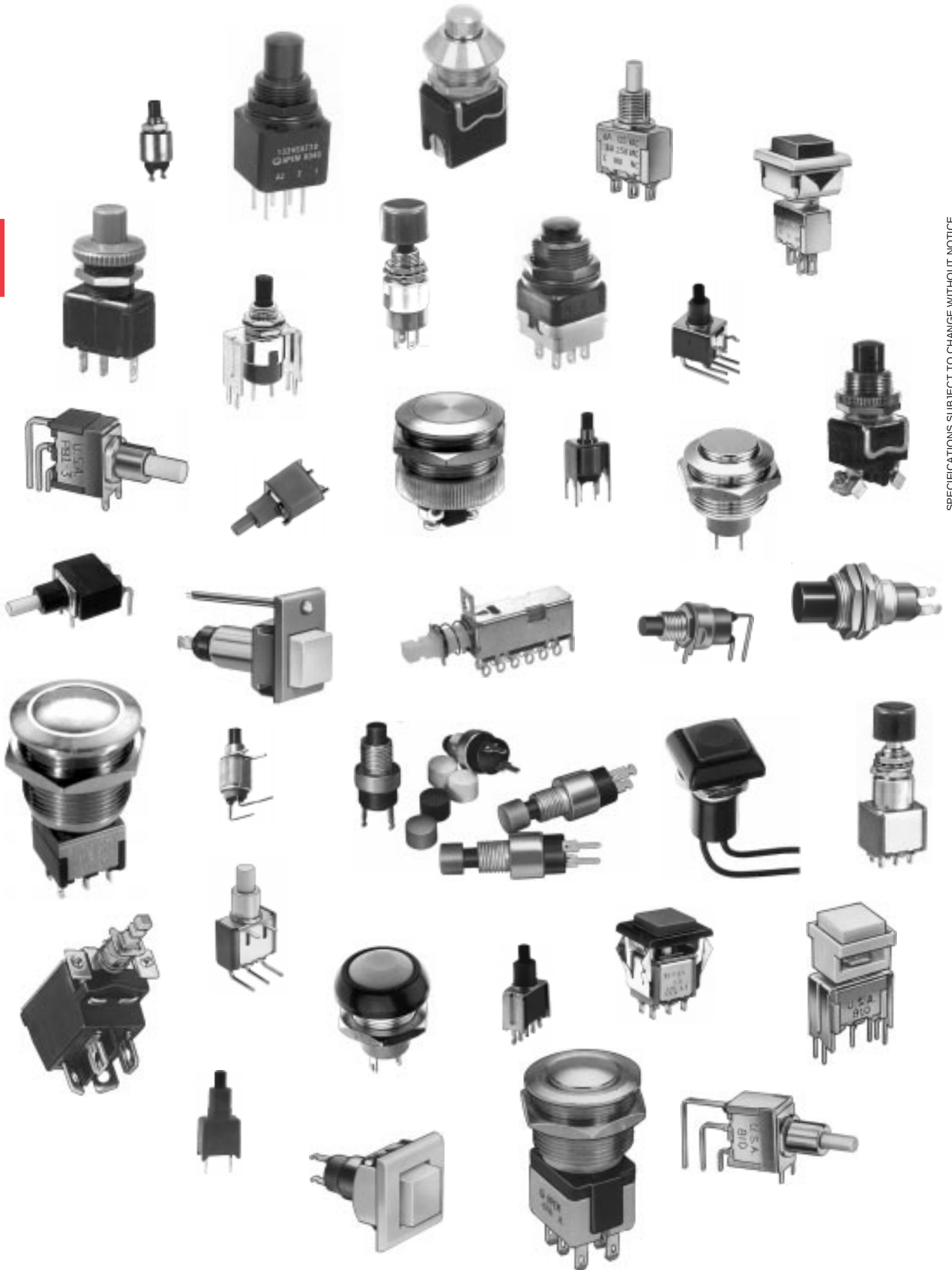




# PUSHBUTTON SWITCHES

PUSHBUTTON SWITCH SELECTION GUIDE: This catalog contains an extensive variety of pushbutton switches with numerous options and accessories. To facilitate easy selection of the desired switch for your application, this guide lists the various Series with some key selection parameters.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

| SERIES    | SIZE      | RATINGS (Max. in bold)                                                                  | POLES    | ILLUMINATED | SMT MOUNT | PANEL MOUNT | P. C. MOUNT | UL | CSA | VDE | WASHABLE | ESD PROTECTION | PAGE(S) |
|-----------|-----------|-----------------------------------------------------------------------------------------|----------|-------------|-----------|-------------|-------------|----|-----|-----|----------|----------------|---------|
| TP        | TINY      | <b>0.4VA 20V</b>                                                                        | SP       |             | X         |             |             |    |     |     | X        | X              | C2-C5   |
| TP        | TINY      | <b>500mA 48V</b> 0.4VA 20V                                                              | SP,DP    |             |           |             | X           |    |     |     | X        |                | C6-C9   |
| 9000      | SUB-MINI. | <b>100mA 30VDC</b>                                                                      | SP       |             |           | X           | X           |    |     |     |          |                | C10-C14 |
| 9000      | MINIATURE | <b>.6-1A 125VAC</b> 1A 30VDC<br>.3-.5A 250VAC                                           | SP       |             |           |             | X           |    |     |     |          |                | C15-C18 |
| 10400     | MINIATURE | <b>3 A 110VAC</b> or 24VDC<br>2A 220VAC                                                 | SP,DP    |             |           | X           |             |    |     |     |          |                | C19-C20 |
| 300 & 400 | MINIATURE | <b>3A 125VAC</b> or 28VDC<br>1.5A 250VAC 0.4VA 20V                                      | SP       | X           |           | X           | X           | X  |     |     |          |                | C21-C27 |
| MPB       | MINIATURE | <b>300mA 125VAC</b>                                                                     | SP       |             |           | X           |             |    |     |     |          |                | C28     |
| IP        | MINIATURE | <b>500mA 48VAC</b><br>200mA 50VDC or 250VAC                                             | SP       |             |           | X           |             |    |     |     | X        |                | C29-C31 |
| SP        | MINIATURE | <b>1A 120VAC</b> or 30VDC                                                               | SP       |             |           | X           | X           |    |     |     |          | X              | C32-C35 |
| 18000     | MINIATURE | <b>1A 120VAC</b> or 30VDC                                                               | SP,DP    |             |           | X           | X           |    |     |     |          |                | C36-C42 |
| 8000      | MINIATURE | <b>6A 125VAC</b> 3A 250VAC<br>4A 30VDC 0.4VA 20V                                        | SP,DP    |             |           | X           | X           | X  |     |     |          |                | C43-C46 |
| 800       | MINIATURE | <b>6A 125VAC</b> 3A 250VAC<br>7A 30VDC 0.4VA 20V                                        | SP,DP    | X           |           | X           | X           | X  | X   |     |          |                | C47-C56 |
| PB        | MINIATURE | <b>6A 125VAC</b> 3A 250VAC<br>7A 30VDC 0.4VA 20V                                        | SP       | X           |           | X           | X           | X  | X   |     |          |                | C57-C65 |
| 13000     | MINIATURE | <b>4A 125VAC</b> 2A 250VAC<br>4A 30VDC 100mA 30V                                        | SP,DP    |             |           | X           | X           |    |     |     |          |                | C66-C69 |
| 13000X778 | MINIATURE | <b>4A 125VAC</b> 2A 250VAC<br>4A 28VDC 300mA 30VDC                                      | DP       |             |           | X           | X           |    |     |     |          |                | C70-C72 |
| 1200      | STANDARD  | <b>8A 125VAC</b> 4A 250VAC<br>4A 24VDC                                                  | SP       |             |           | X           |             | X  | X   | X   |          |                | C73-C75 |
| 1200M&MR  | STANDARD  | <b>8A 125VAC</b> 4A 250VAC<br>4A 24VDC                                                  | SP       |             |           | X           |             | X  | X   |     |          |                | C76-C77 |
| 4700&4800 | STANDARD  | <b>6A 125VAC</b> 3A 250VAC                                                              | SP,DP    |             |           | X           |             | X  | X   | X   |          |                | C78-C79 |
| MD        | STANDARD  | <b>200mA 30VDC</b>                                                                      | SP,DP,4P |             |           | X           | X           |    |     |     |          |                | C80-C82 |
| MD1       | STANDARD  | <b>7.5A 125/250VAC</b> TV5&8<br><b>10A 125/250VAC</b> TV5&8<br>8A/128A 250VAC $\mu$ T85 | DP       |             |           | X           |             |    |     |     |          |                | C83     |
| MD2       | STANDARD  | <b>15A 125VAC</b> 10A 250VAC<br>TV-5                                                    | SP       |             |           | X           |             |    |     |     |          |                | C84     |
| AV        | STANDARD  | SEE TABULATION BOX ON PAGE C86 FOR AV SERIES PUSHBUTTON SWITCHES. C85-C99               |          |             |           |             |             |    |     |     |          |                |         |

C

## **New!** TP SERIES - SMT WASHABLE TINY PUSHBUTTON SWITCHES

### **DESIGNED EXCLUSIVELY FOR SURFACE MOUNTING**

SMT TP Series switches incorporate many desirable features that include:

- **Tape & reel packaging**  
This type of packaging is recommended for:
  - economy
  - suitability for automated placement
  - handling of large quantities of components per packaging unit
  - positive component positioning
  - protection of terminals against damage during handling
  - high static resistance
- **Reflow solderable**
  - High temperature plastic materials
  - Tin plated grounding brackets
  - Tin-lead alloy over nickel terminal plating
  - Terminals turned outward to prevent the shadow effect in infrared soldering and to permit visual inspection of the solder joints
  - .021" (0.55mm) air gap between p.c. board and switch case
  - End stackable with .400" (10.16mm) pitch
  - Available with positioning pins to assure correct switch orientation during the reflow process and provide additional mechanical integrity
- **Protected against electrostatic discharges (ESD) up to 10 KV.**
- **Washable**  
Switches are designed to withstand cleaning processes, including hot water under pressure.

Surface mount devices (SMD) are subject to more stringent constraints of temperature, solderability, sealing and space savings than through-hole components.

To meet these requirements, APEM has designed a family of tiny surface mount switches that include TP Series pushbutton switches, TG Series slide switches and TL Series toggle switches. See Slide & Toggle switch sections of catalog for TG & TL Series respectively.



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# New! TP SERIES - SMT WASHABLE TINY PUSHBUTTON SWITCHES

## ELECTRICAL SPECIFICATIONS

|                                          |                                                                   |
|------------------------------------------|-------------------------------------------------------------------|
| <b>Contact ratings (resistive lds.):</b> | 0.4 VA at 20 V max. (AC or DC)                                    |
| <b>Minimum load:</b>                     | 10 mA at 50 mV or 10µA at 5 VD                                    |
| <b>Initial contact resistance:</b>       | 50 milliohms maximum                                              |
| <b>Insulation resistance:</b>            | 1000 MΩ min. at 500 VDC                                           |
| <b>Dielectric strength:</b>              | 1000 V rms between terminals & frame. 500 V rms between terminals |
| <b>Electrical life (at full load):</b>   | 60,000 cycles                                                     |
| <b>Static resistance:</b>                | 10 KV (Schaffner equipment)                                       |

## GENERAL SPECIFICATIONS

|                                     |                                            |
|-------------------------------------|--------------------------------------------|
| <b>Travel:</b>                      | ON-MOM .039" (1mm), OFF-MOM. .031" (0.8mm) |
| <b>Operating temperature range:</b> | -40°C to +85°C                             |
| <b>Moisture resistance:</b>         | 21 days per IEC 512-6 test 11c             |
| <b>Vibration resistance:</b>        | 10-500 Hz/10g per IEC 512-4 test 6d        |
| <b>Shock resistance:</b>            | 50 g per IEC 512-4 test 6c                 |

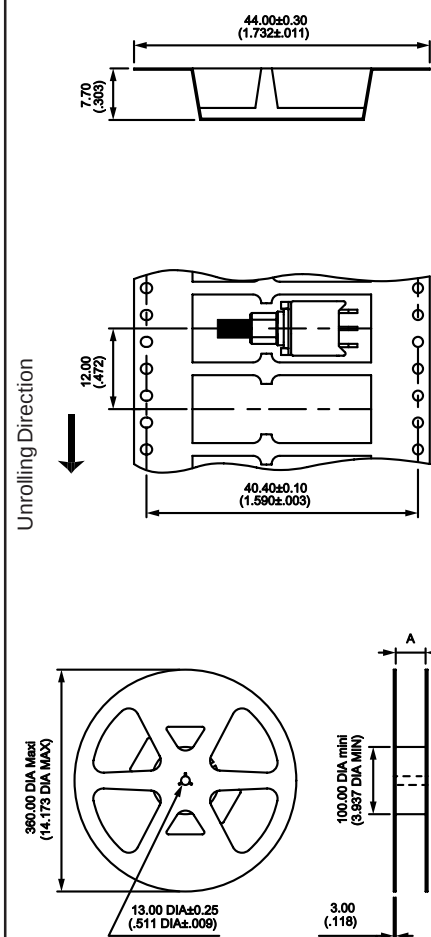
## MATERIALS

|                            |                                              |
|----------------------------|----------------------------------------------|
| <b>Case:</b>               | High temperature plastic UL94V-0             |
| <b>Actuator:</b>           | High temperature plastic UL94V-0             |
| <b>Grounding brackets:</b> | Tin plated steel (includes positioning pins) |
| <b>Contacts:</b>           | Gold plated brass                            |
| <b>Terminals:</b>          | Brass with tin-lead alloy over nickel plate  |

## SOLDERING AND CLEANING

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| <b>Reflow soldering:</b> | Infrared, vapor phase and infrared convection               |
| <b>Washable:</b>         | Per IEA-RS448-2: water and detergent - preferred. Solvents. |

## PACKAGING



### Standard packaging unit:

700 pieces  
Tape meeting international standard IEC Publication 286-3 (EIA481A)  
Start leader: 15.7" (400mm) min.  
Dimension 'A': 1.748" (44.40mm)

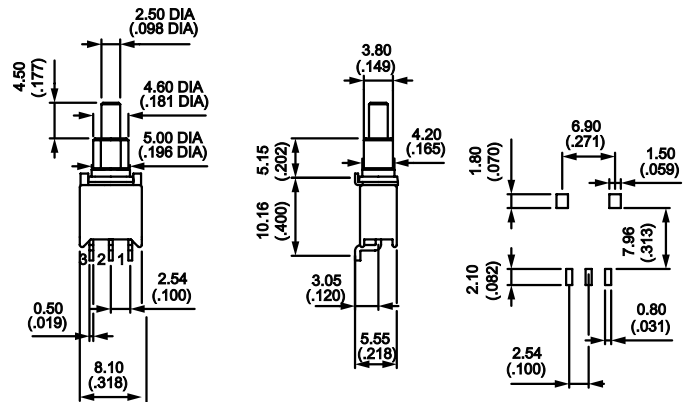
# New! TP SERIES - SMT WASHABLE TINY PUSHBUTTON SWITCHES

## Single pole momentary pushbutton switches



| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| TP32WS83500      | ON      | MOM |
| TP33WS83500      | OFF     | MOM |
| Handle position: |         |     |

Function 2 shown

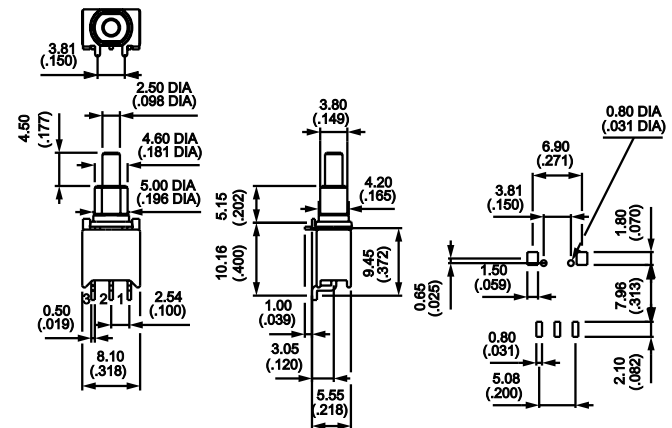


## Single pole momentary pushbutton switches with positioning pins

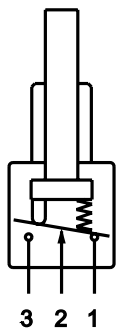


| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| TP32WS83565      | ON      | MOM |
| TP33WS83565      | OFF     | MOM |
| Handle position: |         |     |

