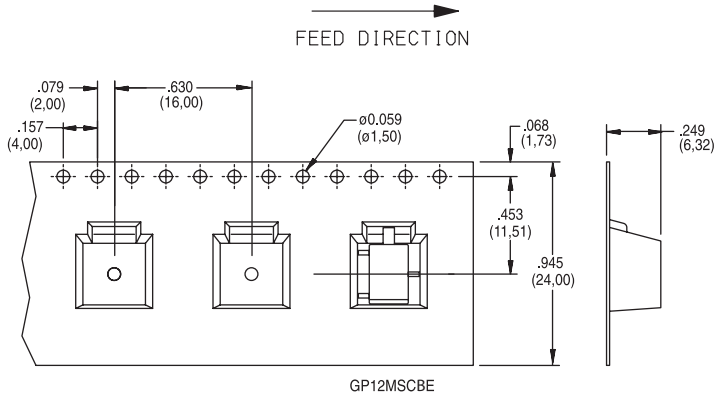

For part numbers GPXXSA1BE, GPXXMSABE

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




For part numbers GP12MSCBE

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




Third Angle Projection

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

# PN Series
# Alternate & Momentary Action Pushbutton Switches

## *Features/Benefits*

- ***Momentary or locking action***
- ***Different actuation forces for customized feel***
- ***Low cost, reliable contact design***
- ***Single and double pole options***
- ***RoHS compliant***

## *Typical Applications*

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



## Specifications

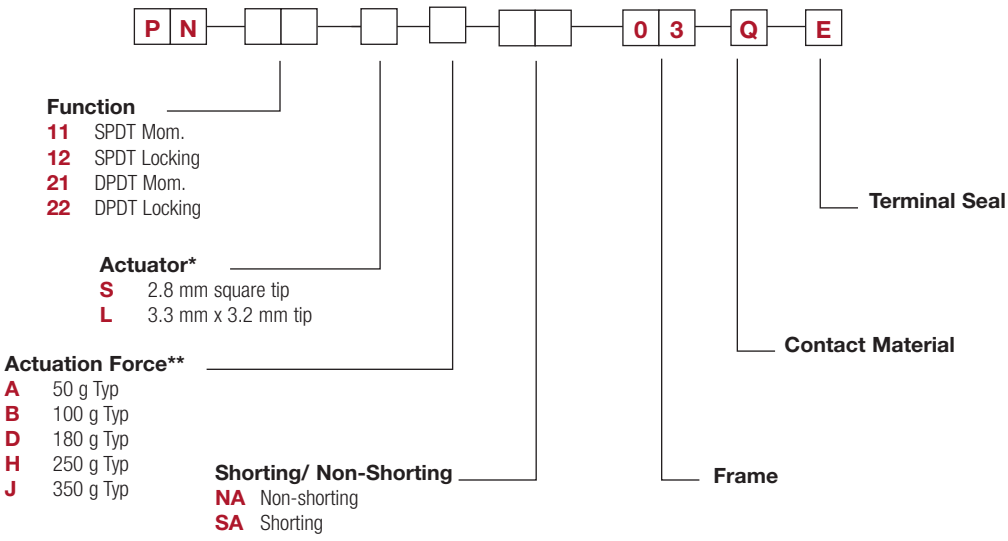
CONTACT RATING: 0.2 AMP @ 30 V DC max.
ELECTRICAL LIFE: 10,000 make-and-break cycles at full load.
MECHANICAL LIFE: 10,000 on/off cycles.
CONTACT RESISTANCE: 30 mΩ max. initial
INSULATION RESISTANCE: 100 MΩ min.
DIELECTRIC STRENGTH: 500 V AC min.
OPERATING/STORAGE TEMPERATURES: –10°C to 60°C.
PACKAGING: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

## Materials

FRAME: Tin plated steel.
ACTUATOR: PA 66 black.
BASE: Phenolic resin.
TERMINALS: Silver plated brass.
MOVABLE CONTACTS: Silver plated phosphor bronze.
RETURN SPRING: SWC
DETENT SPRING: Phosphor bronze.
DETENT SPRING PLATE: Phosphor bronze.
RETURN SPRING RETAINER RING: Nickel plated steel.
TERMINAL SEAL: Epoxy.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. For additional options not shown in catalog, consult Customer Service Center.

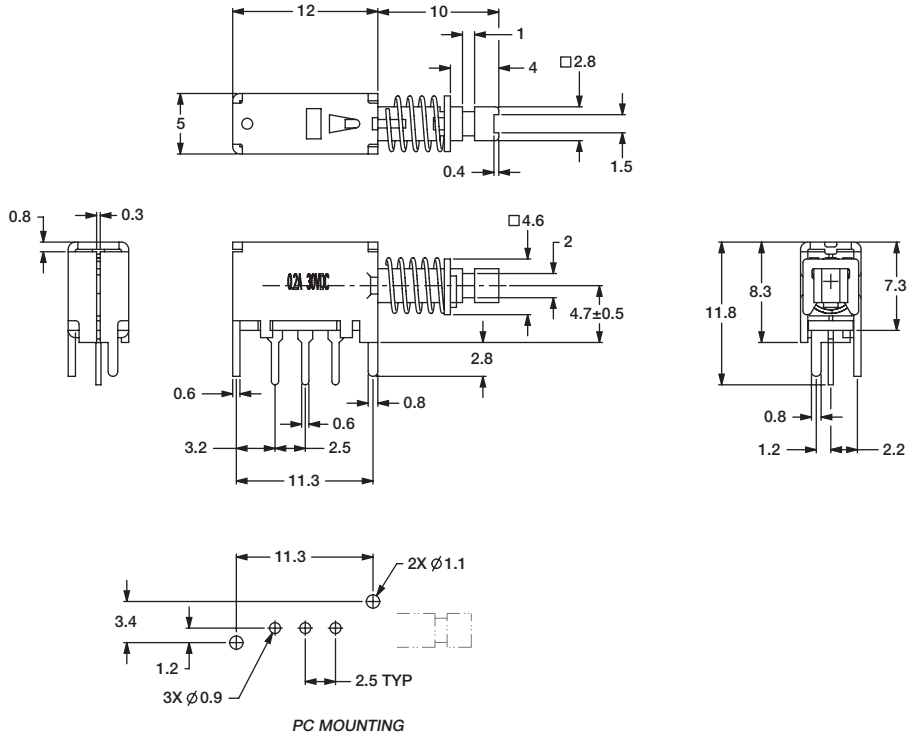



* "L" actuator is available for PN 21 & PN 22 options only

** Actuation Force "A" is available with PN11 on "S" actuator only
PN 11 & PN 21 are available with Acuation Force "B", "D", "H", "J"
PN 12 & PN 22 are available with Actuation Force "D", "H", "J"

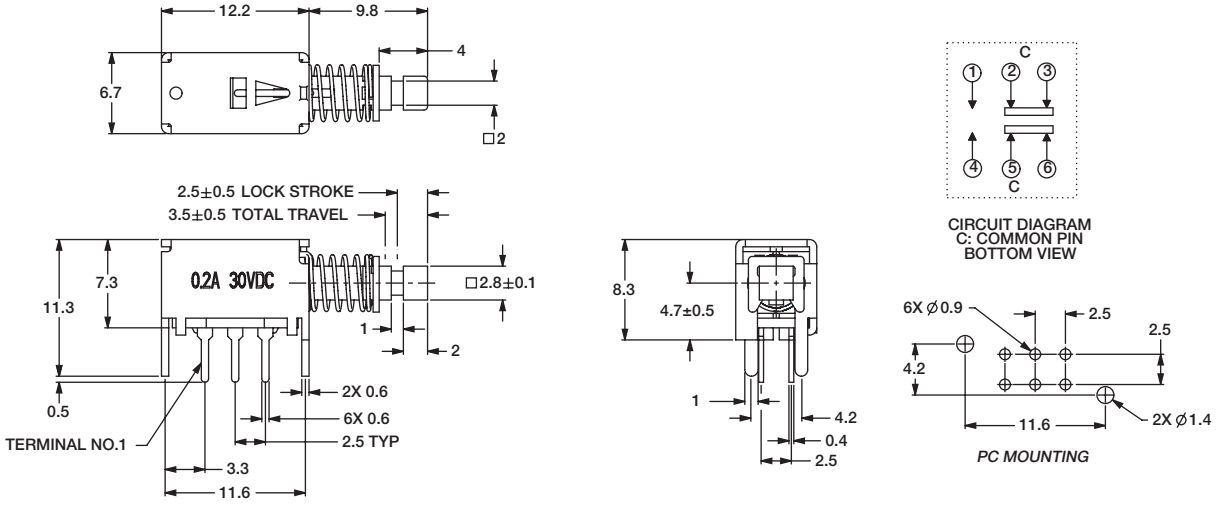
# PN Series
# Alternate & Momentary Action Pushbutton Switches

**PN 11** SPDT Mom.
**PN 12** SPDT Locking




*PC MOUNTING*

**PN 21** DPDT Mom. with "S" Actuator
**PN 22** DPDT Locking with "S" Actuator

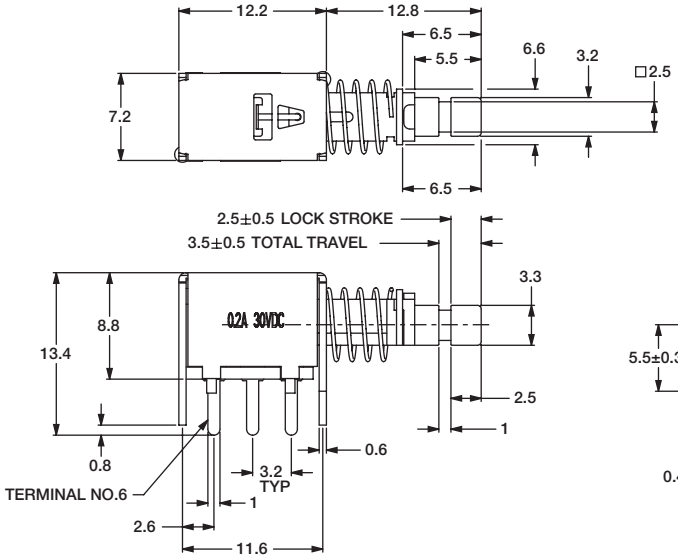


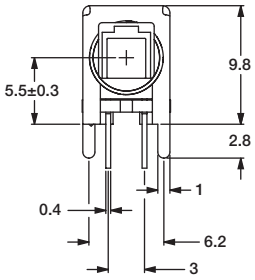

*PC MOUNTING*

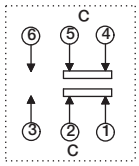
Third Angle Projection

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

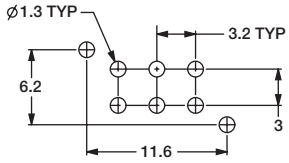
## PN 21 DPDT Mom. with "L" Actuator
## PN 22 DPDT Locking with "L" Actuator




CIRCUIT DIAGRAM
C: COMMON PIN
BOTTOM VIEW

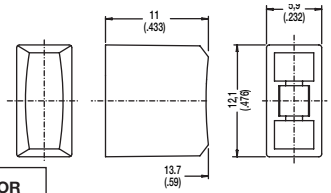



*PC MOUNTING*

**BUTTONS MUST BE ORDERED SEPARATELY. SHIPPED IN BULK.**

## PE



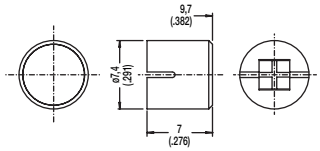



| OPTION CODE | COLOR |
|---|---|
| RD | Red |
| GY | Gray |
| BK | Black |
| WH | White |

PE and PV buttons fit "L" actuators

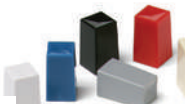
## PV

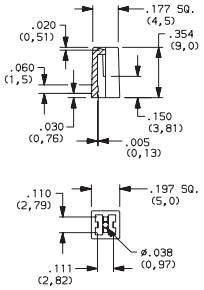





### Indexed

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

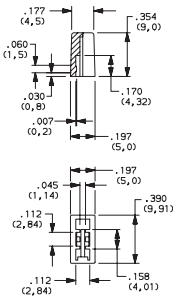





### Rectangular

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

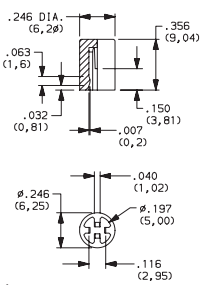





### Round

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

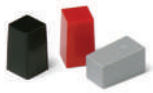


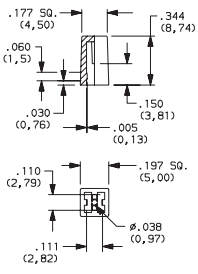



G001, G002, G003 and G004 buttons fit "S" actuators

### Square

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






Third Angle Projection



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

# PHB Series
# Short Stroke Pushbutton Switches





## *Features/Benefits*

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

## *Typical Applications*

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

## Specifications

RATING: 1 A @ 15 V DC

DIELECTRIC STRENGTH (50 Hz/1 min.): 500 V DC between terminals or between terminals and frame for 1 minute

OPERATING LIFE: 10,000 cycles at rated load

CONTACT RESISTANCE: 20 m Ωohms initial

INSULATION RESISTANCE: 100 M Ωohms

TOTAL TRAVEL/LATCHING TRAVEL: 2.5mm (± 0.5 mm) / 1.5mm (± 0.5 mm) to latch EE option (push-push)

OPERATING FORCE:
2U option: 170 grams ± 100 grams (1.67 ± 0.98N)
4U option: 230 grams ± 100 grams (2.26 ± 0.98N)

OPERATING TEMPERATURE: -10˚C to 60˚C

BOUNCE TIME: ≤10 ms

SEALING: Sealed contacts.

PACKAGING: Switches; PHB2 models: 84 pcs per tray; PHB4 models 72 pcs per tray
Optional Caps; Bulk bag - 100 caps per bag

## Materials

FIXED TERMINAL: Brass, silver plated

MOVABLE CONTACT: Phosphor bronze, silver plated

COVER: PA 66 Black

COVER TO BASE RETAINING CLIP: POM

ACTUATOR: POM

RETURN SPRING: Stainless steel

SPRING RETAINING RING: Steel, nickel plate

BASE: Phenolic resin

TERMINAL SEAL: Epoxy.

**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. For additional options not shown in catalog, consult Customer Service Center.

### Switch

P H B — [ ][ ] — [ ][ ] — [ ][ ] — 1 A — [ ][ ]

**Contact Arrangement**
**2U** 2 Changeovers
**4U** 4 Changeovers

**Mechanical Function**
**OA** Momentary
**EE** Push-push

**Termination**
**TS** Straight
**SN** Kinked (plug in)

**Electrical Rating**
**1A** 1 Amp / 15 VDC

**Contacts / Timing**
**Blank** Shorting
**NS** Non Shorting

### Caps (order separately)

[ ][ ][ ][ ][ ]

| INDEXED | COLOR |
|---|---|
| G001A | BLACK |
| G001G | GRAY |
| G0011 | IVORY |
| G001R | RED |

| RECTANGULAR | COLOR |
|---|---|
| G002A | BLACK |
| G002G | GRAY |
| G0021 | IVORY |
| G002R | RED |

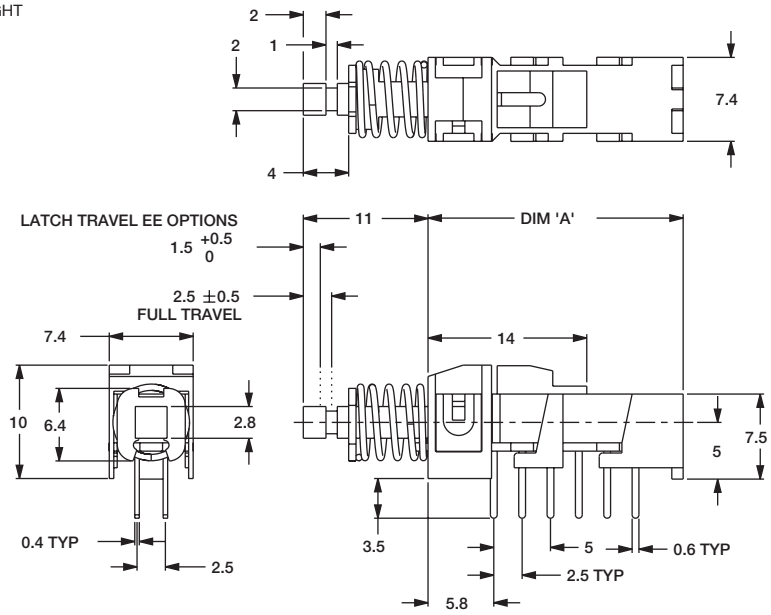
| ROUND | COLOR |
|---|---|
| G003A | BLACK |
| G003G | GRAY |
| G0031 | IVORY |
| G003R | RED |

| SQUARE | COLOR |
|---|---|
| G004A | BLACK |
| G004G | GRAY |
| G0041 | IVORY |
| G004R | RED |

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

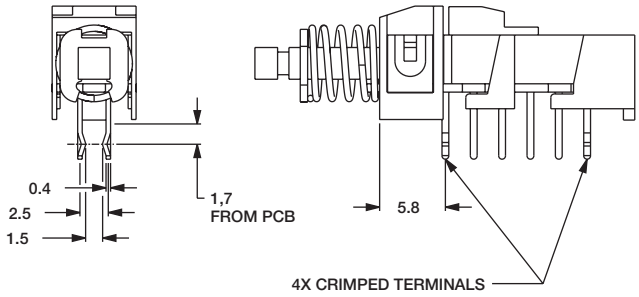
## TERMINATION

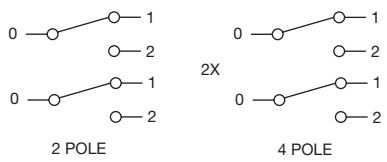
**TS** STRAIGHT

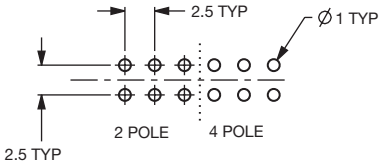



| POLES | MODEL NO. | DIM 'A' | ACTION |
|---|---|---|---|
| 4 | PHB4UEE1A | 22,5 | PUSH/PUSH |
| | PHB4U0A1A | 22,5 | MOMENTARY |
| 2 | PHB2UEE1A | 15,0 | PUSH/PUSH |
| | PHB2U0A1A | 15,0 | MOMENTARY |

**SN** KINKED (PLUG IN)




Third Angle Projection

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

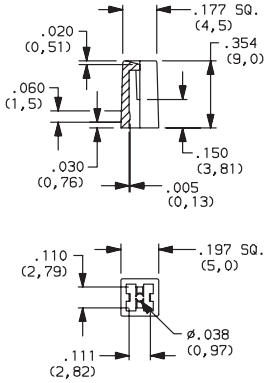
# PHB Series
# Short Stroke Pushbutton Switches

## CAPS

### Indexed

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

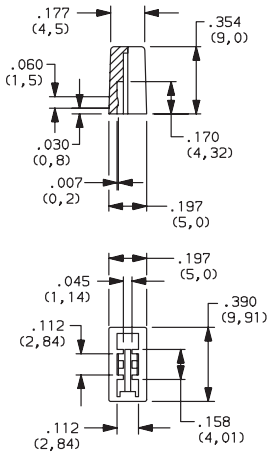





### Rectangular

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

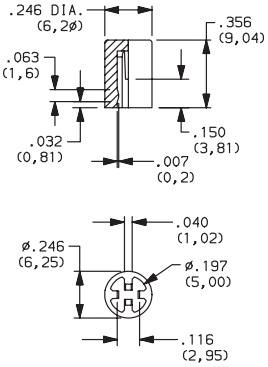





### Round

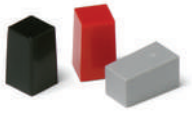
**G003A** Black
**G003G** Gray
**G003I** Ivory
**G003R** Red

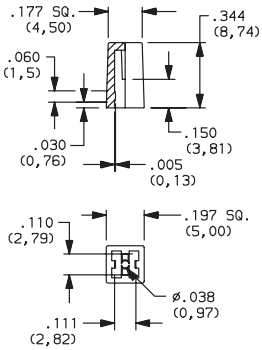





### Square

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






Third Angle Projection

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

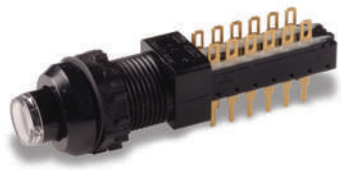
# F Series
# Pushbutton Switches

## Features/Benefits

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

## Typical Applications

- *Audio selection*
- *Digital equipment interface*
- *Medical equipment interface*



## Specifications

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

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

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

CARRYING CURRENT: Max at Δu = 20°C: Silver: < 2A, Gold: <0.5A.

DIELECTRIC STRENGTH (50 Hz, 1 min.): Chassis/contact: ≥1500V Between contacts: ≥1500V.

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

CONTACT RESISTANCE: Initial: Typical ≤10 mΩ, max. 20 mΩ After operating life: ≤100 mΩ

INSULATION RESISTANCE: $\geq 10^9$ Ω between open contacts, $\geq 10^9$ Ω between chassis and contacts.

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

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

All models and options are RoHS compliant and compatible.

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

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

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

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

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

## Materials

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

ACTUATOR: Polyester UL 94V-0.

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

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

TERMINAL BOARD: Polyester UL 94V-0.

RETURN SPRING: Music wire.

TERMINAL SEAL: RTV adhesive sealant.

CHASSIS: Steel.

LOCKOUT PIN: Steel.

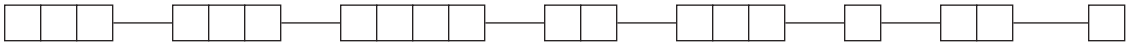
BLOCKERS: Steel.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-88 thru A-95. For additional options not shown in catalog, consult Customer Service Center.

If requesting only a switch, select either a North American or European switch as noted below. Chassis and buttons are sold separately. If multiple stations are selected, we will assume all switches are the same unless noted otherwise.

## North American Order Code - Switch Only



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

**Contact Arrangement**
**2U** 2PDT
**4U** 4PDT
**6U** 6PDT
**8U** 8PDT
**10U** 10PDT

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

**Terminal Sealing**
**(NONE)** None
**TB** Top/bottom

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

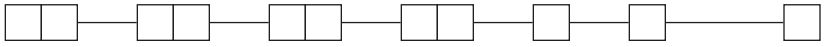
**Electrical Function**
**(NONE)** BBM Break-Before-Make
**M** MBB (special) Make-Before-Break

**Contact Material**
**(NONE)** Silver, AG
**AU** Gold

**Dress nut***
*Central mounted F series only
**(NONE)** No dress nut
**B** Black
**C** Chrome

# F Series
# Pushbutton Switches

## European Order Code - Switch Only



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

**Contact Arrangement**
**2U** 2PDT
**4U** 4PDT
**6U** 6PDT
**8U** 8PDT

**Mechanical Function**
**OA** Momentary
**EE** Alternate (push-push)
**GR** Interlock

**Terminal Style**
**(NONE)** Solder lugs & PC pins
**LB** Cut solder lugs
**PB** Cut PC pins, for other configurations, consult factory

**Electrical Function**
**(NONE)** BBM

**Contact Material**
**(NONE)** Silver, AG
**P** Gold

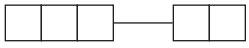
**Dress nut***
*Central mounted F series only

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

*Minimum order quantities apply.

## Order Code - Buttons

### Solid Buttons

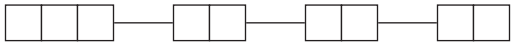


**Style**
**F01** FMR
**F02** FG*
**F12** FSC
**F13** FSD
**F14** FU12
**F15** FSB
**F16** FE
**F19** FA
**F21** F001

**Button Color**
**01** Black
**02** White
**03** Red
**04** Light gray

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

### Mechanical Indicator Buttons



**Style**
**F01** FA100
**F02** FA101
**F07** FA120
**F08** FA201
**F11** FA200*

**Shell Color**
**01** Black

**Out Position Color**
**01** Black

**In Position Color**
**02** White
**06** Yellow
**07** Blue
**08** Green
**12** Orange

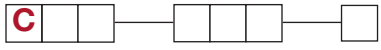
### BUTTON REMOVAL

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

## Order Code - Chassis

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

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




**No. of Stations**
**01 thru 23** Comes with standard .094 (2,4mm) mounting holes
Note: Single station chassis available with special mounting configurations, consult factory.

**Spacing between Stations**
**00** Single station
**10** 10mm
**12.5** 12.5mm
**15** 15mm
**17.5** 17.5mm
**20** 20mm

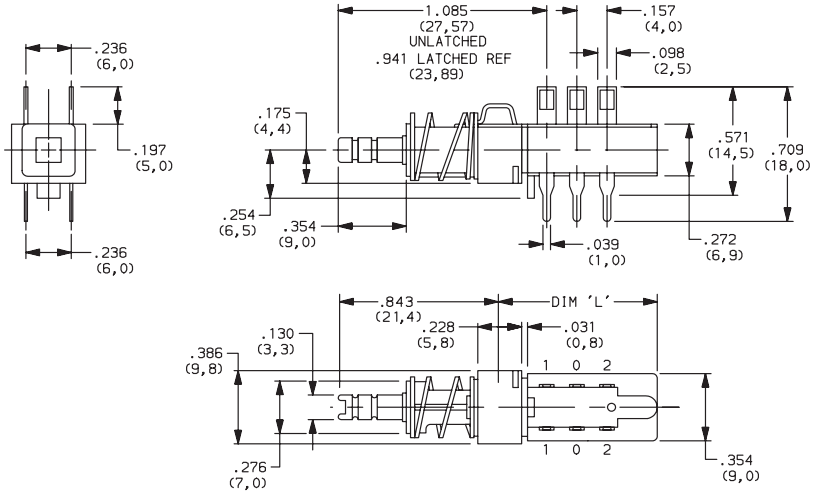
**Special Acknowledgements**
See note

*Minimum order quantities apply.

## SWITCHES WITH STANDARD OPTIONS

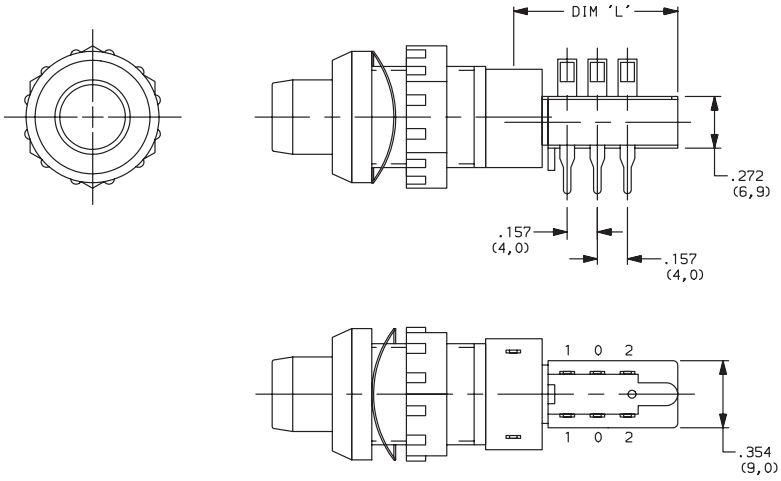
### F2UEE

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

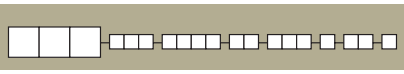



### ZF2UEEBF11010108

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




## DESIGNATION



**Designation, North America**

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

**Designation, Europe**

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

Third Angle Projection

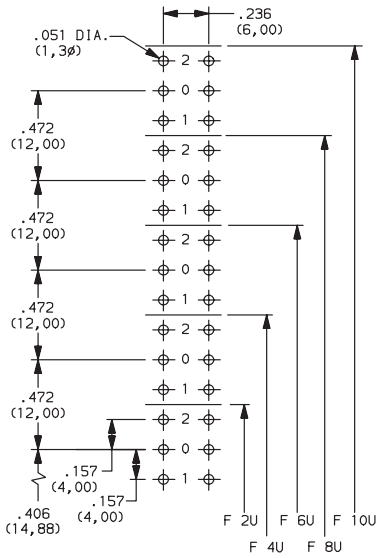
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# F Series
# Pushbutton Switches

## CONTACT ARRANGEMENT

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

**PC MOUNTING**




## MECHANICAL FUNCTION

**North America**

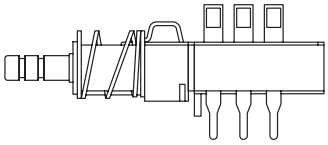
| OPTION CODE | FUNCTION |
|---|---|
| OA | Momentary |
| EE | Alternate (push-push) |
| GR | Interlock |
| AOR | Central release |
| OASP | Momentary with lockout |
| GRSP | Interlock with lockout |

**Europe**

| OPTION CODE | FUNCTION |
|---|---|
| OA | Momentary |
| EE | Alternate (push-push) |
| GR | Interlock |

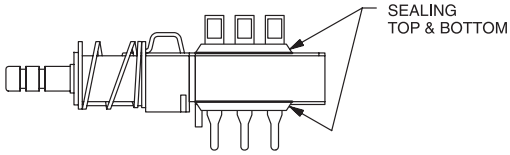
## TERMINAL SEALING

**(NONE)** NO SEAL



F2UEE shown in example above.

**TB** TOP & BOTTOM



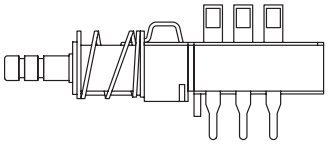

**NOTE:** Available for North America only

Third Angle Projection

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

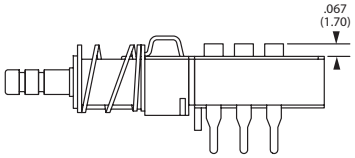
## TERMINAL STYLE

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



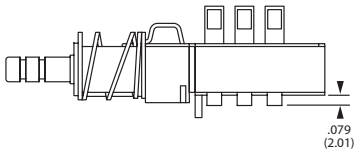
**01A** CUT SOLDER LUGS (North America)

**LB** CUT SOLDER LUGS (Europe)




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

**PB** CUT PC PINS (Europe)




## ELECTRICAL FUNCTION

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

## CONTACT MATERIAL

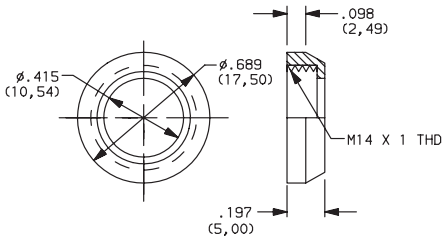
| NORTH AMERICA OPTION CODE | EUROPE OPTION CODE | RoHS COMPLIANT * | RoHS COMPATIBLE * | MATERIAL | RATING |
|---|---|---|---|---|---|
| (NONE) | (NONE) | YES | YES | SILVER, AG | 50 VA/15 W; 125/30 V; 0.5/0.5 A |
| AU | P | YES | YES | GOLD | 1 VA/300mW; 50/30 V; 0.04 A/0.01 A |

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

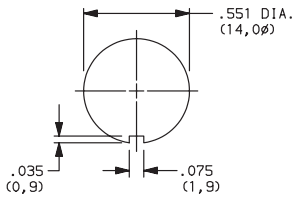
## DRESS NUT

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

**B** BLACK

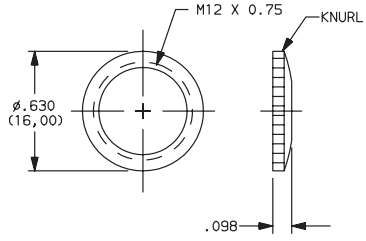



**PANEL CUTOUT**

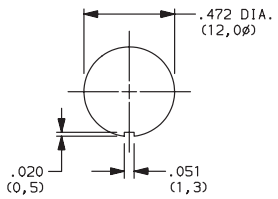



**NOTE:** Available with ZF designation and FA200 buttons.

**C** CHROME




**PANEL CUTOUT**




**NOTE:** Available with ZF designation and FG button.

Third Angle Projection

# F Series
# Pushbutton Switches

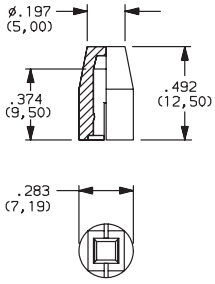
## SOLID BUTTON

COLOR
STYLE

## STYLE

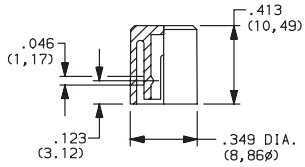
### F01 FMR



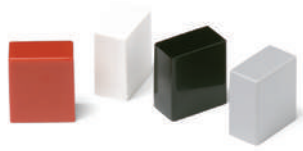


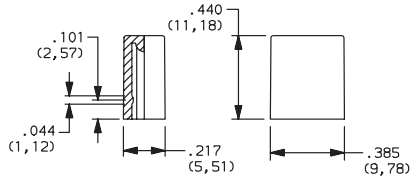

### F02 FG





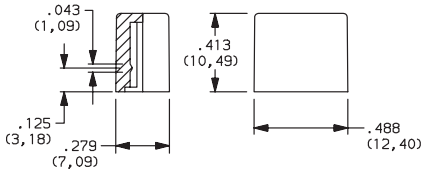

### F12 FSC





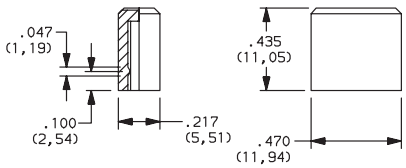

### F13 FSD



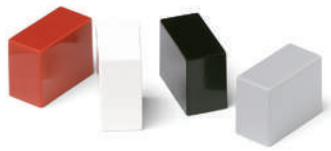


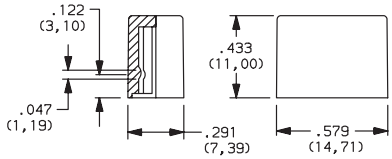

### F14 FU12





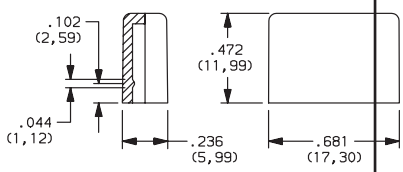

### F15 FSB





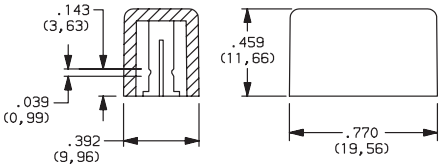

### F16 FE





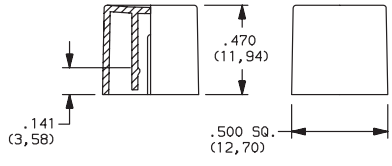

### F19 FA






### F21 F001






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

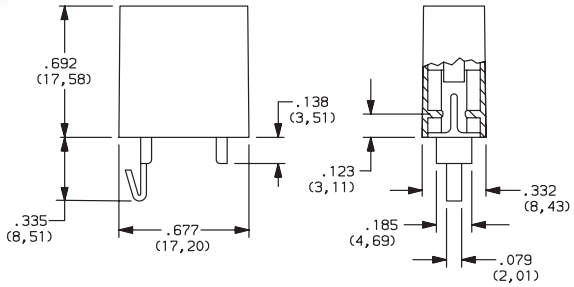
## MECHANICAL BUTTON

SHELL COLOR | IN POSITION COLOR
STYLE | OUT POSITION COLOR

## STYLE

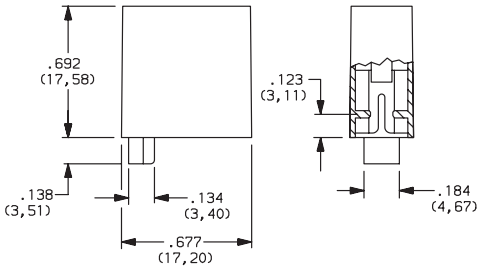
### F01 FA100





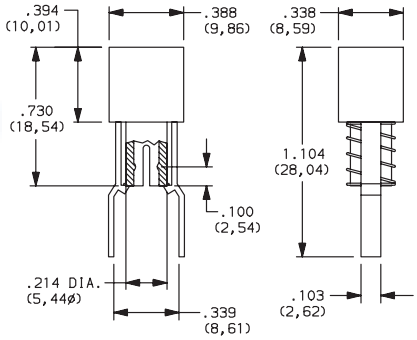

### F02 FA101





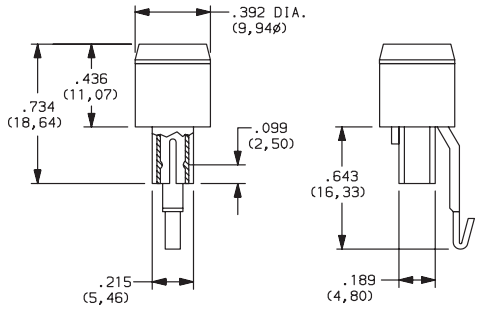

### F07 FA120






### F08 FA201

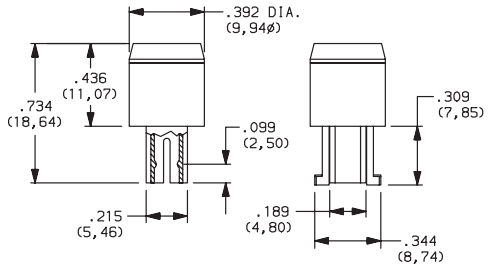





### F11 FA200








## SHELL COLOR

**01** BLACK

## OUT POSITION COLOR

**01** BLACK

## IN POSITION COLOR

| OPTION CODE | COLOR |
|---|---|
| 02 | WHITE |
| 06 | YELLOW |
| 07 | BLUE |
| 08 | GREEN |
| 12 | ORANGE |

# F Series
# Pushbutton Switches

## CHASSIS

SPACING

NO. OF STATIONS

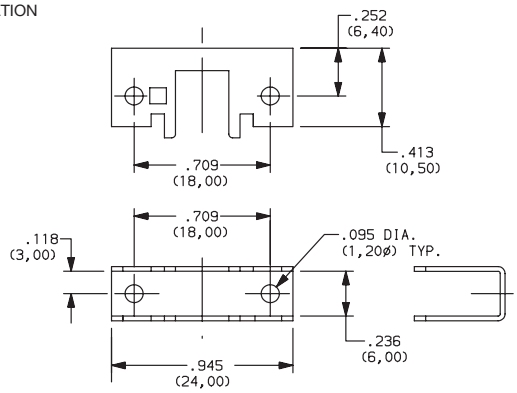
## NUMBER OF STATIONS

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

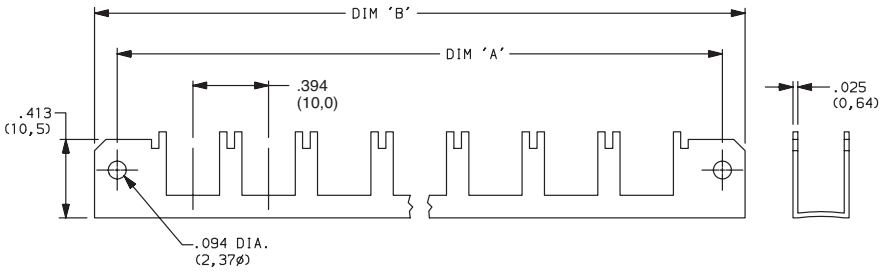
**NOTE:** Single station chassis available with mounting configurations, consult factory.