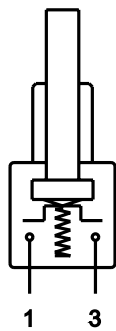
Function 2 shown



## SWITCH ACTION

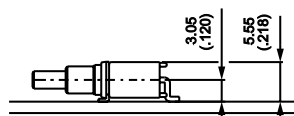


Function 2



Function 3

## P.C. BOARD DIMENSIONS



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

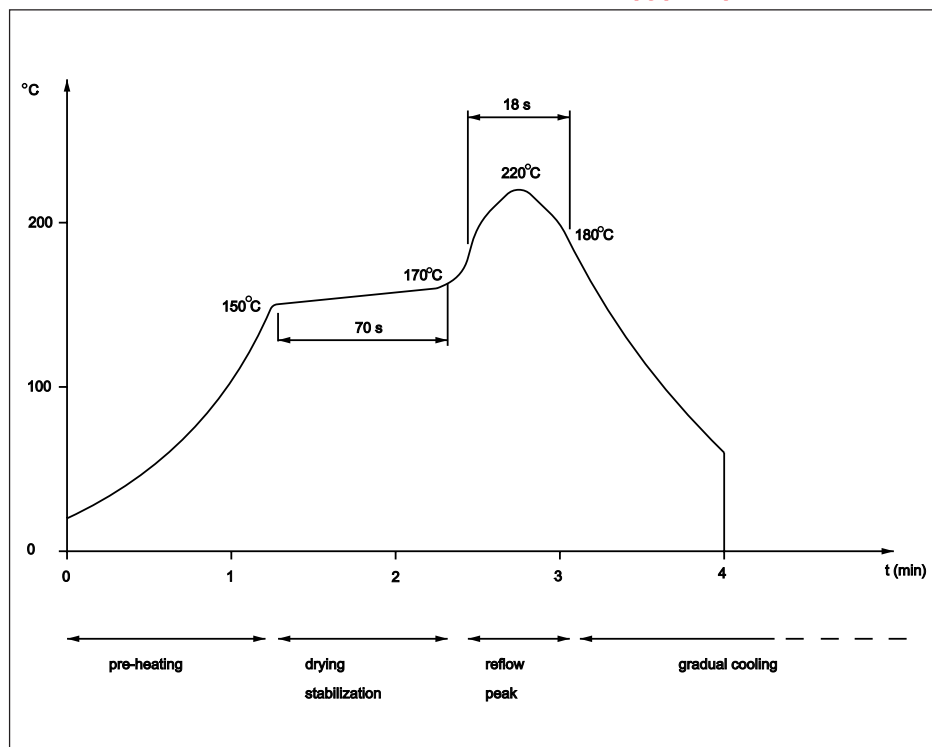
# New! TP SERIES - SMT WASHABLE TINY PUSHBUTTON SWITCHES

## REFLOW SOLDERING - STANDARD PROFILE

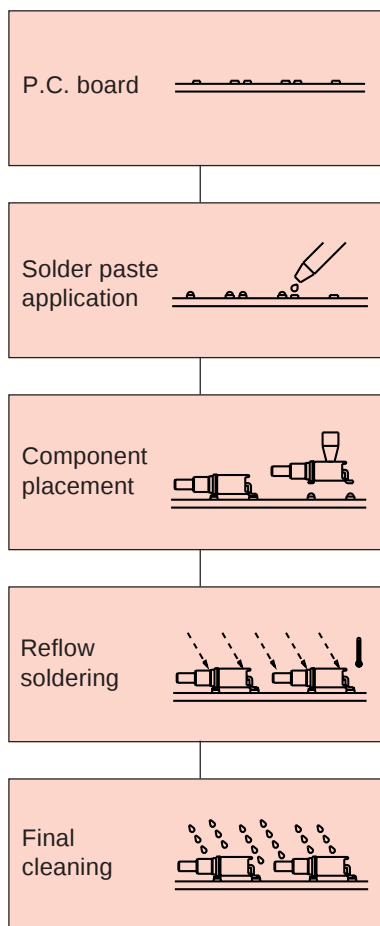
The printed circuit board, carried by a conveyor belt, travels through the reflow soldering oven and experiences the following programmed cycles:

- pre-heat to a maximum of 200°C for 30 seconds
- reflow at a maximum of 245°C for 10 seconds
- final cleaning

### TEMPERATURE/TIME PROFILE (typical)

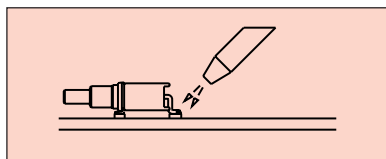


### PROCESSING STEPS



### P.C. BOARD REWORK RECOMMENDATIONS

Hot air reflow technique is preferred. Avoid the use of a soldering iron.



**Caution:** Excessive and/or repeated high temperature exposure may affect switch performance & reliability.

# TP SERIES - WASHABLE SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Wave solderable.
- Fully sealed for process compatibility.
- Ultra-compact case size.
- Case color options - blue or black (with black actuator).
- SPST, SPDT, DPST & DPDT p.c. mounting models.

## SPECIFICATIONS

|                                           |                                                                                                  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | Gold plated brass: 0.4 Volt-Amps max. at 20 V max.<br>Silver plated brass: 0.5 Amps at 48 V max. |
| <b>Minimum load:</b>                      | 10 mA at 50 mV - 10µA at 5 VDC                                                                   |
| <b>Initial contact resistance:</b>        | 50 milliohms maximum                                                                             |
| <b>Insulation resistance:</b>             | 1000 megohms minimum at 500 VDC                                                                  |
| <b>Dielectric strength:</b>               | 1000 V rms min. between terminals and frame. 500 V rms between terminals.                        |
| <b>Electrical life:</b>                   | 60,000 cycles minimum at full load.                                                              |
| <b>Operating temperature range:</b>       | -30°C to +85°C                                                                                   |
| <b>Plunger travel:</b>                    | 'ON MOM' - .039" (1mm)      'OFF MOM' - .031" (0.8mm)                                            |
| <b>Washing:</b>                           | Permissible with water, detergents and solvents.                                                 |

## MATERIALS

|                                  |                                   |
|----------------------------------|-----------------------------------|
| <b>Contacts &amp; Terminals:</b> | Gold or silver plated brass       |
| <b>Actuator:</b>                 | Polyamide (UL94V-O), glass filled |
| <b>Bracket:</b>                  | Tin plated steel                  |
| <b>Case:</b>                     | PBT (UL94V-O)                     |
| <b>Terminal seal:</b>            | Epoxy                             |

## AGENCY LISTINGS

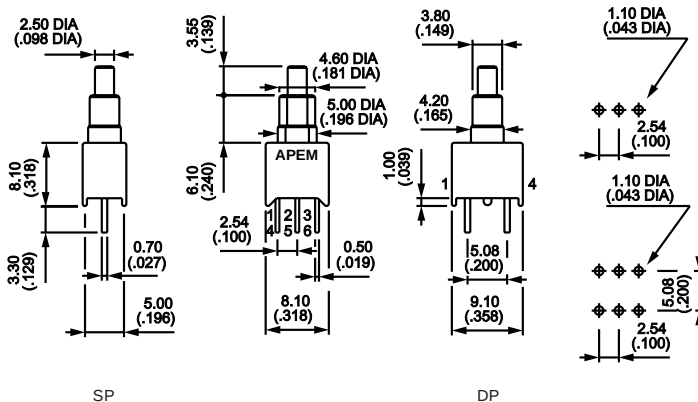
GAM T1 (military). Availability: consult factory for details of listed models.

Note: drawings show switches with 3 terminals (function 2). Function 3 switches have only 2 terminals. See switch cross-sections at end of section.

## Straight p.c. terminals - gold plated brass contacts



| SINGLE POLE      |         |
|------------------|---------|
| MODEL NO.        | CIRCUIT |
| TP32P003000      | ON MOM  |
| TP33P003000      | OFF MOM |
| DOUBLE POLE      |         |
| MODEL NO.        | CIRCUIT |
| TP42P003000      | ON MOM  |
| TP43P003000      | OFF MOM |
| Handle position: |         |

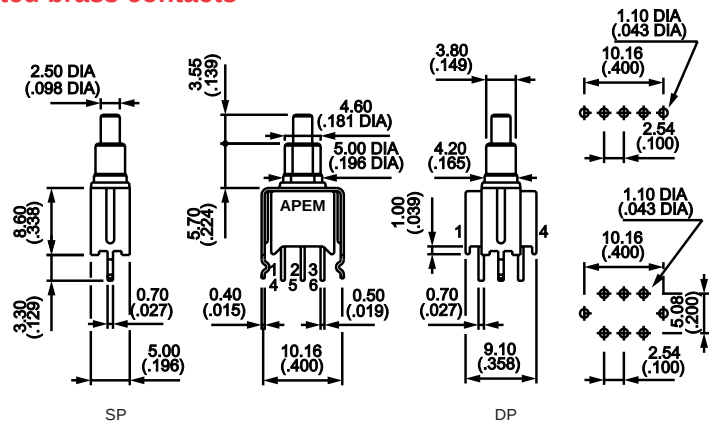


# TP SERIES - WASHABLE SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Straight p.c. terminals - bracket mounting - gold plated brass contacts



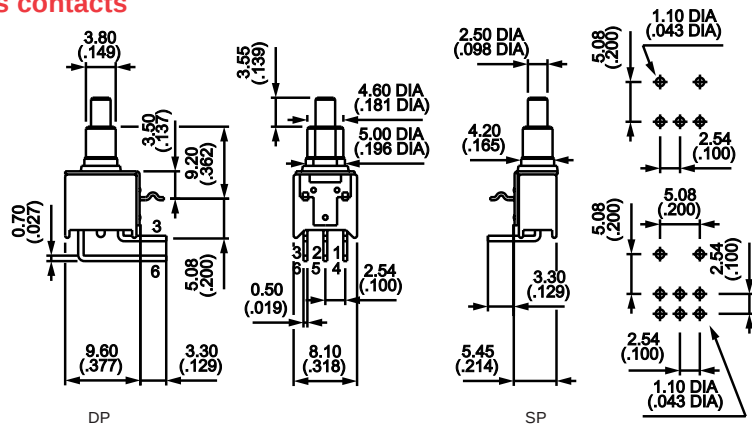
| SINGLE POLE      |  | CIRCUIT |     |
|------------------|--|---------|-----|
| MODEL NO.        |  | ON      | MOM |
| TP32Y003050      |  | ON      | MOM |
| TP33Y003050      |  | OFF     | MOM |
| DOUBLE POLE      |  | CIRCUIT |     |
| MODEL NO.        |  | ON      | MOM |
| TP42Y003050      |  | ON      | MOM |
| TP43Y003050      |  | OFF     | MOM |
| Handle position: |  |         |     |



## Horizontal right angle terminals - gold plated brass contacts



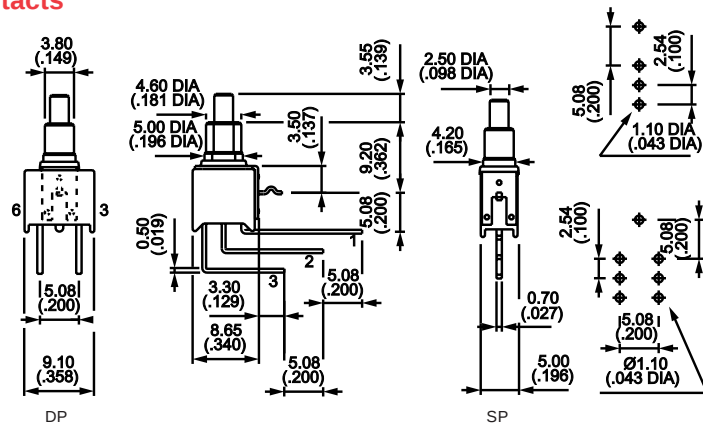
| SINGLE POLE      |  | CIRCUIT |     |
|------------------|--|---------|-----|
| MODEL NO.        |  | ON      | MOM |
| TP32W003050      |  | ON      | MOM |
| TP33W003050      |  | OFF     | MOM |
| DOUBLE POLE      |  | CIRCUIT |     |
| MODEL NO.        |  | ON      | MOM |
| TP42W003050      |  | ON      | MOM |
| TP43W003050      |  | OFF     | MOM |
| Handle position: |  |         |     |



## Vertical right angle terminals - gold plated brass contacts



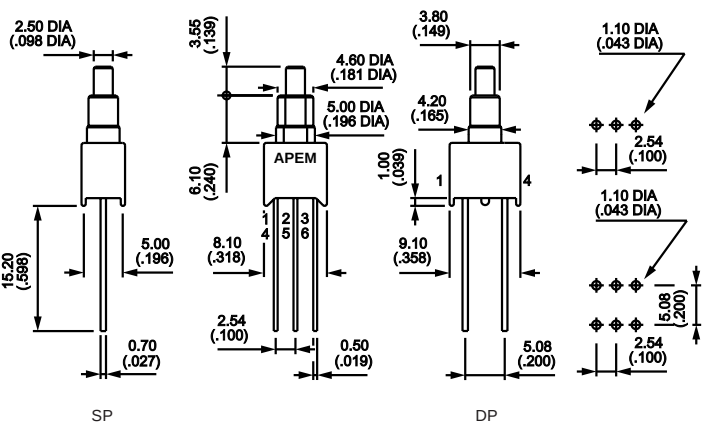
| SINGLE POLE      |  | CIRCUIT |     |
|------------------|--|---------|-----|
| MODEL NO.        |  | ON      | MOM |
| TP32WW03050      |  | ON      | MOM |
| TP33WW03050      |  | OFF     | MOM |
| DOUBLE POLE      |  | CIRCUIT |     |
| MODEL NO.        |  | ON      | MOM |
| TP42WW03050      |  | ON      | MOM |
| TP43WW03050      |  | OFF     | MOM |
| Handle position: |  |         |     |



## Wire-wrap terminals - gold plated brass contacts



| SINGLE POLE      |  | CIRCUIT |     |
|------------------|--|---------|-----|
| MODEL NO.        |  | ON      | MOM |
| TP32MW03000      |  | ON      | MOM |
| TP33MW03000      |  | OFF     | MOM |
| DOUBLE POLE      |  | CIRCUIT |     |
| MODEL NO.        |  | ON      | MOM |
| TP42MW03000      |  | ON      | MOM |
| TP43MW03000      |  | OFF     | MOM |
| Handle position: |  |         |     |



# TP SERIES - WASHABLE SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
( Allowable options are shown under each respective box).

### Model Structure:

| Series            | Number of poles      | Electrical functions | Terminals                     |
|-------------------|----------------------|----------------------|-------------------------------|
| <b>T</b> <b>P</b> | <input type="text"/> | <input type="text"/> | <input type="text"/>          |
|                   | 3 Single pole        | 2 ON MOM             | P 0 Straight p.c.             |
|                   | 4 Double pole        | 3 OFF MOM            | Y 0 Straight p.c.with bracket |
|                   |                      |                      | W 0 Horizontal right angle    |
|                   |                      |                      | W W Vertical right angle      |
|                   |                      |                      | M W Wire-wrap                 |

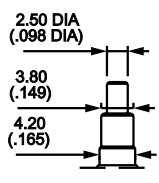
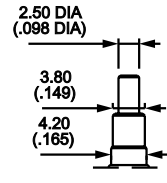
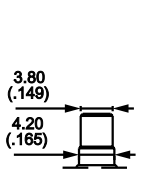
### Options:

| Contact & terminal mat'ls.                                                 | Actuators & case colors                          | Miscellaneous                                                                                                | Caps                                |
|----------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <input type="text"/>                                                       | <input type="text"/>                             | <input type="text"/>                                                                                         | <input type="text"/>                |
| 0 Brass, gold plated                                                       | Specify 30, 35, 80, 82, or 85                    | 0 0 No special requirement                                                                                   | 1 0*                                |
| 1 Brass, silver plated                                                     | See drawings with specifications and dimensions. | 5 0 Crimped bracket terminals - specify for models with brackets. See additional listings on following page. | 2 0*                                |
| 3 Brass, gold plated - (1.27 microns gold)                                 |                                                  |                                                                                                              | 3 0*                                |
| 8 Brass, gold plated contacts with tin plated terminals                    |                                                  |                                                                                                              | 4 0*                                |
| 9 Contacts brass, gold plated (1.27 microns gold) and tin plated terminals |                                                  |                                                                                                              | * - Specify color - see caps below. |

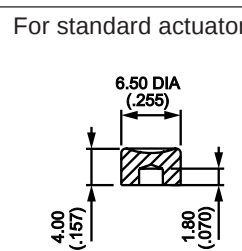
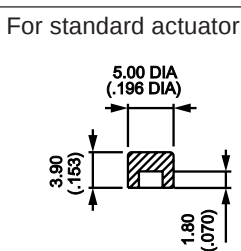
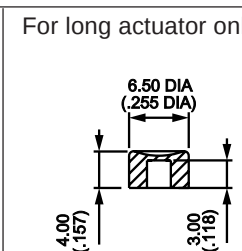
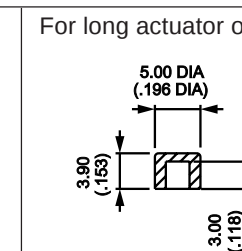
Example of completely specified model number: **TP32Y00305025**

## OPTION DRAWINGS

### Actuators & case colors

|                                                                                                                                                                                                                                     |                                                                                                                                                                                                                         |                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>2.50 DIA (.098 DIA)<br/>3.80 (.149)<br/>4.20 (.165)</p> <p>Blue case 30 Black case 80</p> <p><b>Short</b> (standard) <b>30</b> <b>80</b></p> |  <p>2.50 DIA (.098 DIA)<br/>3.80 (.149)<br/>4.20 (.165)</p> <p>Blue case 35 Black case 85</p> <p><b>Long</b> <b>35</b> <b>85</b></p> |  <p>2.50 DIA (.098 DIA)<br/>3.80 (.149)<br/>4.20 (.165)</p> <p>Black case 82</p> <p><b>Flush</b> <b>82</b></p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### CAPS Note: replace last '0' in part numbers with color code.

| For standard actuator                                                                                                                                                                             | For standard actuator                                                                                                                                                                                  | For long actuator only                                                                                                                                                                                 | For long actuator only                                                                                                                                                                                   | Colors                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|  <p>6.50 DIA (.255)<br/>4.00 (.157)<br/>1.80 (.070)</p> <p><b>10</b><br/><b>U570</b> If ordered separately</p> |  <p>5.00 DIA (.196 DIA)<br/>3.90 (.153)<br/>1.80 (.070)</p> <p><b>20</b><br/><b>U3600</b> If ordered separately</p> |  <p>6.50 DIA (.255 DIA)<br/>4.00 (.157)<br/>3.00 (.118)</p> <p><b>30</b><br/><b>U4310</b> If ordered separately</p> |  <p>5.00 DIA (.196 DIA)<br/>3.90 (.153)<br/>3.00 (.118)</p> <p><b>40</b><br/><b>U4320</b> If ordered separately</p> | <p><b>Colors</b></p> <p>1 blue<br/>2 black<br/>3 green<br/>4 grey<br/>5 yellow<br/>6 red<br/>7/1 white<br/>9 orange</p> |

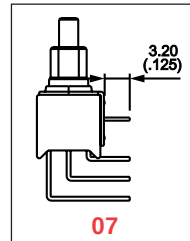
Note: Caps U4310 and U4320 (for long actuators) offer better resistance to vibration.

# TP SERIES - WASHABLE SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

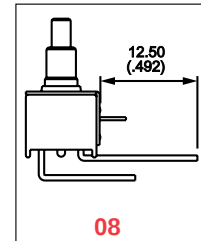
## SPECIAL OPTIONS & MISCELLANEOUS

### SPECIAL OPTIONS

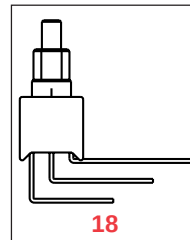
- 00** No special requirement.
- 07** Trimmed terminals for **WW** models only - .125" (3.2mm).
- 08** Extended terminals for **W0** models only.
- 18** **WW** models without mounting bracket.
- 20** **WW** models with mounting bracket and p.c. board spacer tab.
- 25** Trimmed terminals for all models except **WW** - .196" (5mm).
- 30** Wire-wrap terminals on models with **Y** bracket.
- 40** With cap **U3500** mounted over plunger and bushing.  
Provides additional protection during soldering & cleaning.
- 50** Crimped bracket terminals (retains switch on p.c. board during assembly and soldering). For models with **W0**, **WW** & **Y0** terminals.



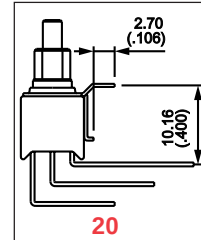
**07**



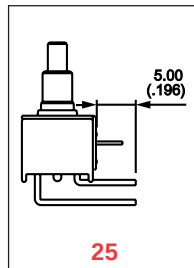
**08**



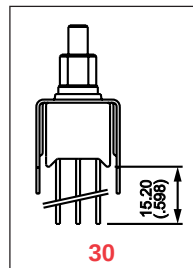
**18**



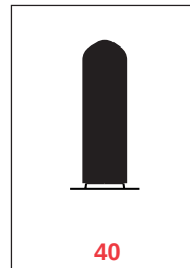
**20**



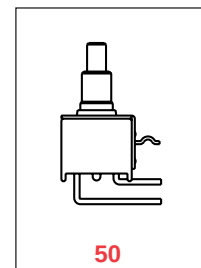
**25**



**30**

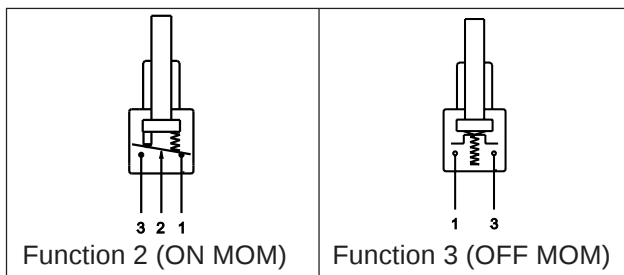


**40**



**50**

### Switch cross-sections



# 9000 SERIES - SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Single pole panel and p.c. mounting models.
- Normally open (NO) & normally closed (NC) electrical functions.
- Self-cleaning or butt action contacts.
- Ultra-compact case size.

## SPECIFICATIONS

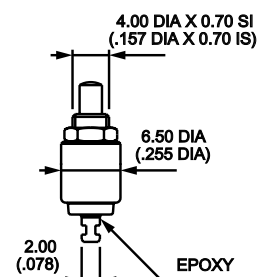
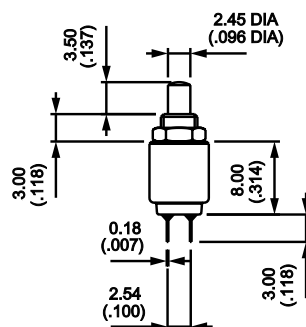
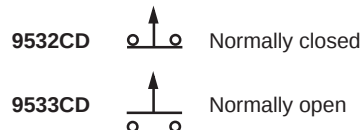
**Contact ratings (resistive loads):** 100 mA at 30 VDC  
**Initial contact resistance:** 30 milliohms maximum  
**Insulation resistance:** 1000 megohms minimum at 500 VDC  
**Dielectric strength:** 500 V rms min. between terminals. 1000 V rms between terminals & case  
**Electrical life:** 9100, 9200N & 9500N: 250,000 cycles min. 9200 & 9500: 100,000 cycles min.  
**Operating temperature range:** -30°C to +65°C

| Travel | 9533 & 9233    | 9532 & 9232    | 9533N, 9233N & 9133 |
|--------|----------------|----------------|---------------------|
| Total  | .062" (1.60mm) | .070" (1.80mm) | .035" (0.9mm)       |
| Pre-   | .029" (0.75mm) | .039" (1.00mm) | -                   |
| Over-  | .027" (0.70mm) | .029" (0.75mm) | -                   |

## MATERIALS

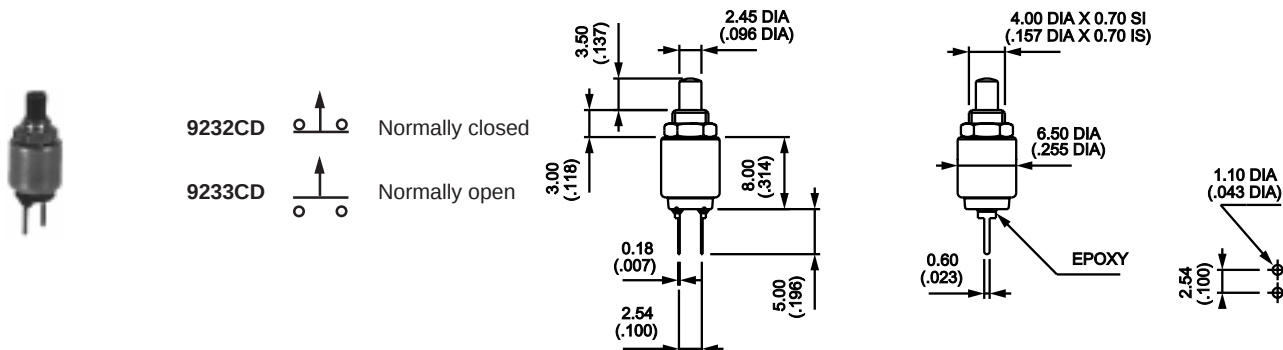
**Contacts & Terminals:** Gold plated brass  
**Actuator:** Polyamide, glass filled  
**Bracket:** Tin plated steel  
**Case:** PPS  
**Bushing:** Nickel plated brass  
**Terminal seal:** Epoxy  
**Hardware:** Threaded bushing models supplied with 1 Hex Nut p/n U544. See drawing - end of section.

## Solder lug terminals - threaded bushing - self-cleaning contacts

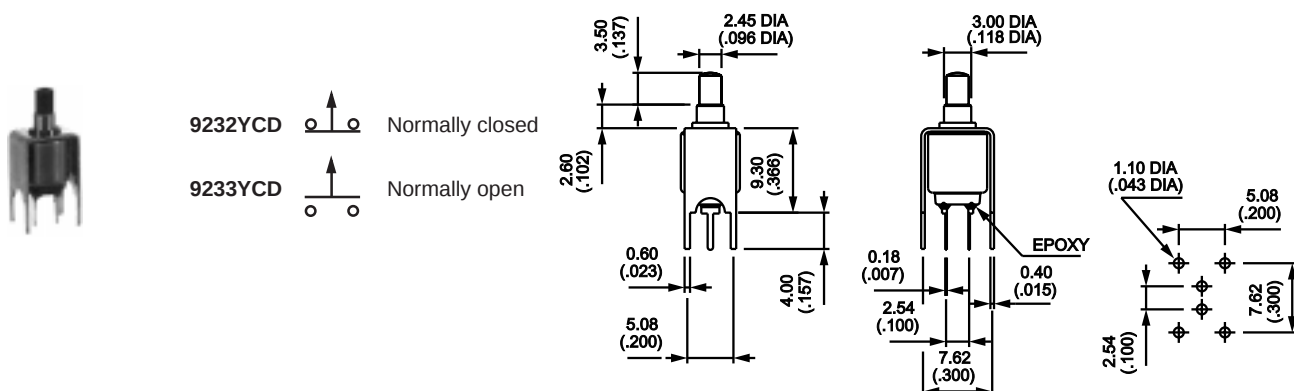


# 9000 SERIES - SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

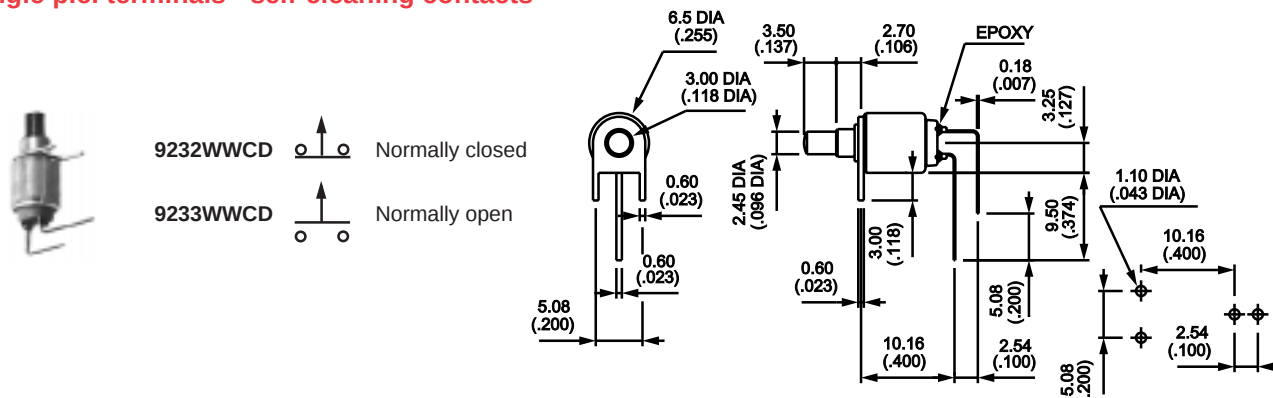
## Straight p.c. terminals - threaded bushing - self-cleaning contacts



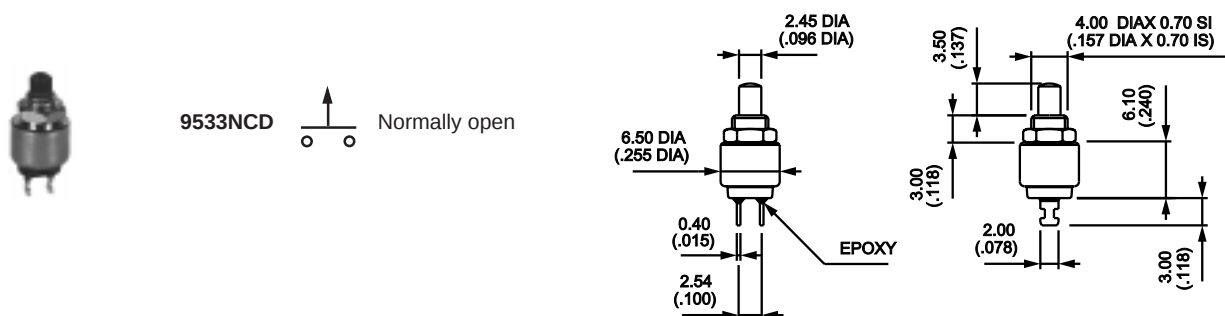
## Straight p.c. terminals - bracket mounting - self-cleaning contacts



## Right angle p.c. terminals - self-cleaning contacts



## Solder lug terminals - threaded bushing - butt action contacts



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

C

# 9000 SERIES - SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

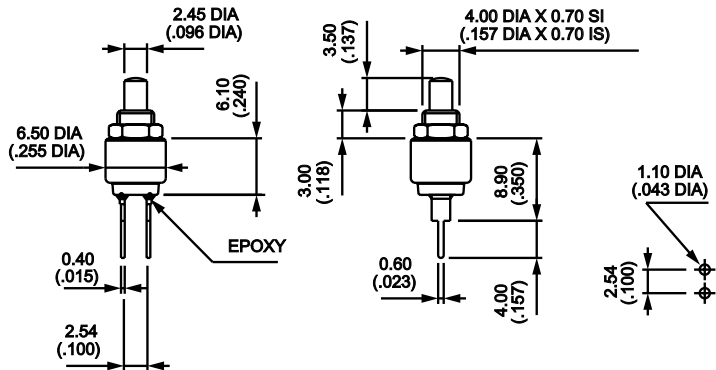
## Straight p.c. terminals - threaded bushing - .350" (8.9mm) p.c. to panel - butt action contacts



9233NCD



Normally open



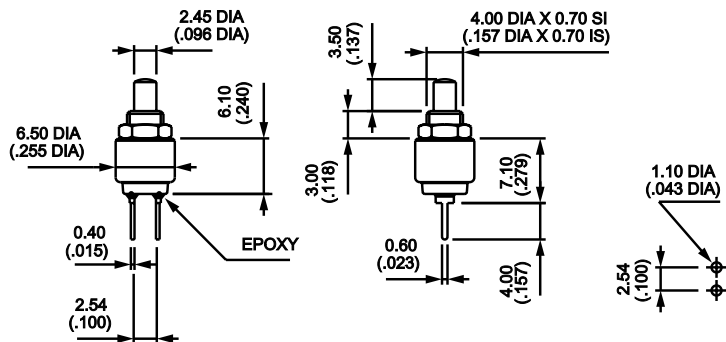
## Straight p.c. terminals - threaded bushing - .279" (7.1mm) p.c. to panel - butt action contacts