## SPACING

### 00 SINGLE STATION

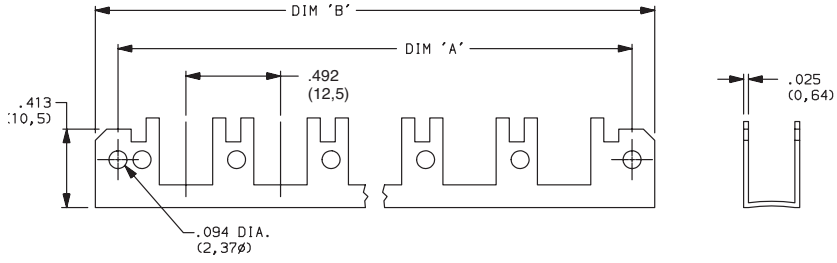



### 10 10mm




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

### 12.5 12.5mm




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

Third Angle Projection

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

## CHASSIS

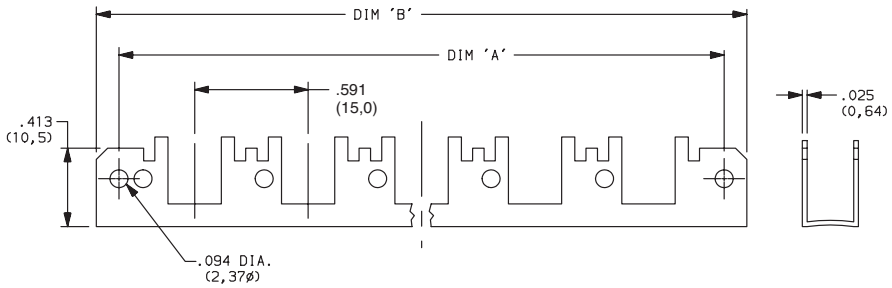
SPACING

NO. OF STATIONS

## SPACING

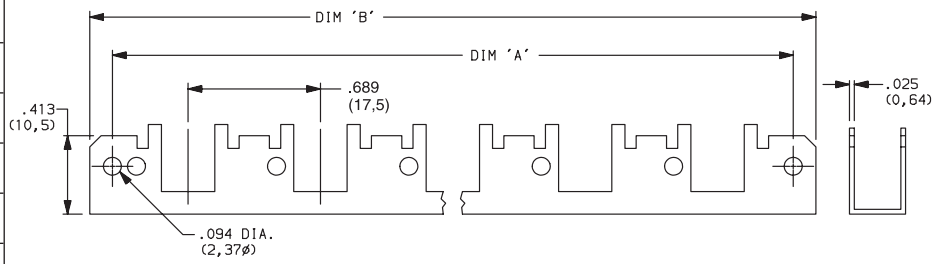
### 15 15mm

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



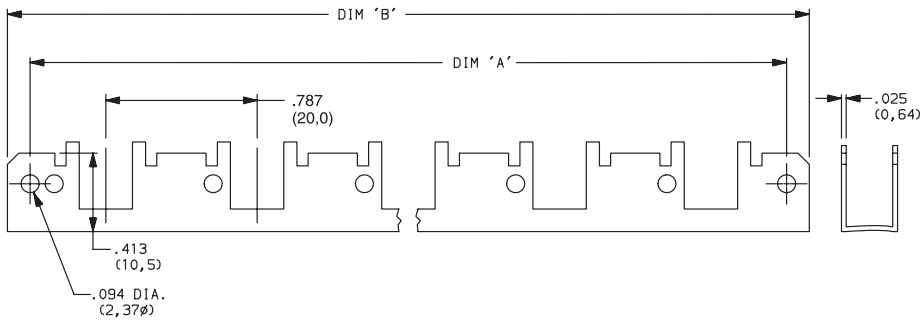

### 17.5 17.5mm

| No. of Stations | Dim. 'A' | Dim. 'B' | Tolerance |
|---|---|---|---|
| 2 | 1.477 (37,52) | 1.713 (43,51) | 0.005 |
| 3 | 2.166 (55,02) | 2.402 (61,01) | 0.010 |
| 4 | 2.855 (75,52) | 3.091 (78.51) | 0.010 |
| 5 | 3.544 (90,02) | 3.780 (96,01) | 0.010 |
| 6 | 4.233 (107,52) | 4.469 (113,51) | 0.015 |
| 7 | 4.922 (125,02) | 5.158 (131,01) | 0.015 |
| 8 | 5.611 (142,52) | 5.847 (148.51) | 0.015 |
| 9 | 6.300 (160,02) | 6.536 (166,01) | 0.015 |
| 10 | 6.989 (177,52) | 7.225 (183,52) | 0.015 |




### 20 20mm

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




Third Angle Projection

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

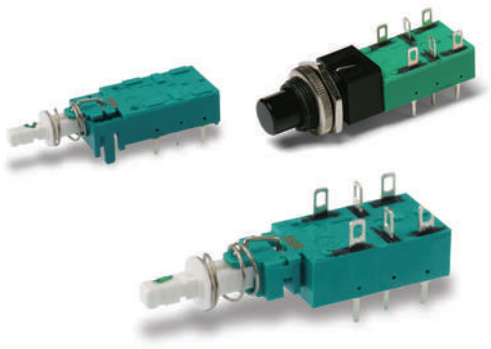
# NE-18 Series
# Mains / Power Switches

## *Features/Benefits*

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

## *Typical Applications*

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



**UL61058-1**

## Specifications

ELECTRICAL RATING:

NE18 Series:

8A GP, 125 VAC, 50/60 Hz, 1E4, T70

6A GP, 250 VAC, 50/60 Hz, 1E4, T70

6(4)A RM, 250 VAC, 50/60 Hz, 1E4, T70

6/48A RC, 250 VAC, 50/60 Hz, 1E4, T70

1RA, 100 VDC, 1E4, T70

8RA, 30VDC, 1E4, T70

NE18CTII Series:

4A GP, 250 VAC, 50/60 Hz, 1E4, T70

4/48A RC, 250 VAC, 50/60 Hz, 1E4, T70

1RA, 100 VDC, 1E4, T70

4RA, 30VDC, 1E4, T70

DIELECTRIC STRENGTH (50 Hz, 1 min.): 2000 V

OPERATING LIFE AT MAX. LOAD AND AT MAX. INRUSH CURRENT: ^$10^4$ operations[5])

CONTACT RESISTANCE: Initial: 50mΩ; After $10^4$ operations: 70mΩ.

INSULATION RESISTANCE: ^$10^{12}$ Ωchassis – nearest contact; ^$10^{12}$ Ωmains contact – mains contact; ^$10^{12}$ Ωmains contact – mains contact after $10^4$ operations.

LOW VOLTAGE CONTACT:

SWITCHING POWER MAX.: 12W

SWITCHING VOLTAGE MAX.: 24V

SWITCHING CURRENT MAX.: 0.5A

TOTAL TRAVEL: 4.7mm (.185 inch)

LATCHING TRAVEL: 3.3mm (.130 inch)

OPERATING FORCE: Without auxiliary low voltage contacts: NE18: 7N (700 grams); NE18CTII: 9.5N (950 grams).

With auxiliary low voltage contacts: NE18: 8N (800 grams).

SEALING: Dust proof.

## Materials

HOUSING, ACTUATOR & TERMINAL BOARD: Thermoplastic polyester (UL 94V-0).

MOVABLE CONTACT: Silver nickel alloy, silver plated.

FIXED CONTACTS: Silver nickel alloy, silver plated.

COMMON CONTACTS & TERMINALS: Copper alloy, silver plated.

RETURN SPRING: Music wire.

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

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

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-97 thru A-104. For additional options not shown in catalog, consult Customer Service Center.

If requesting only a switch, select the switch as noted below. Buttons are sold separately.



**Designation**
**NE18** NE18
**ZNE18** Cental mounted NE18

**Contact Arrangement**
NE18 code # - see list

**Mechanical Function**
**OA** Momentary
**EE** Alternate (push-push)

**Single Station Chassis**
**01** With .094 mounting holes
**(NONE)** No chassis
**02** With 4-40 tapped mounting holes
**03** Special chassis (consult factory)

**Dress nut***
*Central mounted ZNE18 series only
**(NONE)** No dress nut
**B** Black
**C** Chrome

## Order Code - Buttons

### Solid Buttons

**Style**
- **F01** FMR
- **F02** FG*
- **F12** FSC
- **F13** FSD
- **F14** FU12
- **F15** FSB
- **F16** FE
- **F19** FA
- **F21** F001

**Button Color**
- **01** Black
- **02** White
- **03** Red
- **04** Light gray

### Mechanical Indicator Buttons

**Style**
- **F01** FA100
- **F02** FA101
- **F07** FA120
- **F08** FA201
- **F11** FA200*

**Shell Color**
- **01** Black

**Out Position Color**
- **01** Black

**In Position Color**
- **02** White
- **06** Yellow
- **07** Blue
- **08** Green
- **12** Orange

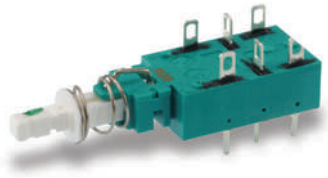
*Button options for central mounting configurations, use 'FG' for central mount with chrome dress nut, use 'FA200' for central mount with black dress nut.

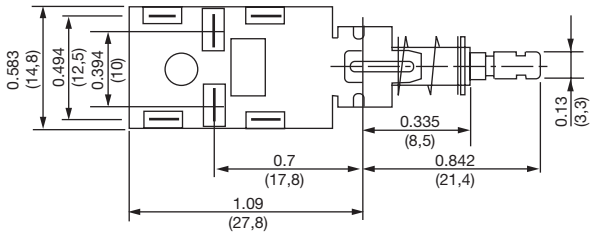
**BUTTON REMOVAL**

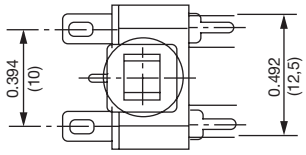
A button of a push-push switch should only be removed in the "OFF" non-latching position.

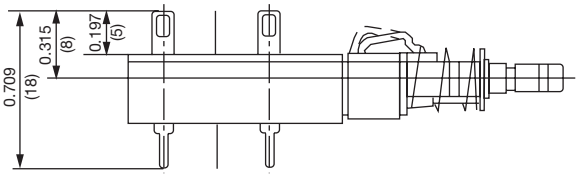
## DESIGNATION & SWITCHES WITH STANDARD OPTIONS

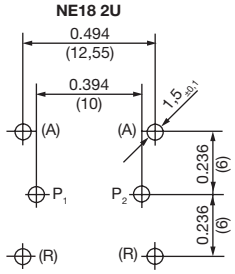
### NE1838EE





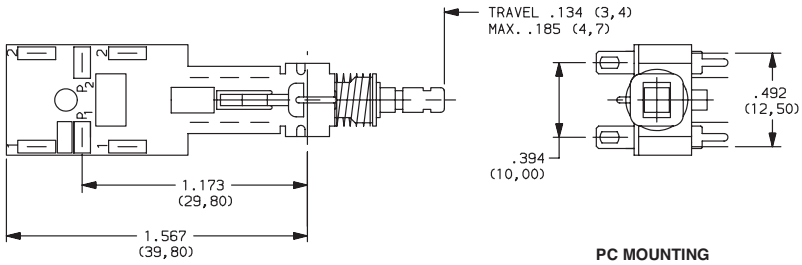

Third Angle Projection

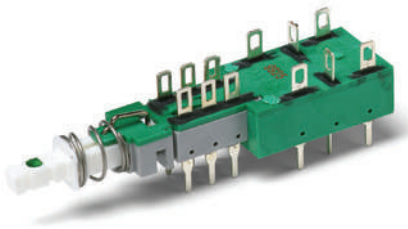
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

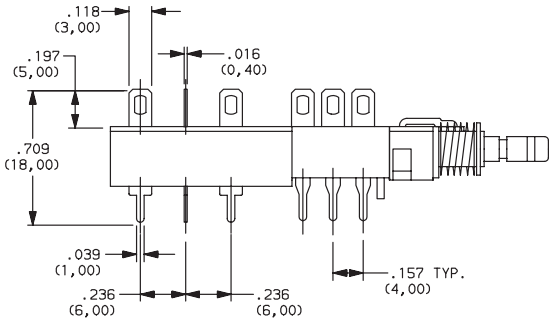
# NE-18 Series
# Mains / Power Switches

## DESIGNATION & SWITCHES WITH STANDARD OPTIONS

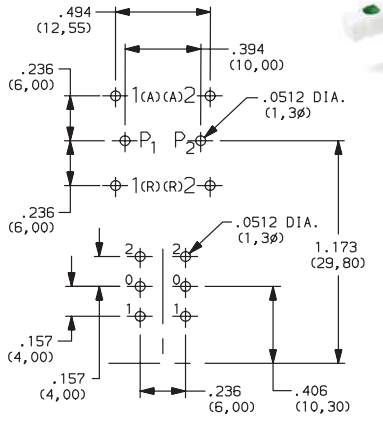
### NE1839EE



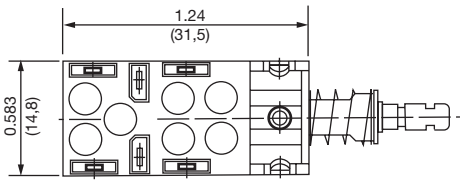



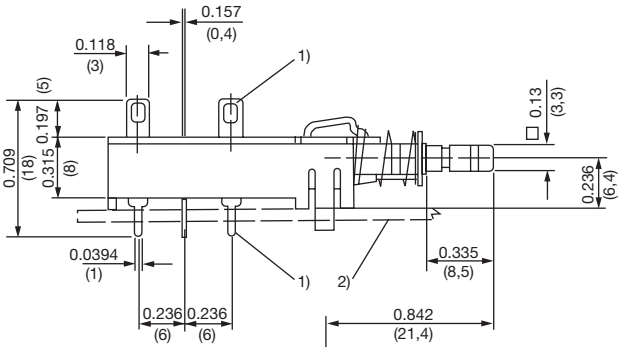


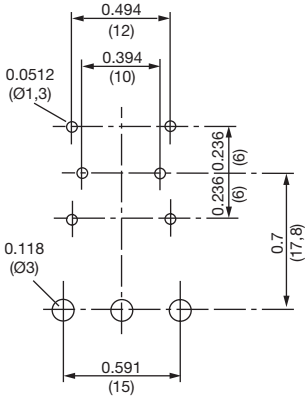

PC MOUNTING

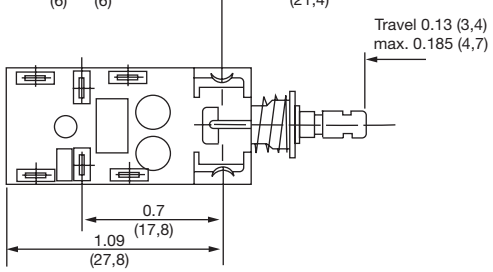



### NE1846EE



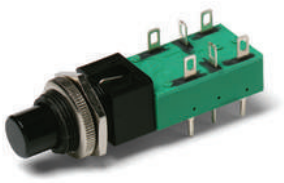



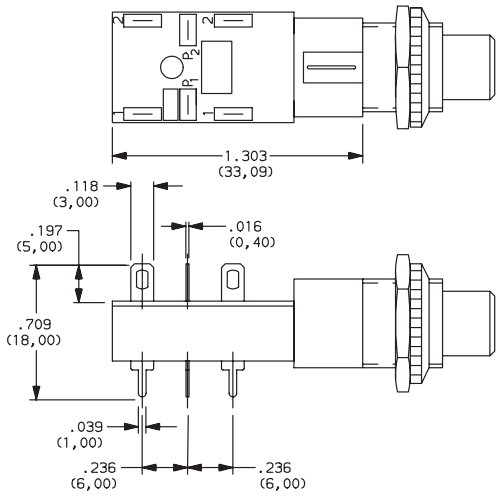

Third Angle Projection

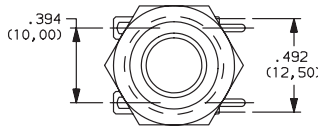
*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

## DESIGNATION & SWITCHES WITH STANDARD OPTIONS

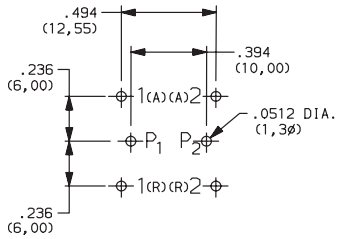
### ZNE1838EECF0201






**PC MOUNTING**




Third Angle Projection

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

# NE-18 Series
# Mains / Power Switches

## CONTACT ARRANGEMENT

| OPTION CODE Contact capacity and availability | STYLE | ELECTRICAL CIRCUIT |
|---|---|---|
| 37 | NE18 — 2AX | DPST |
| 38 | NE18 — 2UX | DPDT |
| 51 | 2U + NE18 — 2AX | DPST* |
| 52 (4A/64) | NE18CTII — 2AX | DPST |
| 39 | 2U + NE18 — 2UX | DPDT* |
| 41 | NE18 — 2AP | DPST |
| 42 | NE18 — 2UP | DPDT |
| 43 | NE18 — 2AW | DPST |
| 44 | NE18 — 2UW | DPDT |
| 45 | NE18 — 2ASX | DPST |

| OPTION CODE Contact capacity and availability | STYLE | ELECTRICAL CIRCUIT |
|---|---|---|
| 46 | NE18 — 2USX | DPDT |
| 47 | NE18 — 2ASP | DPST |
| 48 | NE18 — 2USP | DPDT |
| 49 | NE18 — 2ASW | DPST |
| 50 | NE18 — 2USW | DPDT |
| 54 | 2U + NE18 — 2AW | DPST |
| 55 | 2U + NE18 — 2AP | DPST |
| 56 | 2U + NE18 — 2UW | DPDT |
| 57 | 2U + NE18 — 2UP | DPDT |

* 2U + Denotes auxiliary set of low current contacts DPDT
2A = DPST
2U = DPDT
S = Snap-in mounting
X = Solder lug/PC pins
W = Solder lugs only
P = PC pins only

NOTES
1. Contact plating is silver on all Power Switches.
2. The electrical function is Break Before Make (BBM) on all Power Switches.
3. The terminals will be epoxy sealed.

| TYPE | POSSIBLE CONTACT ARRANGEMENT | | CONTACT SPACING | PROTECTION CLASS (CEE 24) | APPROVALS |
|---|---|---|---|---|---|
| | POWER CONTACTS[1] | AUXILIARY CONTACTS | | | |
| NE18 | 2A[2] | 2U | > 3mm (.118 inch) | II | UL61058-1 |
| NE18 | 2A[2] 2U | 2U | > 3mm (.118 inch) | I | UL61058-1 |
| NE18CTII | 2A[2] | | > 3mm (.118 inch) | II | UL61058-1 |

1) A = make contact, U = changeover contact
2) With 2A mains contacts: Mounting only by PC pins is not sufficient.

## MECHANICAL FUNCTION

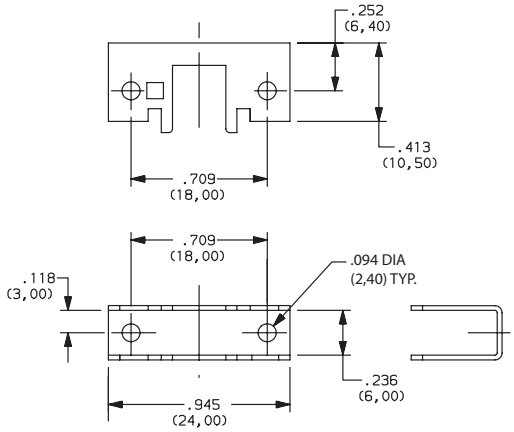
| OPTION CODE | FUNCTION |
|---|---|
| OA | Momentary |
| EE | Alternate (push-push) |

Third Angle Projection

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

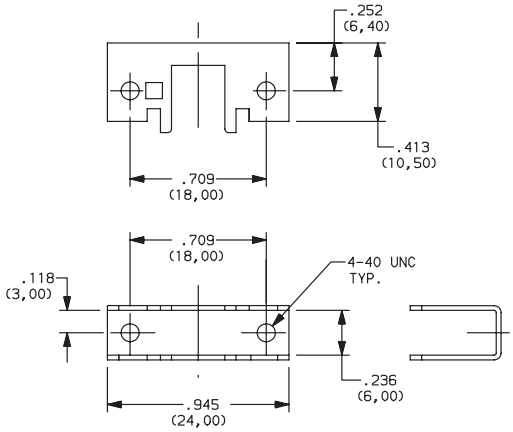
## SINGLE STATION CHASSIS

**01** WITH .094 MOUNTING HOLES




**(NONE)** NO CHASSIS

**02** WITH 4-40 TAPPED MOUNTING HOLES

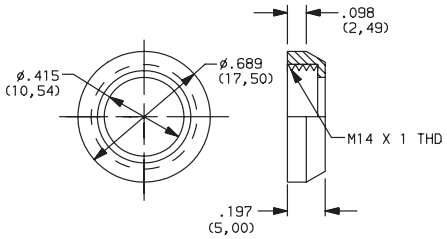



**03** SPECIAL CHASSIS (CONSULT FACTORY)

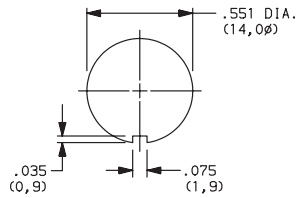
## DRESS NUT

**(NONE)** NO DRESS NUT

**B** BLACK

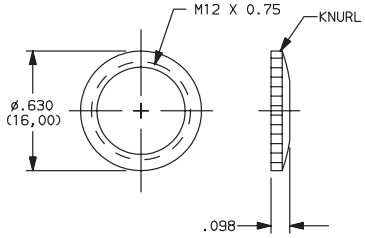



**PANEL CUTOUT**

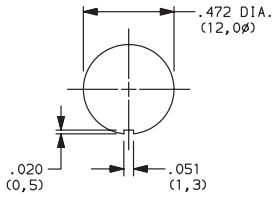



**NOTE:** Available with ZNE18 designation and FA200 buttons.

**C** CHROME




**PANEL CUTOUT**




**NOTE:** Available with ZNE18 designation and FG button.

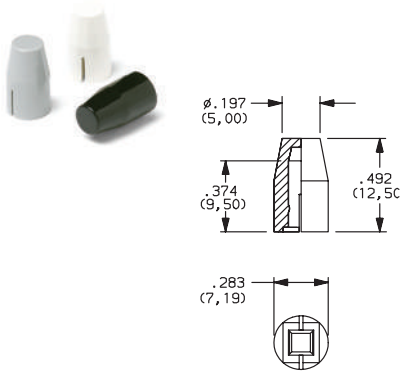
Third Angle Projection

# NE-18 Series
# Mains / Power Switches

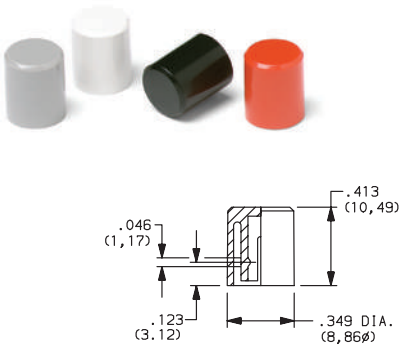
## SOLID BUTTON

### STYLE

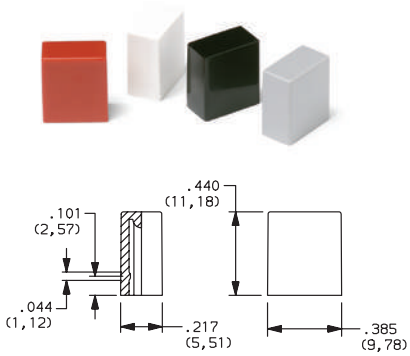
**F01** FMR



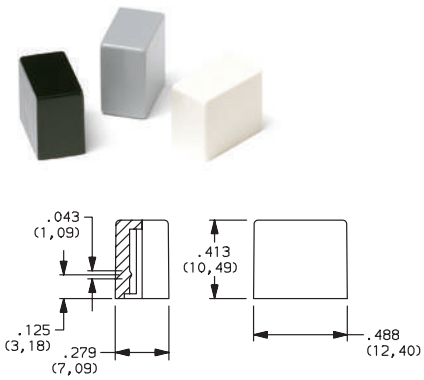

**F02** FG



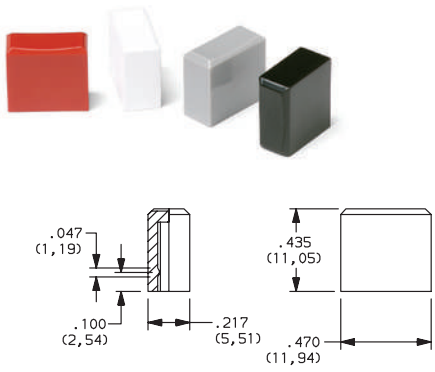

**F12** FSC



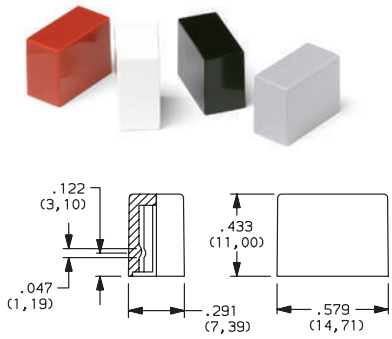

**F13** FSD



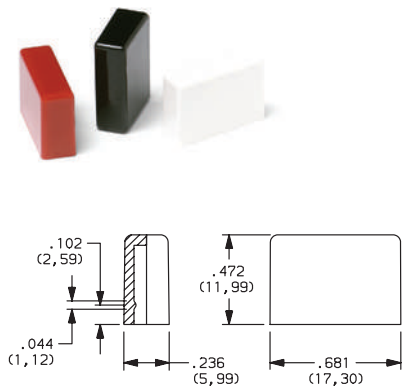

**F14** FU12



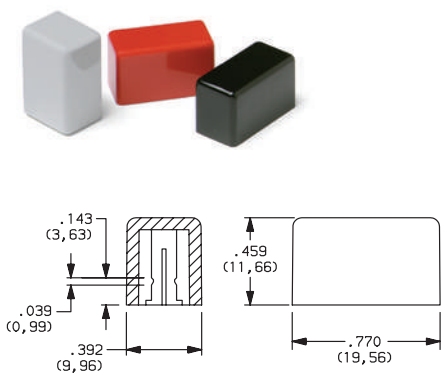

**F15** FSB




**F16** FE




**F19** FA




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

Third Angle Projection

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

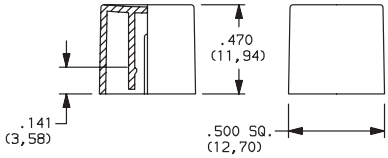
## SOLID BUTTON

COLOR
STYLE

### STYLE

**F21** F001






| OPTION CODE | COLOR |
|---|---|
| 01 | BLACK |
| 02 | WHITE |
| 03 | RED |
| 04 | LT. GRAY |
| 09 | BLACK/CHROME (F03,F06 & F07 buttons only |

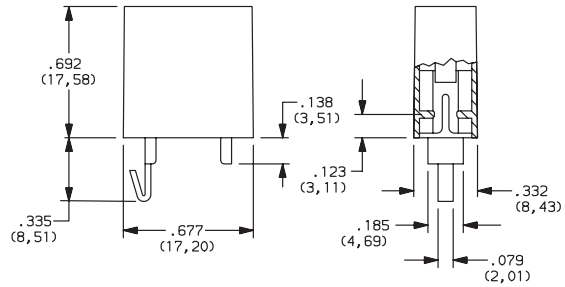
## MECHANICAL BUTTON

SHELL COLOR
IN POSITION COLOR
STYLE
OUT POSITION COLOR

### STYLE

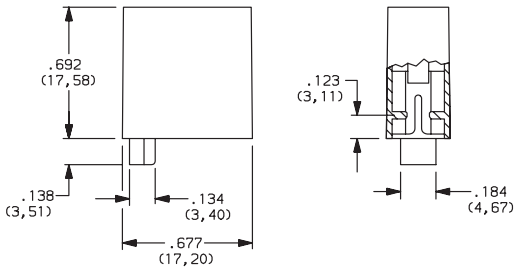
**F01** FA100






**F02** FA101






Third Angle Projection

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

# NE-18 Series
# Mains / Power Switches

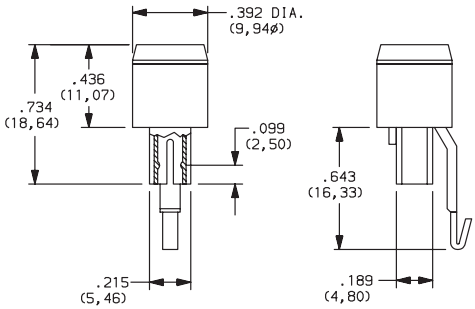
## MECHANICAL BUTTON

SHELL COLOR | IN POSITION COLOR
STYLE | OUT POSITION COLOR

## STYLE

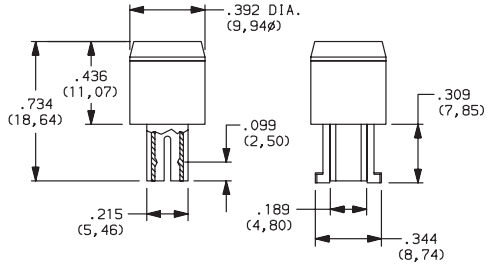
### F08 FA201






### F11 FA200






## SHELL COLOR

**01** BLACK

## OUT POSITION COLOR

**01** BLACK

## IN POSITION COLOR

| OPTION CODE | COLOR |
|---|---|
| 02 | WHITE |
| 06 | YELLOW |
| 07 | BLUE |
| 08 | GREEN |
| 12 | ORANGE |

Third Angle Projection

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

NEW

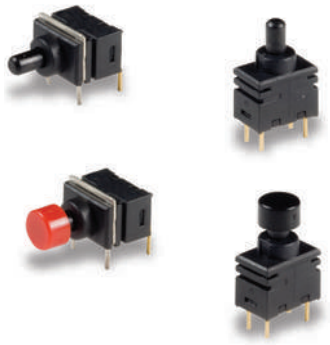
# FP Series
# Sealed Ultra Miniature Pushbutton Switches

## Features/Benefits

- *Ultra-miniature pushbutton*
- *Multiple poles and throws*
- *Long life 100,000 cycles*
- *Vertical and right angle mount*
- *Sealed against soldering and cleaning processes*
- *Optional caps*
- *RoHS compliant*

## Typical Applications

- *Networking equipment*
- *High-end consumer*
- *Professional instrumentation*
- *Computer, Server, Modem & Data storage*



## Specifications

CONTACT RATING: Max. 0.4 VA (28 V DC or V AC)
ELECTRICAL LIFE: 50,000 cycles (FP11 & FP21)
10,000 cycles (FP12 & FP22)
CONTACT RESISTANCE: (10mA @ 2 V DC) 80 mΩ max. initial
INSULATION RESISTANCE: 500MΩ min. @ 500 V DC - 1 minute
OPERATING TEMPERATURE: –20°C to 80°C
SOLDERABILITY: Per MIL-STD-202F method 208D, or
EIA RS-186E method 9
PACKAGING:
Tray pack - 25 pcs per tray (A1 type terminal)
- 100 pcs per tray (C1 type terminal)
Caps (optional) - Bulk bag; 100 caps per bag.