9133CD



Normally open



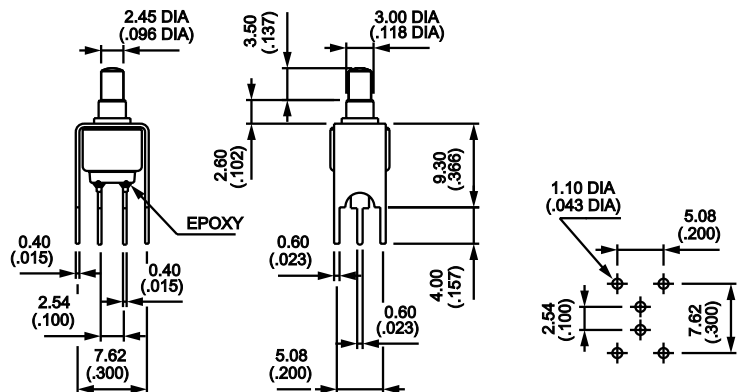
## Straight p.c. terminals - tall bracket mounting - butt action contacts



9233NYCD



Normally open



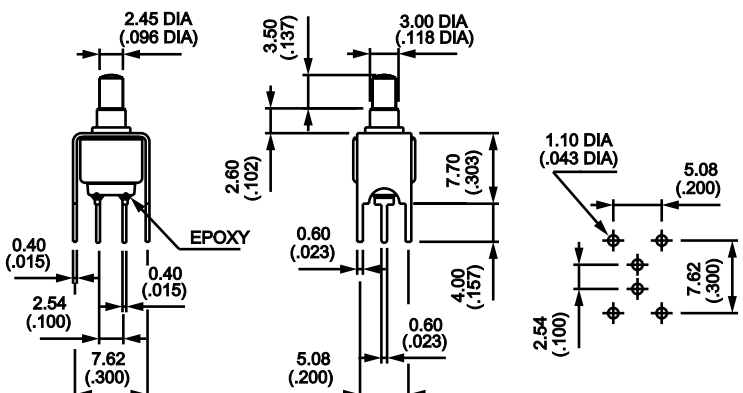
## Straight p.c. terminals - short bracket mounting - butt action contacts



9133YCD



Normally open



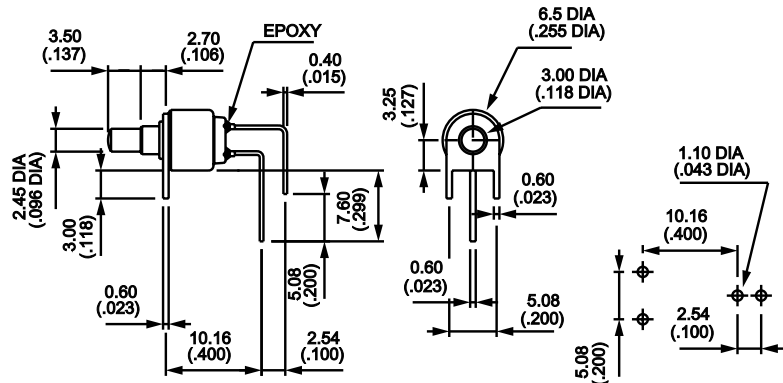
# 9000 SERIES - SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Right angle p.c. terminals - butt action contacts



9133WWCD

Normally open



**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.

(Allowable options are shown under each respective box).

Note: 'NONE' indicates box may be left empty.

### Model Structure:

| Series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Terminals case height | Number of poles | Electrical function                            | Bracket/ terminals |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|------------------------------------------------|--------------------|
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       | 3               |                                                |                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       | Single pole     | 2 Normally closed (NC)<br>3 Normally open (NO) |                    |
| <p><b>Case height: .314" (8mm)</b></p> <p>2.....Straight p.c. terminals, threaded bushing.....(NONE)</p> <p>2.....Straight p.c. terminals, tall bracket, smooth bushing.....Y</p> <p>2.....Right angle p.c. terminals, bracket, smooth bushing.....W W</p> <p>5.....Solder lug terminals, threaded bushing.....(NONE)</p> <p><b>Case height .240" (6.1mm)</b></p> <p>1.....Straight p.c. terminals, threaded bushing .279" (7.1mm) to panel.....(NONE)</p> <p>1.....Straight p.c. terminals, short bracket, smooth bushing.....Y</p> <p>1.....Right angle p.c. terminals, bracket, smooth bushing.....W W</p> <p>2.....Straight p.c. terminals, threaded bushing, .350" (8.9mm) to panel...N</p> <p>2.....Straight p.c. terminals, tall bracket, smooth bushing.....N Y</p> <p>5.....Solder lug terminals, threaded bushing.....N</p> |                       |                 |                                                |                    |

Although most combinations of options are available, some may result in incompatibilities. Consult factory if there is any question.

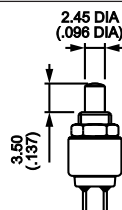
### Options:

| Contact materials            | Sealing                                                                              | Actuator                             |
|------------------------------|--------------------------------------------------------------------------------------|--------------------------------------|
| C D                          |                                                                                      |                                      |
| Gold plated brass (standard) | (NONE) Epoxy sealed terminals (standard)<br>K Front panel sealing with two 'o'-rings | (NONE) Standard<br>0 Flush<br>4 Long |

Caps available separately - see option drawings

Example of completely specified model number: **9233YCD**

## ACTUATOR OPTIONS



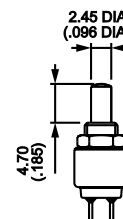
(NONE) Standard



0 Flush



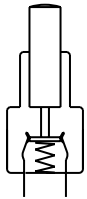
4 Long



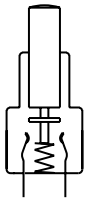
# 9000 SERIES - SUBMINIATURE MOMENTARY PUSHBUTTON SWITCHES

## MISCELLANEOUS

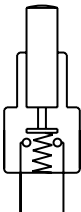
### SWITCH ACTION



Function 2  
(NC)



Function 3  
(NO)

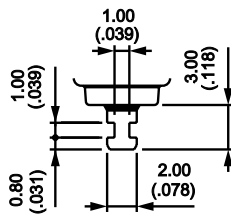


Function 3  
(NO)

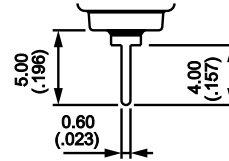
**Self-cleaning contacts**

**butt action contacts**

### TERMINAL OUTLINES

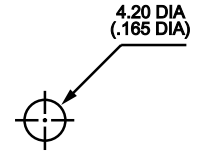


Solder lug



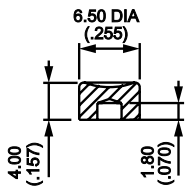
Straight p.c.

### PANEL CUT-OUT

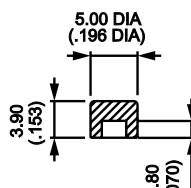


## OPTION DRAWINGS

**CAPS** Note: replace last '0' in p/n with color code. (order separately)

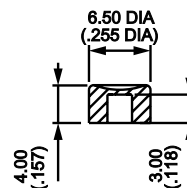


**U570** Standard  
For standard actuator

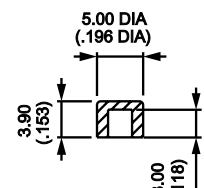


**U3600**  
For standard actuator

Below caps have deeper engagement and provide better retention



**U4310**  
For 4 actuator only



**U4320**  
For 4 actuator only

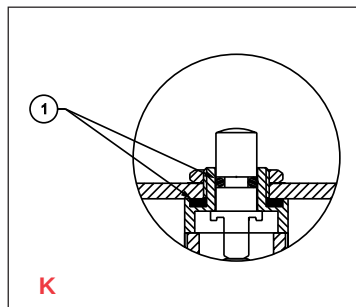
### Colors

- |     |        |
|-----|--------|
| 1   | blue   |
| 2   | black  |
| 3   | green  |
| 4   | grey   |
| 5   | yellow |
| 6   | red    |
| 7/1 | white  |
| 9   | orange |

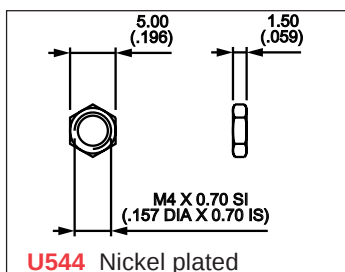
## SEALING OPTIONS

**(NONE)** Epoxy sealed terminals standard.

**K** Front panel sealing with 2 'O'-rings (1) provides protection against water and dust.  
Panel seal withstands 0.1bar pressure



**HEX NUT** Supplied with threaded bushing models



**U544** Nickel plated

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 9000 SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Single pole panel mounting models.
- NO, NC & NC/NO combined electrical functions.
- Solder lug & straight p.c. terminals.
- Compact case size.
- Supplied with 2 Hex Nuts & Lockwasher.

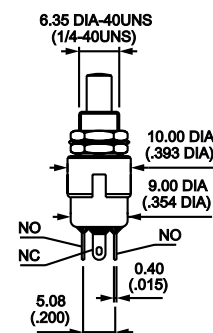
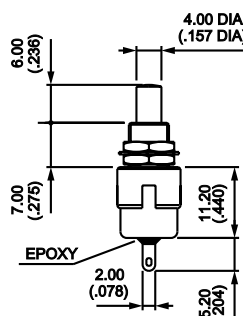
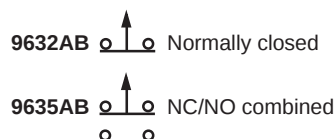
## SPECIFICATIONS

|                                           |                                                                                                            |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | Gold plated brass: 100 mA at 30 VDC<br>Silver: 0.3 Amps at 250 VAC, 0.6 Amps at 125 VAC or 1 Amp at 30 VDC |
| <b>Initial contact resistance:</b>        | 50 milliohms maximum                                                                                       |
| <b>Insulation resistance:</b>             | 1000 megohms minimum at 500 VDC                                                                            |
| <b>Dielectric strength:</b>               | 1000 V rms min. between terminals. 1500 V rms between terminals & case                                     |
| <b>Electrical life:</b>                   | 250,000 cycles minimum                                                                                     |
| <b>Operating temperature range:</b>       | -30°C to +65°C                                                                                             |
| <b>Travel:</b>                            | 9600, 9400 & 9400Y models - .051" (1.3mm)<br>9600N & 9400N models - .035" (0.9mm)                          |

## MATERIALS

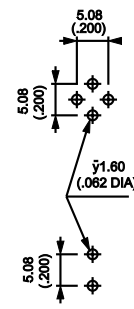
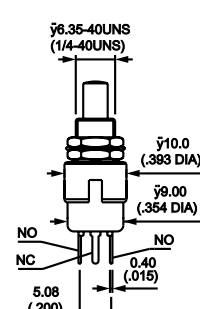
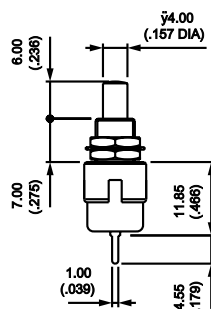
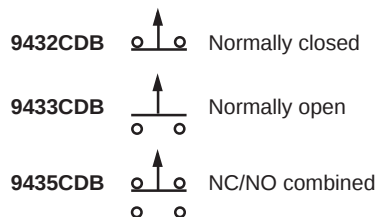
|                                  |                                                                                                      |
|----------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Contacts &amp; Terminals:</b> | Gold plated brass or silver                                                                          |
| <b>Actuator:</b>                 | Polyamide, glass filled or nickel plated brass (with K option)                                       |
| <b>Bracket:</b>                  | Tin plated steel                                                                                     |
| <b>Case:</b>                     | Diallyl phthalate                                                                                    |
| <b>Bushing:</b>                  | Nickel plated brass                                                                                  |
| <b>Terminal seal:</b>            | Epoxy                                                                                                |
| <b>Hardware:</b>                 | Supplied with 2 Hex Nuts .314" (8mm) across flats & 1 Lockwasher<br>See hardware section of catalog. |

## Solder lug terminals - case length .440" (11.2mm) - silver contacts



# 9000 SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

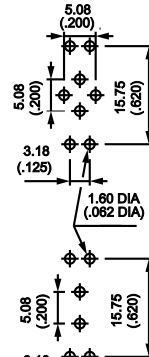
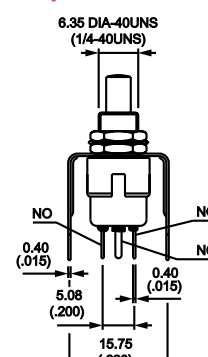
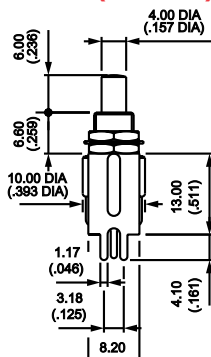
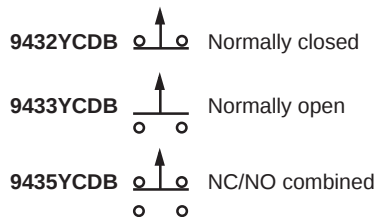
## Straight p.c. terminals - case length .440" (11.2mm) - gold plated brass contacts



F2

F5

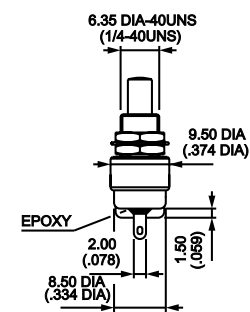
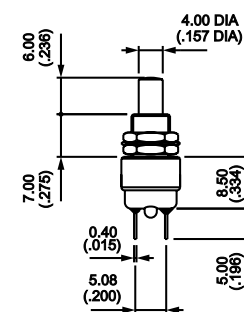
## Bracket mounting w/straight p.c. terminals - case length .440" (11.2mm) - gold plated brass contacts



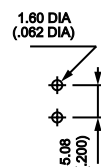
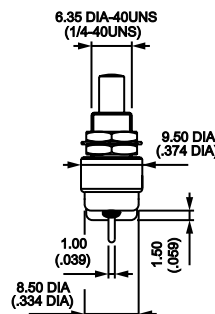
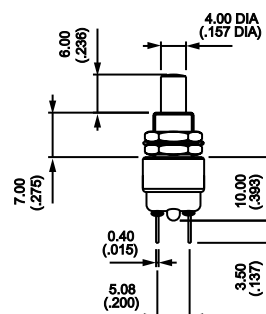
F2

F5

## Solder lug terminals - case length .334" (8.5mm) - silver contacts



## Straight p.c. terminals - case length .334" (8.5mm) - gold plated brass contacts



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 9000 SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Solder lug terminals - .630" dia. (16mm) bushing - metal button - silver contacts



Silver contacts

**9633AX1146**



Normally open

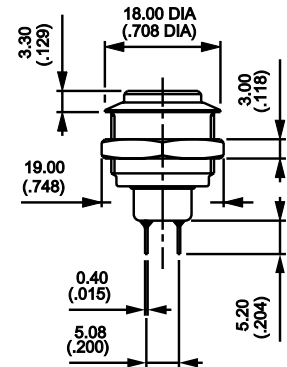
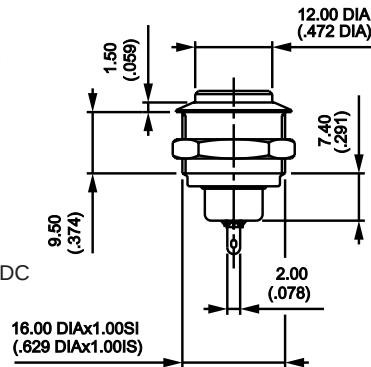
Gold plated  
silver contacts

**9633ADX1146**



Normally open

Panel cut-out: .637" dia. (16.2mm)  
Maximum rating: 0.3A 250VAC or 1A 30VDC  
Epoxy sealed terminals.  
Other options not applicable for this configuration



**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

### 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
(Allowable options are shown under each respective box).  
Note: 'NONE' indicates box may be left empty.

#### Model Structure:

| Series                         | Terminals/case length                                                                                                                                                                                                                                                                                                      | Number of poles                | Electrical function                                                | Bracket/case length                                                                                                     |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <input type="text" value="9"/> | <input type="text" value="6"/>                                                                                                                                                                                                                                                                                             | <input type="text" value="3"/> | <input type="text" value="2"/>                                     | <input type="text" value="N"/>                                                                                          |
|                                | 4 Straight pc terms., case length .440" (11.2mm)<br>6 Solder lug terms., case length .440" (11.2mm)<br>4 Straight pc terms. with optional case length/brkt.<br>- select <b>N</b> or <b>Y</b> from 'brkt/case length' box<br>6 Solder lug terms. with optional case length -<br>indicate <b>N</b> in 'brkt/case length' box | Single pole                    | 2 Normally closed (NC)<br>3 Normally open (NO)<br>5 NC/NO combined | <b>(NONE)</b><br><b>N</b> Case length -<br>.334" (8.5mm)<br><b>Y</b> Brkt. mounting,<br>case length -<br>.456" (11.6mm) |

#### Options:

##### Contact materials

**A** Silver  
**C D** Brass, gold plated

##### Sealing

**(NONE)** No sealing  
**B** Epoxy sealed terminals  
**K** Front panel sealing with  
  two 'o'-rings & metal  
  actuator

##### Special options

**(NONE)**  
**F** Tin plated terminals  
  (for p.c. terms. only)  
**X 6 0 1** Special  
  contact w/ lower rating

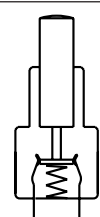
Example of completely specified  
model number: **9432YCDBF**

Caps available separately -  
see option drawings.

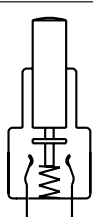
Although most combinations of options are available, some may  
result in incompatibilities. Consult factory if there is any question.

### MISCELLANEOUS

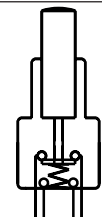
#### SWITCH ACTION



Function 2  
(NC)

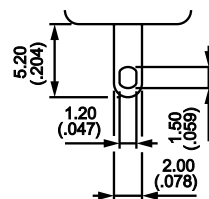


Function 3  
(NO)

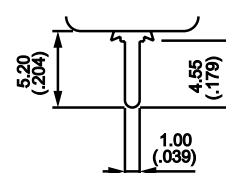


Function 5  
(combined)

#### TERMINAL OUTLINES

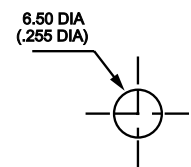


Solder lug



Straight p.c.

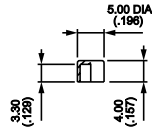
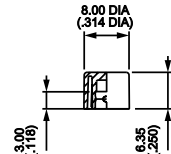
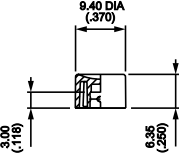
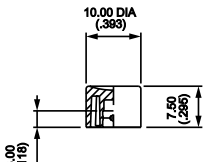
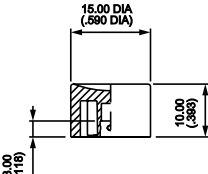
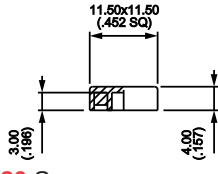
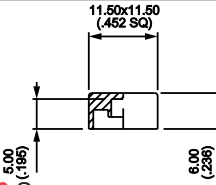
#### PANEL CUT-OUT



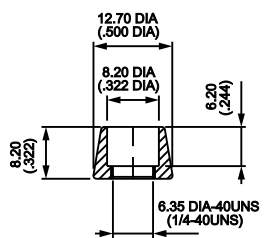
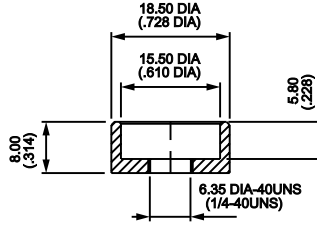
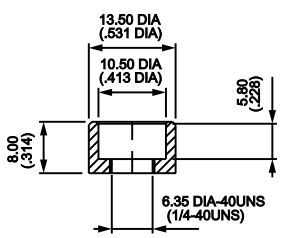
# 9000 SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## OPTION DRAWINGS & SPECIAL OPTIONS

**CAPS** Note: replace last '0' in p/n with color code. (order separately)

|  <p><b>U900</b></p> |  <p><b>U1140</b></p>        |  <p><b>U1720</b></p>        |  <p><b>U480</b> Standard</p>                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--|---|------|---|-------|---|-------|---|------|---|--------|---|-----|-----|-------|---|--------|
|  <p><b>U630</b></p> |  <p><b>U2430</b> Square</p> |  <p><b>U2020</b> Square</p> | <table><tr><th colspan="2">Colors</th></tr><tr><td>1</td><td>blue</td></tr><tr><td>2</td><td>black</td></tr><tr><td>3</td><td>green</td></tr><tr><td>4</td><td>grey</td></tr><tr><td>5</td><td>yellow</td></tr><tr><td>6</td><td>red</td></tr><tr><td>7/1</td><td>white</td></tr><tr><td>9</td><td>orange</td></tr></table> | Colors |  | 1 | blue | 2 | black | 3 | green | 4 | grey | 5 | yellow | 6 | red | 7/1 | white | 9 | orange |
| Colors                                                                                               |                                                                                                              |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 1                                                                                                    | blue                                                                                                         |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 2                                                                                                    | black                                                                                                        |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 3                                                                                                    | green                                                                                                        |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 4                                                                                                    | grey                                                                                                         |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 5                                                                                                    | yellow                                                                                                       |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 6                                                                                                    | red                                                                                                          |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 7/1                                                                                                  | white                                                                                                        |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |
| 9                                                                                                    | orange                                                                                                       |                                                                                                               |                                                                                                                                                                                                                                                                                                                             |        |  |   |      |   |       |   |       |   |      |   |        |   |     |     |       |   |        |

**DRESS NUTS** Chrome plated. Order separately.

|                                                                                                                        |                                                                                                                      |                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|  <p><b>U1636</b> (for cap U1140)</p> |  <p><b>U825</b> (for cap U630)</p> |  <p><b>U840</b> (for cap U480)</p> |
|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|

## SPECIAL OPTIONS

**F** Tin plated terminals (for p.c. terminals only).

**X601** Silver plated brass contacts  
 Contact ratings: 0.2A 250VAC, 0.4A 125VAC or 0.5A 30VDC  
 Electric life: 20,000 cycles minimum.  
 Minimum quantity: 5,000 pieces.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## 10400 SERIES - PROFESSIONAL MINIATURE MOMENTARY PUSHBUTTON SWITCHES



### FEATURES

- Single and double pole panel mounting models with optional matte black finish.
- ON - MOM electrical functions.
- Solder lug terminals.
- Compact case size with 10mm (.393") diameter threaded bushing.
- Epoxy terminal sealing standard.

### SPECIFICATIONS

|                                                         |                                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings &amp; life:</b><br>(resistive loads) | Silver or gold plated silver: 3 Amps at 110 VAC, 2 Amps at 220 VAC or 3 Amps at 24 VDC.                                                                  |
| <b>Initial contact resistance:</b>                      | 10 mΩ max.                                                                                                                                               |
| <b>Insulation resistance:</b>                           | 1000 megohms min. at 500 VDC                                                                                                                             |
| <b>Dielectric strength:</b>                             | 1000 V rms min. between terminals of the same pole<br>2000 V rms min. between terminals and frame<br>2000 V rms min. between terminals of adjacent poles |
| <b>Electric life:</b>                                   | 50,000 cycles min.                                                                                                                                       |
| <b>Torque:</b>                                          | 1.106 Ft-lbs. (1.50 Nm) max. applied to nut                                                                                                              |
| <b>Operating temp. range:</b>                           | -40°C to +85°C                                                                                                                                           |

### MATERIALS

|                                  |                              |
|----------------------------------|------------------------------|
| <b>Contacts &amp; Terminals:</b> | Silver or gold plated silver |
| <b>Actuator:</b>                 | Chrome plated brass          |
| <b>Case:</b>                     | Diallyl phthalate            |
| <b>Housing:</b>                  | Nickel plated brass          |
| <b>Bushing:</b>                  | Nickel plated brass          |
| <b>Terminal seal:</b>            | Epoxy                        |

### AGENCY LISTINGS

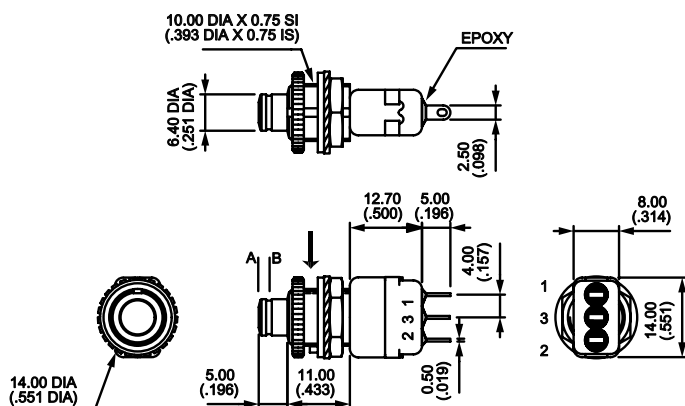
|                |                                                                                                                                      |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| CECC 96401-001 | Availability: Consult factory for details of approved models.<br>Marking: To order switches marked CECC, add 'CECC' to model number. |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|

# 10400 SERIES - PROFESSIONAL MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Single pole - solder lug terminals



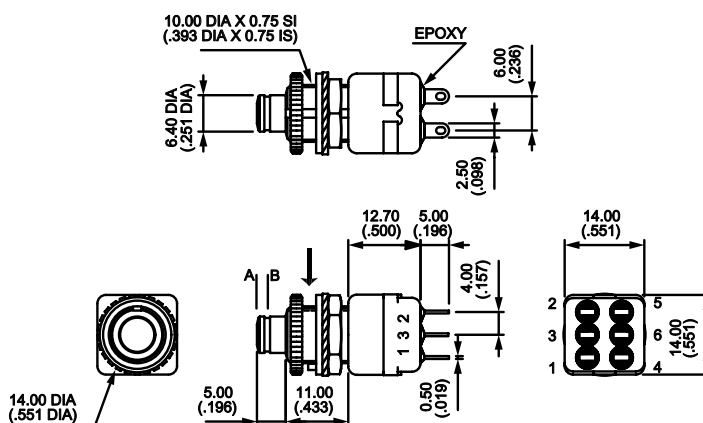
|                                 |     |       |
|---------------------------------|-----|-------|
|                                 | A   | B     |
|                                 | 1-2 | 1-3   |
| Silver contacts                 |     |       |
| <b>104350003</b>                | ON  | - MOM |
| Gold plated silver contacts     |     |       |
| <b>104350108</b>                | ON  | - MOM |
| Standard hardware supplied:     |     |       |
| 1 Knurled nut, 1 hex nut,       |     |       |
| 1 locking ring and 1 lockwasher |     |       |



## Double pole - solder lug terminals

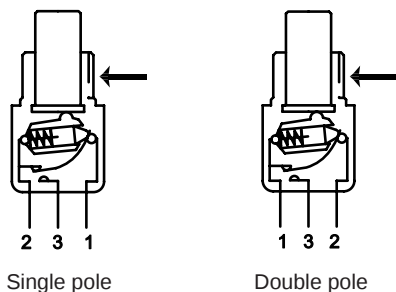


|                                 |     |       |
|---------------------------------|-----|-------|
|                                 | A   | B     |
|                                 | 2-1 | 2-3   |
|                                 | 5-4 | 5-6   |
| Silver contacts                 |     |       |
| <b>104450003</b>                | ON  | - MOM |
| Gold plated silver contacts     |     |       |
| <b>104450108</b>                | ON  | - MOM |
| Standard hardware supplied:     |     |       |
| 1 Knurled nut, 1 hex nut,       |     |       |
| 1 locking ring and 1 lockwasher |     |       |

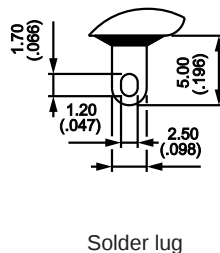


## MISCELLANEOUS

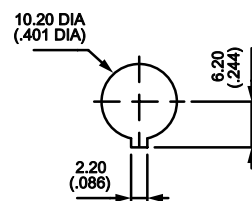
### SWITCH ACTION



### TERMINAL OUTLINE



### PANEL CUT-OUT



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES



### FEATURES

- Dry circuit through power ratings .
- Compact size SPST momentary and alternate action models with numerous options.
- Panel, panel & p.c. and p.c. mounting models, lighted and unlighted.

### SPECIFICATIONS

#### Contact ratings & life:

(Q) power models - coin silver: 1 Amp at 125 VAC or 28 VDC or 0.5 Amps at 250 VAC - electric life 250,000 cycles min. 3 Amps at 125 VAC or 28 VDC, or 1.5 Amps at 250 VAC - electric life 10,000 cycles min. (All previous loads are resistive).

(B) dry circuit models - gold over nickel over brass: 0.4 VA max. at 20 V max. - electric life 250,000 cycles min.

UL models - coin silver: 1 Amp at 125 VAC or 0.5 Amps at 250 VAC (75% power factor). UL file no. E66367.

#### Initial contact resistance:

10 milliohms max. at 3 VDC, 0.1 Amp.

#### Insulation resistance:

Greater than 10,000 megohms.

#### Dielectric strength:

1000 Volts RMS min. at sea level.

#### Operating temperature range:

-30°C to +85°C

### MATERIALS

#### Contacts:

Coin silver for power & UL models. Gold over nickel over brass for dry circuit models.

#### Actuator:

Nylon. Black color is standard for 300 Series. White is standard for 400 Series.

#### Bushing:

Nickel plated brass

#### Base:

Melamine phenolic, color red.

#### Terminal seal:

Epoxy (standard)

#### Support bracket:

Brass or steel, tin plated

#### Spring mounting bracket:

Stainless steel

#### Bezel & cap:

Nylon. Available in black, red or white. Consult factory for other colors.

#### Hardware:

See Miscellaneous section.

#### LED:

Intensity: 2.0 mcd at 10 mA. Forward voltage: 2.0V (3.0V max.). Max. continuous forward current: 30 mA at 25°C. Red standard - yellow & green are optional. Specifications are subject to change without notice - consult factory.

### AGENCY RECOGNITION



UL Marking: Switches ordered with 'UL' added at end of model no. are supplied with recognized mark.

### ABOUT THIS SERIES

The material in this series is organized in the following sequence:

- Completely specified switch models & options
- 'build your own switch' order format
- Additional options & panel cut-outs

# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

## 300 SERIES SPST Momentary (Normally open or normally closed)

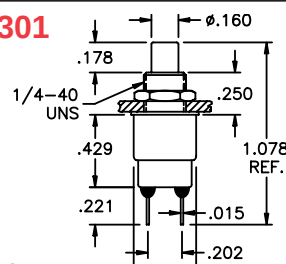


White actuator optional - black is standard

| (Q) Power Model No. | (B) Dry ckt. Model No. | UL Model No. |
|---------------------|------------------------|--------------|
| 301ZQE              | 301ZBE                 | 301ZQE/UL    |
| 302ZQE              | 302ZBE                 | 302ZQE/UL    |
| 303ZQE              | 303ZBE                 | 303ZQE/UL    |
| 304ZQE              | 304ZBE                 | 304ZQE/UL    |
| 305ZQE              | 305ZBE                 | 305ZQE/UL    |
| 306ZQE              | 306ZBE                 | 306ZQE/UL    |

Switch caps optional - see Hardware section of catalog.

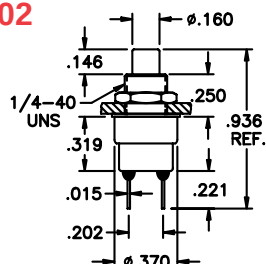
### 301



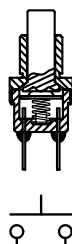
N.O. with overtravel  
Total travel: .110  
Overtravel: .020 min.  
Actuation force: 8.5 oz. ± 4 oz.



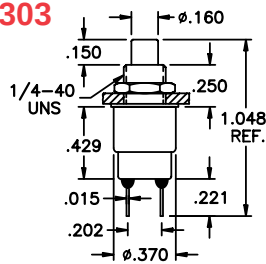
### 302



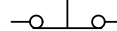
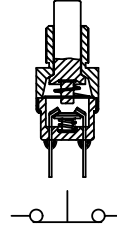
N.O. without overtravel  
Total travel: .060  
Actuation force: 10 oz. ± 4 oz.



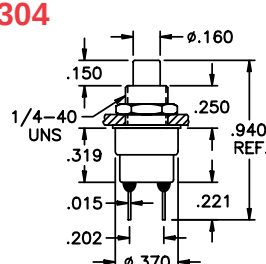
### 303



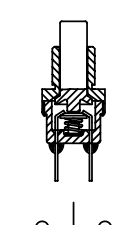
N.C. with pretravel  
Total travel: .055  
Pretravel: .020 min.  
Actuation force: 8 oz. ± 4 oz.



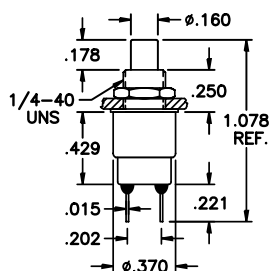
### 304



N.C. without pretravel  
Total travel: .040  
Actuation force: 8.5 oz. ± 4 oz.