## Materials

MOVABLE CONTACTS:
Base metal: Phosphor bronze
Plating: Gold over nickel plate
FIXED CONTACTS:
Base metal: Brass
Plating: Gold over nickel plate
COVER: PA66 - Black
ACTUATOR: PPS - Black
BASE: PPS - Black
SUPPORT BRACKET: Steel with tin plate
(A1 type terminal only)

**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-106 thru A-107. For additional options not shown in catalog, consult Customer Service Center.

| F | P | | | S | P | | | B | 1 | T | P | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**FP11** SPST N.O.
**FP12** SPDT N.O.
**FP21** DPST N.O.
**FP22** DPDT N.O.

**Actuator Length**
**SP** Standard plunger 3.3mm

**Terminal Style**
**C1** Vertical
**A1** Right Angle

**Contact Plating**
**B1** Gold over nickel plate

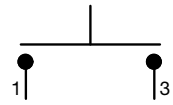
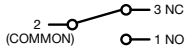
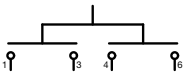
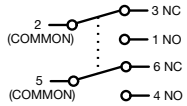
**Packaging**
**TP** Tray packaging

**Cap**
**00** No cap
**01** White cap - bulk bagged
**02** Black cap - bulk bagged
**03** Red cap - bulk bagged

# FP Series
# Sealed Ultra Miniature Pushbutton Switches

NEW

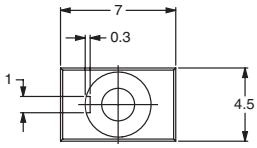
## SWITCH CIRCUIT

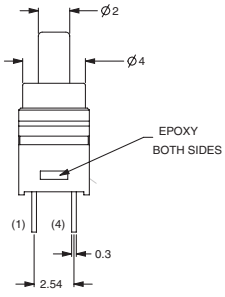
| CIRCUIT | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | SCHEMATIC |
|---|---|---|---|---|
| SPST | FP11 | OFF | MOM |  |
| | | CONNECTED TERMINALS | | |
| | | OPEN | 1-3 | |
| SPDT | FP12 | ON | MOM |  |
| | | CONNECTED TERMINALS | | |
| | | 2-3 | 2-1 | |
| DPST | FP21 | OFF | MOM |  |
| | | CONNECTED TERMINALS | | |
| | | OPEN | 1-3,4-6 | |
| DPDT | FP22 | ON | MOM |  |
| | | CONNECTED TERMINALS | | |
| | | 2-3,5-6 | 2-1,5-4 | |

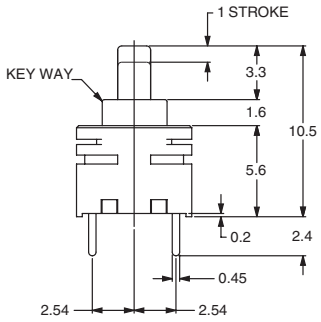
## TERMINAL STYLE

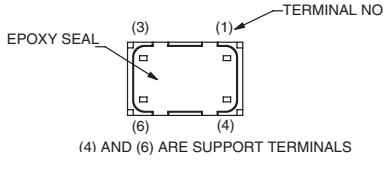
**C1** VERTICAL





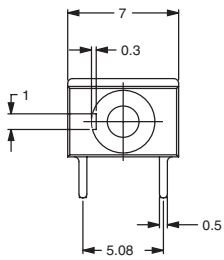



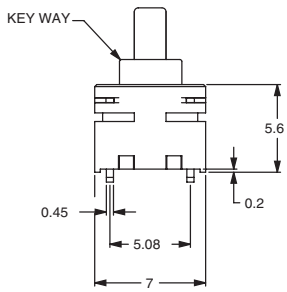



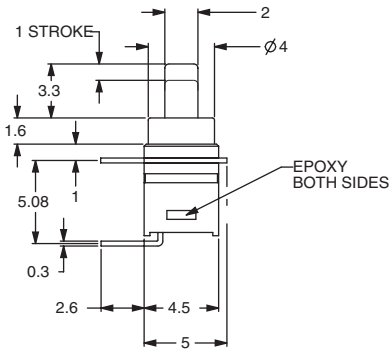



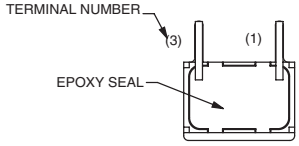

**A1** RIGHT ANGLE

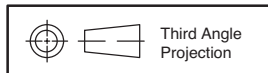




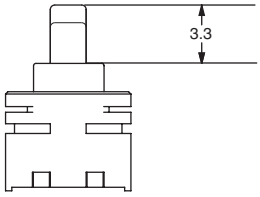




*Dimensions are shown: mm*
*Specifications and dimensions subject to change*

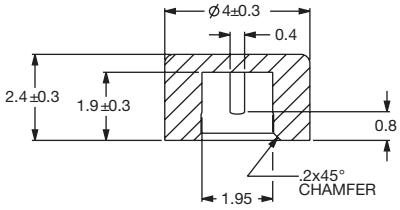
## ACTUATOR LENGTH

**SP** STANDARD PLUNGER 3.3MM




## CAPS

| OPTION CODE | DESCRIPTION |
|---|---|
| 00 | NO CAP |
| 01 | WHITE CAP, BULK BAGGED |
| 02 | BLACK CAP, BULK BAGGED |
| 03 | RED CAP, BULK BAGGED |




To purchase Caps separately without switch, please use these part numbers

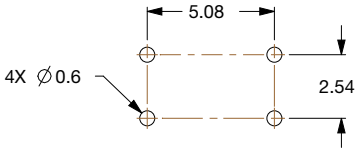
| PART # | COLOR |
|---|---|
| 798D01000 | WHITE |
| 798D02000 | BLACK |
| 798D03000 | RED |

## MOUNTING HOLE

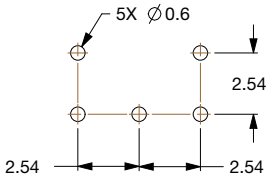
**C1** VERTICAL



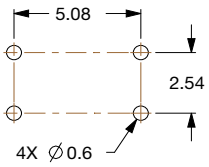
**FP11**



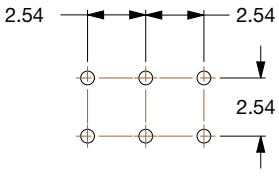

**FP12**




**FP21**

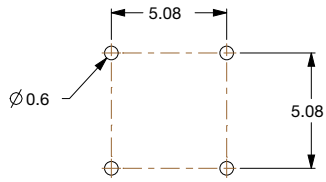


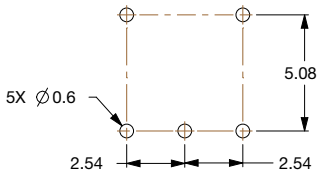

**FP22**

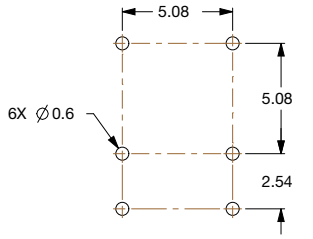


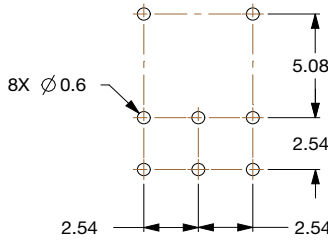

**A1** RIGHT ANGLE






Third Angle Projection

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

# AP Series
# Industrial Pushbutton Switch

## Features/Benefits

- *IP67 sealed*
- *1,000,000 life cycle*
- *Illumination / non-illumination*
- *Multiple colored caps*
- *Threaded or snap-in mounting*
- *Caps available separately*
- *RoHS compliant*

## Typical Applications

- *Harsh environments*
- *Off-Road*
- *Industrial*
- *Medical*
- *Transportation*
- *Joystick control modules*
- *Gaming*
- *Military*



## Specifications

FUNCTION: SPST Momentary
CONTACT ARRANGEMENT: N.O.
MOUNTING TYPE:
Snap-in (no panel seal)
Threaded body (hex nut, lock washer, and panel seal gasket provided)
Torque spec for threaded body: Do not exceed 8-9 in-lbs (0.9-1.0 N.m)

### Mechanical

OPERATING LIFE: 1,000,000 cycles
TOTAL TRAVEL: 2.1 ± 0.2 mm
OPERATING POINT 1.55 ± 0.25 mm
OVER TRAVEL: 0.6 min.
OPERATING FORCE: 4N ± 1N standard configuration; other force option 2N ± 0.5N
VIBRATION: 10-500 Hz 10g Max
SHOCK: 60g 11ms sawtooth wave

### Electrical

CONTACT RATING:
200mA @ 24 V DC resistive (500,000 cycles)
100mA @ 50 V DC resistive (500,000 cycles)
400mA @ 32 V AC resistive (500,000 cycles)
125mA @ 125 V AC resistive (1,000,000 cycles)
DIELECTRIC STRENGTH: 1000 V AC min.
INSULATION RESISTANCE: 1 G Ω @ 500 VDC
INITIAL CONTACT RESISTANCE 50 mΩ max (without wire leads)
BOUNCE TIME: <5 ms

## Materials

HOUSING: PBT
BASE: PBT
CAP: PBT
ACTUATOR:
Illuminated: Clear polycarbonate
Non-illuminated: PBT
INTERNAL SEAL: Silicone rubber
TERMINALS: Copper alloy, gold over silver plating
MOVABLE CONTACT: Copper alloy, gold over silver plating
TERMINAL SEAL: Epoxy
WIRE LEADS: UL1569 Black 22 AWG

### Operating Environment

OPERATING TEMPERATURE: -40°C to 85°C (+105°C non-illuminated)
ESD PROTECTION: 20 KV min.

### Process Environment

SEALING: IP67 for threaded body
IP65 for snap-in version (no panel seal)

**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.

| A | P | | | | | | | | B | E |
|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**AP** AP Series

**Operating Force**
**2** 2 Newtons
**4** 4 Newtons

**Actuator Style**
**D** Dome / Convex
**C** Concave
**E** Extended Dome
**N** None

**Actuator Color**
**0** No Cap
**2** Black
**3** Red
**4** Orange
**5** Yellow
**6** Green
**7** Blue
**9** Gray

Please contact Customer Service for additional colors and paint / laser etched button options.

**Illumination**
**00** No LED*
**01** Super White
**02** Bi-color; Red (Green)
**03** Red
**05** Amber
**06** Green
**07** Super Blue
**08** Bi-color; Amber (Green)

* No LED available in short body only

**Bushing Style****
**S**** Snap-in plastic
**T** Threaded plastic

** No panel seal option
*** PC terminals not available with illumination

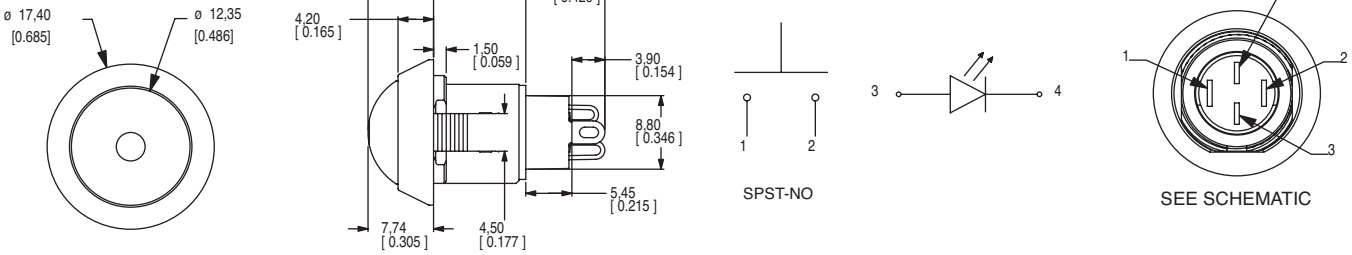
Contact Customer Service for additional hardware options.

**Termination**
**Z** Solder Lug
**W** 12" Wire Leads 22 AWG
**C***** PC Terminals

**Contact Material**
**B** Gold

**Terminal Seal**
**E** Epoxy
All models are epoxy sealed

## STANDARD VIEW




## OPERATING FORCE

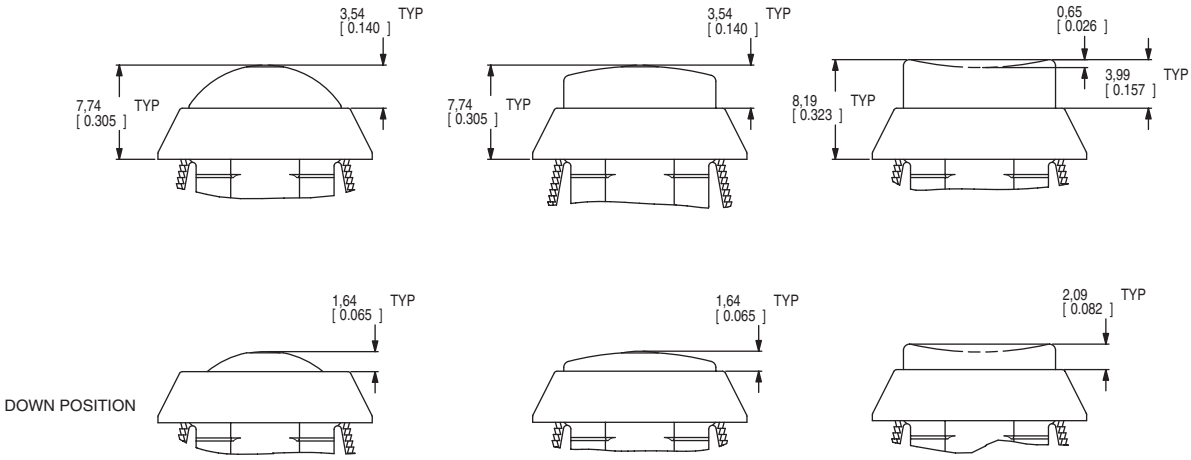
| OPTION CODE | OPERATING FORCE |
|---|---|
| 2 | 2 N, 200 g |
| 4 | 4 N, 400 g |

## ACTUATOR STYLE

**D** DOME / CONVEX

**E** EXTENDED DOME

**C** CONCAVE




## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|---|---|
| 0 | No Cap |
| 2 | Black |
| 3 | Red |
| 4 | Orange |
| 5 | Yellow |
| 6 | Green |
| 7 | Blue |
| 9 | Gray |

For additional colors please contact Customer Service.

Third Angle Projection

# AP Series
# Industrial Pushbutton Switch

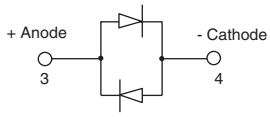
## ILLUMINATION

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

*LED FORWARD CURRENT: 20 mA
LED FORWARD VOLTAGE: see chart above
LED REVERSE VOLTAGE: 5.0 V MAX

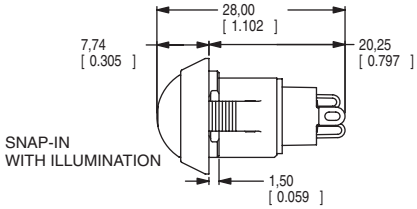
* For information on specific and custom LED, please contact Customer Service.

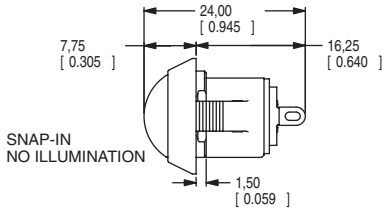
NOTE:
For bi-color LED's the polarity must be reversed to alternate the color



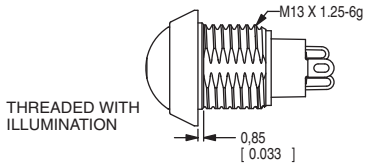

## BUSHING STYLE

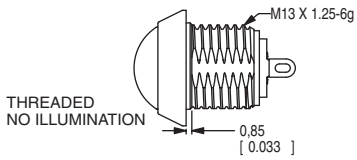
**S** SNAP-IN



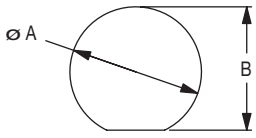




**T** THREADED PLASTIC




PANEL CUTOUT




| PANEL THICKNESS | DIM A (± 0.05 mm) | DIM B (± 0.05 mm) |
|---|---|---|
| 1 mm [0.039 in] | 13.70 mm [0.539 in] | 13.00 mm [0.512 in] |
| 2 mm [0.079 in] | 13.80 mm [0.539 in] | 13.00 mm [0.512 in] |
| 3 mm [0.118 in] | 13.90 mm [0.547 in] | 13.10 mm [0.516 in] |
| THREADED BODY MIN PANEL THICKNESS 1 mm | 13.70 mm [0.539 in] | 13.00 mm [0.512 in] |

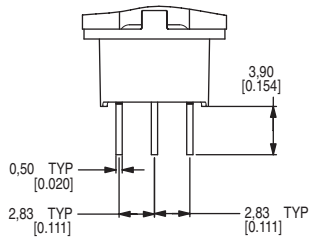
Third Angle Projection

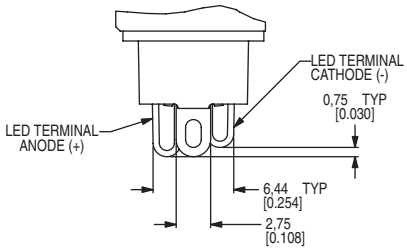
A 0.1mm min. chamfer on the leading edge of the mounting hole is recommended for snap-in version.

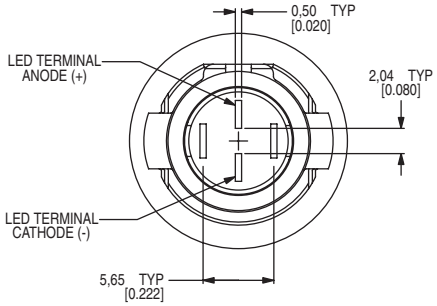
*Dimensions are shown: mm (inches)*
*Specifications and dimensions subject to change*

## TERMINATION

### Z SOLDER LUG



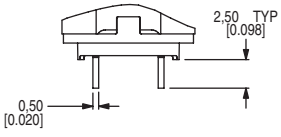



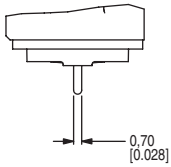



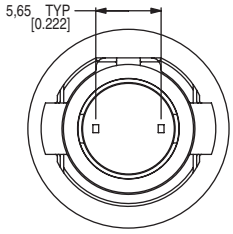

* Switching terminals are gold and LED terminals are silver

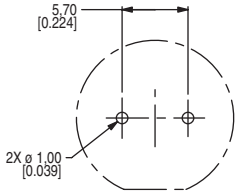
### C PC TERMINALS

*** Illumination not available with PC Terminals

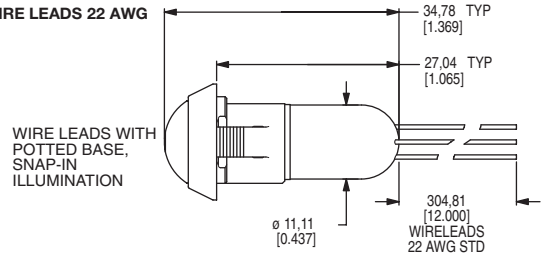


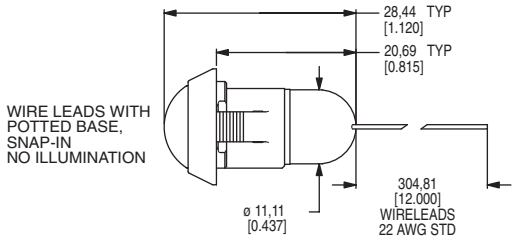



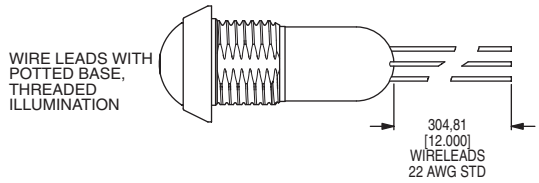



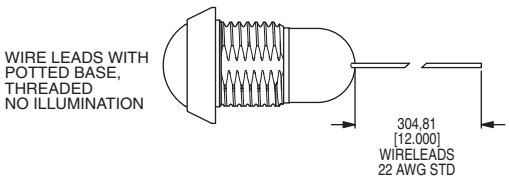




### W 12" WIRE LEADS 22 AWG




Wires: Black wires - Terminals
Red wires - LED (+) Positive
White wire - LED (-) Negative

Third Angle Projection

# AP Series
# Industrial Pushbutton Switch

## CONTACT MATERIAL

**B** GOLD

| OPTION CODE | CONTACT MATERIAL |
|---|---|
| B | Gold |

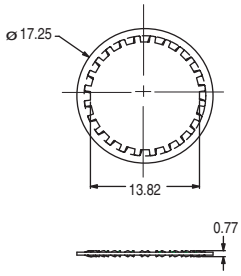
## TERMINAL SEAL

**E** EPOXY

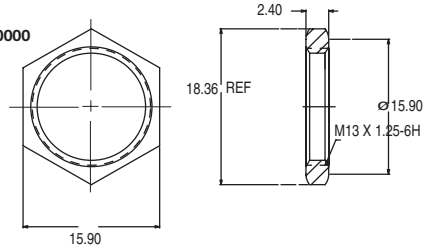
**All models are epoxy sealed**

## HARDWARE

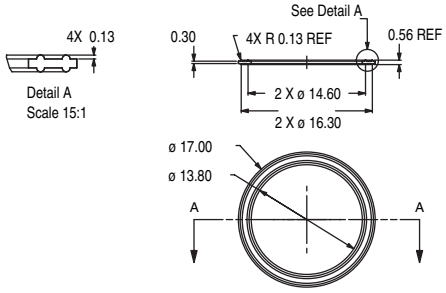
**LOCK WASHER**
**Part Number 647D00A47**




**HEX NUT**
**Part number 515D00000**




**PANEL SEAL**
**Part Number 655D00000**




**Caps available on next page**

Third Angle Projection

## AVAILABLE CAPS



481D XX XXX

Cap Color

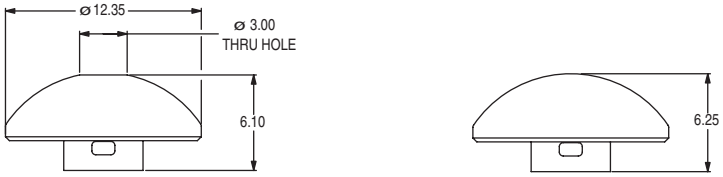
Style

| OPTION | CAP COLOR |
|---|---|
| 01 | WHITE |
| 02 | BLACK |
| 03 | RED |
| 04 | ORANGE |
| 05 | YELLOW |
| 06 | GREEN |
| 07 | BLUE |
| 08 | BROWN |
| 09 | GRAY |

| PART NUMBER | HOLE | STYLE |
|---|---|---|
| 481DXX000 | NO | DOME |
| 481DXX001 | YES | DOME |
| 481DXX002 | NO | EXTENDED DOME |
| 481DXX003 | YES | EXTENDED DOME |
| 481DXX004 | NO | CONCAVE |
| 481DXX005 | YES | CONCAVE |

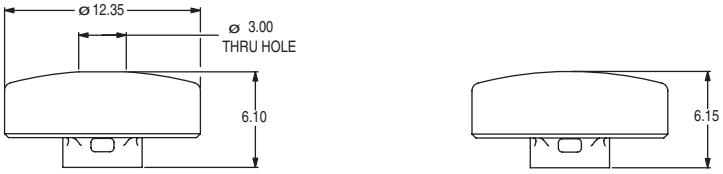
### DOME

**481DXX000 = NO HOLE**
**481DXX001 = HOLE**



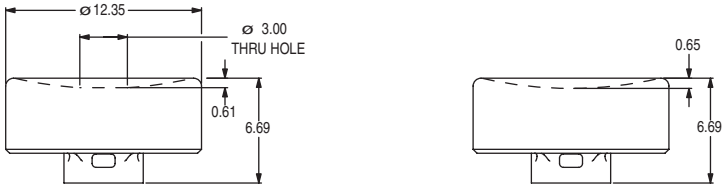

### EXTENDED DOME

**481DXX002 = NO HOLE**
**481DXX003 = HOLE**




### CONCAVE

**481DXX004 = NO HOLE**
**481DXX005 = HOLE**




Third Angle Projection



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

# APB Series
# Backlit Pushbutton Switch

## Features/Benefits

- *IP67 sealed*
- *1,000,000 life cycle*
- *Illumination*
- *Threaded or snap-in mounting*
- *RoHS compliant*

## Typical Applications

- *Harsh environments*
- *Off-Road*
- *Industrial*
- *Medical*
- *Transportation*
- *Joystick control modules*
- *Gaming*
- *Military*



## Specifications

FUNCTION: SPST Momentary
CONTACT ARRANGEMENT: N.O.
MOUNTING TYPE:
Snap-in (no panel seal)
Threaded body (hex nut, lock washer, and panel seal gasket provided)
Torque spec for threaded body: Do not exceed 8-9 in-lbs (0.9-1.0 N.m)

### Mechanical

OPERATING LIFE: 1,000,000 cycles
TOTAL TRAVEL: 2.1 ± 0.2 mm
OPERATING POINT 1.55 ± 0.25 mm
OVER TRAVEL: 0.6 min.
OPERATING FORCE: 4N ± 1N standard configuration; other force option 2N ± 0.5N
VIBRATION: 10-500 Hz 10g Max
SHOCK: 60g 11ms sawtooth wave

### Electrical

CONTACT RATING:
200mA @ 24 V DC resistive (500,000 cycles)
100mA @ 50 V DC resistive (500,000 cycles)
400mA @ 32 V AC resistive (500,000 cycles)
125mA @ 125 V AC resistive (1,000,000 cycles)
DIELECTRIC STRENGTH: 1000 V AC min.
INSULATION RESISTANCE: 1 G Ω @ 500 VDC
INITIAL CONTACT RESISTANCE 50 mΩ max (without wire leads)
BOUNCE TIME: <5 ms

## Materials

HOUSING: PBT
BASE: PBT
CAP: Painted polycarbonate
ACTUATOR:
Illuminated: Clear polycarbonate
INTERNAL SEAL: Silicone rubber
TERMINALS: Copper alloy, gold over silver plating
MOVABLE CONTACT: Copper alloy, gold over silver plating
TERMINAL SEAL: Epoxy
WIRE LEADS: UL1569 Black 22 AWG

### Operating Environment

OPERATING TEMPERATURE: -40˚C to 85˚C
ESD PROTECTION: 20 KV min.

### Process Environment

SEALING: IP67 for threaded body
IP65 for snap-in version (no panel seal)

**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.

| A | P | B | | E | | | | | B | E | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**APB** APB Series

**Operating Force**
**2** 2 Newtons
**4** 4 Newtons

**Cap**
**E** Extended Dome (600E)

**Illumination**
**01** Super White
**07** Super Blue

**Bushing Style**
**S** **Snap-in plastic**
**T** Threaded plastic

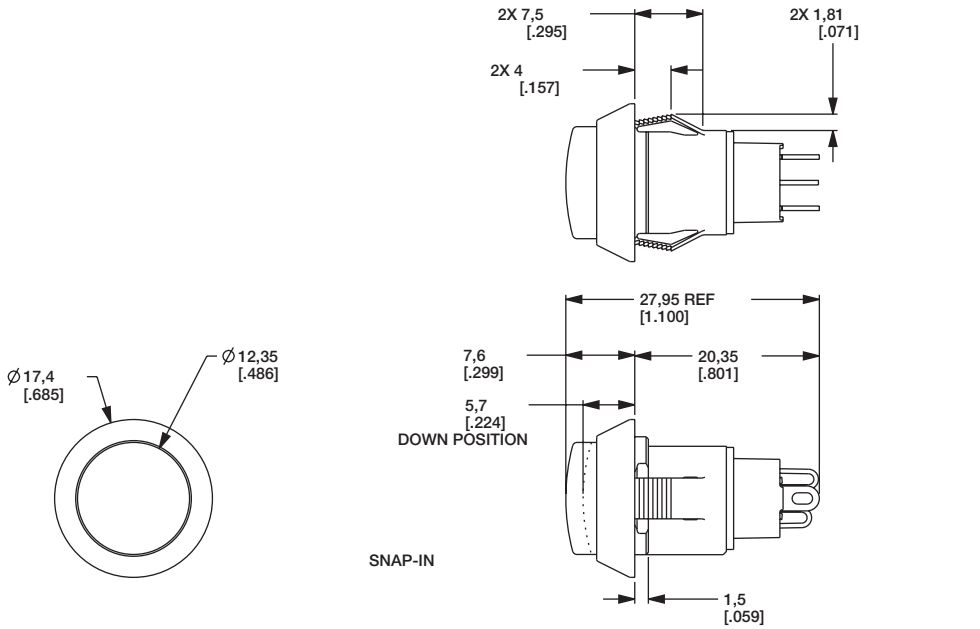
**Termination**
**Z** Solder Lug
**W** 12” Wire Leads 22 AWG

**Contact Material**
**B** Gold

**Terminal Seal**
**E** Epoxy

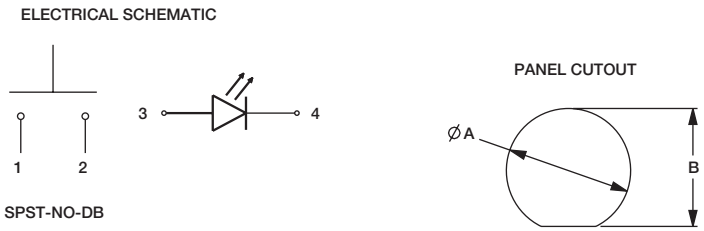
**Cap Symbol**
**000** Painted black over white without symbol*
**001** Plus
**002** Locked
**003** Engine stop
**004** Park brake release
**005** Engine start
**006** Fast
**007** Slow
**008** Unlocked
**009** Rock shaft lower
**010** Minus

* cap painted black over white to allow customer laser etching










| PANEL THICKNESS | DIM A (±0.05 MM) | DIM B (±0.05 MM) |
|---|---|---|
| 1 MM [0.039 IN] | 13.70 MM [0.539 IN] | 13.00 MM [0.512 IN] |
| 2 MM [0.079 IN] | 13.80 MM [0.539 IN] | 13.00 MM [0.512 IN] |
| 3 MM [0.118 IN] | 13.90 MM [0.547 IN] | 13.10 MM [0.516 IN] |
| THREADED BODY MIN PANEL THICKNESS 1 MM | 13.70 MM [0.539 IN] | 13.00 MM [0.512 IN] |

A 0.1 MM MIN CHAMFER ON THE LEADING EDGE OF MOUNTING HOLE IS RECOMMENDED FOR SNAP-IN VERSION.

Third Angle Projection

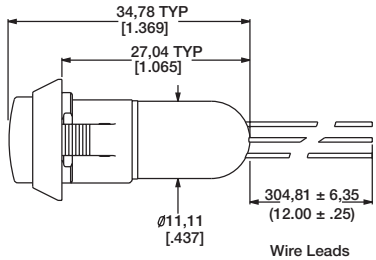
# APB Series
# Backlit Pushbutton Switch

## TERMINATION

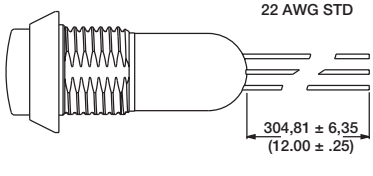
**W** 12" WIRE LEADS

**Z** SOLDER LUG

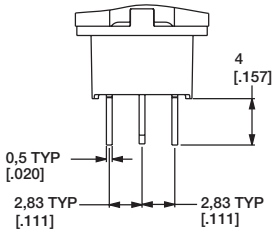
WIRE LEADS WITH POTTED BASE, SNAP-IN ILLUMINATION

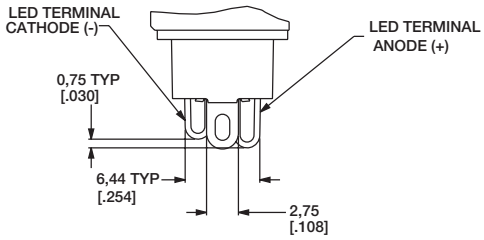


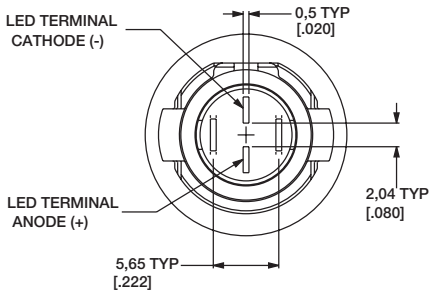

WIRE LEADS WITH POTTED BASE, THREADED ILLUMINATION




WIRES:
BLACK - TERMINALS
RED - LED (+) POSITIVE
WHITE - LED (-) NEGATIVE




## CONTACT MATERIAL

**B** GOLD

| OPTION CODE | CONTACT MATERIAL |
|---|---|
| B | Gold |

## TERMINAL SEAL

**E** EPOXY

All models are epoxy sealed

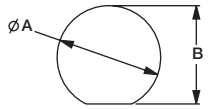
Third Angle Projection

## CAP SYMBOLS

| | | |
|---|---|---|
| -000 | | NO SYMBOL |
| -001 | | PLUS |
| -002 | | LOCKED |
| -003 | STOP | ENGINE STOP |
| -004 | | PARK BRAKE RELEASE |
| -005 | | ENGINE START |
| -006 | | FAST |
| -007 | | SLOW |
| -008 | | UNLOCKED |
| -009 | | ROCK SHAFT LOWER |
| -010 | | MINUS |

NOTES:
1. ALL GRAPHICS MUST BE POSITIONED AS SHOWN, PERPENDICULAR TO ALIGNMENT FEATURE ON UNDERSIDE OF CAP.
2. GRAPHIC MARKING MUST BE ALIGNED WITH THE FLAT FEATURE ON THE UNDERSIDE OF THE CAP AS SHOWN, TOLERANCE ±3°

PANEL CUTOUT

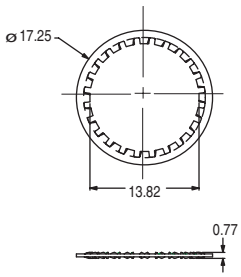



Panel Orientation
Flat indicates bottom

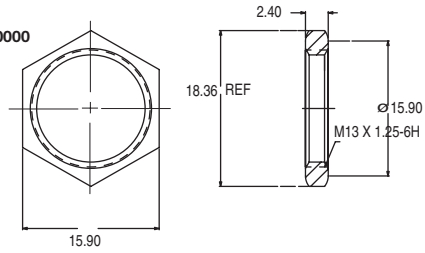
See chart on previous page for dimensions

## HARDWARE

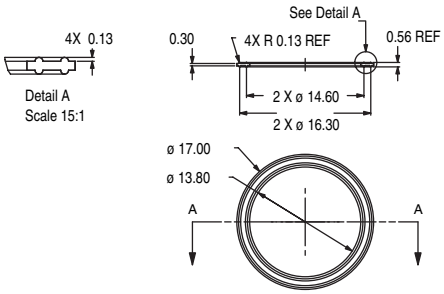
**LOCK WASHER**
**Part Number 647D00A47**




**HEX NUT**
**Part number 515D00000**




**PANEL SEAL**
**Part Number 655D00000**




Third Angle Projection

# NP Series
# Sealed Industrial Pushbutton Switch

## *Features/Benefits*

- ***IP68 sealed***
- ***1,000,000 life cycle***
- ***Multiple housing styles***
- ***Capable of up to 5A resistive load***
- ***Wirelead options available***
- ***RoHS compliant***

## *Typical Applications*

- ***Harsh environments***
- ***Off-Road***
- ***Industrial***
- ***Transportation***
- ***Military***



## Specifications

FUNCTION: SPDT Double Break (Form Z) Momentary
CONTACT ARRANGEMENT: N.O. and N.C.
MOUNTING TYPE: Threaded front or rear mount and slot mount
TORQUE SPEC FOR THREADED BODY: Do not exceed 50 in-lbs (5.65 N-m)

### Mechanical

OPERATING LIFE: 1,000,000 cycles
TOTAL TRAVEL: 1.6 ± 0.15 mm
OPERATING POINT 0.9 ± 0.25 mm
OVER TRAVEL: 0.45 min.
OPERATING FORCE: 8N ± 1.5N
VIBRATION: 10-500 Hz 10g Max
SHOCK: 50g 11ms sawtooth wave

### Electrical

CONTACT RATING:
Option G - Gold over Silver
10mA/5 VDC (1,000,000 cycles)
Option Q - Silver
1A/32 VDC resistive (100,000 cycles)
5A/32 VDC resistive (25,000 cycles)
3A/32 VDC resistive (25,000 cycles)

### Electrical (cont.)

DIELECTRIC STRENGTH: 1000 V AC for 1 min.
INSULATION RESISTANCE: 1 G Ω @ 500 VDC
INITIAL CONTACT RESISTANCE 50 mΩ max (without wire leads)
BOUNCE TIME: <5 ms

### Materials

HOUSING: 6061-T6 Aluminum, black or clear anodized
BASE: PBT
CAP: PBT
ACTUATOR: PBT
INTERNAL SEAL: Silicone rubber
TERMINALS: Copper with silver nickel inlay, silver plating
MOVABLE CONTACT: Copper alloy, gold over silver plating
TERMINAL SEAL: Epoxy

### Operating Environment

OPERATING TEMPERATURE: -40°C to +85°C
ESD PROTECTION: 15KV min.

### Process Environment

SEALING: IP68

**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.

| N | P | | 8 | | | | | | | | | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**NP** NP Series

**Operating Force**
**8** 8 Newtons

**Actuator Style**
**S** Standard
**E** Extended (D housing style only)

**Actuator Color***
**1** White
**2** Black (STD)
**3** Red
**4** Orange
**5** Yellow
**6** Green
**7** Blue
**9** Gray

**Housing Style**
**T** Standard threaded mount
**L** Long threaded mount
**H** Short threaded mount
**S** Slot mount
**R** Rear mount
**D** Dome bezel
**P** Tapered bezel

**Housing Anodizing Color**
**1** Clear anodized
**2** Black anodized (STD)

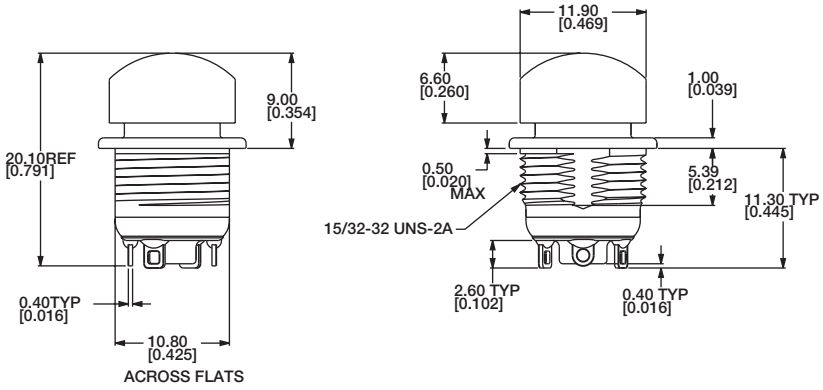
**Termination**
**03** Solder Lug (STD)
**02** PC Pin (G Contact Material)
**W4** 4x 12" 22 AWG UL1569 wire (overmolded)
**W3** 3x 12" 22 AWG UL1569 wire (overmolded)

**Contact Material**
**Q** Silver (STD)
**G** Gold over silver

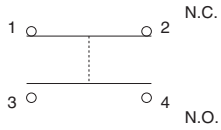
**Terminal Seal**
**E** Epoxy
All models are epoxy sealed

* Please contact Customer Service for additional colors.

## STANDARD VIEW




ELECTRICAL SCHEMATIC

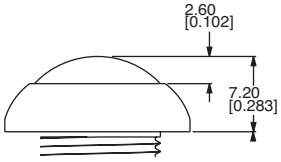



## OPERATING FORCE

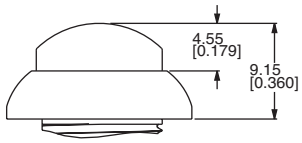
| OPTION CODE | OPERATING FORCE |
|---|---|
| 8 | 8 N |

## ACTUATOR STYLE

**S** STANDARD




**E** EXTENDED (D HOUSING STYLE ONLY)




## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|---|---|
| 1 | White |
| 2 | Black |
| 3 | Red |
| 4 | Orange |
| 5 | Yellow |
| 6 | Green |
| 7 | Blue |
| 9 | Gray |

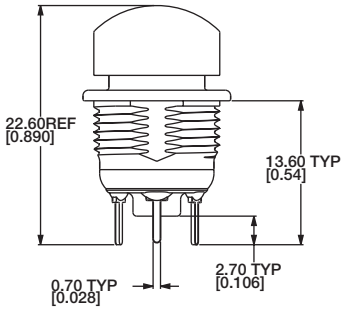
For additional colors please contact Customer Service.

Third Angle Projection

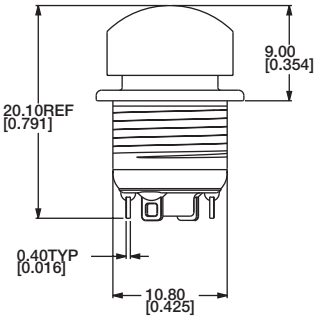
# NP Series
# Sealed Industrial Pushbutton Switch

## HOUSING STYLE

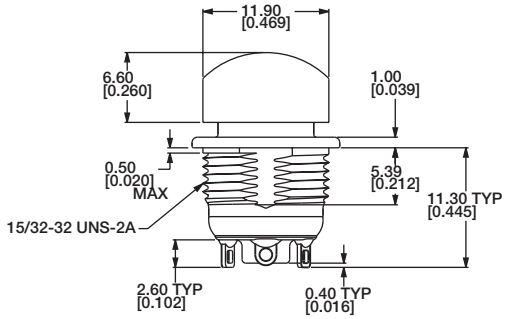
### T STANDARD THREADED MOUNT

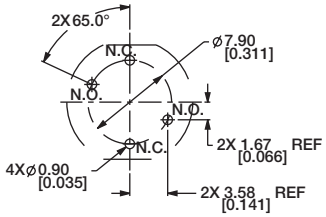



PC TERMINALS

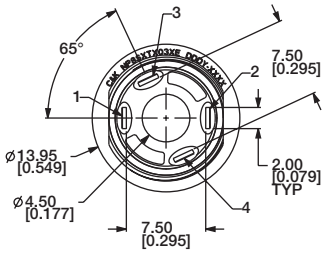


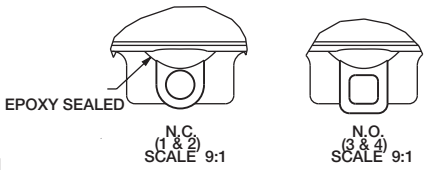

ACROSS FLATS

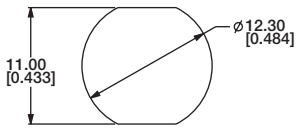



PC HOLE PATTERN
BOARD VIEW

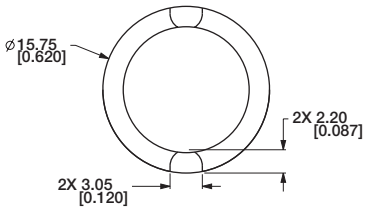


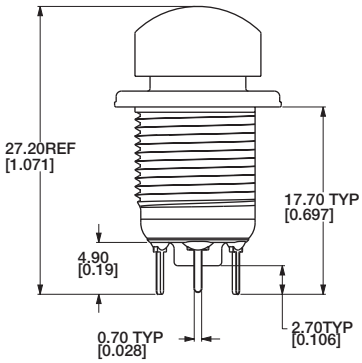



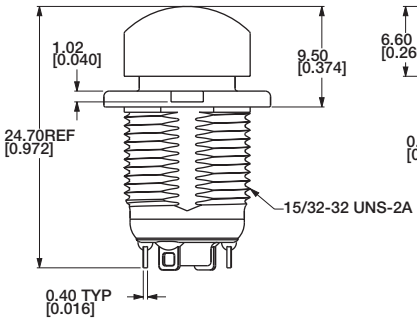

PANEL CUTOUT

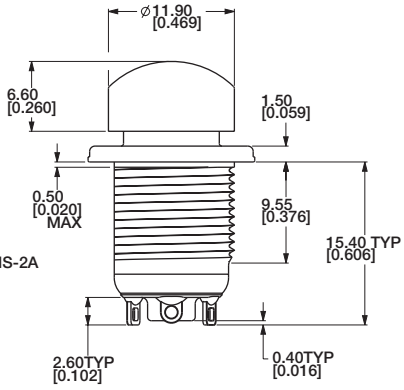
### L LONG THREADED MOUNT

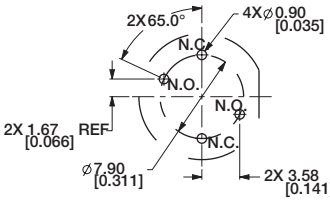


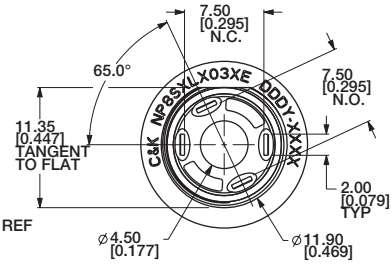

PC TERMINALS

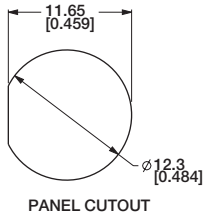



PC HOLE PATTERN
BOARD VIEW



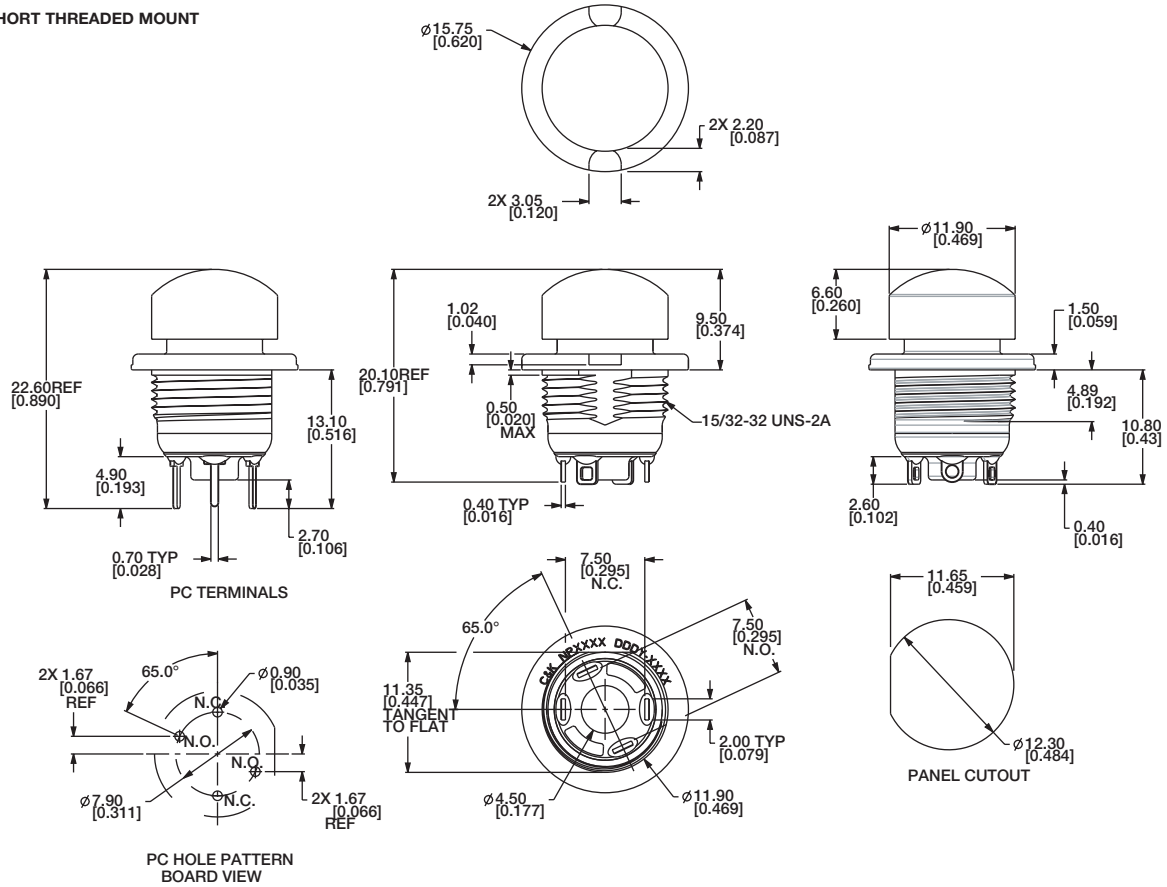




PANEL CUTOUT

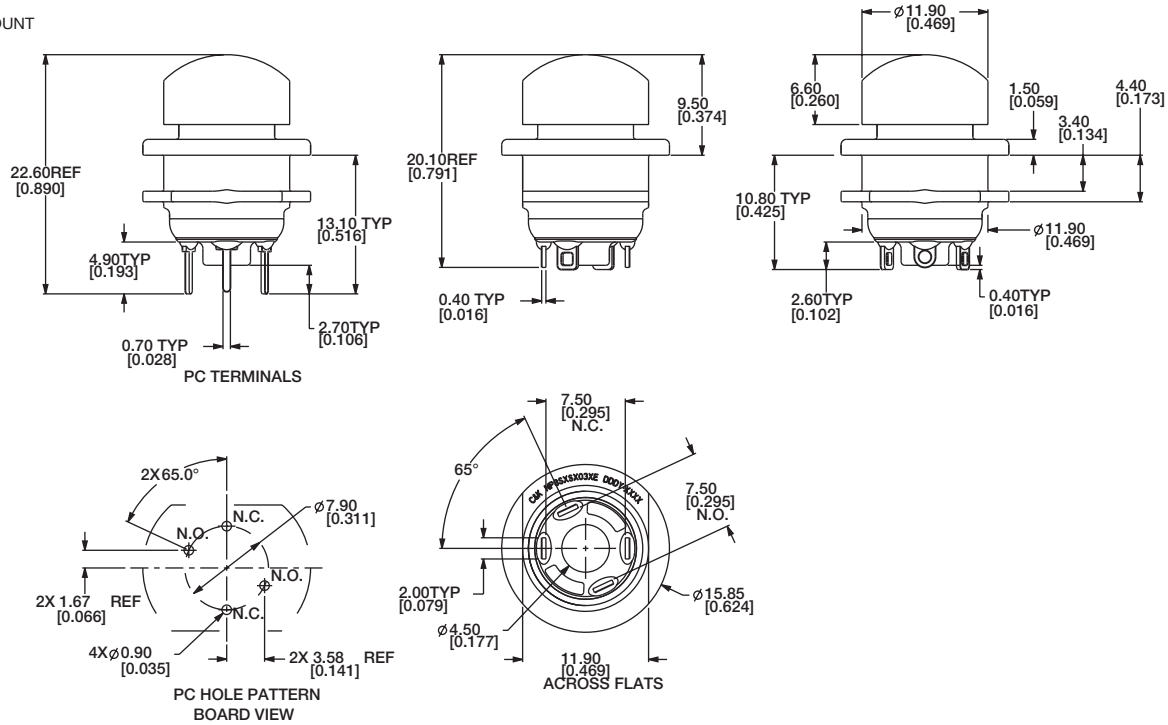
Third Angle Projection

## HOUSING STYLE

### H SHORT THREADED MOUNT




### S SLOT MOUNT

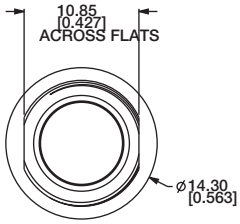


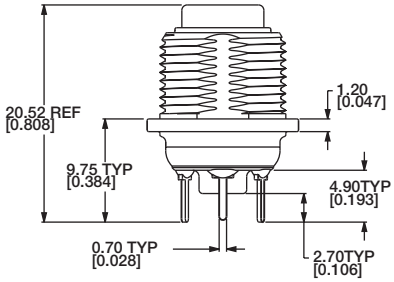

Third Angle Projection

# NP Series
# Sealed Industrial Pushbutton Switch

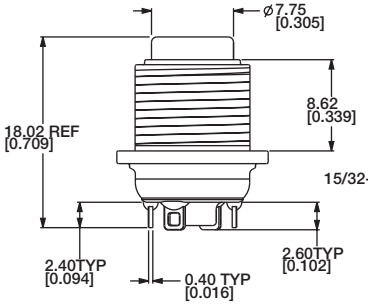
## HOUSING STYLE

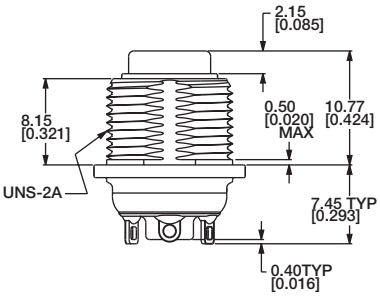
### R REAR MOUNT

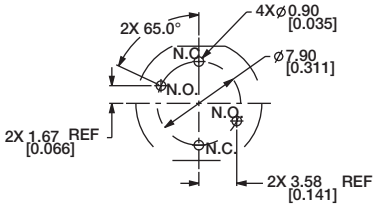


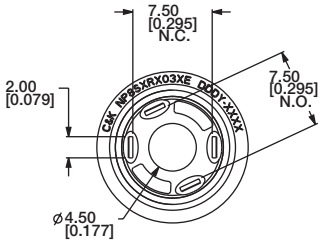

PC TERMINALS

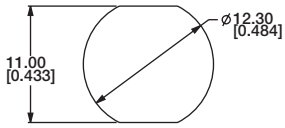


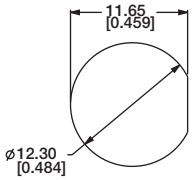

PC HOLE PATTERN
BOARD VIEW



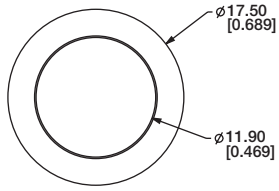



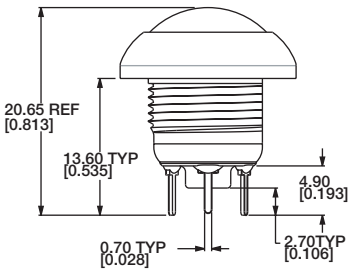

PANEL CUTOUT

### D DOME BEZEL

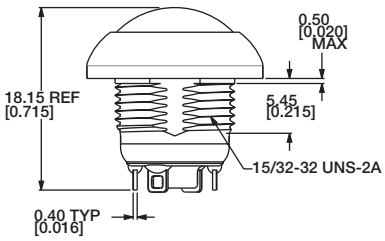


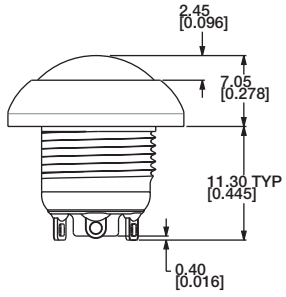

PANEL CUTOUT

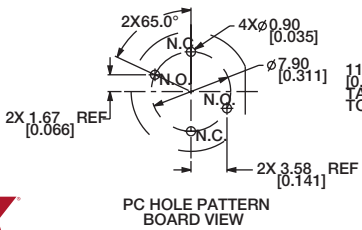


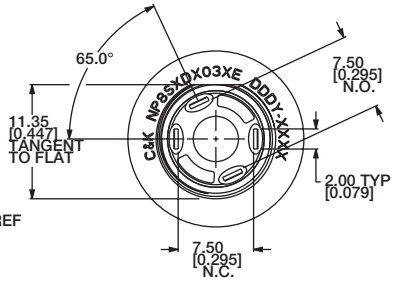

PC TERMINALS

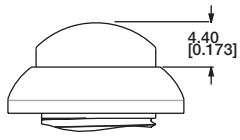



PC HOLE PATTERN
BOARD VIEW



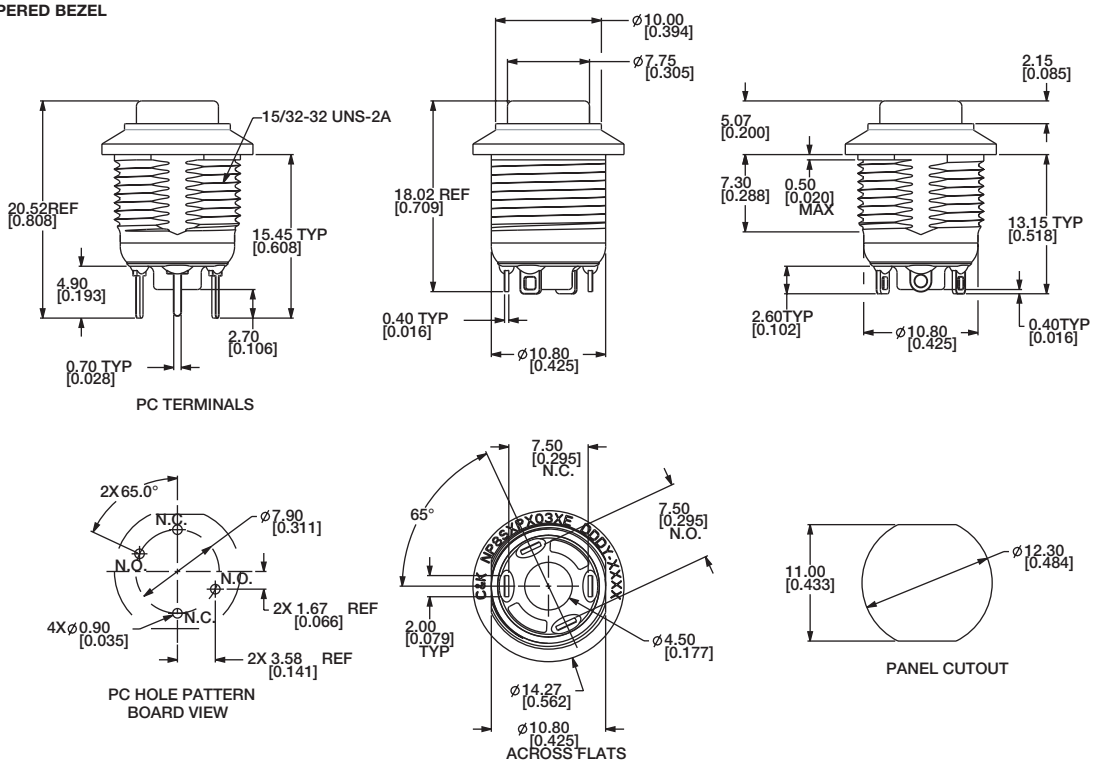

EXTENDED CAP

Third Angle
Projection

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

## HOUSING STYLE

**P** TAPERED BEZEL

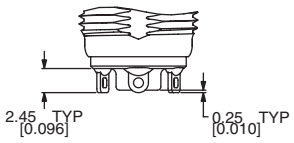



## HOUSING ANODIZING COLOR

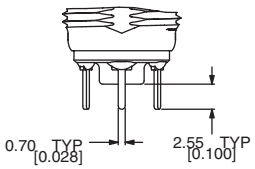
| OPTION CODE | ANODIZING COLOR |
|---|---|
| 1 | Clear anodized |
| 2 | Black anodized (STD) |

## TERMINATION

**03** SOLDER LUG (STD)




**02** PC PIN (G CONTACT MATERIAL)



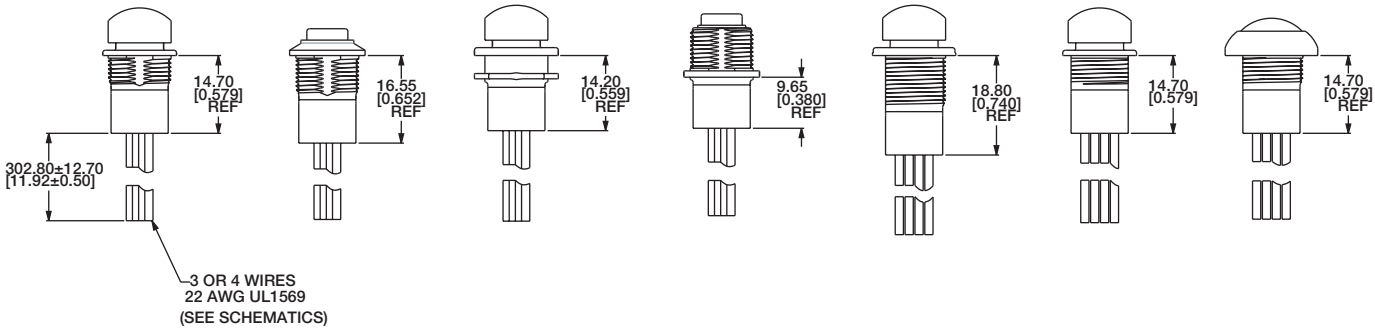

Third Angle Projection



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

# NP Series
# Sealed Industrial Pushbutton Switch

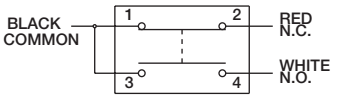
## TERMINATION



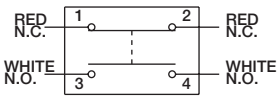

**W3** 3X 12" 22 AWG UL1569 WIRE (OVERMOLDED)

**W4** **4X 12" 22 AWG UL1569 WIRE (OVERMOLDED)**

ELECTRICAL SCHEMATIC - 3 WIRES




ELECTRICAL SCHEMATIC - 4 WIRES




## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL |
|---|---|
| **Q** | Silver (STD) |
| **G** | Gold over Silver |

## TERMINAL SEAL

**E** EPOXY

All models are epoxy sealed

## HARDWARE

**HEX NUT**

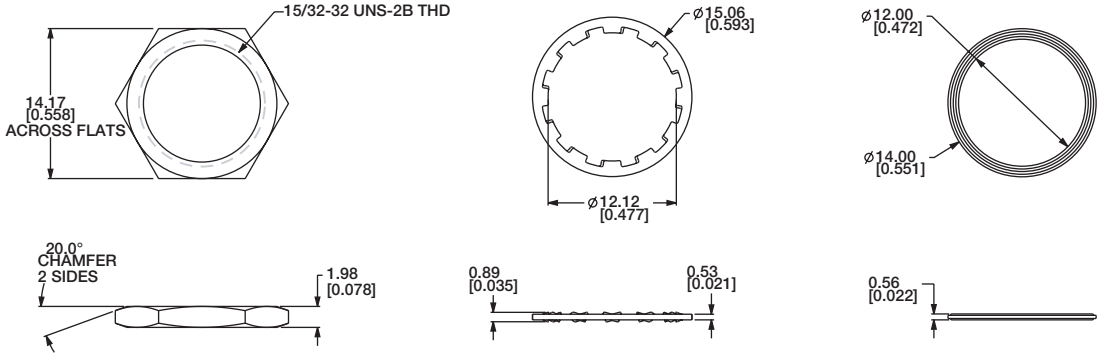
**707100201 Nickel-plated**

**LOCKWASHER**

**700302202**

**PANEL GASKET**

**851D02000**




Third Angle Projection

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

# PNP Series
# Sealed Pushbutton Switch

## Features/Benefits

- *Snap-Action provides positive tactile feedback*
- *IP68 sealed to endure harsh environments*
- *1,000,000 life cycle*
- *Up to 5A resistive load*
- *Multiple housing styles*
- *Various termination types and wirelead options are also available*
- *RoHS compliant*

## Typical Applications

- *Control Grips*
- *Off-Road Panels*
- *Heavy Equipment*
- *Industrial Instruments*
- *Lifts*
- *Conveyor Controls*



## Specifications

FUNCTION: SPST, SPDT Double Break (Form Z) Momentary
CONTACT ARRANGEMENT: N.O. and N.C.
MOUNTING TYPE: Threaded front mount
TORQUE SPEC FOR THREADED BODY: Do not exceed 10 in-lbs (1.35 N-m)

## Mechanical

OPERATING LIFE: 1,000,000 cycles
TOTAL TRAVEL: 2 mm max.
OPERATING POINT 0.9 ± 0.25 mm
OVER TRAVEL: 0.25 mm min.
OPERATING FORCE: 3N ± 1.5N
8N ± 1.5N
VIBRATION: 10-500 Hz 10g Max
SHOCK: 50g 11ms sawtooth wave

## Electrical

CONTACT RATING:
Option "Q" Silver
5A/32 VDC resistive (25,000 cycles)
3A/32 VDC resistive (25,000 cycles)
Option "G" Gold over Silver
10mA/5 VDC resistive (1,000,000 cycles)
DIELECTRIC STRENGTH: 1000 V AC for 1 min.
INSULATION RESISTANCE: 1 G Ω @ 500 VDC
INITIAL CONTACT RESISTANCE 50 mΩ max (without wire leads)
BOUNCE TIME: <5 ms

## Materials

HOUSING: PBT/PC
BASE: PBT
CAP: PBT
ACTUATOR: PBT
INTERNAL SEAL: Silicone rubber
TERMINALS: Copper with silver nickel inlay, silver plating
MOVABLE CONTACT: Copper alloy, gold over silver plating
TERMINAL SEAL: Epoxy

## Operating Environment

OPERATING TEMPERATURE: -40°C to +85°C
ESD PROTECTION: 15KV min.
SEALING: IP68

**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.

P N P [ ] [ ] [ ] [ ] 2 [ ] [ ] [ ] E

**Designation**
**PNP** PNP Series

**Operating Force**
**3** 3 Newtons
**8** 8 Newtons

**Actuator Style**
**S** Standard
**E** Extended (D housing style only)
**N** None

**Actuator Color ***
**0** No Cap
**1** White
**2** Black (STD)
**3** Red
**4** Orange
**5** Yellow
**6** Green
**7** Blue
**9** Gray

**Housing Style**
**T** Standard threaded mount
**D** Dome bezel

**Housing Color**
**2** Black (STD)

**Circuit**
**C** SPDT - Double Break
**W** SPST NC - Double Break
**Y** SPST NO - Double Break

**Termination**
**02** PC Pin (G contact material only)
**03** Solder Lug (STD)
**W2** 2 x 12" 22 AWG UL1569 wire (overmolded)
**W3** 3 x 12" 22 AWG UL1569 wire (overmolded)
**W4** 4 x 12" 22 AWG UL1569 wire (overmolded)

**Contact Material**
**Q** Silver (STD)
**G** Gold over silver

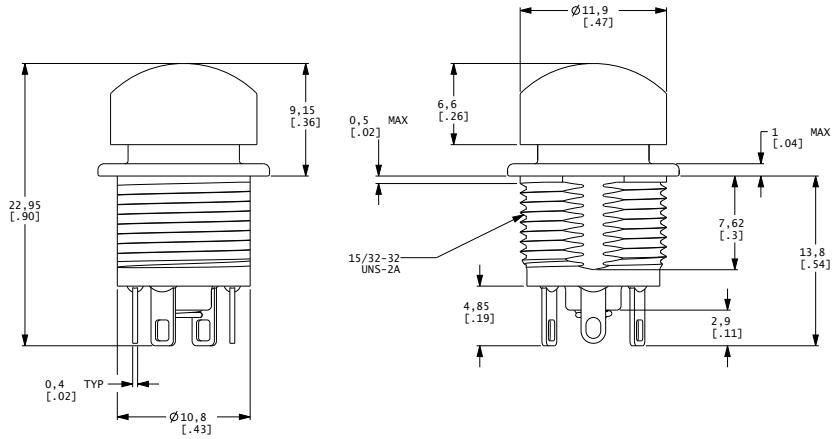
**Terminal Seal**
**E** Epoxy
All models are epoxy sealed