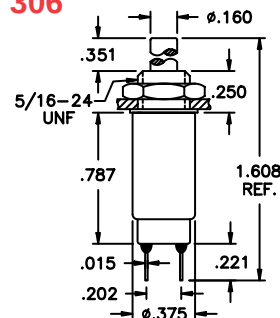
### 305



N.O. with more overtravel than 301  
Total travel: .110  
Pretravel to contact closure: .030  
Actuation force to contact closure: 3 oz.  
Overtravel: .075  
Actuation force at full travel: 8 oz.



### 306



N.O. with sealed contact area and maximum overtravel.  
Total travel: .310  
Pretravel to contact closure: .025  
Actuator force to contact closure: 1.5 oz.  
Overtravel: .250 minimum  
Actuation force at full travel: 9 oz.  
Note: Electrical or mechanical life for this model is 50,000 cycles.



## 400 SERIES (401 Push on/ push off, 402 N.O. momentary)

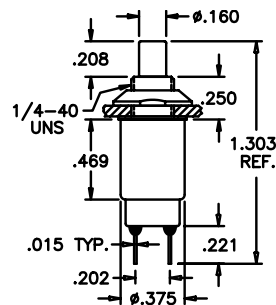


Black actuator optional - white is standard

| (Q) Power Model No. | (B) Dry ckt. Model No. | UL Model No. |
|---------------------|------------------------|--------------|
| 401ZQE              | 401ZBE                 | 401ZQE/UL    |
| 402ZQE              | 402ZBE                 | 402ZQE/UL    |

### SNAP-ACTION MECHANISM

Pretravel to contact closure: .026  
Travel to actuate switch: .106  
Total travel: .137  
Force to actuate switch: 22 oz.  
Force at maximum travel: 35 oz.  
Mechanical life: 1,000,000 cycles minimum



United States Patent 4,319,106

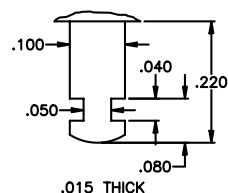
Switchcaps optional - see Hardware section of catalog.

## OPTIONS

### Colored operating actuator

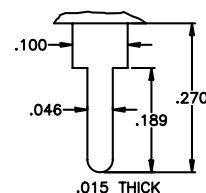
Available in dyed nylon. To specify, add digit at end of model number - 1 blue, 2 black, 3 green, 5 yellow, 6 red, 7/1 white or 9 orange. Black is standard for 300 Series. White is standard for 400 Series.

### Z



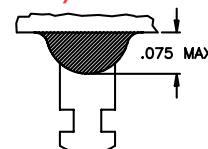
Solder lug terminal

### C



Printed circuit terminal

### E (standard)



Epoxy seal

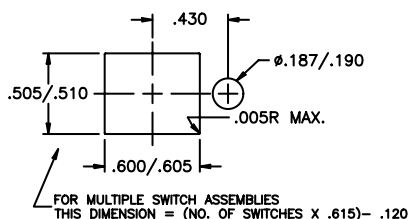
# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

## Solder lug terminals - snap-in bezel with outboard LED



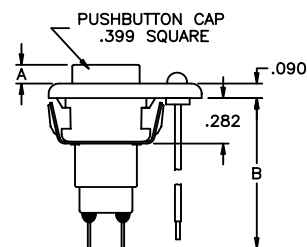
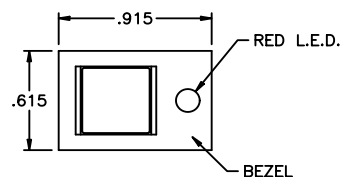
**401SZQEJ6168**

RECOMMENDED PANEL CUTOUT  
Panel thickness range - .047-.125



| MODEL NO. | DIM. A | DIM. B |
|-----------|--------|--------|
| 301       | .108   | .929   |
| 302       | .085   | .817   |
| 303       | .085   | .929   |
| 304       | .085   | .817   |
| 305       | .108   | .929   |
| 401       | .145   | 1.142  |
| 402       | .145   | 1.142  |

LED leads - 31/32" min. long  
Anode (front) - white  
Cathode (back) - black



## Solder lug terminals - snap-in bezel

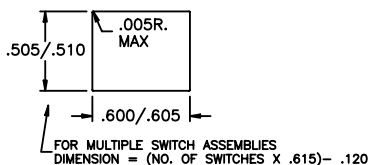


**302SZQEJ8168**

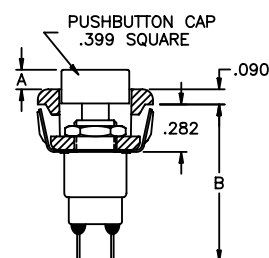
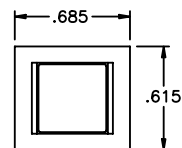


**401SZQEJ8188**

RECOMMENDED PANEL CUTOUT  
Panel thickness range - .047-.125



| MODEL NO. | DIM. A | DIM. B |
|-----------|--------|--------|
| 301       | .108   | .929   |
| 302       | .085   | .817   |
| 303       | .085   | .929   |
| 304       | .085   | .817   |
| 305       | .108   | .929   |
| 401       | .145   | 1.142  |
| 402       | .145   | 1.142  |



# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

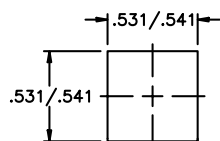
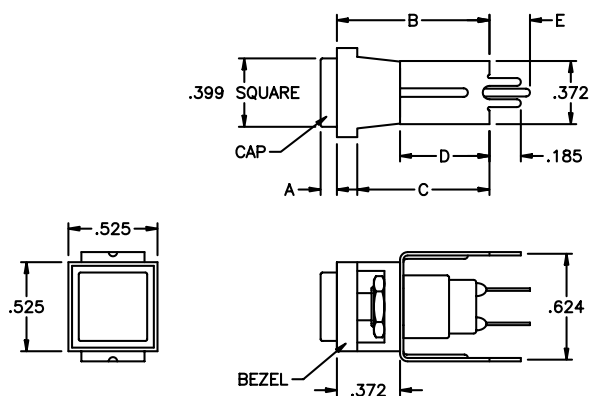
## Straight p.c. terminals - p.c. mounting bezel



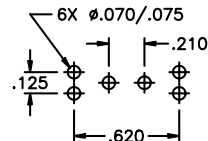
302SV30BEJ8488

| DRY CKT.<br>MODEL NO. | ELECTRICAL<br>FUNCTION           |
|-----------------------|----------------------------------|
| 301SV30BEJ8488        | MOM. S.P N.O. w/overtravel       |
| 302SV30BEJ8488        | MOM. S.P N.O. no overtravel      |
| 305SV30BEJ8488        | MOM. S.P N.O. w/added overtravel |

| MODEL NO. | OPTION | DIM. A | DIM. B | DIM. C | DIM. D | DIM. E |
|-----------|--------|--------|--------|--------|--------|--------|
| 301S      | V30    | .100   | .900   | .780   | .527   | .237   |
| 301S      | V40    | .100   | 1.020  | .900   | .647   | .118   |
| 302S      | V30    | .070   | .900   | .780   | .527   | .125   |
| 302S      | V40    | .070   | 1.020  | .900   | .647   | .357   |
| 305S      | V30    | .100   | .900   | .780   | .527   | .237   |
| 305S      | V40    | .100   | 1.020  | .900   | .647   | .118   |



PANEL CUTOUT



P.C. LAYOUT

## Right angle p.c. terminals - p.c. mounting bezel

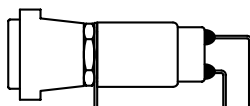
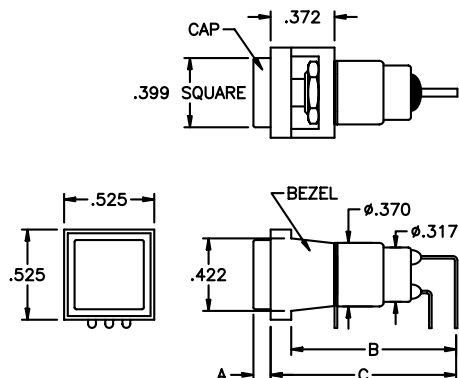


302SV-1BEJ8488

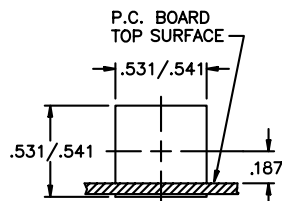
| DRY CKT.<br>MODEL NO. | ELECTRICAL<br>FUNCTION                   |
|-----------------------|------------------------------------------|
| 301SV-1BEJ8488        | MOM. S.P N.O. w/overtravel               |
| 302SV-1BEJ8488        | MOM. S.P N.O. no overtravel              |
| 305SV-1BEJ8488        | MOM. S.P N.O. w/added overtravel         |
| 401SV-1BEJ8488        | S.P Alternate action w/ tactile response |
| 402SV-1BEJ8488        | MOM. S.P N.O. w/ tactile response        |

| MODEL NO.   | OPTION | DIM. A | DIM. B | DIM. C | DIM. D | DIM. E | DIM. F |
|-------------|--------|--------|--------|--------|--------|--------|--------|
| 301S        | V      | .100   | .960   | 1.080  | .550   | .150   | .250   |
| 301S        | V-1    | .100   | .910   | 1.030  | .550   | .100   | .250   |
| 302S        | V      | .070   | .860   | .980   | .450   | .150   | .250   |
| 302S        | V-1    | .070   | .810   | .930   | .450   | .100   | .250   |
| 305S        | V      | .100   | .960   | 1.080  | .550   | .150   | .250   |
| 305S        | V-1    | .100   | .910   | 1.030  | .550   | .100   | .250   |
| 401S & 402S | V      | .130   | 1.222  | 1.342  | .750   | .150   | .310   |
| 401S & 402S | V-1    | .130   | 1.172  | 1.292  | .750   | .100   | .310   |

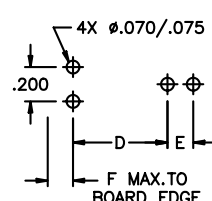
Notes: Terminals are not fully bent, to facilitate spring retention in p.c. board.



401 & 402 ONLY



PANEL CUTOUT



P.C. LAYOUT

# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

## Snap-in bezel for round hole mounting

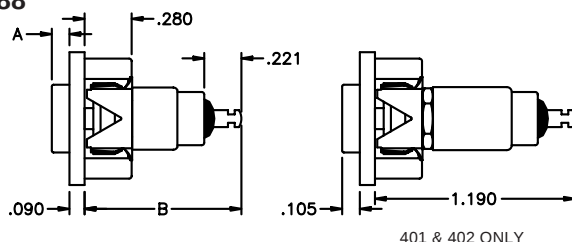
Self-keying against rotation



| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. | UL<br>MODEL NO. | ELECTRICAL<br>FUNCTION      |
|-------------------------|-----------------------|-----------------|-----------------------------|
| 301SZQEJ9688            | 301SZBEJ9688          | 301SZQEJ9688/UL | MOM. S.P N.O. w/overtravel  |
| 302SZQEJ9688            | 302SZBEJ9688          | 302SZQEJ9688/UL | MOM. S.P N.O. no overtravel |
| 303SZQEJ9688            | 303SZBEJ9688          | 303SZQEJ9688/UL | MOM. S.P N.C. w/pretravel   |
| 304SZQEJ9688            | 304SZBEJ9688          | 304SZQEJ9688/UL | MOM. S.P N.C. no pretravel  |
| 305SZQEJ9688            | 305SZBEJ9688          | 305SZQEJ9688/UL | MOM. S.P N.O. w/overtravel  |
| 401SZQEJ9688            | 401SZBEJ9688          | 401SZQEJ9688/UL | S.P Alternate snap-action   |
| 402SZQEJ9688            | 402SZBEJ9688          | 402SZQEJ9688/UL | MOM. S.P N.O. (snap-action) |

### 302SZQEJ9688

| MODEL NO. | DIM. A   | DIM. B |
|-----------|----------|--------|
| 301       | .108     | .929   |
| 302       | .085     | .817   |
| 303       | .085     | .929   |
| 304       | .085     | .817   |
| 305       | .108     | .929   |
| 401 & 402 | AS SHOWN |        |



301, 302  
305, 402

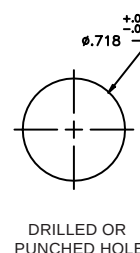
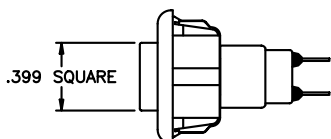
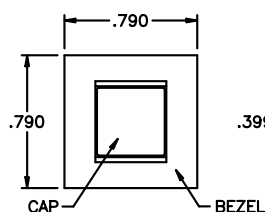
303, 304

401

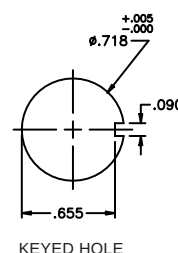


### RECOMMENDED PANEL CUTOUTS

Panel thickness range - .047 - .125



DRILLED OR  
PUNCHED HOLE

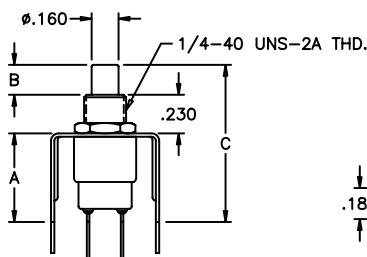
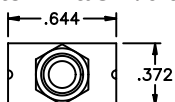


KEYED HOLE

## OPTIONS FOR SELECTIVE MODELS ONLY

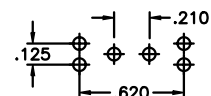
### Options V30 & V40 Straight p.c. terminals w/bracket

For models 301, 302 & 305 only



| MODEL NO. | OPTION | DIM. A | DIM. B | DIM. C | DIM. D |
|-----------|--------|--------|--------|--------|--------|
| 301,305   | V30    | .527   | .173   | .933   | .237   |
| 301,305   | V40    | .647   | .173   | 1.053  | .118   |
| 302       | V30    | .527   | .150   | .910   | .125   |
| 302       | V40    | .647   | .150   | 1.030  | .357   |

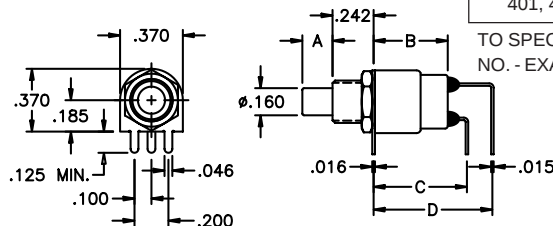
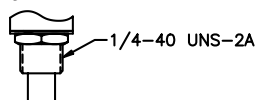
TO SPECIFY, ADD OPTION FROM BOX TO SWITCH MODEL NO. - EXAMPLE: 302V30BE



### P.C. BOARD LAYOUT

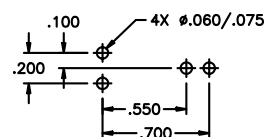
### Options V & V-1 Right angle terminals w/bracket

For models 301, 302, 305, 401 & 402 only



| MODEL NO. | OPTION | DIM. A | DIM. B | DIM. C | DIM. D |
|-----------|--------|--------|--------|--------|--------|
| 301, 305  | V      | .173   | .439   | .550   | .700   |
| 301, 305  | V-1    | .173   | .439   | .550   | .650   |
| 302       | V      | .150   | .327   | .450   | .600   |
| 302       | V-1    | .150   | .327   | .450   | .550   |
| 401, 402  | V      | .210   | .653   | .750   | .900   |
| 401, 402  | V-1    | .210   | .653   | .750   | .850   |

TO SPECIFY, ADD OPTION FROM BOX TO SWITCH MODEL NO. - EXAMPLE: 301V-1BE



### P.C. BOARD LAYOUT

Support Bracket is Brass, Solder Coated.  
Available with B, N, or T Contact Materials.  
(See pg. C27)

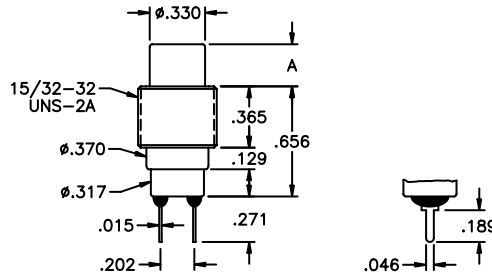
Supplied with Epoxy Sealed Terminals.

Note: Terminals are not fully bent, to facilitate spring retention in p.c. board.

# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

## OPTIONS FOR SELECTIVE MODELS ONLY

**Option T1** 15/32" bushing mounts from front or rear of panel  
For models 301, 303 & 305 only



| MODEL NO. | A    |
|-----------|------|
| 301,305   | .250 |
| 303       | .225 |

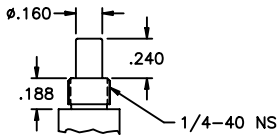
TO SPECIFY, ADD 'T1' TO SWITCH MODEL NO. - EXAMPLE: 301T1CQE6

Threaded bushing: Brass, nickel plated  
Actuator button: Nylon. Specify color - see order format.

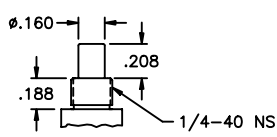
Supplied with 2 Hex Nuts, p/n A465 & 1 Lockwasher, p/n A466 (see Hardware section of catalog).

Printed circuit or solder lug terminals available.

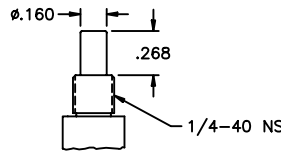
**Option S** Long actuator  
For models 301, 302, 303, 304, 305, 401 & 402 only



301 & 305



302, 303 & 304



401 & 402

TO SPECIFY, ADD 'S' TO SWITCH MODEL NO. - EXAMPLE: 301SCQE

Actuator: Nylon  
Color: Black standard for 300 Series  
White standard for 400 Series.  
Other colors available - see options.

**Additional ordering information:** Commonly ordered models are shown above and on prior pages with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number. Allowable options are shown below each respective box with brief description - see option dwgs. & info. following.

Notes: 'NONE' indicates box may be left empty. Not all combinations can be made - see other pages of Series.

### Model Structure:

| Series               | Actuators            | Bushings             | Terminations                       | Contact materials    | Sealing              |
|----------------------|----------------------|----------------------|------------------------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/>               | <input type="text"/> | <input type="text"/> |
| 3 0 1                | (NONE)               | (NONE)               | Z Solder lug                       | B Gold               | Epoxy                |
| 3 0 2                | S Long               | T 1 15/32" thd'd.    | C Printed circuit                  | Q Coin silver        | terminal             |
| 3 0 3                | (see dwg. -          | (see dwg. -          | V Right angle p.c. term-           | N Economy            | seal is              |
| 3 0 4                | specify for all      | for 301,             | V - 1 inals for 301, 302, 305,     | gold                 | standard             |
| 3 0 5                | models with          | 303 & 305            | only).                             | T Economy            |                      |
| 3 0 6                | bezels- not          | only).               |                                    | silver               |                      |
| 4 0 1                | available            |                      | V 3 0 Straight p.c. terminals with |                      |                      |
| 4 0 2                | for 306).            |                      | V 4 0 bracket for 301, 302 & 305   |                      |                      |
|                      |                      |                      | only (see dwg.).                   |                      |                      |

### Options:

| Bezel& cap                 | Bezel color            | Cap color              | Recognitions         |
|----------------------------|------------------------|------------------------|----------------------|
| <input type="text"/>       | <input type="text"/>   | <input type="text"/>   | <input type="text"/> |
| (NONE)                     | (NONE)                 | (NONE)                 | (NONE)               |
| J 6 1 Snap-in w/LED        | 2 Black                | 2 Black                | /U L                 |
| J 8 1 Snap-in no LED       | 6 Red                  | 6 Red                  |                      |
| J 8 4 P.C. style           | 8 White                | 8 White                |                      |
| J 9 6 Snap-in (round hole) | Other Colors Available | Other Colors Available |                      |

Switch caps for switches without bezels also available - see Hardware section of catalog.

Example of completely specified model number:  
**301SZQEJ8122/UL**

Although most combinations of options are available, some may result in incompatibilities. Consult factory if there is any question.

# 300 & 400 SERIES - MINIATURE PUSHBUTTON SWITCHES

## CONTACT MATERIAL OPTIONS

- B** Dry circuit - gold over nickel over brass.  
RATING: 0.4 Volt-Amps (VA) max. at 20 V max.  
ELECTRIC LIFE: 250,000 cycles minimum.
- Q** Power circuit - coin silver.  
RATING: 1 Amp at 120 VAC or 28 VDC or 0.5 Amps at 250 VAC. ELECTRIC LIFE: 250,000 cycles minimum at full load.  
Also - 3 Amps at 120 VAC or 28 VDC or 1.5 Amps at 250 VAC. ELECTRIC LIFE: 10,000 cycles minimum at full load.  
Dry circuit or power circuit - gold over nickel over coin silver.
- G** Dry circuit - gold over nickel over coin silver.  
RATINGS & ELECTRIC LIFE: Same as B & Q above -i.e.- can be used in either dry circuit or power circuit, however once used in power circuit, switch cannot be re-used in dry circuit. This option permits customers to inventory one switch to satisfy either application,
- N** RATING: 0.4 Volt-Amps (VA) max. at 20 V max. Note- less gold than B option.  
ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.
- T** Power circuit - Silver plate over brass.  
RATING: 0.5 Amps at 120 VAC or 0.25 Amps at 250 VAC (resistive loads).  
ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.

Solder dipped terminals and custom contact plating available - contact factory.

## UL OPTION

- /UL** For power circuits - coin silver  
RATING: 1 Amp at 125 VAC or 0.25 Amps at 250 VAC (75% power factor).  
Underwriter Laboratories file no. E66367. Note - applicable only to terminations with coin silver contacts (Q or G options).

## HARDWARE

### HARDWARE SUPPLIED

(See Hardware section of catalog)

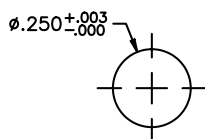
Panel mounted 300 Series switches with threaded 1/4" bushing are supplied with 1 Hex Nut A112 and 1 Lockwasher A115.

Panel mounted 300 Series switches with threaded 15/32" bushing are supplied with 2 Hex Nuts A465 and 1 Lockwasher A466.

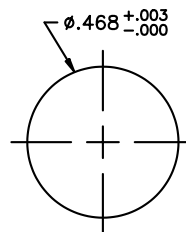
Panel mounted 306 Series switches with threaded 5/16" bushing are supplied with 1 Hex Nut A713 and 1 Lockwasher A734.

Panel mounted 400 Series switches with threaded bushing are supplied with 1 Panel Dress Nut A274 and 1 Lockwasher A115.

## PANEL CUT-OUTS



Accepts all 1/4" threaded bushings



Accepts all 15/32" threaded bushings

# MPB SERIES PUSHBUTTON SWITCHES

## FEATURES

- Single pole single throw momentary action.
- Normally open and normally closed models.
- Permanent cap is standard.
- Single hole mounting w/mtg. nut & lk'wshr supplied.

## MATERIALS

Base: PBT thermoplastic, color black  
 Bushing: Brass, nickel plated  
 Actuator: ABS thermoplastic  
 Terminals: Brass, silver plated  
 Shorting Contact: Brass or phos. brz., silver plated

## GENERAL SPECIFICATIONS

### ELECTRICALS

Contact rating: 300 mA @ 125 VDC  
 Insulation resistance: 100 megohms min. (500 VDC)  
 Dielectric withstanding voltage: 500 VAC for 1 minute  
 Contact resistance: 25 milliohms max. at 1 amp, 5 VDC  
 Electrical/Mechanical life: 10,000 cycles min.  
 Contact bounce: less than 10 milliseconds

### MECHANICALS, THERMALS

Plunger travel: MPB1110: .063" (1.6mm) MPB1140: .078" (2mm)  
 Actuation force: 300 grams  $\pm$ 150 grams  
 Operating temperature range: -20 °C to +60 °C

### SOLDERING

Wave or hand soldering: 235°C max. for 5 seconds max.  
 Solvent washing: Non-washable. Do not apply flux to terminals or switch mtg. surface

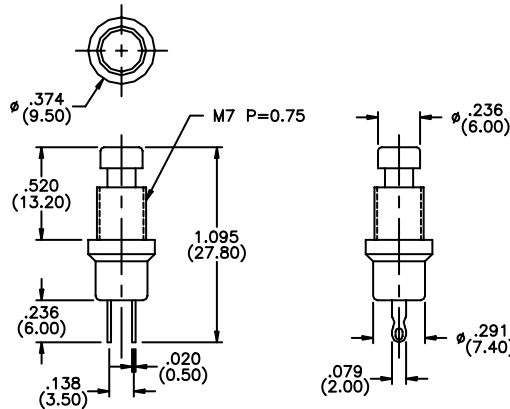
### MPB1110



NORMALLY OPEN

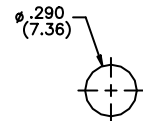


SCHEMATIC



MECHANICAL OUTLINE

| Model No. | Cap Color |
|-----------|-----------|
| MPB11102  | Black     |
| MPB11106  | Red       |



TOLERANCE FOR PANEL  
 MTG. HOLE:  $\begin{matrix} +.005 & (0.13) \\ -.000 & (0.00) \end{matrix}$

PANEL MTG. HOLE

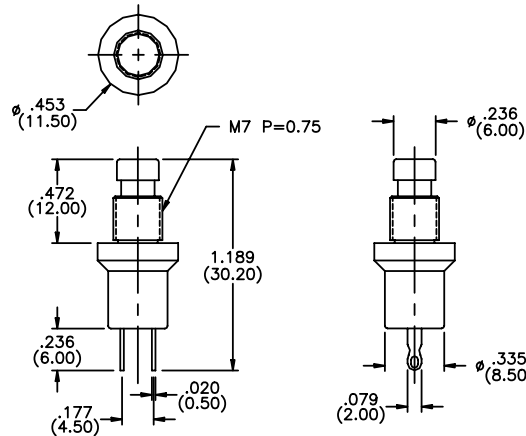
### MPB1140



NORMALLY CLOSED

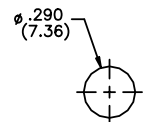


SCHEMATIC



MECHANICAL OUTLINE

| Model No. | Cap Color |
|-----------|-----------|
| MPB11402  | Black     |
| MPB11406  | Red       |



TOLERANCE FOR PANEL  
 MTG. HOLE:  $\begin{matrix} +.005 & (0.13) \\ -.000 & (0.00) \end{matrix}$

PANEL MTG. HOLE

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## New! IP SERIES - PUSHBUTTON SWITCHES FOR HARSH ENVIRONMENTS



### FEATURES

- Single pole NO momentary action with double break.
- Totally sealed compact construction.
- Ergonomically sculptured bezels with colorful actuator selections.
- Excellent tactile feedback with precise actuation

### ELECTRICAL AND GENERAL SPECIFICATIONS

|                                    |                                                         |
|------------------------------------|---------------------------------------------------------|
| Contact ratings (resistive loads): | 500 mA at 48 VAC, 200 mA at 50 VDC or 200 mA at 250 VAC |
| Initial contact resistance:        | 50 milliohms maximum                                    |
| Insulation resistance:             | 1 gigohm min. at 500 VDC                                |
| Dielectric strength:               | 1500 V rms min.                                         |
| Electrical life:                   | 500,000 cycles min. at full load                        |
| Mechanical life:                   | 1,000,000 cycles min.                                   |
| Total Travel:                      | .059" (1.5mm)                                           |
| Operating force:                   | 14 ±4 oz. (4±1 N)                                       |
| Contact bounce:                    | 1 millisecond                                           |

### ENVIRONMENTAL SPECIFICATIONS

|                              |                                       |
|------------------------------|---------------------------------------|
| Degree of protection:        | IP 67                                 |
| Shock resistance:            | 100g per IEC 512-4, test 6c           |
| Vibration resistance:        | 10-500 Hz, 10g per IEC 512-4, test 6d |
| Salt spray:                  | Per IEC 512-6, test 11f               |
| Strength of mechanism:       | IK06 per EN 50101, 1 joule (1 Nm)     |
| Operating temperature range: | -40°C to +125°C                       |

### MATERIALS

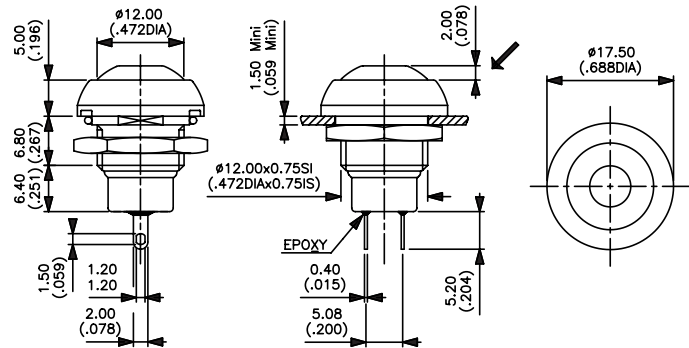
|                        |                                                                 |
|------------------------|-----------------------------------------------------------------|
| Contacts :             | Gold plated silver                                              |
| Actuator:              | Polyamide 6/6                                                   |
| Bushing/bezel:         | Zamac (with black finish on bezel)                              |
| Case:                  | PBT UL94V-0                                                     |
| Wire leads (F models): | Stranded, 20 AWG, UL approved                                   |
| Hardware:              | Supplied with 1 Hex Nut .629" (16mm) across flats and 1 'o'ring |

# New! IP SERIES - PUSHBUTTON SWITCHES FOR HARSH ENVIRONMENTS

## Round - solder lug terminals



| MODEL NO.  | ACT. COLOR |
|------------|------------|
| IPR3SAD1   | BLUE       |
| IPR3SAD2   | BLACK      |
| IPR3SAD3   | GREEN      |
| IPR3SAD5   | YELLOW     |
| IPR3SAD6   | RED        |
| IPR3SAD7/1 | WHITE      |
| IPR3SAD9   | ORANGE     |

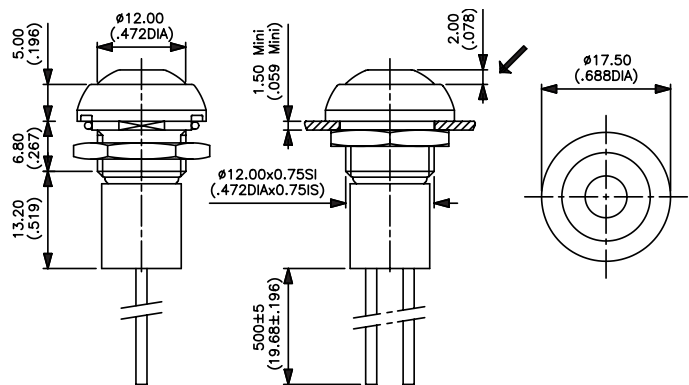


→ Flat

## Round - stranded 20 AWG wire leads



| MODEL NO.  | ACT. COLOR |
|------------|------------|
| IPR3FAD1   | BLUE       |
| IPR3FAD2   | BLACK      |
| IPR3FAD3   | GREEN      |
| IPR3FAD5   | YELLOW     |
| IPR3FAD6   | RED        |
| IPR3FAD7/1 | WHITE      |
| IPR3FAD9   | ORANGE     |

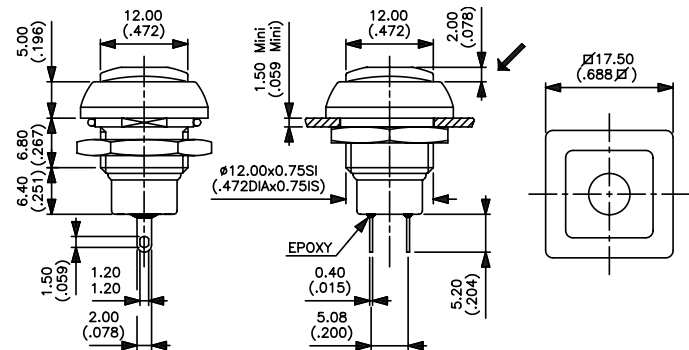


→ Flat

## Square - solder lug terminals



| MODEL NO.  | ACT. COLOR |
|------------|------------|
| IPC3SAD1   | BLUE       |
| IPC3SAD2   | BLACK      |
| IPC3SAD3   | GREEN      |
| IPC3SAD5   | YELLOW     |
| IPC3SAD6   | RED        |
| IPC3SAD7/1 | WHITE      |
| IPC3SAD9   | ORANGE     |

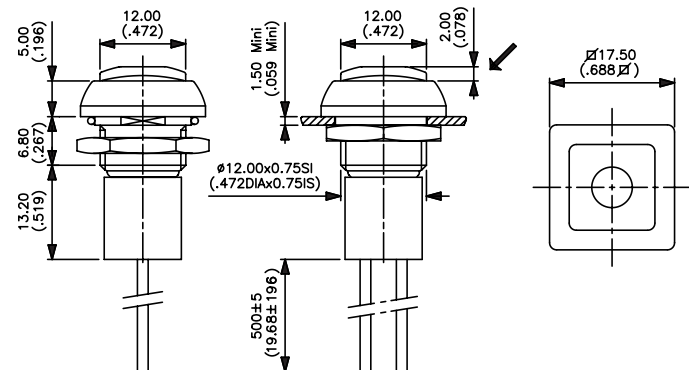


→ Flat

## Square - stranded 20 AWG wire leads



| MODEL NO.  | ACT. COLOR |
|------------|------------|
| IPC3FAD1   | BLUE       |
| IPC3FAD2   | BLACK      |
| IPC3FAD3   | GREEN      |
| IPC3FAD5   | YELLOW     |
| IPC3FAD6   | RED        |
| IPC3FAD7/1 | WHITE      |
| IPC3FAD9   | ORANGE     |



→ Flat

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# New! IP SERIES - PUSHBUTTON SWITCHES FOR HARSH ENVIRONMENTS

**Additional ordering information:** Commonly ordered models are shown on prior page with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

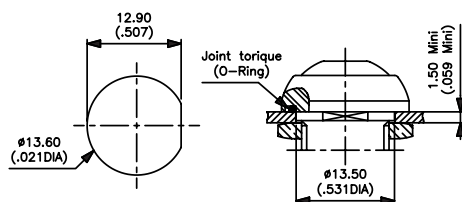
## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with allowable options shown below each respective box.