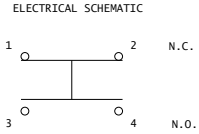
* Additional colors available, please contact Customer Service

Third Angle Projection

# PNP Series
# Sealed Pushbutton Switch

## STANDARD VIEW




## OPERATING FORCE

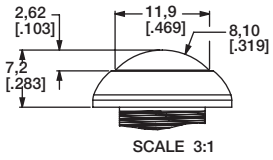
| OPTION CODE | OPERATING FORCE |
|---|---|
| 3 | 3 N |
| 8 | 8 N |

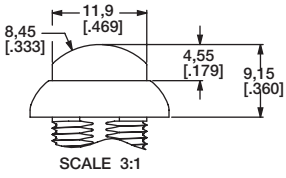
## ACTUATOR STYLE

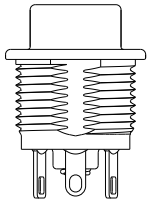
**S** STANDARD

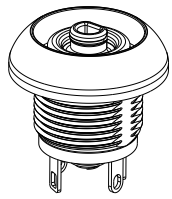
**E** EXTENDED (D HOUSING STYLE ONLY)

**N** NO CAP



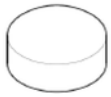





## ACTUATOR COLOR

| OPTION CODE | ACTUATOR COLOR |
|---|---|
| 0 | No color |
| 1 | White |
| 2 | Black |
| 3 | Red |
| 4 | Orange |
| 5 | Yellow |
| 6 | Green |
| 7 | Blue |
| 9 | Gray |

* Cap may be ordered separately

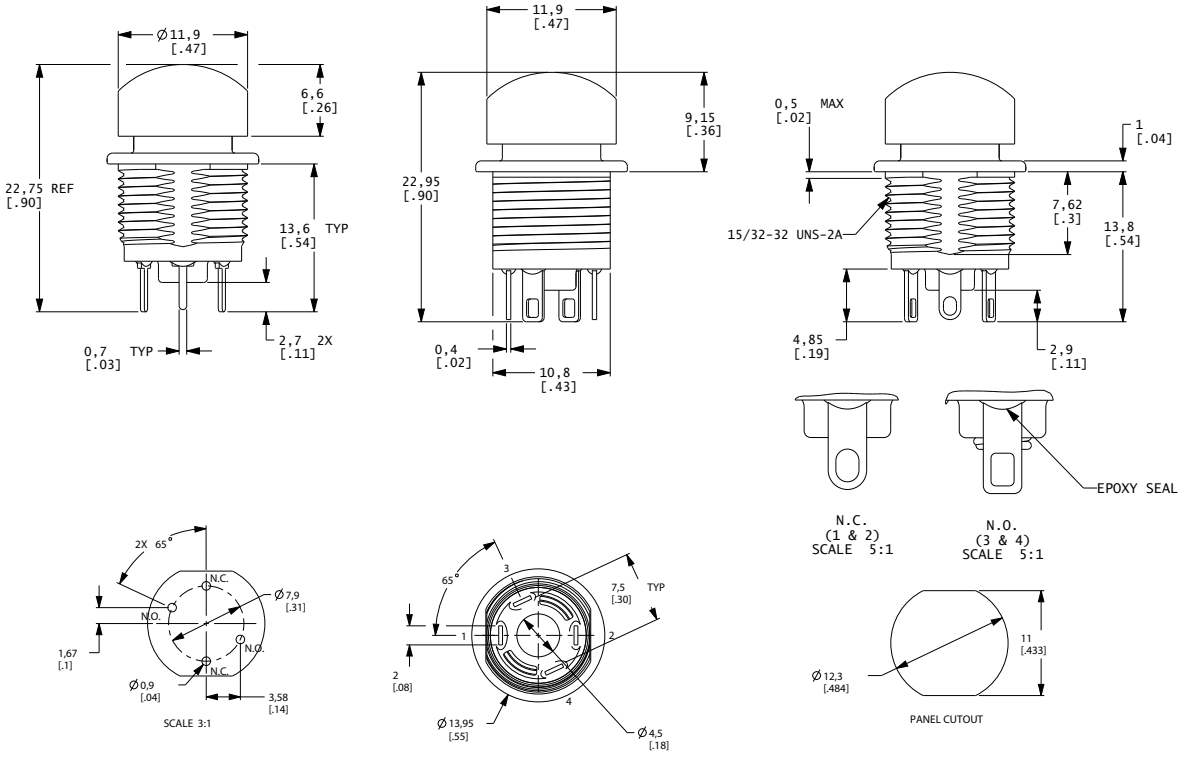




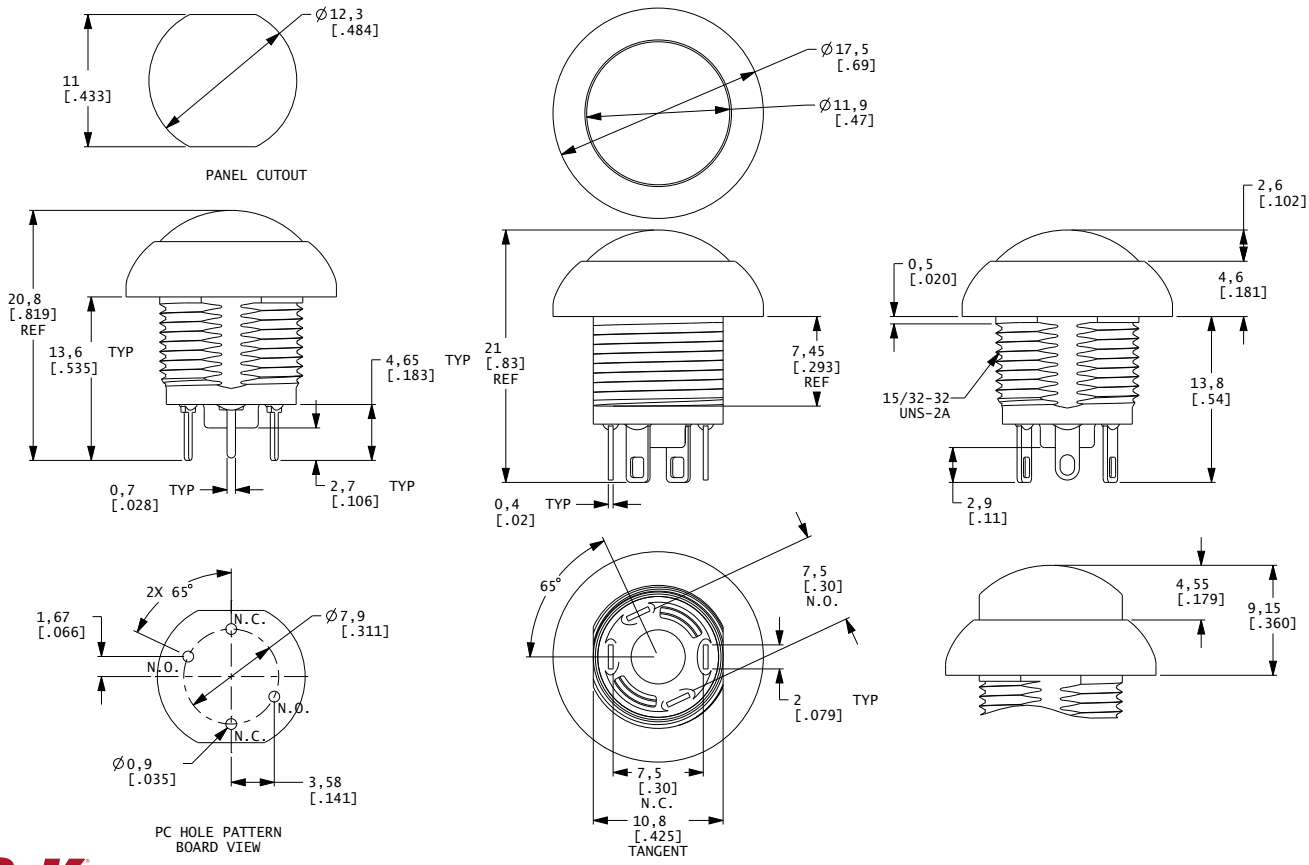
| PART NUMBER | COLOR |
|---|---|
| 285E01000 | White |
| 285E02000 | Black |
| 285E03000 | Red |
| 285E04000 | Orange |
| 285E05000 | Yellow |
| 285E06000 | Green |
| 285E07000 | Blue |
| 285E09000 | Gray |
| | |
| 824D01000 | White |
| 824D02000 | Black |
| 824D03000 | Red |
| 824D04000 | Orange |
| 824D05000 | Yellow |
| 824D06000 | Green |
| 824D07000 | Blue |
| 824D09000 | Gray |

## HOUSING STYLE

### T STANDARD THREADED MOUNT




### D DOME BEZEL



# PNP Series
# Sealed Pushbutton Switch

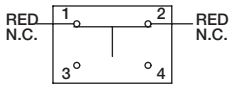
## HOUSING COLOR

| OPTION CODE | COLOR |
|---|---|
| 2 | Black (STD) |

## CIRCUIT

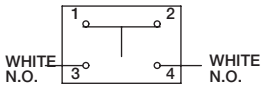
**W** SPST NC - Double Break

ELECTRICAL SCHEMATIC
2 WIRES



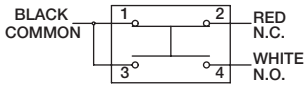

**Y** SPST NO - Double Break

ELECTRICAL SCHEMATIC
2 WIRES



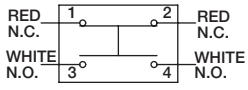

**C** SPDT - Double Break

ELECTRICAL SCHEMATIC
3 WIRES



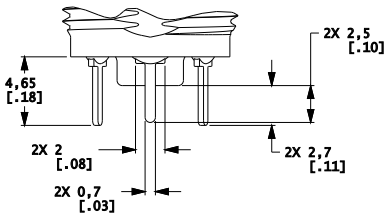

**C** SPDT - Double Break

ELECTRICAL SCHEMATIC
4 WIRES

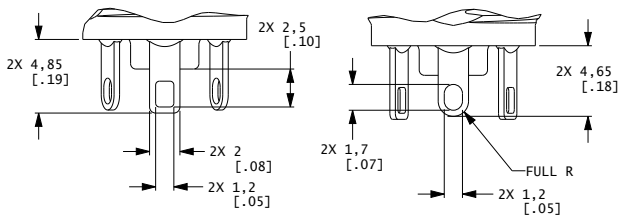



## TERMINATION

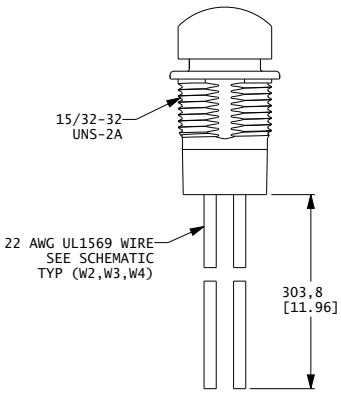
**02** PC PIN



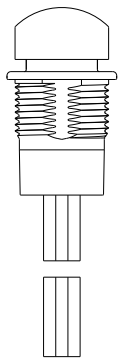

**03** SOLDER LUG (STD)



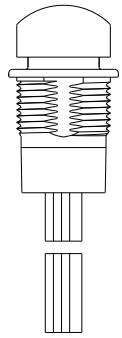

**W2** 2 x 12" 22 AWG UL1569 wire (overmolded)




**W3** 3 x 12" 22 AWG UL1569 wire (overmolded)



**W4** 4 x 12" 22 AWG UL1569 wire (overmolded)



## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL |
|---|---|
| Q | Silver (STD) |
| G | Gold over silver |

## TERMINAL SEAL

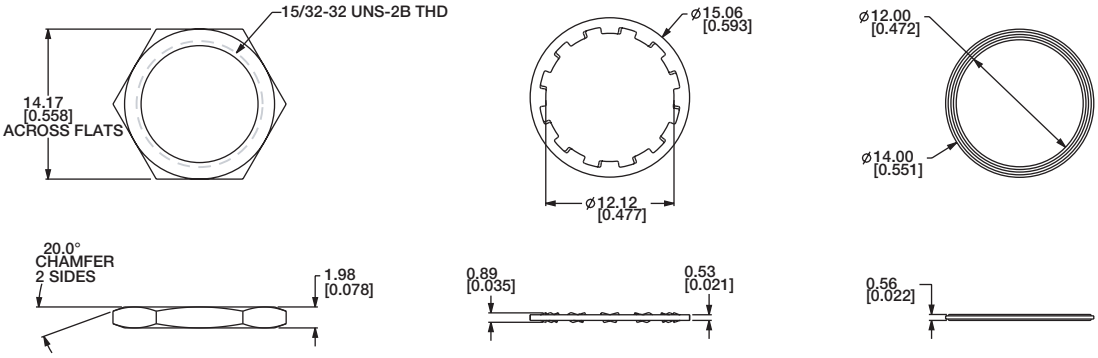
**E** EPOXY
**All models are epoxy sealed**

## HARDWARE

**HEX NUT**
**707100201 Nickel-plated**

**LOCKWASHER**
**700302202**

**PANEL GASKET**
**851D02000**



# ATP16 Series
# Anti-Vandal Sealed Pushbutton Switch

## Features/Benefits

- *Momentary or Lock version*
- *IP67 sealed*
- *Rated at 2A / 36 Vdc*
- *1,000,000 life cycle*
- *Various colors of LED illuminate indicator*
- *Choices of actuator with ring or power logo*
- *RoHS compliant*

## Typical Applications

- *Alarm, safety and security systems*
- *Intercom "push-to-talk" devices*
- *Automatic food and drink vending machines*
- *Parking lot ticket machines & ticket paying stations*
- *Industrial Instruments*



## Specifications

FUNCTION: SPST
CONTACT ARRANGEMENT: N.O.
MOUNTING TYPE: Threaded front panel mount
TORQUE FOR THREADED BODY: 11.5 kgf/cm

## Mechanical

OPERATING LIFE: Momentary 1,000,000 cycles
Lock 100,000 cycles
TOTAL TRAVEL: Momentary 2.0 mm; Lock 2.3 mm
OPERATING FORCE: 4.5 ± 1.5N

## Electrical

CONTACT RATING: 2A / 36Vdc
OPERATING LIFE: Make-and-break cycles at full load
200,000 (Momentary)
100,000 (Lock)
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 1,000 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max @1A 12VDC

## Materials

BUSHING: Stainless steel / Aluminum alloy, anodized
BASE: PBT (UL 94-A0), Nylon 6/6 (lock version)
ACTUATOR: PC (UL 94-V2); POM (lock version)
INTERNAL ASSEMBLY: POM / PA66
SPRING: Steel
SEALING / O-ring: Silicone (Translucent) / Silicone
TERMINALS / CONTACT: Brass, Silver or gold plated
HEX NUT: Brass (Nickel plated)

## Operating Environment

OPERATING TEMPERATURE: -20˚C to +70˚C
SEALING / PROTECTION: IP67

**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.

| A | T | P | 1 | 6 | | | | | | | | | | S | | | | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ATP16** Series

**Actuator Style**
**D** Dome*
**S** Standard**

**Actuator Indicator**
**L1** Ring
**L5** Ring & Power logo

**LED Illumination**

| Color | Dual color |
|---|---|
| **0** Without LED | **A** Red & Green |
| **2** White | **R** RGB*** |
| **3** Red | |
| **4** Orange*** | |
| **5** Yellow | |
| **6** Green | |
| **7** Blue | |

**LED voltage DC**
**00** Without LED
**03** 3V
**06** 6V
**12** 12V
**24** 24V

**Bushing type**

| | |
|---|---|
| **B3** | Al alloy (Black anodized) |
| **B4** | Al alloy (Natural anodized) |
| **M0** | Stainless (Natural), Round*** |
| **M4** | Stainless (Natural), Double D*** |

**Contact arrangement**
**S** SPST

**Mechanical function**
**A** Momentary (Double D bushing)
**E** Lock (D shape bushing)

**Termination**
**04** Solder lug
**W1** Wire lead 500mm ****

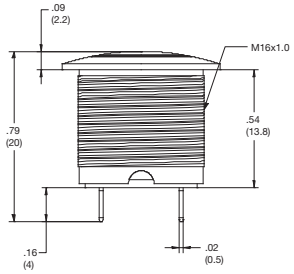
**Terminal plating**
**G** Gold flash

* For bushing type B3 and B4 only.
** Available on bushing type M0 & M4 only.
*** Available on momentary function only.
**** Available upon request, please consult your sales representative for details.

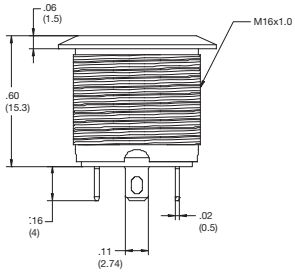
## STANDARD VIEW

### MOMENTARY

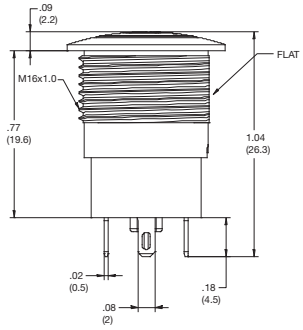
**DOME**




**STANDARD / FLAT**

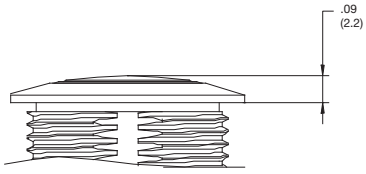



### LOCK

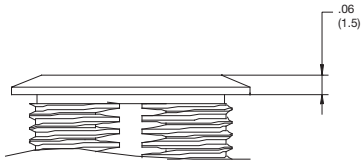



## ACTUATOR STYLE

**D** DOME

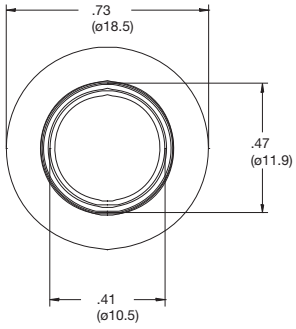



**S** STANDARD / FLAT

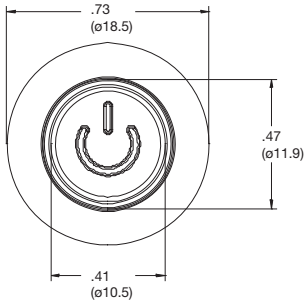



## ACTUATOR INDICATOR

**L1** RING




**L5** RING & POWER

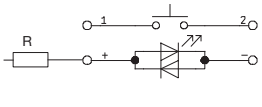


# ATP16 Series
# Anti-Vandal Sealed Pushbutton Switch

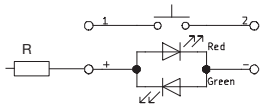
## CIRCUIT

### MOMENTARY

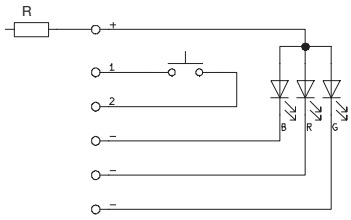
**SINGLE COLOR LED**



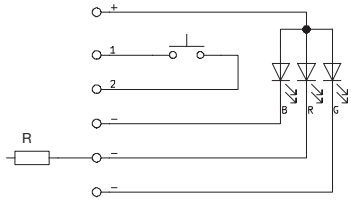

**DUAL COLOR LED**




**RGB LED**



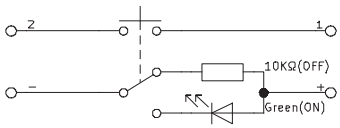

6 / 12 / 24V LED



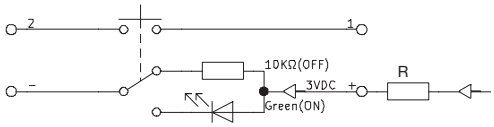

3V LED

### LOCK

**SINGLE COLOR LED**

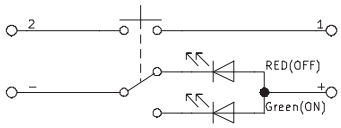



3V LED

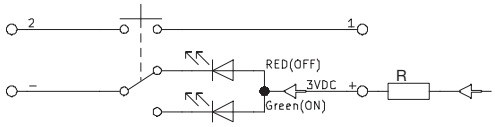



6 / 12 / 24V LED

**DUAL COLOR LED**




3V LED




6 / 12 / 24V LED

R: Resistor value is according to the LED voltage applied.

| Resistor value<br>(Apply LED Voltage) |
|---|
| LED input 3 VDC, 47 ohms<br>(Red/Yellow/Orange LED, also applied to the dual LED with any of these 3 colors) |
| LED input 6 VDC, 180 ohms |
| LED input 12 VDC, 470 ohms |
| LED input 24 VDC, 1000 ohms |

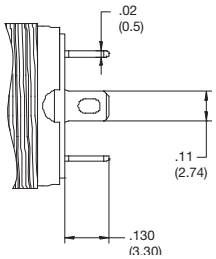
Ohms value of resistance tolerance: ±5%

# ATP16 Series
# Anti-Vandal Sealed Pushbutton Switch

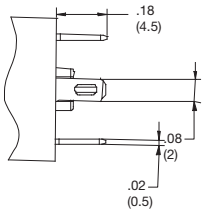
## TERMINATION

### 04 SOLDER LUG

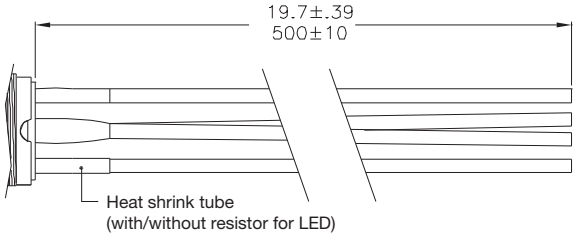
**MOMENTARY**

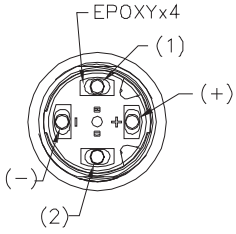



**LOCK**




### W1 WIRE LEAD 500MM*



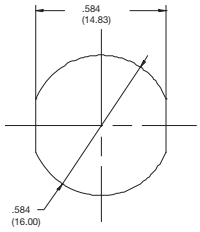




* Available upon request, please consult your sales representative for details.

## PANEL CUTOUT

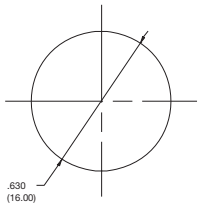
### B3, B4 & M4

**DOUBLE D**



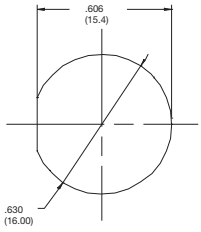

### M0

**ROUND**




### B3 & B4

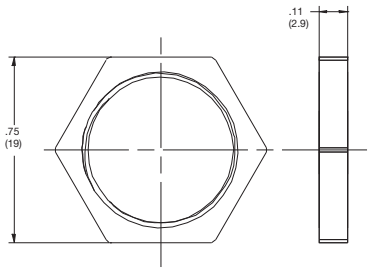
**D SHAPE**




## HARDWARE

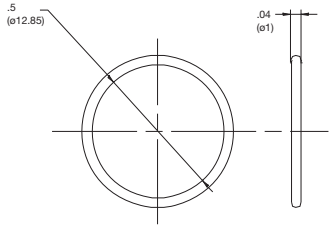
### HEX NUT

**Order PN: ATP16-HN**




### O RING

**Order PN: ATP16-OR**



# ATPS19 Series
# Anti-Vandal Short-Body Sealed Pushbutton Switch

## Features/Benefits

- *Momentary*
- *IP67 sealed & IK10 (Stainless steel bushing)*
- *Rated at 2A / 36 Vdc*
- *1,000,000 mechanical lifecycles*
- *Various colors of LED illuminate indicator*
- *Choices of actuator with ring or power logo*
- *RoHS compliant*

## Typical Applications

- *Alarm, safety & security systems*
- *Intercom "push-to-talk" devices*
- *Automatic food & drink vending machines*
- *Parking lot ticket machines & ticket paying stations*
- *Industrial instruments*





## Specifications

FUNCTION: SPST
CONTACT ARRANGEMENT: N.O.
MOUNTING TYPE: Threaded front panel mount
TORQUE FOR THREADED BODY: 11.5 kgf/cm

## Mechanical

MECHANICAL LIFE: 1,000,000 cycles
TOTAL TRAVEL: 1.8 ± 0.2 mm
OPERATING FORCE: 4.5 ± 1.5N

## Electrical

CONTACT RATING: 2A / 36Vdc
ELECTRICAL LIFE: Make-and-break cycles at full load
200,000
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 1,000 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max @1A 12VDC

## Materials

BUSHING: Stainless steel
BASE: PA66, white (UL 94-V0)
ACTUATOR: PC, translucent (UL 94-V2), std steel
INTERNAL ASSEMBLY: PC, transparent (UL 94V2)
SPRING: Steel
SEALING / O-ring: Silicone (Translucent) / Silicone
TERMINALS / CONTACT: Brass, gold flash plated / Brass, silver alloy
HEX NUT: Brass (Nickel plated)

## Operating Environment

OPERATING TEMPERATURE: -20˚C to +70˚C
SEALING / PROTECTION: IP67

**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.

| A | T | P | S | 1 | 9 | S | | | | | | | | | S | A | | | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ATPS19** Series

**Actuator Style**
**S** Standard

**Actuator Indicator**
**L0** Without LED
**L1** Ring
**L5** Ring & Power logo

**LED Illumination**

| Color | Dual Color |
|---|---|
| **0** Without LED | **A** Red & Green |
| **2** White | **B** Red & Blue |
| **3** Red | |
| **5** Yellow | |
| **6** Green | |
| 7 Blue | |

**LED Voltage DC**
**00** Without LED
**03** 3V (47Ω with red/yellow LED)
**06** 6V (180Ω)
**12** 12V (470Ω)
**24** 24V (1000Ω)

**Bushing type**

| | |
|---|---|
| **M0** | Stainless (Natural), Round |
| **M2** | Stainless (Natural), D shape |
| **M4** | Stainless (Natural), Double D |

**Contact Arrangement**
**S** SPST

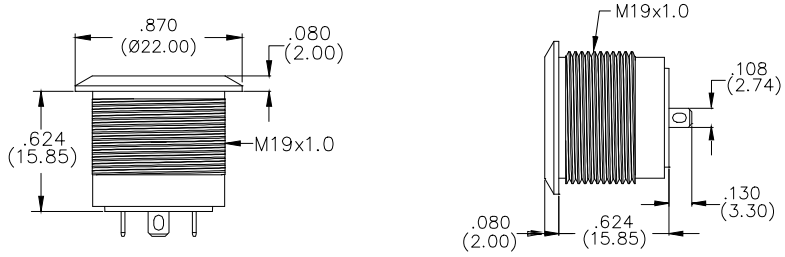
**Mechanical Function**
**A** Momentary

**Termination**
**04** Solder lug
**W1** Wire lead 500mm

**Terminal Plating**
**G** Gold flash

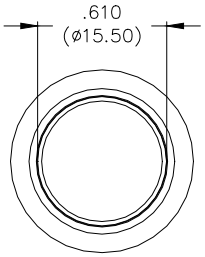
## STANDARD VIEW

### STANDARD

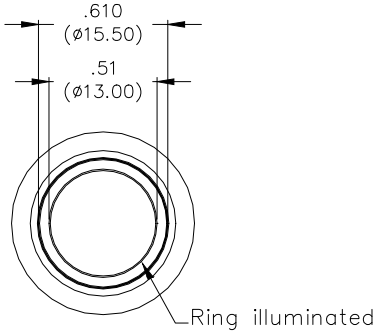



## ACTUATOR INDICATOR

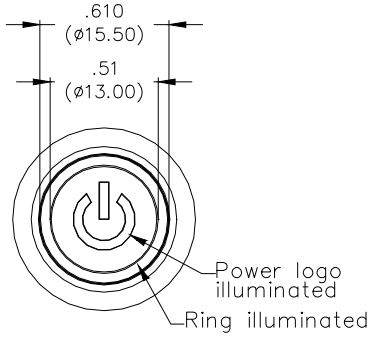
**L0** WITHOUT LED




**L1** RING



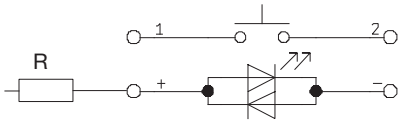

**L5** RING & POWER



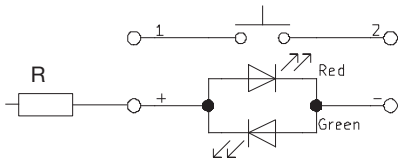

## CIRCUIT

### MOMENTARY

**SINGLE COLOR LED**




**DUAL COLOR LED**




R: Resistor value is according to the LED voltage applied.

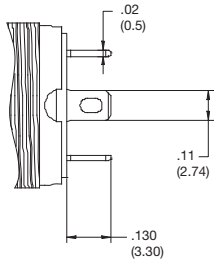
| Resistor value (Apply LED Voltage) |
|---|
| LED input 3 VDC, 47 ohms (Red/Yellow LED type only) |
| LED input 6 VDC, 180 ohms |
| LED input 12 VDC, 470 ohms |
| LED input 24 VDC, 1000 ohms |

Ohms value of resistance tolerance: ±5%

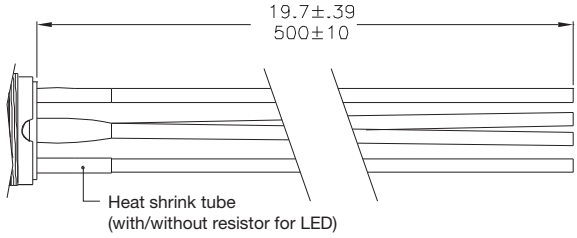
# ATPS19 Series
# Anti-Vandal Short-Body Sealed Pushbutton Switch

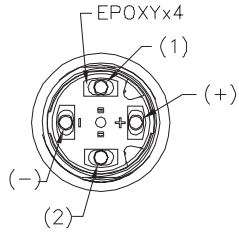
## TERMINATION

### 04 SOLDER LUG




### W1 WIRE LEAD 500MM*
**(Multi-wire lead AWG20, Section 0.6 mm², UL approved)**



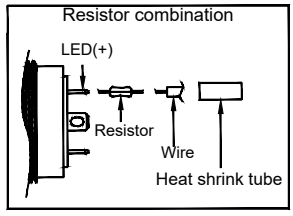




Non-LED

| Description | Wire color |
|---|---|
| Terminal 1 | Black |
| Terminal 2 | Black |

With LED

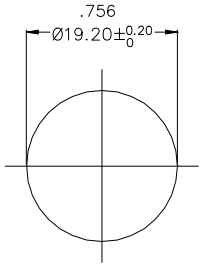
| Description | Wire color |
|---|---|
| Terminal 1 | Black |
| Terminal 2 | Black |
| LED+ | Red |
| LED- | Green |



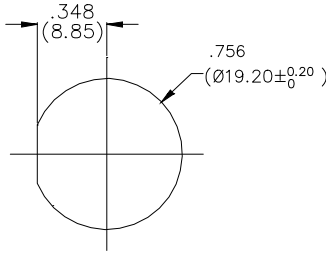

* Special length, please consult your sales representative for details.

## PANEL CUTOUT

### M0
**ROUND**

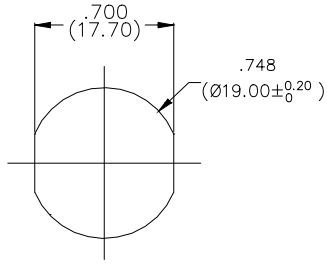



### M2
**D SHAPE**



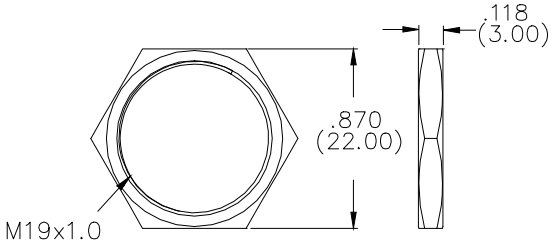

### M4
**DOUBLE D**

Thickness: 6.0mm (Max.)

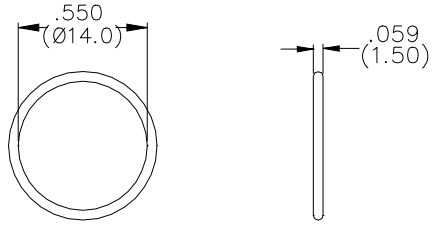



## HARDWARE

### HEX NUT
**Order PN: ATP19-HN**




### O RING
**Order PN: ATP19-OR**



# ATP19 Series
# Anti-Vandal Sealed Pushbutton Switch

## Features/Benefits

- *Momentary or Lock version*
- *IP67 sealed & IK10 (Stainless steel bushing)*
- *Capable of up to 3A resistive load*
- *50,000 life cycle at full load*
- *Various colors of LED illuminate indicator*
- *Choices of pushbutton with symbol on spot, ring or power logo*

## Typical Applications

- *Control Panels including car park and traffic light*
- *Industrial Instruments*
- *Lifts / Escalator*
- *Communication equipment*
- *Alarm, safety and security systems*



c UL us

## Specifications

FUNCTION: Single pole and double poles
CONTACT ARRANGEMENT: N.O. and N.C.
MOUNTING TYPE: Threaded front panel mount
TORQUE FOR THREADED BODY: 5-14 Nm

## Mechanical

OPERATING LIFE: Momentary 1,000,000 cycles
Self-lock 500,000 cycles
TOTAL TRAVEL: about 3.2 mm
OPERATING FORCE: 1 pole 2.5 ± 1N
2 pole 3.5 ± 1N

## Electrical

CONTACT RATING: Ith 5A/250VAC
3A / 250VAC
3A / 28VDC
OPERATING LIFE: 50,000 make-and-break cycles at full load
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 1,000 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max @1A 12VDC

## Materials

BUSHING: Stainless steel / Nickel plated brass / Aluminum alloy
BASE: PBT (UL 94-A0), PC (UL 94-V2)
ACTUATOR: PC (UL 94-V2); Stainless steel / Nickel plated brass / Aluminum alloy
INTERNAL ASSEMBLY: POM / PA66
SPRING: Steel
SEALING / O-ring: Silicone
TERMINALS: Brass with silver or gold plated
CONTACT: Copper, silver plated

## Operating Environment

OPERATING TEMPERATURE: -20˚C to +55˚C
SEALING / PROTECTION: IP67 / IK10 (Stainless steel bushing)

**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.

| A | T | P | 1 | 9 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ATP19** Series

**Actuator Style**
**S** Standard
**R** Raised #
**D** Dome without LED only ###

**Actuator Indicator**
**L0** Without LED *
**L1** Fix ring *
**L2** Spot *
**L3** Moving ring * (standard actuator only)
**L4** Power logo **
**L5** Moving ring & Power logo ** (standard actuator only)

**LED Illumination**

| Color | Dual color |
|---|---|
| **0** Without LED | **A** Red & Green |
| **2** White | **B** Red & Blue |
| **3** Red | **D** Blue & Yellow |
| **5** Yellow | **G** Red & Yellow |
| **6** Green | **H** Green & Yellow |
| 7 Blue | **J** Orange & Green |

**LED voltage (20mA)**
**00** Without LED
**03** 3V
**06** 6V
**12** 12V
**24** 24V
**36** 36V
**A1** 110V AC
**A2** 220V AC

**Bushing type**

| Round | Double D shape |
|---|---|
| **B0** Stainless (Natual) | **M0** Stainless (Natual) |
| **B3** Al alloy (Black anodized) ## | **M3** Al alloy (Black anodized) ## |

**Contact arrangement**
**S** SPDT
**D** DPDT

**Mechanical function**
**A** Momentary
**E** Lock

**Termination**
**03** STD solder lug
**04** Short solder lug
**W1** Wire lead 500mm ***
**W2** Wire lead 1,000mm ***

**Terminal plating**
**Q** Silver
**G** Gold

* Available on round bushing only
** Available on double D-shape bushing only
*** Available upon request, please contact your sales representative for details
# Come in B0 & M0 with L1 or L4 indicator only
## Come in S style actuator only & no L5 indicator
### Without LED & for B0 & M0 bushing type only

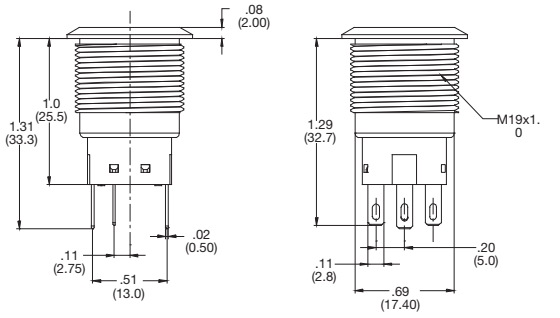
Third Angle Projection

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

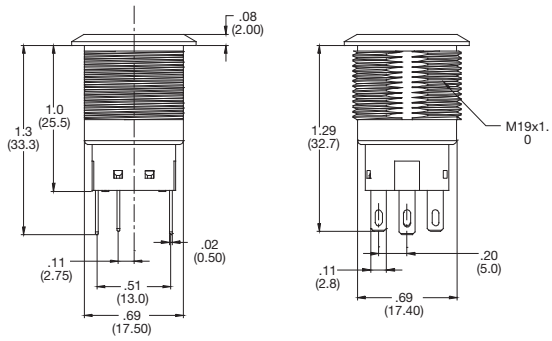
# ATP19 Series
# Anti-Vandal Sealed Pushbutton Switch

## STANDARD VIEW

**ROUND BUSHING**

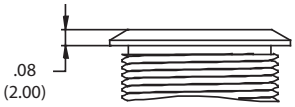



**DOUBLE-D BUSHING**

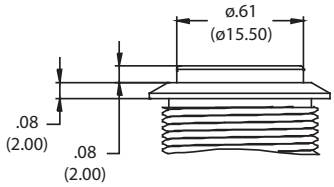



## ACTUATOR STYLE

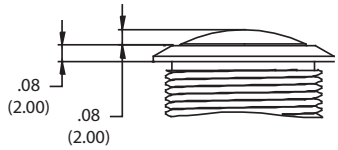
**S** STANDARD




**R** RAISED

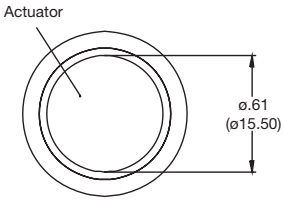



**D** DOME

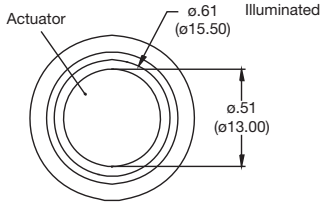



## ACTUATOR INDICATOR

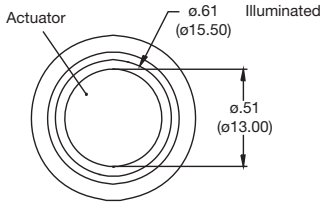
**L0** WITHOUT LED



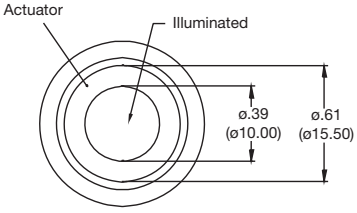

**L1** FIX RING



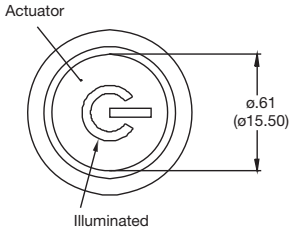

**L3** MOVING RING



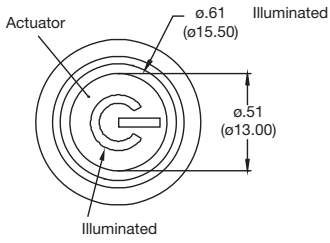

**L2** SPOT




**L4** FPOWER LOGO

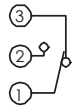



**L5** POWER & MOVING RING

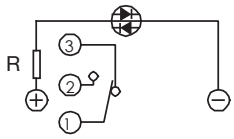


## CIRCUIT

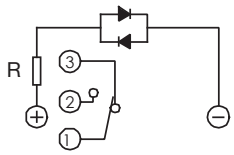
**SPDT**



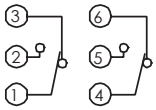

**SPDT - SINGLE COLOR LED**



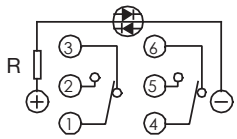

**SPDT - DUAL COLOR LED**



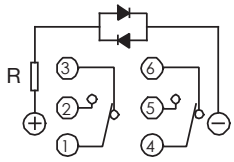

**DPDT**




**DPDT - SINGLE COLOR LED**

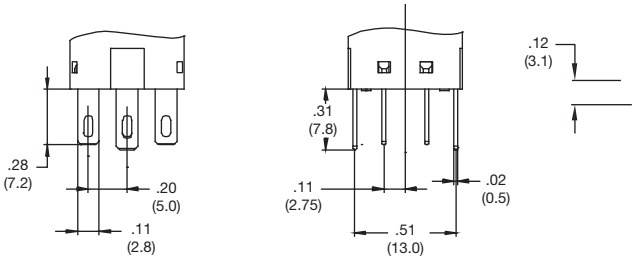



**DPDT - DUAL COLOR LED**

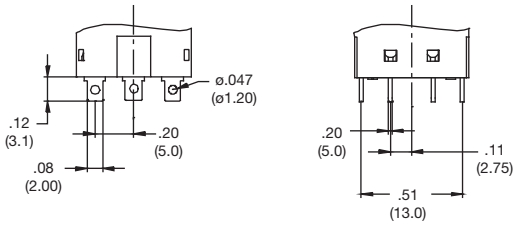



## TERMINATION

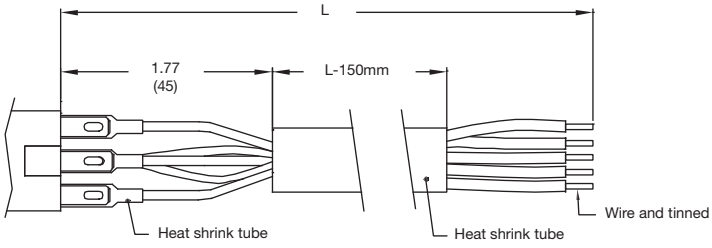
### 03 SOLDERLUG

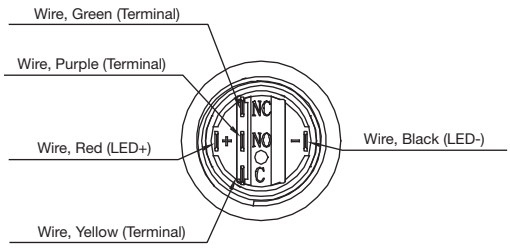



### 04 SHORT SOLDER LUG




### W1 OR W2 WIRE LEAD

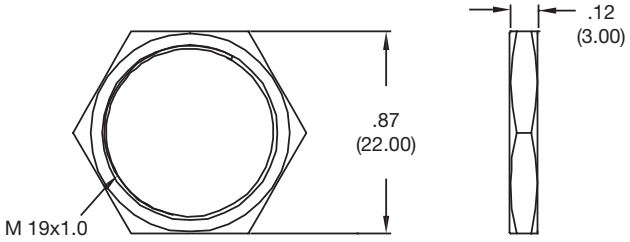



## HARDWARE

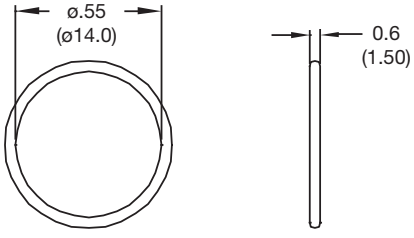
### HEX NUT

**Order PN: ATP19-HN**




### O RING

**Order PN: ATP19-OR**



# ATPS22 Series
# Anti-Vandal Short-Body Sealed Pushbutton Switch

NEW

## Features/Benefits

- *Momentary*
- *IP67 sealed & IK10 (Stainless steel bushing)*
- *Rated at 2A / 36 Vdc*
- *1,000,000 mechanical lifecycles*
- *Various colors of LED illuminate indicator*
- *Choices of actuator with ring or power logo*
- *RoHS compliant*

## Typical Applications

- *Alarm, safety & security systems*
- *Intercom "push-to-talk" devices*
- *Automatic food & drink vending machines*
- *Parking lot ticket machines & ticket paying stations*
- *Industrial instruments*



### Specifications

FUNCTION: SPST
CONTACT ARRANGEMENT: N.O.
MOUNTING TYPE: Threaded front panel mount
TORQUE FOR THREADED BODY: 11.5 kgf/cm

### Mechanical

MECHANICAL LIFE: 1,000,000 cycles
TOTAL TRAVEL: 1.8 ± 0.2 mm
OPERATING FORCE: 4.5 ± 1.5N

### Electrical

CONTACT RATING: 2A / 36Vdc
ELECTRICAL LIFE: Make-and-break cycles at full load
200,000
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 1,000 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max @1A 12VDC

### Materials

BUSHING: Stainless steel
BASE: PA66, white (UL 94-V0)
ACTUATOR: PC, translucent (UL 94-V2), std steel
INTERNAL ASSEMBLY: PC, transparent (UL 94V2)
SPRING: Steel
SEALING / O-ring: Silicone (Translucent) / Silicone
TERMINALS / CONTACT: Brass, gold flash plated / Brass, silver alloy
HEX NUT: Brass (Nickel plated)

### Operating Environment

OPERATING TEMPERATURE: -20˚C to +70˚C
SEALING / PROTECTION: IP67

**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.

| A | T | P | S | 2 | 2 | S | | | | | | | | | S | A | | | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ATPS22** Series

**Actuator Style**
**S** Standard

**Actuator Indicator**
**L0** Without LED
**L1** Ring
**L5** Ring & Power logo

**LED Illumination**

| Color | Dual Color |
|---|---|
| **0** Without LED | **A** Red & Green |
| **2** White | **B** Red & Blue |
| **3** Red | **C** Orange & Green |
| **5** Yellow | |
| **6** Green | |
| 7 Blue | |

**LED Voltage DC**
**00** Without LED
**03** 3V (47Ω with red/yellow LED)
**06** 6V (180Ω)
**12** 12V (470Ω)
**24** 24V (1000Ω)

**Bushing type**

| | |
|---|---|
| **M0** | Stainless (Natural), Round |
| **M2** | Stainless (Natural), D shape |
| **M4** | Stainless (Natural), Double D |

**Contact Arrangement**
**S** SPST

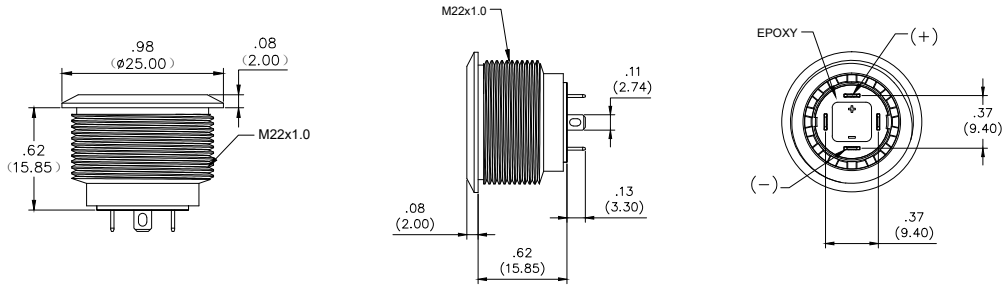
**Mechanical Function**
**A** Momentary

**Termination**
**04** Solder lug
**W1** Wire lead 500mm

**Terminal Plating**
**G** Gold flash

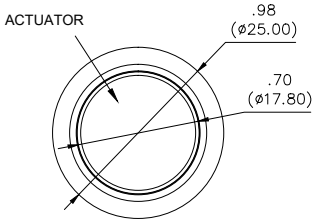
## STANDARD VIEW

### STANDARD

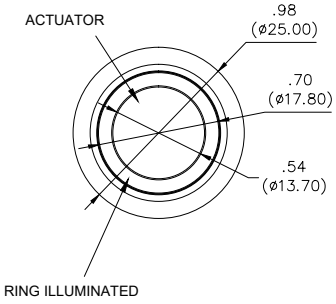



## ACTUATOR INDICATOR

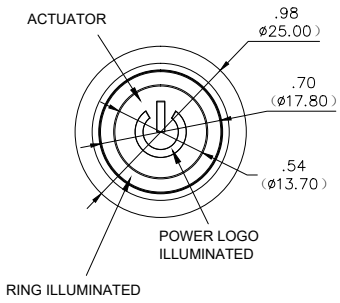
**L0** WITHOUT LED




**L1** RING



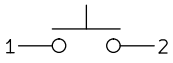

**L5** RING & POWER



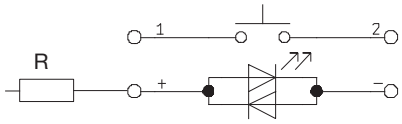

## CIRCUIT

### MOMENTARY

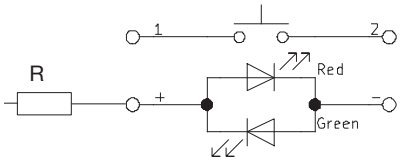
**WITHOUT LED**




**SINGLE COLOR LED**




**DUAL COLOR LED**




R: Resistor value is according to the LED voltage applied.

| Resistor value (Apply LED Voltage) |
|---|
| LED input 3 VDC, 47 ohms (Red/Yellow LED type only) |
| LED input 6 VDC, 180 ohms |
| LED input 12 VDC, 470 ohms |
| LED input 24 VDC, 1000 ohms |

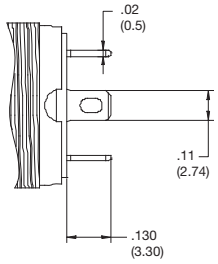
Ohms value of resistance tolerance: ±5%

# ATPS22 Series
# Anti-Vandal Short-Body Sealed Pushbutton Switch

NEW

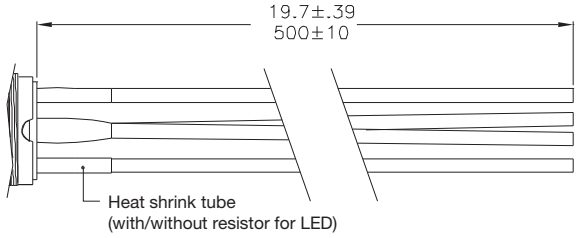
## TERMINATION

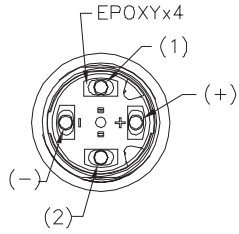
### 04 SOLDER LUG




### W1 WIRE LEAD 500MM*

**(Multi-wire lead AWG20, Section 0.6 mm², UL approved)**



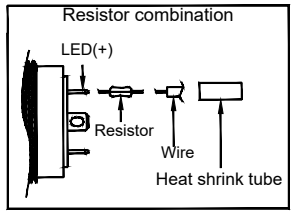




Non-LED

| Description | Wire color |
|---|---|
| Terminal 1 | Black |
| Terminal 2 | Black |

With LED

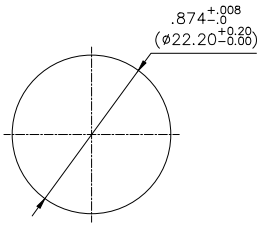
| Description | Wire color |
|---|---|
| Terminal 1 | Black |
| Terminal 2 | Black |
| LED+ | Red |
| LED- | Green |



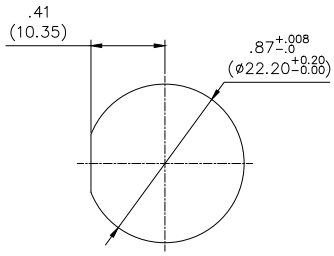

* Special length, please consult your sales representative for details.

## PANEL CUTOUT

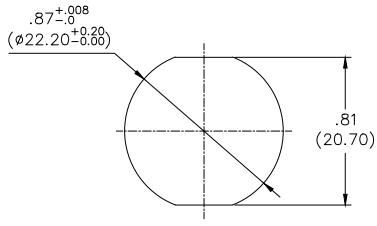
### M0
**ROUND**




### M2
**D SHAPE**

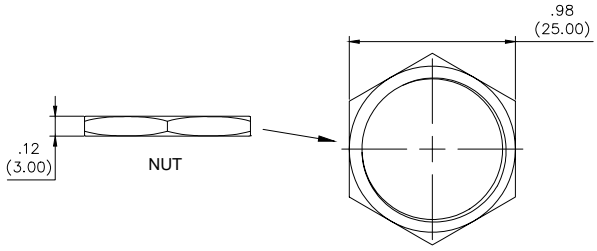



### M4
**DOUBLE D**

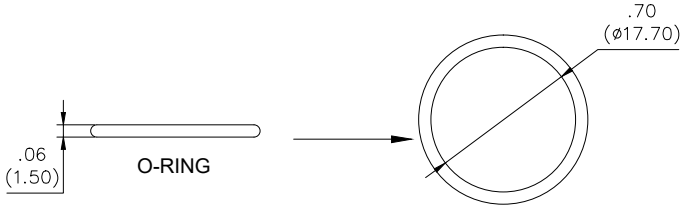



## HARDWARE

### HEX NUT
**Order PN: ATP22-HN**




### O RING
**Order PN: ATP22-OR**



# ATP22 Series
# Anti-Vandal Sealed Pushbutton Switch

## Features/Benefits

- *Momentary or Lock version*
- *IP67 sealed & IK10 (Stainless steel bushing)*
- *Capable of up to 3A resistive load*
- *50,000 life cycle at full load*
- *Various colors of LED illuminate indicator*
- *Choices of pushbutton with symbol on spot, ring or power logo*

## Typical Applications

- *Control Panels including car park and traffic light*
- *Industrial Instruments*
- *Lifts / Escalator*
- *Communication equipment*
- *Alarm, safety and security systems*



## Specifications

FUNCTION: Single pole and double poles
CONTACT ARRANGEMENT: N.O. and N.C.
MOUNTING TYPE: Threaded front panel mount
TORQUE FOR THREADED BODY: 5-14 Nm

## Mechanical

OPERATING LIFE: Momentary 1,000,000 cycles
Self-lock 500,000 cycles
TOTAL TRAVEL: about 3.2 mm
OPERATING FORCE: 1 pole 2.5 ± 1N
2 pole 3.5 ± 1N

## Electrical

CONTACT RATING: Ith 5A/250VAC
3A / 250VAC
3A / 28VDC
OPERATING LIFE: 50,000 make-and-break cycles at full load
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 1,000 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max @1A 12VDC

## Materials

BUSHING: Stainless steel / Aluminum alloy
BASE: PBT (UL 94-A0), PC (UL 94-V2)
ACTUATOR: PC; Stainless steel / Aluminum alloy
INTERNAL ASSEMBLY: POM / PA66
SPRING: Steel
SEALING / O-ring: Silicone
TERMINALS: Brass with silver or gold plated
CONTACT: Copper, silver plated

## Operating Environment

OPERATING TEMPERATURE: -20˚C to +55˚C
SEALING / PROTECTION: IP67 / IK10 (Stainless steel bushing)

**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.

| A | T | P | 2 | 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**ATP22** Series

**Actuator Style**
**S** Standard

**Actuator Indicator**
**L0** Without LED
**L3** Moving ring
**L6** Ring LED*
**L7** Ring LED + power logo**
**L8** Ring LED + power logo***

**Illumination**

| Color | Dual color |
|---|---|
| **0** Without LED | **A** Red & Green |
| **2** White | **B** Red & Blue |
| **3** Red | **D** Blue & Yellow |
| **5** Yellow | **G** Red & Yellow |
| **6** Green | **H** Green & Yellow |
| **7** Blue | **J** Orange & Green |

**LED voltage (20mA)**
**00** Without LED
**03** 3V
**06** 6V
**12** 12V
**24** 24V
**36** 36V
**A1** 110V AC
**A2** 220V AC

**Bushing type**
**B0** Stainless (Round)
**B3** Al alloy: black anodized (Round)
**M0** Stainless (Double D-shape)****

**Contact arrangement**
**S** SPDT
**D** DPDT

**Mechanical function**
**A** Momentary
**E** Lock

**Termination**
**03** STD solder lug
**W1** Wire lead 500mm*****
**W2** Wire lead 1,000mm*****

**Terminal plating**
**Q** Silver
**G** Gold

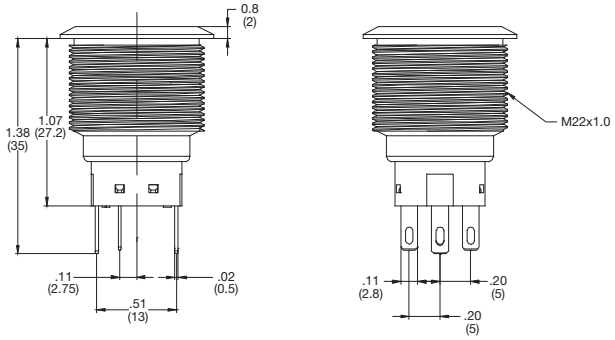
* Available on ring color CAP of red/green/blue only
** Power logo and ring with clear color CAP available on double D-shape bushing only
*** Power logo and ring with red/green/blue color CAP available on double D-shape bushing only
**** Not available on L0/L3/L6 actuator indicator
***** Available upon request, please contact your sales representative for details

Third Angle Projection

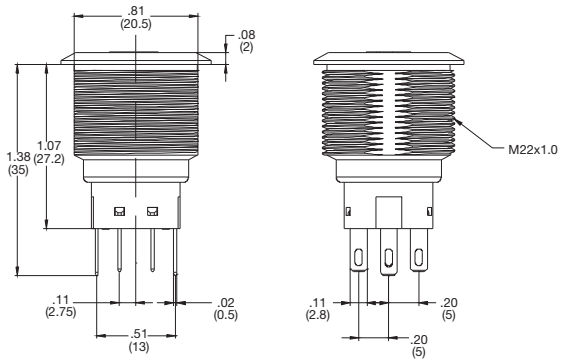
*Dimensions are shown: mm (inches)*
*Specifications and dimensions subject to change*

## STANDARD VIEW

ROUND BUSHING

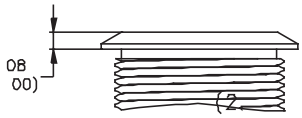



DOUBLE-D BUSHING



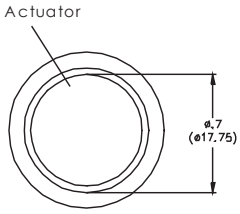

## ACTUATOR STYLE

**S** STANDARD

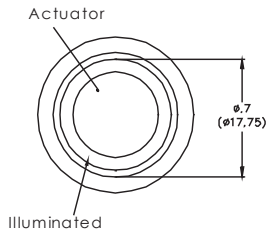


## ACTUATOR INDICATOR

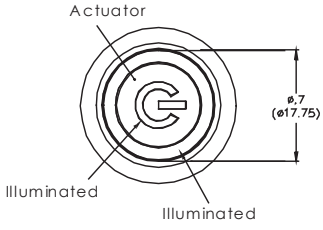
**L0** WITHOUT LED




**L3 & L6** RING LED




**L7 & L8** POWER & RING



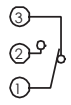



*Dimensions are shown: mm (inches)*
*Specifications and dimensions subject to change*

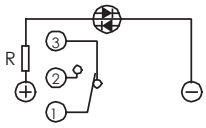
# ATP22 Series
# Anti-Vandal Sealed Pushbutton Switch

## CIRCUIT

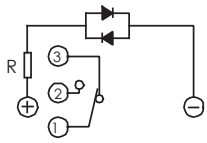
**SPDT**



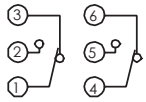

**SPDT - SINGLE COLOR LED**



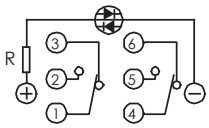

**SPDT - DUAL COLOR LED**



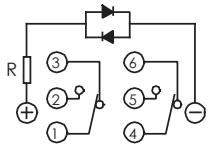

**DPDT**




**DPDT - SINGLE COLOR LED**

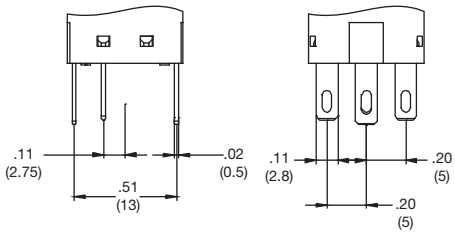



**DPDT - DUAL COLOR LED**

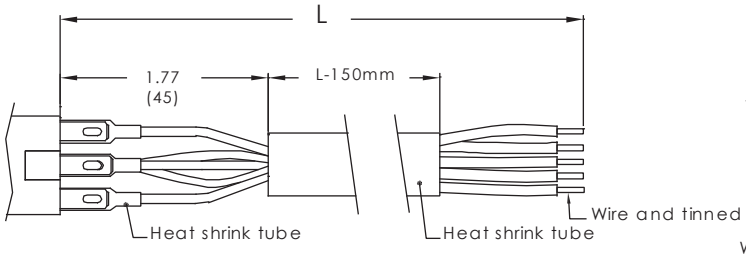


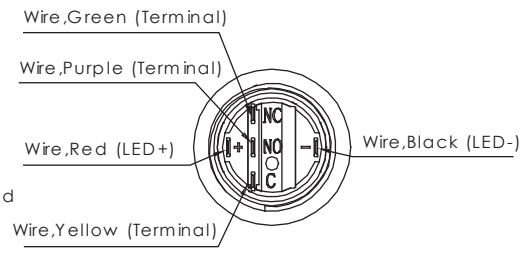

## TERMINATION

### 03 SOLDERLUG




### W1 OR W2 WIRE LEAD

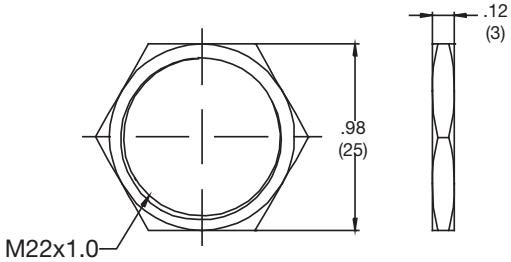



## HARDWARE

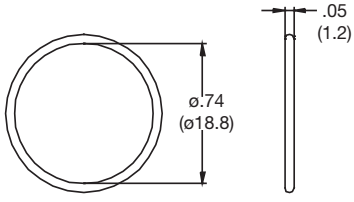
### HEX NUT

**Order PN: ATP22-HN**




### O RING

**Order PN: ATP22-OR**



# PBA Series
# Illuminated Pushbutton

## *Features/Benefits*

- ***Illuminated display***
- ***Small size***
- ***Cold lighting***
- ***Tactile feed back***

## *Typical Applications*

- ***Avionic***




## Mechanical

ACTUATION FORCE: 5,5 N ± 0,5 N
MAXIMUM FORCE: 80 N
TRAVEL TO CONTACT: 1,2 ± 0,1 mm
OVERTRAVEL: >0,3 mm
TOTAL TRAVEL: 1,5 ± 0,1 mm
LIFE EXPECTANCY: $10^6$ operations 28 V - 10 mA
WEIGHT: 2 grams
VIBRATION: ± 0,45mm from 33 Hz to 75 Hz
ACCELERATION: 10 g max

## Electrical

CONTACTS: Gold plated
VOLTAGE: Max 100 V - Min 20 mV DC
CARRYING CURRENT: Max 250 mA - Min 50 µA
SWITCHING CURRENT: Max 50 mA - Min 50 µA
MAX SWITCHING POWER: 1 W
CONTACT RESISTANCE: < 50 Ω
DIELECTRIC STRENGTH: 500 V rms
INSULATION RESISTANCE (100 V): > 5000 M Ω
BOUNCE: < 3 ms
SWITCHING OF 2 POLES MATCHING: < 10 ms

## Environmental Data

STORAGE TEMPERATURE: -55°C TO 85°C
OPERATING TEMPERATURE: -30°C TO 85°C
TEMPERATURE OF KEY TO CAP: < Ambiant +25°C
HUMIDITY TEST: 21 days (-40°C - 93% HR)
ALTITUDE PRESSURE: From 20 hPa to 1070 hPa

## Soldering Data

MANUAL SOLDERING: 250°C / 2s
SEALING: According to IP64

## Plastic Material

Housing and Cap: UL-94 V0

**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.

| P | B | A | | | | | | Repeat sequence for 2nd Marking | | |
|---|---|---|---|---|---|---|---|---|---|---|

**Designation**
**PBA** PBA Series

**Size**
**1** 9,5 x 14
**2** 11,5 x 14
**3** 14 x 14

**Marking Location**
**H** High
**M** Middle
**L** Low

**Type of Marking**
**T** Text / Legend
**S** Status Indicator

**LED Color**

| | | |
|---|---|---|
| **0** | White | λ |
| **1** | Green | λ 560 nm |
| **2** | Yellow Green | λ 568 nm |
| **3** | Amber | λ 590 nm |
| **4** | Red | λ 660 nm |
| **5** | Other | λ |

**Display Type**

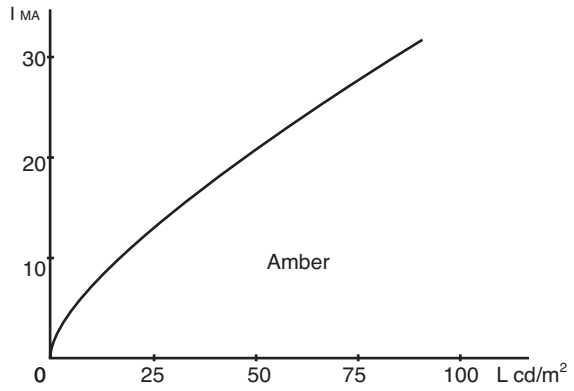
| | | LED Non-Illuminated | LED Illuminated |
|---|---|---|---|
| **N** | Text Marking | White | LED Color |
| | Background | Black | Black |
| **S** | Text Marking | Not visible | LED Color |
| | Background | Black | Black |
| **R** | Text Marking | White | LED Color |
| | Background | Red | Red |
| **G** | Text Marking | Green | Green |
| | Background | Black | Black |

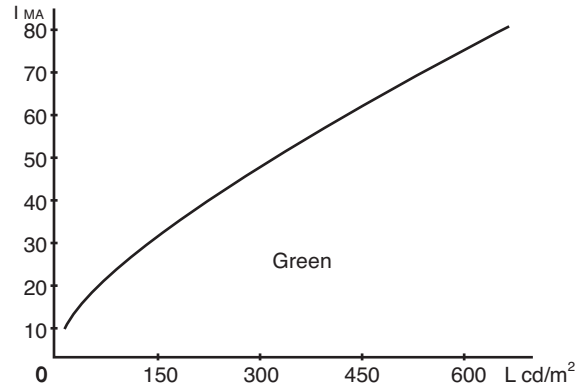
**LED Supply or Type**
**AC** Alternative
**DC** Direct
**XX** for each marking 1:6 LEDs in parallel for direct current

# PBA Series
# Illuminated Pushbutton

## LIGHTING DATA

The legends of function and the status indicator can be illuminated separately.



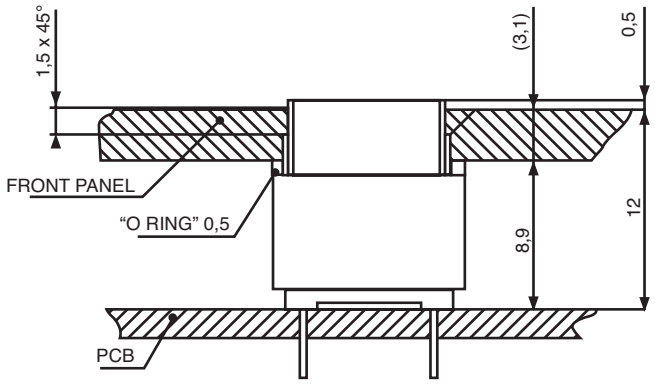



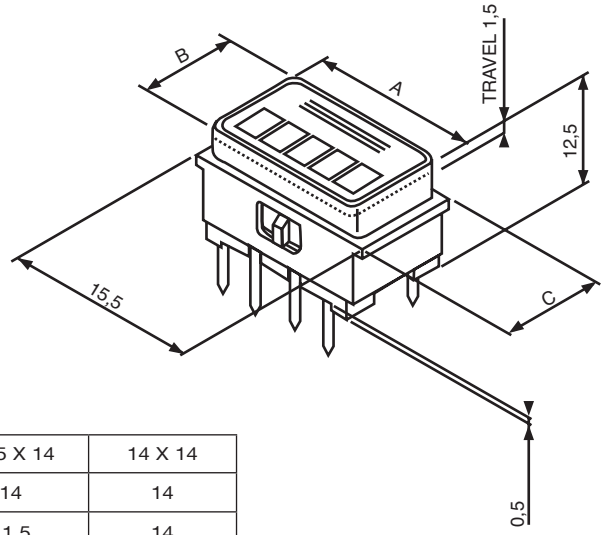

LIGHTING / CURRENT

| Color | | Amber | Green |
|---|---|---|---|
| Wave Length | | 586 < l < 592 | 555 < l < 560 |
| Current Max | | 80 mA | 80 mA |
| Chromaticity | X<br>Y | 0,54 < X < 0,58<br>0,40 < Y < 0,44 | 0,30 < X < 0,40<br>0,6 < Y |
| Contrast Min. | | 1,2 | 0,85 |

For other colors and displays, please contact Customer Service.

## DIMENSIONS (applicable for any size)

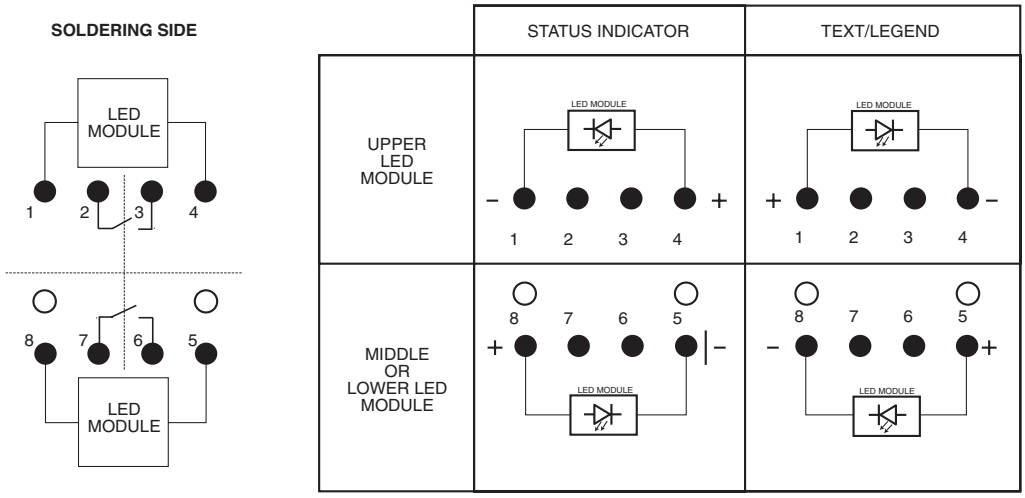


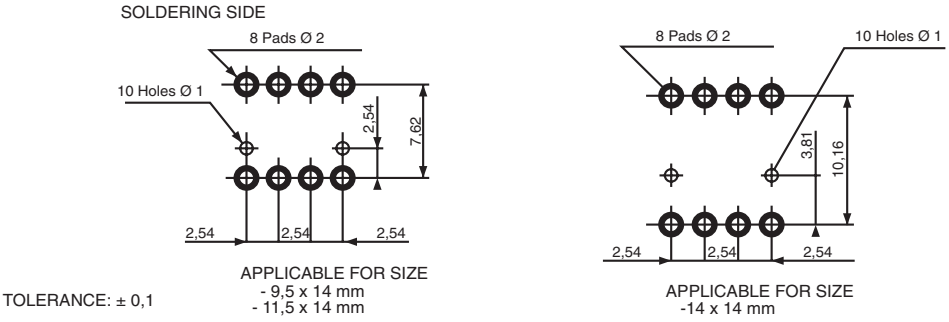

| | 9,5 X 14 | 11,5 X 14 | 14 X 14 |
|---|---|---|---|
| A | 14 | 14 | 14 |
| B | 9,5 | 11,5 | 14 |
| C | 11 | 11,5 | 15,5 |

Tolerance: ± 0,1 mm

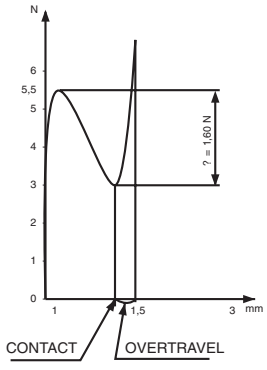
## LED MODULE LAYOUT




## PCB Layout



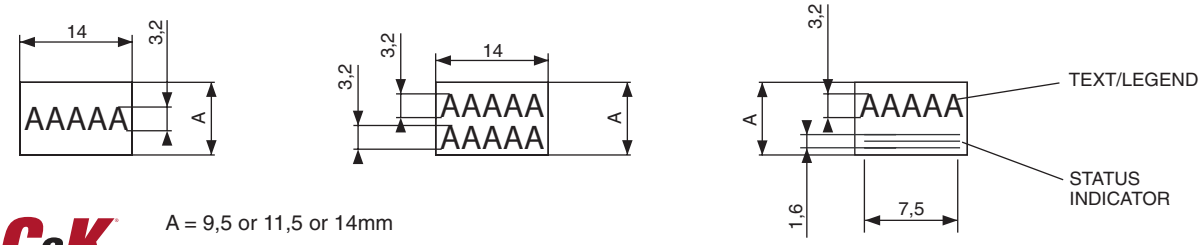

## TACTILE EFFECT




TRAVEL
- TRAVEL TO CONTACT: 1,2 ± 0,1 mm
- OVERTRAVEL: > 0,3 mm
- TOTAL TRAVEL: 1,5 ± 0,1 mm

FORCE
- ACTUATOR FORCE: 5,5 N ± 0,5 N
- TACTILE FEELING: 1,6 N

1 or 2 markings are available in any combination of text / legend or status indicator.




A = 9,5 or 11,5 or 14mm

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

# PS-12G Series
# Pushbutton Switches

## *Features/Benefits*

- ***Latching pushbutton***
- ***Non-shorting with lock***
- ***5 mm travel***
- ***SPDT***

## *Typical Applications*

- ***Automotive interior lighting***
- ***Computer peripherals***
- ***Appliances***

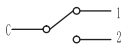


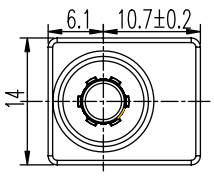
## How To Order

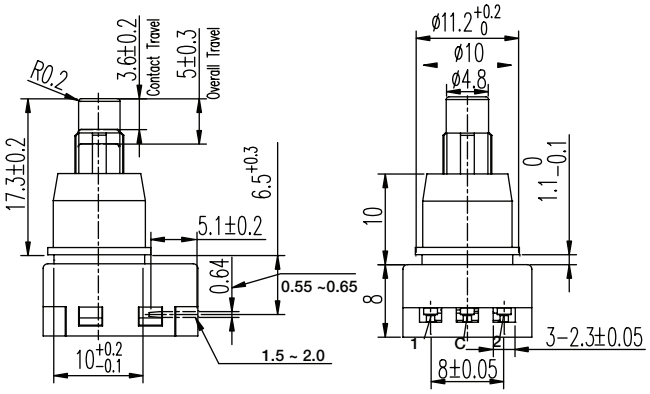
Part number list is shown below. For individual part details, please refer to the following pages.

| Part Number (Part Description) | Product Details |
|---|---|
| PS-12G01 | SPDT, non-shorting with lock, 1A @ 14 VDC, white actuator |
| PS-12G03 | SPDT, non-shorting with lock, 2.2A @ 14.5 VDC, black actuator |



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-12G01 | 200 pieces |  |




## Dimensions

WIDTH X DEPTH: 14 x 16.8 mm

HEIGHT: 18 mm

## Specifications

CONTACT RATING: 1A @ 14 VDC

INITIAL CONTACT RESISTANCE: 100 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 20,000 cycles with load

OPERATING FORCE: 400 ± 100 gf

OPERATING POSITION: 3.6 ± 0.2 mm

TOTAL TRAVEL: 5 ± 0.3 mm

OPERATING TEMPERATURE: -20°C to 70°C

## Materials

KNOB: POM (UL 94HB)

HOUSING: PBT (UL 94V-0)

COVER: PBT (UL 94V-0)

ROTOR: PBT (UL 94V-0)

SLIDER: POM (UL 94HB)

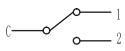
TERMINAL: Phospher bronze, silver plated

SPRING: Stainless steel

CONTACT: Phospher bronze, silver plated

# PS-12G Series
# Pushbutton Switches



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-12G03 | 200 pieces |  |

## Dimensions

WIDTH X DEPTH: 14 x 16.8 mm

HEIGHT: 18.3 mm

## Specifications

CONTACT RATING: 2.2A @ 14.5 VDC

INITIAL CONTACT RESISTANCE: 50 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 20,000 cycles with load

OPERATING FORCE: 650 ± 300 gf

OPERATING POSITION: 4.00 ± 0.2 mm

TOTAL TRAVEL: 4.5 ± 0.3 mm

OPERATING TEMPERATURE: -40°C to 85°C

## Materials

KNOB: POM (UL 94HB)

HOUSING: PBT & PA (UL 94V-0)

COVER: PBT (UL 94V-0)

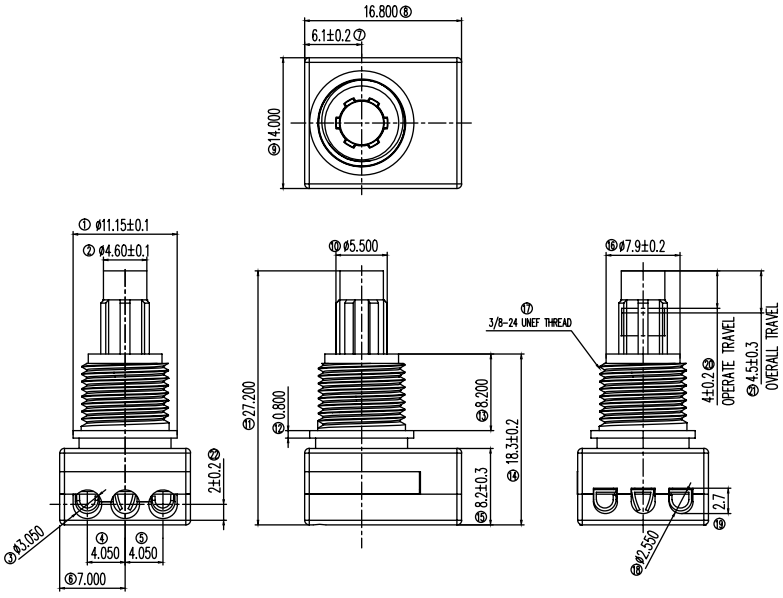
ROTOR: PBT (UL 94V-0)

SLIDER: POM (UL 94HB)

TERMINAL: Brass, silver plated

SPRING: Stainless steel

CONTACT: Phosphor bronze, silver plated




TYCO .062 Commercial Pin and Socket Connector PT# 770983-1

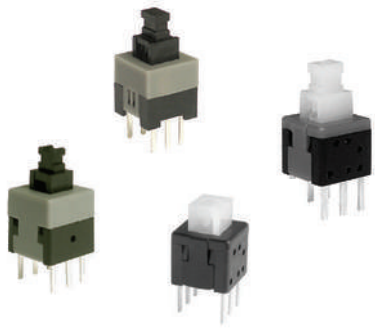
# PS-22 Series
# Subminiature Pushbutton Switches

## *Features/Benefits*

- *Compact miniature push switch*
- *Momentary or latching options*
- *Shorting or non-shorting*
- *DPDT*

## *Typical Applications*

- *Industrial*
- *Automotive*
- *Audio and visual equipment*



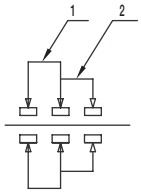
## How To Order

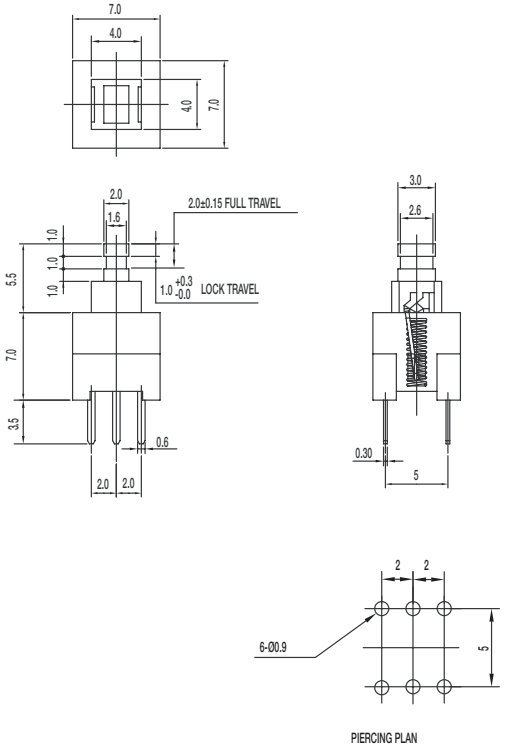
Part number list is shown below. For individual part details, please refer to the following pages.

| Part Number (Part Description) | Product Details |
|---|---|
| PS-2203-L NS PA | DPDT, non-shorting, lock, dim: 7.0*7.0*12.5 mm |
| PS-2203-F NS PA | DPDT, non-shorting, mom, dim: 7.0*7.0*12.5 mm |
| PS-2206-F NS | DPDT, non-shorting, mom, dim: 8.0*8.0*12.5 mm |

| Part Number (Part Description) | Product Details |
|---|---|
| PS-2214-L NS PA | DPDT, non-shorting, lock, dim: 5.8*5.8*7.5 mm |
| PS-2214-F NS PA | DPDT, non-shorting, mom, dim: 5.8*5.8*7.5 mm |
| PS-221605-L NS | DPDT, non-shorting, lock, dim: 5.8*5.8*10.0 mm |



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-2203-L NS PA | 1,000 pieces |  |
| PS-2203-F NS PA | 1,000 pieces | |




## Dimensions

WIDTH X DEPTH: 7.0 x 7.0 mm

HEIGHT: 12.5 mm

## Specifications

CONTACT RATING: 0.1A @ 30 VDC

INITIAL CONTACT RESISTANCE: 30 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 10,000 cycles with load

OPERATING FORCE:
200 ± 100 gf (1.96 ± 0.98N)

LOCK TRAVEL: 1 mm

TOTAL TRAVEL: 2 mm

OPERATING TEMPERATURE: -20˚C to 70˚C

## Materials

KNOB: POM Black

HOUSING: PA Black

COVER: POM Grey (latch) / White (Mom)

TERMINAL: Brass, silver plated

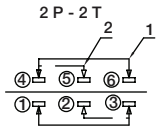
CONTACT CLIP: Phosphor bronze., silver plated

SPRING: Stainless steel

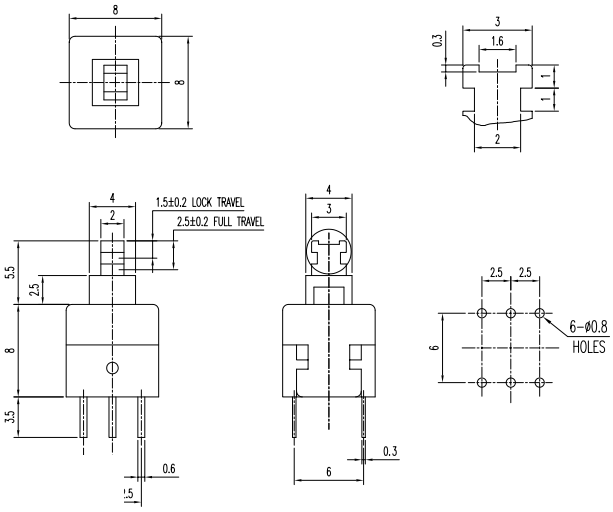
HOOK LOCK: Stainless steel (latch)

# PS-22 Series
# Subminiature Pushbutton Switches



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-2206-F NS | 1,000 pieces |  |







## Dimensions

WIDTH X DEPTH: 8.0 x 8.0 mm

HEIGHT: 13.5 mm

## Specifications

CONTACT RATING: 0.1A @ 30 VDC

INITIAL CONTACT RESISTANCE: 70 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 10,000 cycles with load

OPERATING FORCE:
200 ± 100 gf (1.96 ± 0.98N)

LOCK TRAVEL: 1.5 mm

TOTAL TRAVEL: 2.5 mm

OPERATING TEMPERATURE: -20˚C to 70˚C

## Materials

KNOB: POM Black

HOUSING: PBT Black

COVER: POM Grey (latch) / White (Mom)

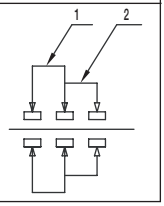
TERMINAL: Brass, silver plated

CONTACT CLIP: Phosphor bronze., silver plated

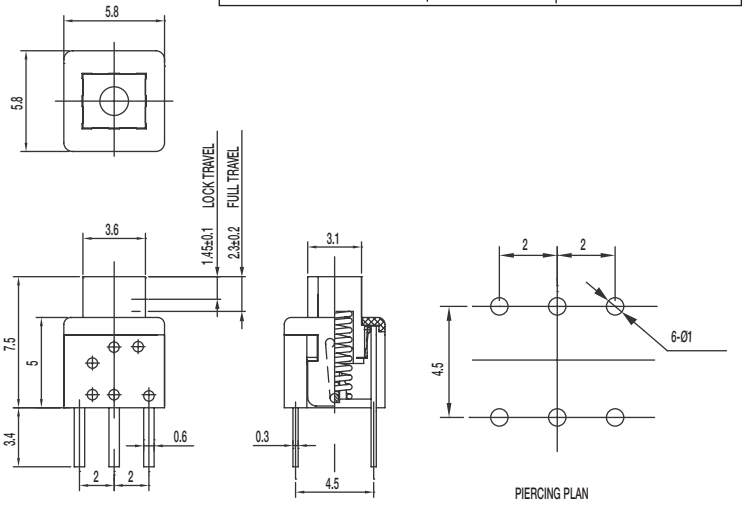
SPRING: Stainless steel

HOOK LOCK: Stainless steel (latch)



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-2214-L NS PA | 1,000 pieces |  |
| PS-2214-F NS PA | 1,000 pieces | |







## Dimensions

WIDTH X DEPTH: 5.8 x 5.8 mm

HEIGHT: 7.5 mm

## Specifications

CONTACT RATING: 0.1A @ 30 VDC

INITIAL CONTACT RESISTANCE: 80 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 10,000 cycles with load

OPERATING FORCE:
150 ± 50 gf (1.47 ± 0.49N)

LOCK TRAVEL: 1.45 mm

TOTAL TRAVEL: 2.3 mm

OPERATING TEMPERATURE: -20˚C to 70˚C

## Materials

KNOB: POM Natural (latch) / PA black

HOUSING: PA Black

COVER: PA Black

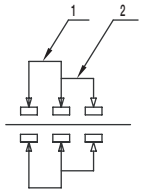
TERMINAL: Brass, silver plated

CONTACT CLIP: Phosphor bronze, silver clad

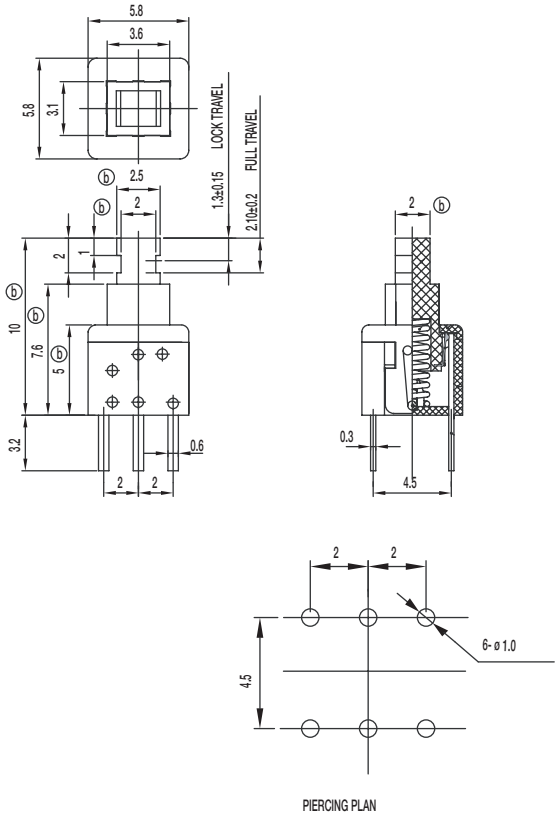
SPRING: Stainless steel

HOOK LOCK: Stainless steel (latch)



| PART NUMBER | PACKAGING | SCHEMATIC |
|---|---|---|
| PS-221605-L NS | 1,000 pieces |  |











PIERCING PLAN

## Dimensions

WIDTH X DEPTH: 5.8 x 5.8 mm

HEIGHT: 10 mm

## Specifications

CONTACT RATING: 0.1A @ 30 VDC / 2A @ 2 VDC

INITIAL CONTACT RESISTANCE: 80 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 10,000 cycles with load

OPERATING FORCE:
150 ± 50 gf (1.47 ± 0.49N)

LOCK TRAVEL: 1.3 mm

TOTAL TRAVEL: 2.1 mm

OPERATING TEMPERATURE: -20˚C to 70˚C

## Materials

KNOB: POM Natural

HOUSING: PA Black

COVER: PC Grey

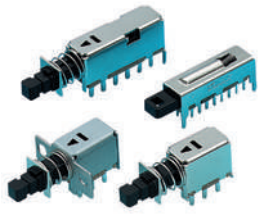
TERMINAL: Bras, silver plated

CONTACT CLIP: Phosphor bronze, silver clad

SPRING: Stainless steel

HOOK LOCK: Stainless steel (latch)

# PS Series
# Miniature Pushbutton Switches



## *Features/Benefits*

- ***Miniature size***
- ***Momentary or latching options***
- ***Broad range of products***

## Typical Applications

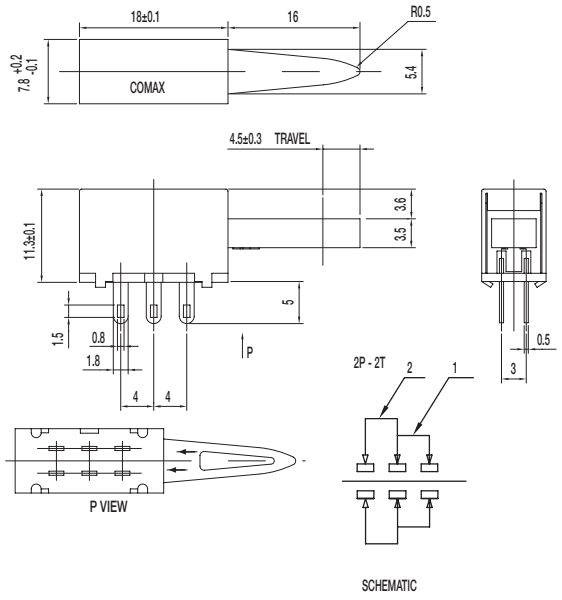
- **Industrial**
- **Automotive**
- **Audio and visual equipment**
- **Telecommunications**

## How To Order

Part number list is shown below. For individual part details, please refer to the following.

| Part Number (Part Description) | Product Details |
|---|---|
| PS-22I05 | DPDT, non-shorting, RT angle with metal frame |

## PS-22I05 DPDT NON-SHORTING




## Specifications

CONTACT RATING: 0.3A @ 30 VDC

INITIAL CONTACT RESISTANCE: 30 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 500 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 10,000 cycles with load

OPERATING FORCE: 400 ± 150 gf (3.92 ± 1.47N)

TOTAL TRAVEL: 4.5 ± 0.3 mm

OPERATING TEMPERATURE: -20˚C to 70˚C

## Materials

FRAME: SECC

KNOB: POM (UL 94HB)

CONTACT PLATE: Silver clad

SPRING: SUS

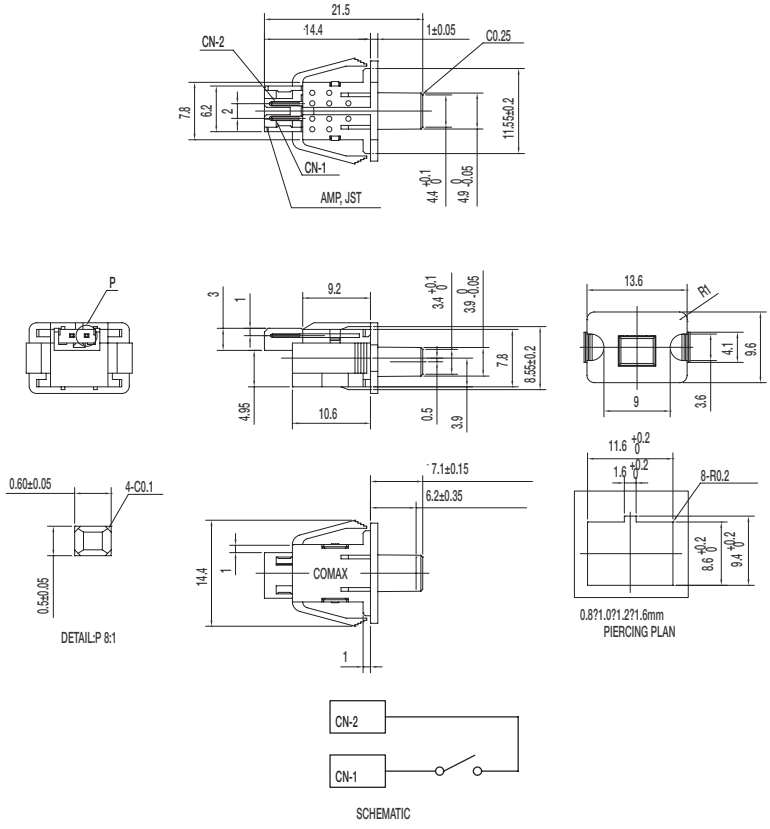
TERMINAL: Silver plated

## How To Order

Part number list is shown below. For individual part details, please refer to the following pages.

| Part Number (Part Description) | Product Details |
|---|---|
| PS-12C02-F NS | SPST non-shorting, mom |
| PS-32C02-F NS | 1P3T non-shorting, mom, pitch: 7.2 mm |
| PS-42C02-F NS | 1P4T non-shorting, mom, pitch: 7.2 mm |

## PS-12C02-F NS SPST NON-SHORTING




### Specifications

CONTACT RATING: 100 µ A @ 3 VDC min. / 10mA @ 5 VDC max

INITIAL CONTACT RESISTANCE: 100 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 250 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 100,000 cycles with load

OPERATING FORCE: 50 ± 15 gf (0.49 ± 0.147N)

PRE-TRAVEL: 6.20 ± 0.35 mm

OPERATING TEMPERATURE: -40˚C to 85˚C

### Materials

KNOB: POM (UL 94HB)

COVER: PA (UL 94V-0)

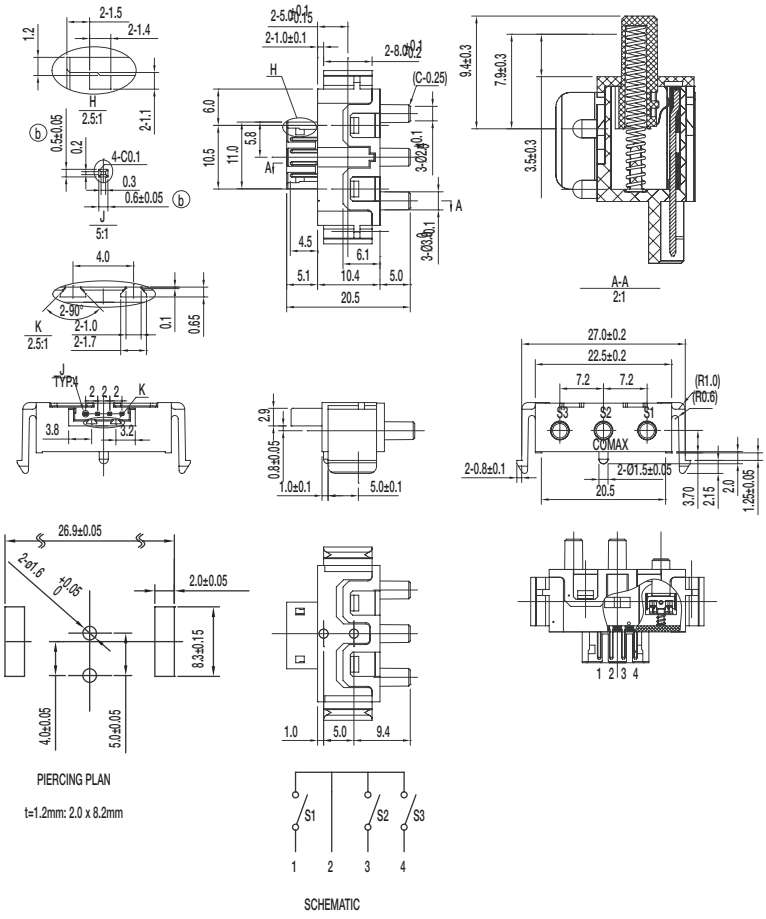
HOUSING: PA (UL 94V-0)

SPRING: SUS

TERMINAL: Silver plated

# PS Series
# Miniature Pushbutton Switches

## PS-32C02-F NS 1P3T NON-SHORTING




### Specifications

CONTACT RATING: 100 µ A @ 3 VDC min. / 10mA @ 5 VDC max

INITIAL CONTACT RESISTANCE: 100 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 250 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 100,000 cycles with load

OPERATING FORCE: 80 ± 20 gf (0.784 ± 0.196N)

PRE-TRAVEL: 1.5 ± 0.3 mm

OVER-TRAVEL: 3.5 ± 0.3 mm

TOTAL TRAVEL: 5 ± 0.3 mm

OPERATING TEMPERATURE: -20˚C to 65˚C

### Materials

KNOB: POM (UL 94HB)

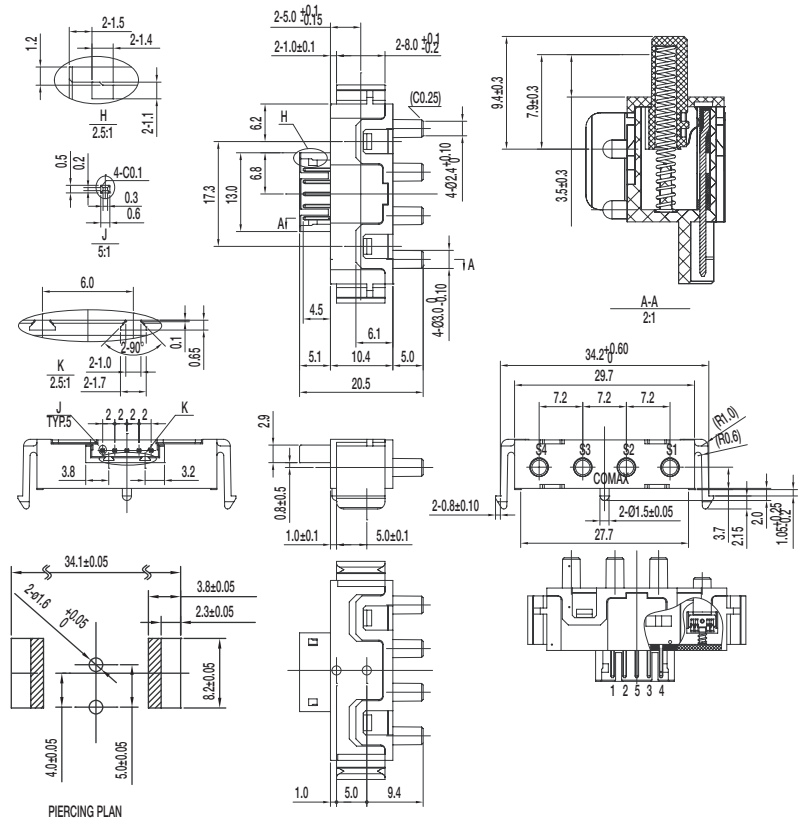
COVER: PA (UL 94V-0)

HOUSING: PA (UL 94V-0)

SPRING: SUS

TERMINAL: Silver plated

## PS-42C02-F NS 1P4T NON-SHORTING




### Specifications

CONTACT RATING: 100 µ A @ 3 VDC min. / 10mA @ 5 VDC max

INITIAL CONTACT RESISTANCE: 100 m ohms max.

INSULATION RESISTANCE: 100 M ohms min.

DIELECTRIC STRENGTH: 250 V AC (50-60 Hz) between open terminals and between the frame and terminal.

OPERATING LIFE: 100,000 cycles with load

OPERATING FORCE: 80 ± 20 gf (0.784 ± 0.196N)

PRE-TRAVEL: 1.5 ± 0.3 mm

OVER-TRAVEL: 3.5 ± 0.3 mm

TOTAL TRAVEL: 5 ± 0.3 mm

OPERATING TEMPERATURE: -20˚C to 65˚C

### Materials

KNOB: POM (UL 94HB)

COVER: PA (UL 94V-0)

HOUSING: PA (UL 94V-0)

SPRING: SUS

TERMINAL: Silver plated

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

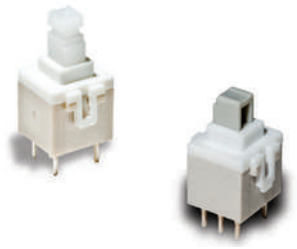
# PVA
# Short Stroke Key Switches

## *Features/Benefits*

- ***Compact design***
- ***Short stroke to latch***
- ***Wide variety of actuator heights***
- ***Adapted for medium power applications***
- ***RoHS compliant and compatible***

## *Typical Applications*

- ***Automotive (air conditioning, lighting)***
- ***Industrial***
- ***Control panel***



### Construction

FUNCTION: Momentary, Push-Push
CONTACT ARRANGEMENT:
PVA1: 2 make contacts (DPST)
PVA2: 2 change over contacts (DPDT)
SWITCHING MODE: Non-shorting
TERMINALS: PC pins[1]

### Mechanical

TOTAL TRAVEL / LATCHING TRAVEL:
OA: 2,4 mm
EE: 2,4 / 1,5 mm
ELECTRICAL TRAVEL: 0.8 mm (1.1 for PVA2 OA H5)
OPERATING FORCE: 1,2N; 1,7N; 3,5N

### Process

SOLDERABILITY:
Wave soldering, compatible with lead free soldering profile
Hand soldering, 350°C for 3 seconds

Note: Specifications listed above are for switches with standard options.
For information on specific and custom switches, please contact technical support using the "Ask a Specialist"option on the PVA product web page.√

### Electrical

SWITCHING POWER MAX.: 3 W DC

SWITCHING VOLTAGE MAX.: 32 V DC

SWITCHING CURRENT MAX.: 100 mA DC*

DIELECTRIC STRENGTH (50 Hz / 1 min):
1000 V between open contacts, PVA2: 750 V

OPERATING LIFE:
OA (momentary): ≥ 1 x $10^5$ operations
EE (push-push): ≥ 1 x $10^5$ operations
CONTACT RESISTANCE: Initial ≤ 100 mΩΩ

INSULATION RESISTANCE: ≥ $10^{10}$ Ω

BOUNCE TIME: ≤ 3 ms

### Environmental

OPERATING TEMPERATURE: -40°C to 85°C.[2]

1) "Snap-in" contacts on request, Version SNA with pins bent inside (standard)
2) With button +70°C

## How To Order

Our easy build-a-switch concept allows you to mix and match options to create the switch you need. To order, select desired option from each category and place it in the appropriate box. **Some of the configurations may not be available or could require some development.**

### Switch

P V A | | | | | | | | V 2

**Series**
**PVA1** 2 make-contacts (DPST)
**PVA2** 2 changeover contacts (DPDT)

**Mechanical Function**
**OA** Momentary
**EE** Push-push

**Total Height**
**H1** 17,5 mm
**H2** 23 mm
**H3** 20,5 mm
**H4** 15 mm
**H5** 13 mm (momentary & PVA2 only)

**Operating Force**
**1.2N** PVA1 only
**1.7N** PVA2 only
**3.5N**

**Termination**
**NONE** Standard terminals
**SNA** Snap-in terminals

### Button

Buttons must be ordered separately.
Shipped in bulk.

| | |

**Button**
**PE***
**PV***

**Button Color**
**RD** Red
**GR** Green
**BK** Black
**WH** White

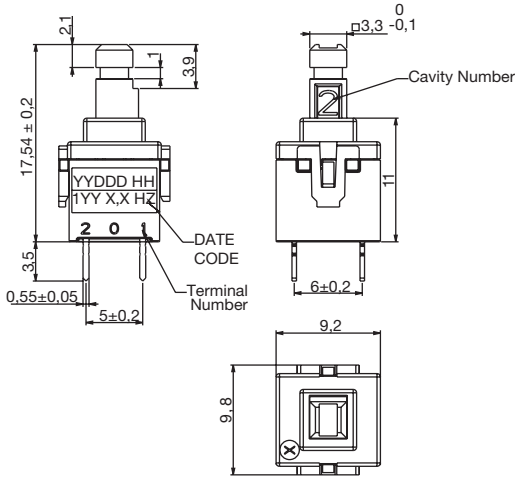
*Compatible with H1 and H3 actuator models only.

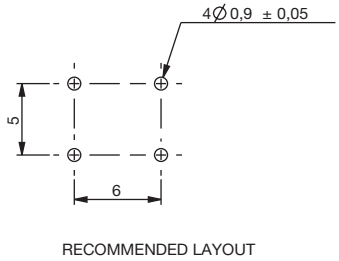
# PVA
# Short Stroke Key Switches

## SERIES

### PVA1 (DPST)



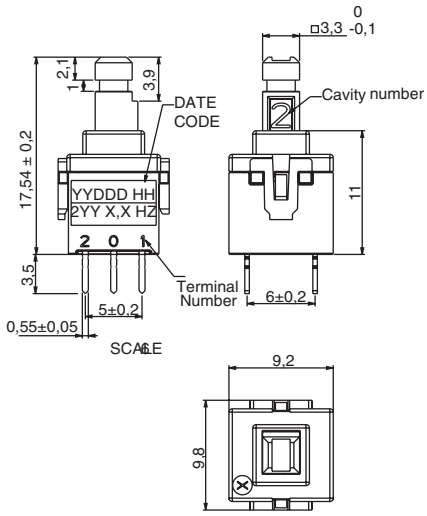


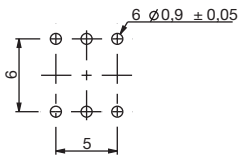

RECOMMENDED LAYOUT

### PVA2 (DPDT)






SCALE

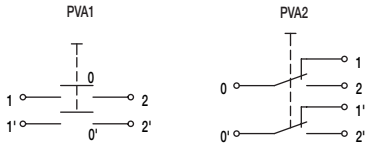



RECOMMENDED LAYOUT

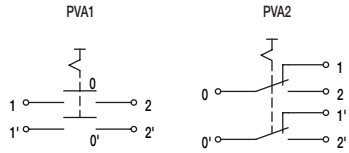
## MECHANICAL FUNCTION

| OPTION CODE | FUNCTION |
|---|---|
| OA | Momentary |
| EE | Push-Push |

**OA**

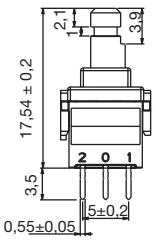



**EE**

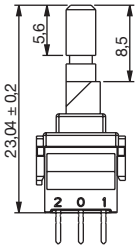


## TOTAL HEIGHT

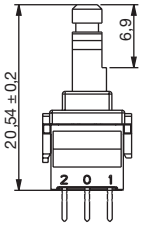
**H1** 17,5 MM



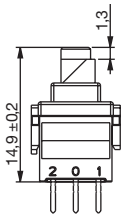

**H2** 23 MM



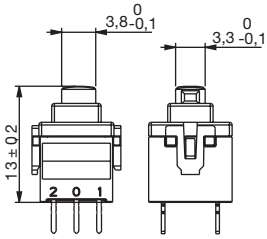

**H3** 20,5 MM




**H4** 15 MM



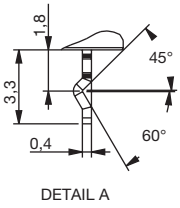

**H5** 13 MM
(MOMENTARY ONLY)



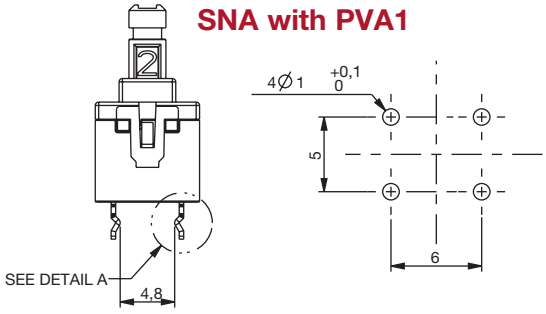

## OPERATING FORCE

**1.2N** PVA1 ONLY
**1.7N** PVA2 ONLY
**3.5N**

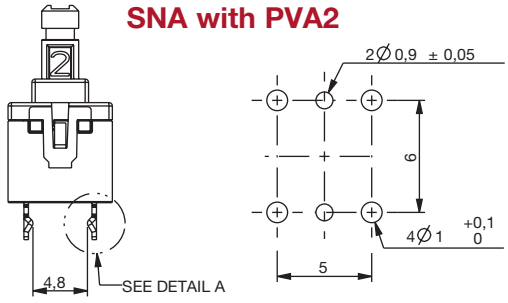
## TERMINATION




**SNA with PVA1**



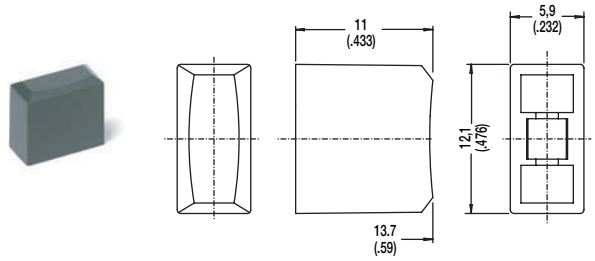

**SNA with PVA2**




## BUTTONS

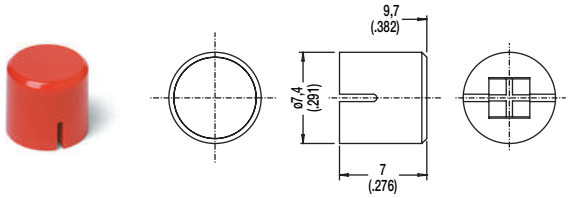
**BUTTONS MUST BE ORDERED SEPARATELY. SHIPPED IN BULK.**

### PE




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

### PV



# KLS
# Illuminated SPDT/DPDT Pushbutton

NEW



## Features/Benefits

- *Positive tactile feedback*
- *Momentary or Lock version*
- *SPDT & DPDT configuration*
- *Gold or silver contact materials*
- *Choices of color on LED illumination*
- *3 different CAP styles & sizes*
- *CAP with printed or etched logo**

## Typical Applications

- *Audio/video system*
- *Vending machine*
- *Kiosks*
- *Network equipment*

## Specifications

FUNCTION: SPDT, DPDT
CONTACT ARRANGEMENT: N.C.
MOUNTING TYPE: Straight PCB terminals

## Mechanical

OPERATING LIFE: 1,000,000 cycles
TOTAL TRAVEL: 2.2 mm
OPERATING FORCE: 200 ± 100 gf (SPDT)
300 ± 150 gf (DPDT)

## Electrical

CONTACT RATING; See table on contact material
OPERATING LIFE: 200,000 cycles on both gold & silver plating
DIELECTRIC STRENGTH: 1,000 V AC for 1 min.
INSULATION RESISTANCE: 100 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE: 50 mΩ max. (silver contact)
100 mΩ max/ (gold contact)

## Materials

CASE: PA66+70G33L (Black)
ACTUATOR: POM (White)
CAP: PC
SPRING: Black wire / Stainless steel
SPRING PLATE: Phosphor bronze
TERMINALS / CONTACT: Brass / Copper with silver or gold plated
TERMINAL SEAL: Epoxy

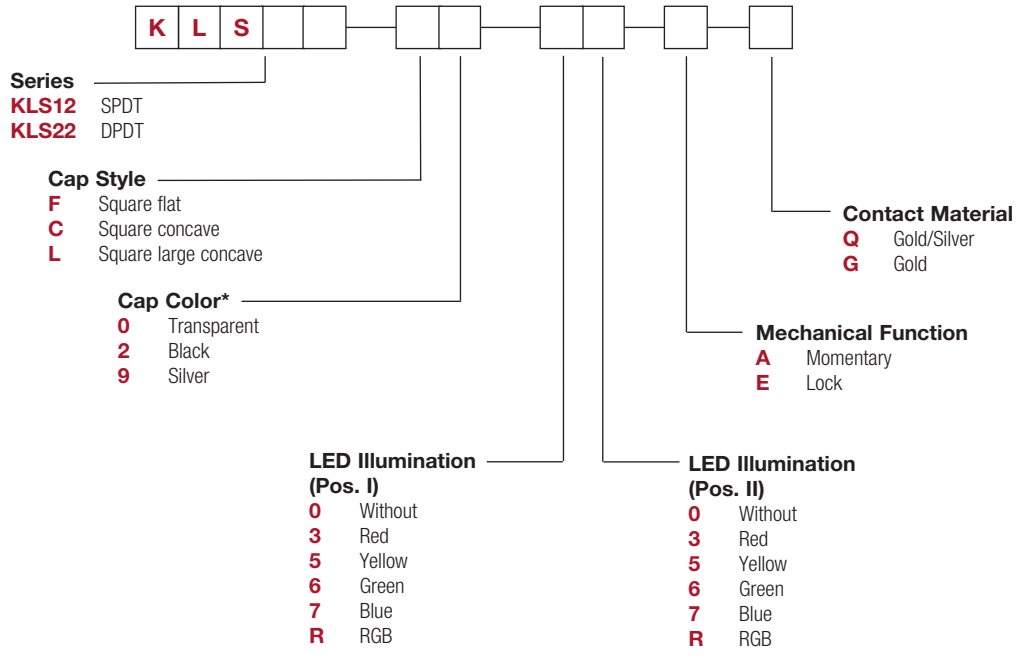
## Operating Environment

OPERATING TEMPERATURE: -40°C to +85°C

**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

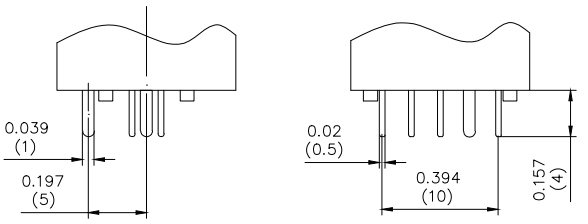
To order, simply select desired option from each category and place it in the appropriate box.



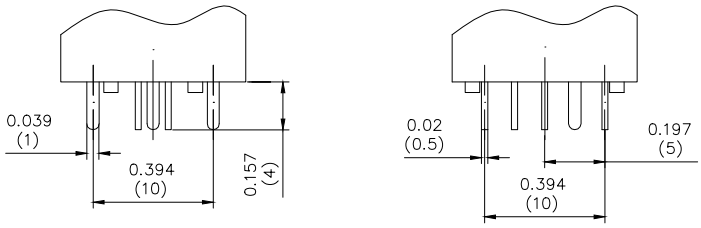

* For CAP with logo or symbol, please contact your sales representative.

## SERIES

### KLS12




### KLS22

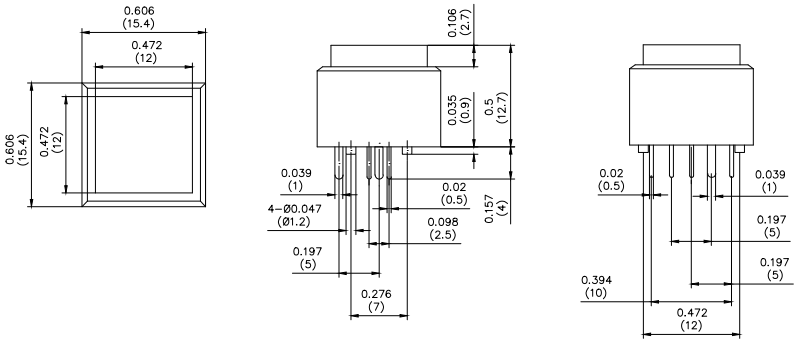



| NO. POLES | MODEL NO. | SWITCH FUNCTION POS. 1 | SWITCH FUNCTION POS. 2 | CONNECTED TERMINALS POS. 1 | CONNECTED TERMINALS POS. 2 | SCHEMATIC |
|---|---|---|---|---|---|---|
| SP | KLS12 | ON<br>ON | (ON)<br>ON | 1-3 | 1-2 | SPDT COMM 1 N.C 3 2 N.O |
| DP | KLS22 | ON<br>ON | (ON)<br>ON | 1-3,4-6 | 1-2,4-5 | DPDT COMM 1 N.C 3 2 N.O; COMM 4 N.C 6 5 N.O |

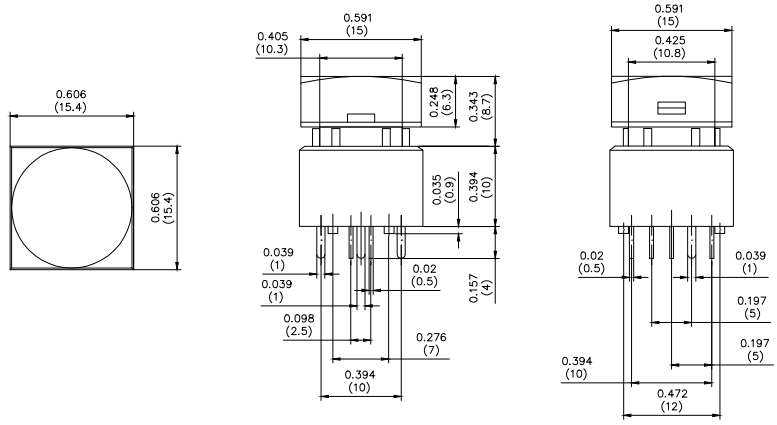
( )=Momentary

## CAP

**F** SQUARE FLAT




**C** SQUARE CONCAVE



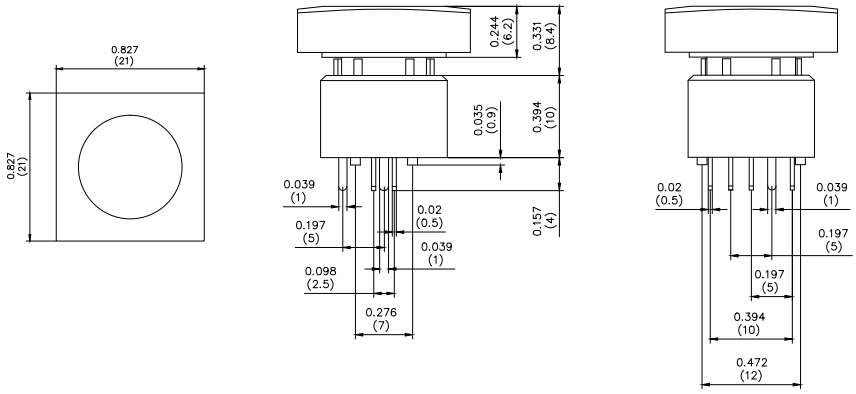

Third Angle Projection

# KLS
# Illuminated SPDT/DPDT Pushbutton

NEW

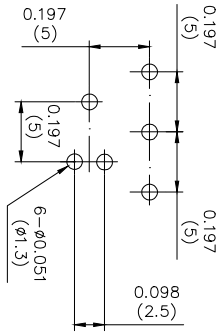
## CAP

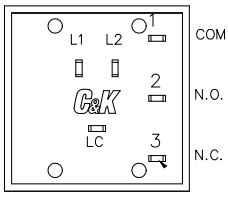
**L** SQUARE LARGE CONCAVE



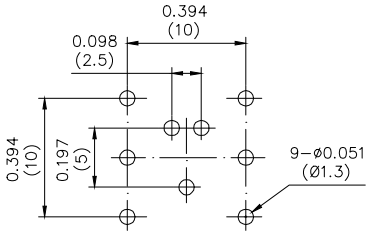

## TERMINATION - PCB LAYOUT

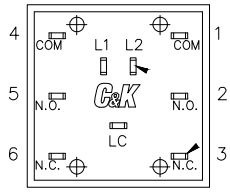
### KLS12



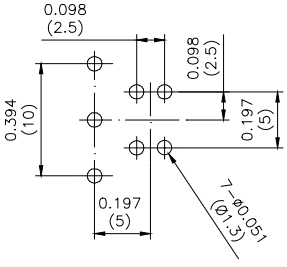



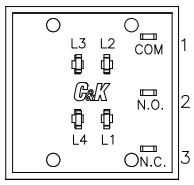

### KLS22

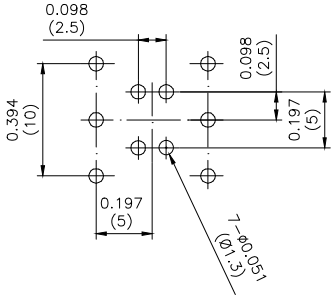


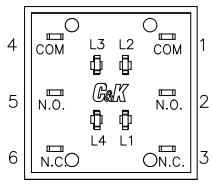




### DUAL COLOUR




### RGB

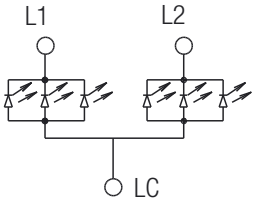
First Angle Projection

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

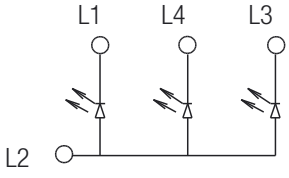
NEW

# KLS
# Illuminated SPDT/DPDT Pushbutton

## LED CIRCUIT




**DUAL COLOUR**




**RGB**

## CONTACT MATERIAL

| OPTION CODE | CONTACT MATERIAL | TERMINAL PLATING | RATING |
|---|---|---|---|
| Q | Copper / Gold [1]<br>Brass / Silver [2] | Silver | 25VDC<br>500 mA |
| G | Copper, Gold | Copper, Gold | 28 VDC<br>100 mA |

[1] Movable contact
[2] Stationary contact

# PLP16 Series
# Panel Mount LED Sealed Pushbutton Switch

NEW

## Features/Benefits

- *Illuminated & non-illuminated type*
- *Momentary or lock version*
- *IP65 or IP40 sealed*
- *1,000,000 life cycle*
- *Choices of colors on LED illumination*
- *Various actuator sizes and styles*
- *Withstand high shock and vibration application*

## Typical Applications

- *Industrial control panel*
- *Off-road transportation*
- *Machine and equipment*
- *Production control indicator*



c UL us

## Specifications

FUNCTION: SPDT or DPDT
CONTACT ARRANGEMENT: N.O. AND N.C.
MOUNTING TYPE: Threaded front panel mount

## Mechanical

OPERATING LIFE: Momentary 1,000,000 cycles
Lock 100,000 cycles
TOTAL TRAVEL: 1.2 ± 0.3 mm
OPERATING FORCE: 3.0 max.

## Electrical

CONTACT RATING: Ith 5A / 250 VAC
3A / 250 VAC
1A / 30 VDC
OPERATING LIFE: Momentary 100,000 cycles
Lock 50,000 cycles
DIELECTRIC STRENGTH: 2,000 V RMS @ sea level
INSULATION RESISTANCE: 100 MΩ min. @ 500 VDC
INITIAL CONTACT RESISTANCE : 50 mΩ max. initial value

## Materials

BUSHING: PEI
BASE / LED holder: PBT
ACTUATOR: PC
INTERNAL ASSEMBLY: POM / PC
SPRING: Steel (SUS304)
SEALING / O-ring: Silicone
TERMINALS: Brass, Gold over Nickel plated
CONTACT: Phosphorus Bronze, Silver plated

## Operating Environment

OPERATING TEMPERATURE: -25˚C to 55˚C
SEALING / PROTECTION: IP65 or IP40

**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.

| P | L | P | 1 | 6 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**IP Rating**

| | |
|---|---|
| 4 | IP40 |
| 6 | IP65 |

**Switch Type**

| Illuminated PB / Pilot light (Apply voltage) | Non-illuminated PB (CAP options) |
|---|---|
| 00 Without LED | C1 Solid color |
| 06 6 VAC/DC | C2 Transparent |
| 12 12 VAC/DC | |
| 24 24 VAC/DC | |

**Mechanical Function**

| | |
|---|---|
| A | Momentary |
| E | Lock |
| N | Pilot light |

**Contact Arrangement**

| | |
|---|---|
| S | SPDT |
| D | DPDT |
| P | Pilot light |

**Actuator Style ***

| | |
|---|---|
| RD | Round |
| SQ | Square |
| TA | Rectangular |
| RV | Round oversize |
| SV | Square oversize |
| TV | Rectangular oversize |
| TG | Rectangular guard |

**Actuator Color**

| | |
|---|---|
| 2 | White |
| 3 | Red |
| 4 | Black ** |
| 5 | Yellow |
| 6 | Green |
| 7 | Blue |
| 8 | Orange *** |

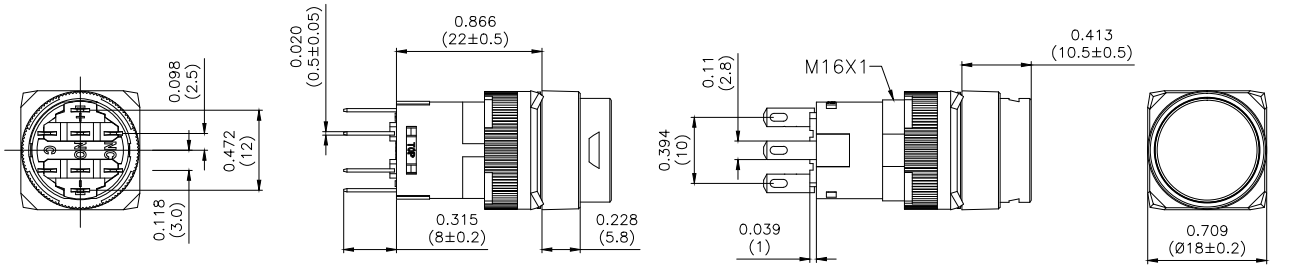
* Pilot light & C2 CAP available on RD, SQ, or TA actuator style only
** For C1 CAP only
*** Not available on C1 CAP

NEW

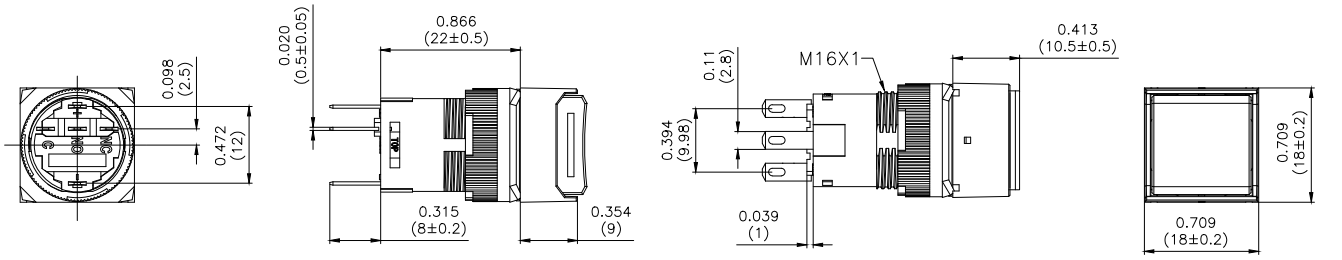
# PLP16 Series
# Panel Mount LED Sealed Pushbutton Switch

## STANDARD VIEW / SWITCH TYPE

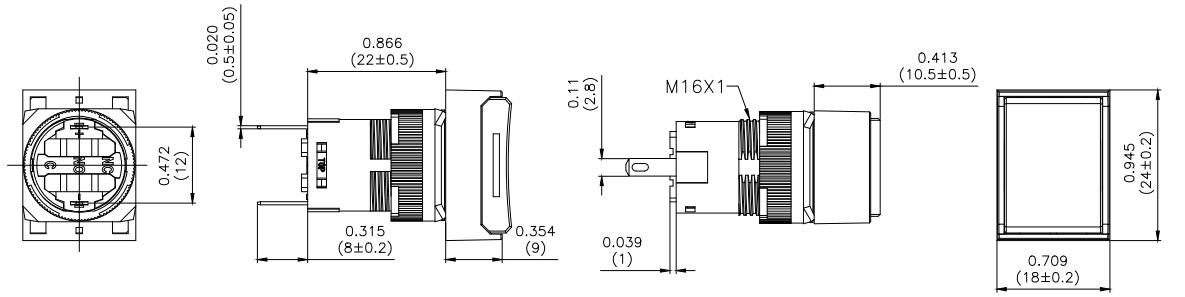
### ILLUMINATED Ø 5/8" (16 MM)




### PUSHBUTTON Ø 5/8" (16 MM)

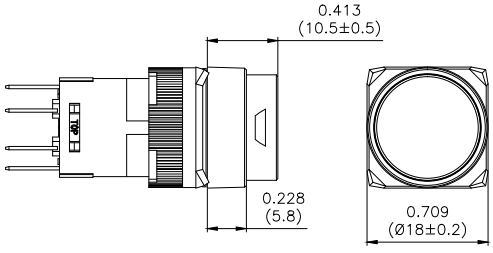



### PILOT LAMP Ø 5/8" (16 MM)

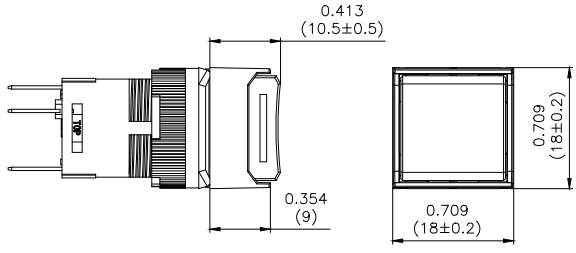



## ACTUATOR STYLE / CAP SIZE

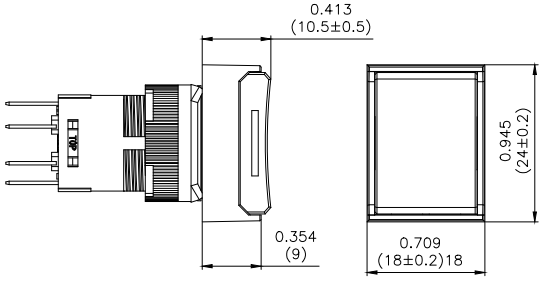
**RD** ROUND



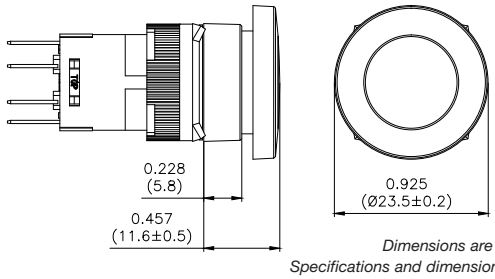

**SQ** SQUARE




**TA** RECTANGULAR




**RV** ROUND OVERSIZE



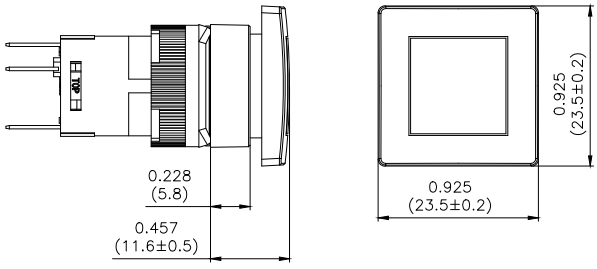

*Dimensions are shown: Inches (mm)*
*Specifications and dimensions subject to change*

# PLP16 Series
# Panel Mount LED Sealed Pushbutton Switch

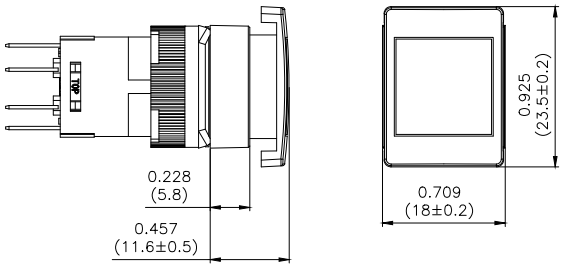
NEW

## ACTUATOR STYLE / CAP SIZE

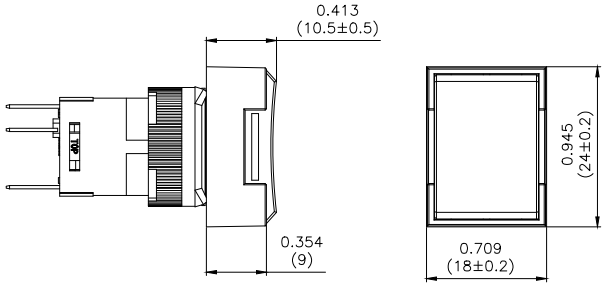
**SV** SQUARE OVERSIZE




**TV** RECTANGULAR OVERSIZE



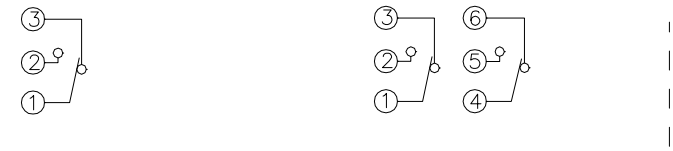

**TG** RECTANGULAR WITH GUARD

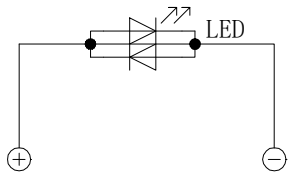



## CONTACT ARRANGEMENT

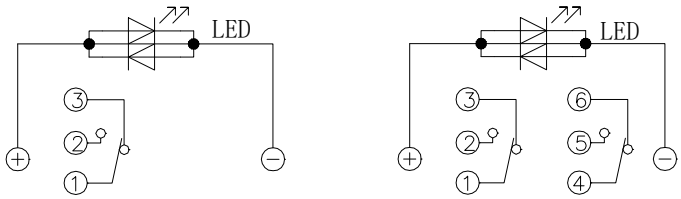
**S** SPDT | **D** DPDT | **P** PILOT LIGHT

PUSHBUTTON



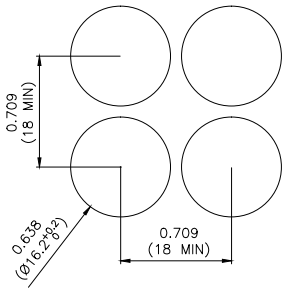




ILLUMINATED

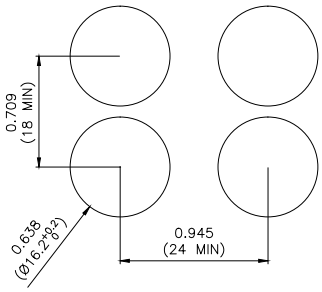



## MOUNTING HOLES LAYOUT

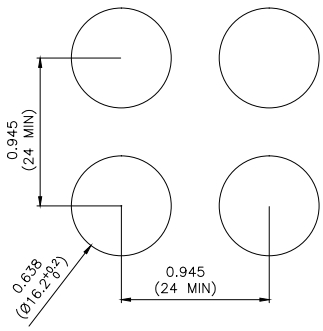
**ROUND / SQUARE**




**RECTANGULAR (PLUS FULL GUARD & OVERSIZE)**




**OVERSIZE ROUND & SQUARE**




Mounting panel thickness reference dia: 0.5-0.6 mm

8 Nov 21

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

NEW

# PLP16 Series
# Panel Mount LED Sealed Pushbutton Switch

## LED - LAMP RATING

| | | | | |
|---|---|---|---|---|
| **Voltage Range** | | 6V AC/DC ± 5% | 12V AC/DC ± 10% | 24V AC/DC ± 10% |
| **Rated Voltage** | | 6V AC/DC | 12V AC/DC | 24V AC/DC |
| **Current Draw** | DC | 8 mA | 8 mA | 8 mA |
| | AC | 9 mA | 9 mA | 9 mA |
| **Lamp Base Color / Lamp Body Resin Color** | | Illumination color / Porcelain white | | |
| **Life (reference value)** | | 50,000 hours (brightness of LED lamp will half of the initial value when using DC only) | | |

## ACCESSORY ORDERING INFORMATION

### LED LAMP

| | Rated Voltage | Ordering Code |
|---|---|---|
|  | 6V AC/DC | PL06X * |
| | 12V AC/DC | PL12X * |
| | 24V AC/DC | PL24X * |

* X = choice of LED color

| X | Color |
|---|---|
| 2 | White |
| 3 | Red |
| 5 | Yellow |
| 6 | Green |
| 7 | Blue |
| 8 | Orange |

### SWITCH PROTECTIVE GUARD FOR IP65 (180˚ SPRING RETURN COVER)#

**ROUND**
**PCS651**



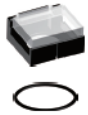
**SQUARE**
**PCS652**



**RECTANGULAR**
**PCS653**



### SWITCH PROTECTIVE GUARD FOR IP40 & IP65 #

| Rated | Cover Opening | For Actuator Type | Ordering Code | Rated | Cover Opening | For Actuator Type | Ordering Code |
|---|---|---|---|---|---|---|---|
| IP40  | 90˚ | Round / Square | PC401 | IP65  | 90˚ | Round / Square | PC654 |
| | | Rectangular | PC402 | | | Rectangular | PC655 |
| | 180˚ | Round / Square | PC403 | | 180˚ | Round / Square | PC656 |
| | | Rectangular | PC404 | | | Rectangular | PC657 |

# Refer to spec for panel cutout dimensions and mounting instruction