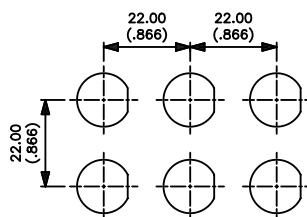
| Series | Bezel shape              | Electrical function | Terminals                              | Contacts           | Actuator color                                                               |
|--------|--------------------------|---------------------|----------------------------------------|--------------------|------------------------------------------------------------------------------|
| I P    | <input type="checkbox"/> | 3                   | <input type="checkbox"/>               | A D                | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>   |
|        | R Round<br>C Square      | Normally open (NO)  | S Solder lugs<br>F Stranded wire leads | Gold plated silver | 1 Blue<br>2 Black<br>3 Green<br>5 Yellow<br>6 Red<br>7 / 1 White<br>9 Orange |

## MOUNTING

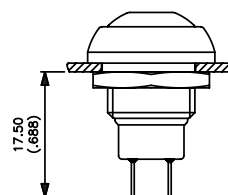
### Panel cut-out



### Matrix mounting

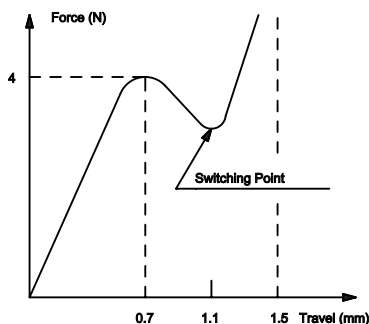


### Back of panel space requirement

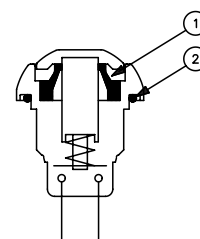


## TACTILE FEEDBACK

### Operating force vs. travel diagram



### Switch cross section



## SEALING

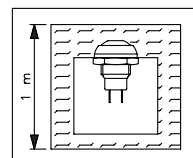
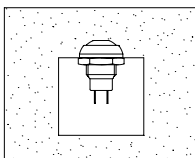
**Per IP 67.** Degree of protection provided by the enclosures of electric appliances according to IEC 529, DIN 40050 & NFC 20-010 shown below:

**IP**  
(ingress protection)

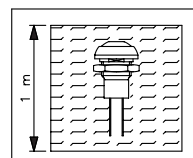
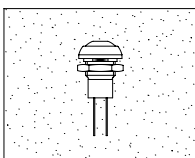
**6**  
Totally protected against dust

**7**  
Protected against the effects of immersion up to 1 meter of water (30 mins.)

**SOLDER LUG VERSION**



**WIRE LEADS VERSION**



# SP SERIES - WASHABLE MINIATURE SNAP-ACTION PUSHBUTTON SWITCHES



## FEATURES

- Wave solderable.
- Compact case size & fully sealed for process compatibility.
- SPDT & DPDT momentary p.c. & panel mounting models.
- Models available with ESD protection up to 12 KV.

## SPECIFICATIONS

|                                    |                                                                                                 |
|------------------------------------|-------------------------------------------------------------------------------------------------|
| Contact ratings (resistive loads): | Gold plated brass: 100 mA at 30 VDC<br>Silver or gold plated silver: 1 Amp at 120 VAC or 30 VDC |
| Initial contact resistance:        | 50 milliohms maximum                                                                            |
| Insulation resistance:             | 1000 megohms minimum                                                                            |
| Dielectric strength:               | 1000 V rms minimum                                                                              |
| Electrical life:                   | 60,000 cycles minimum                                                                           |
| Operating temperature range:       | -20°C to +85°C                                                                                  |
| Washing:                           | Permissible with water, detergents and solvents.                                                |

## MATERIALS

|                       |                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Contacts & Terminals: | Gold plated brass, silver or gold plated silver                                                                                                 |
| Actuator:             | UL94V-0 polyamide, glass filled                                                                                                                 |
| Bracket:              | Tin plated steel                                                                                                                                |
| Case:                 | UL94V-0 polyamide, glass filled or PES                                                                                                          |
| Terminal seal:        | Epoxy                                                                                                                                           |
| Hardware:             | 1/4" threaded bushing models supplied with 2 Hex Nuts .314" (8mm) across flats, 1 Locking Ring & 1 Lockwasher. See hardware section of catalog. |

## AGENCY RECOGNITION

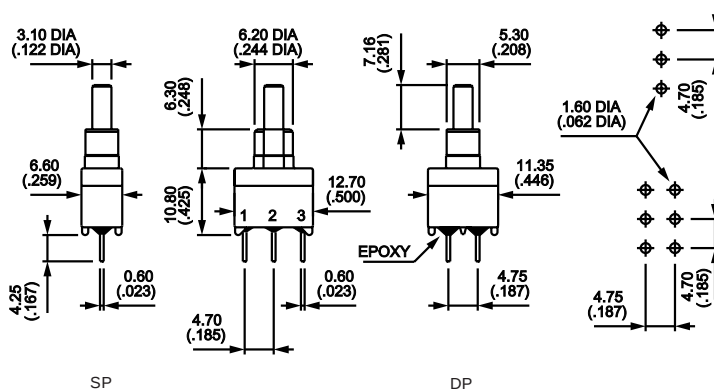


Available with all models with silver or gold plated silver contacts and terminals, standard actuator and smooth bushing. UL marking supplied when specified - see Order Format.

## Plain bushing - straight p.c. terminals - gold plated brass contacts



|                                         |                                                                                                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SINGLE POLE<br>MODEL NO.<br>SP35P000000 | CIRCUIT<br>ON MOM                                                                                                                                                       |
| DOUBLE POLE<br>MODEL NO.<br>SP45P000000 | CIRCUIT<br>ON MOM                                                                                                                                                       |
| Button position:                        |   |
| Terminals connected:                    | 1-3    1-2                                                                                                                                                              |



SP

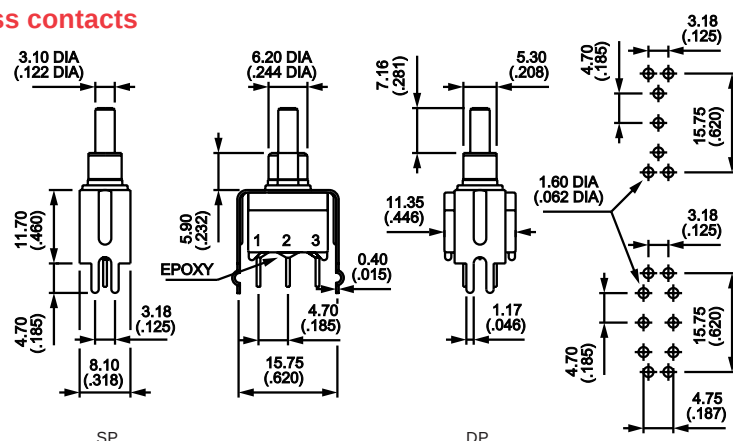
DP

# SP SERIES - WASHABLE MINIATURE SNAP-ACTION PUSHBUTTON SWITCHES

## Plain bushing - bracket mounting - gold plated brass contacts



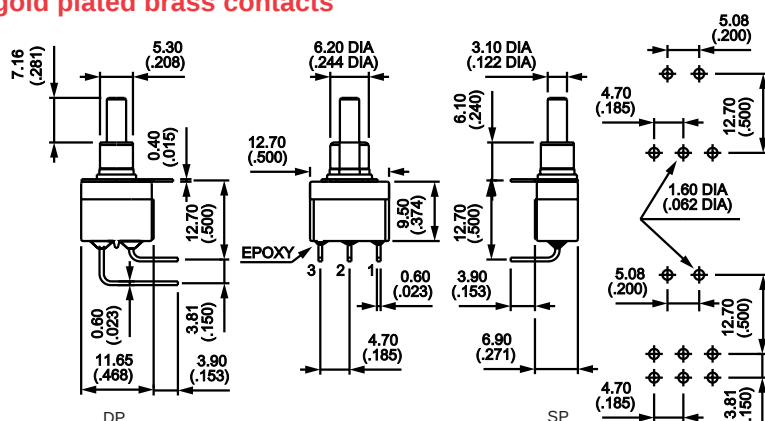
|                      |             |         |     |
|----------------------|-------------|---------|-----|
| SINGLE POLE          |             | CIRCUIT |     |
| MODEL NO.            | SP35Y000000 | ON      | MOM |
| DOUBLE POLE          |             | CIRCUIT |     |
| MODEL NO.            | SP45Y000000 | ON      | MOM |
| Button position:     |             |         |     |
|                      |             |         |     |
| Terminals connected: |             |         |     |
|                      |             | 1-3     | 1-2 |



## Plain bushing - horizontal right angle terminals - gold plated brass contacts



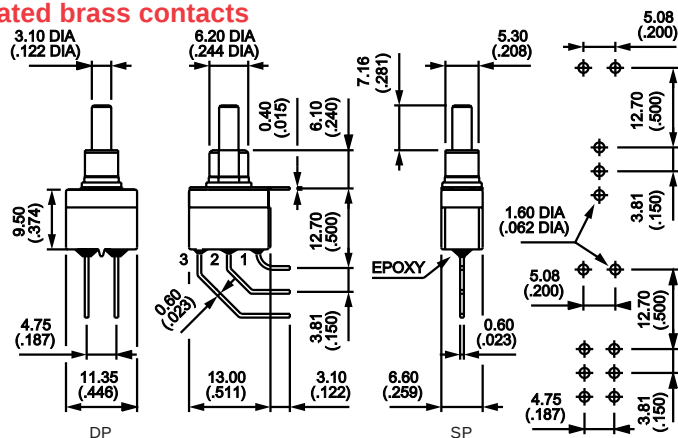
|                      |             |         |     |
|----------------------|-------------|---------|-----|
| SINGLE POLE          |             | CIRCUIT |     |
| MODEL NO.            | SP35W000000 | ON      | MOM |
| DOUBLE POLE          |             | CIRCUIT |     |
| MODEL NO.            | SP45W000000 | ON      | MOM |
| Button position:     |             |         |     |
|                      |             |         |     |
| Terminals connected: |             |         |     |
|                      |             | 1-3     | 1-2 |



## Plain bushing - vertical right angle terminals - gold plated brass contacts



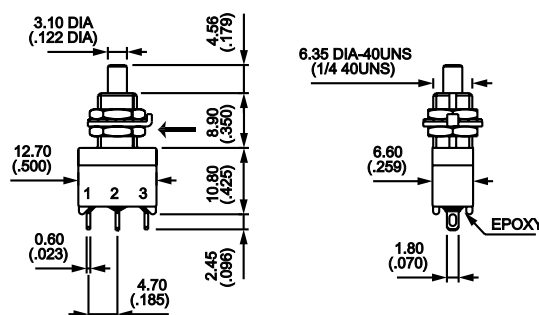
|                      |              |         |     |
|----------------------|--------------|---------|-----|
| SINGLE POLE          |              | CIRCUIT |     |
| MODEL NO.            | SP35WW000000 | ON      | MOM |
| DOUBLE POLE          |              | CIRCUIT |     |
| MODEL NO.            | SP45WW000000 | ON      | MOM |
| Button position:     |              |         |     |
|                      |              |         |     |
| Terminals connected: |              |         |     |
|                      |              | 1-3     | 1-2 |



## Threaded bushing - solder lug terminals - gold plated brass contacts



|                      |             |         |     |
|----------------------|-------------|---------|-----|
| SINGLE POLE          |             | CIRCUIT |     |
| MODEL NO.            | SP35S000077 | ON      | MOM |
| Button position:     |             |         |     |
|                      |             |         |     |
| Terminals connected: |             |         |     |
|                      |             | 1-3     | 1-2 |



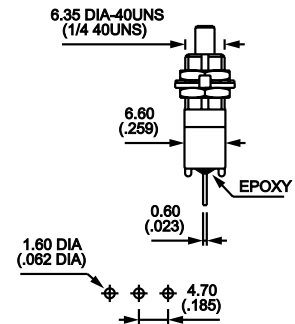
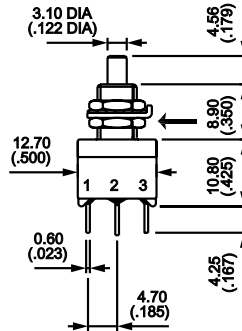
→ Keyway

# SP SERIES - WASHABLE MINIATURE SNAP-ACTION PUSHBUTTON SWITCHES

## Threaded bushing - straight p.c. terminals - gold plated brass contacts



|                      |                                                                                                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SINGLE POLE          |                                                                                                                                                                     |
| MODEL NO.            | CIRCUIT                                                                                                                                                             |
| SP35P000077          | ON MOM                                                                                                                                                              |
| Button position:     |   |
| Terminals connected: | 1-3 1-2                                                                                                                                                             |



→ Keyway

**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
(Allowable options are shown under each respective box).

### Model Structure:

| Series                                                        | Number of poles                                               | Electrical function                                                                             | Terminals                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="text" value="S"/> <input type="text" value="P"/> | <input type="text" value="3"/> <input type="text" value="4"/> | <input type="text" value="5"/> <input type="text" value="ON"/> <input type="text" value="MOM"/> | <input type="text" value="P"/> <input type="text" value="0"/> <input type="text" value="S"/> <input type="text" value="0"/> <input type="text" value="Y"/> <input type="text" value="0"/> <input type="text" value="W"/> <input type="text" value="0"/> <input type="text" value="W"/> <input type="text" value="W"/> |
|                                                               | 3 Single pole<br>4 Double pole                                |                                                                                                 | P 0 Straight pc<br>S 0 Solder lug<br>Y 0 Straight pc with mounting bracket<br>W 0 Horizontal right angle mounting<br>W W Vertical right angle mounting                                                                                                                                                                |

### Options:

| Contact & terminal materials                                                                                                | Actuators and bushings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value="8"/> | <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="0"/> <input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="7"/> <input type="text" value="6"/> |
| 0 Brass, gold plated<br>1 Silver<br>2 Silver, gold plated<br>8 Brass, gold plated, with, tin plated terminals               | 0 0 0 0 Standard actuator w/smooth bushing<br>0 0 0 1 Standard actuator w/smooth bushing & UL marking (UL available with silver or gold plated silver contacts & terminals only)<br>0 0 7 7 Standard actuator w/threaded bushing<br>0 2 7 6 Short actuator w/short smooth bushing<br>(See actuator/ bushing drawings at bottom of this page)                                                                                                                                                                    |

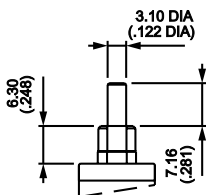
Example of completely specified model number: **SP35Y080000**

Caps available separately - see option drawings on next page.

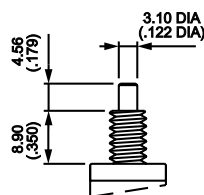
## OPTION DRAWINGS

### ACTUATOR/BUSHING DRAWINGS

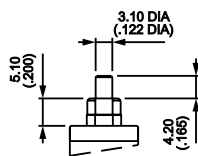
### TERMINAL OUTLINES



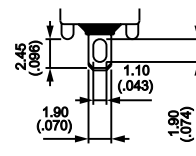
**0000** Standard actuator w/smooth bushing



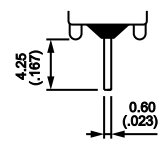
**0077** Standard actuator w/threaded bushing



**0276** Short actuator with short smooth bushing



**S0** Solder lug

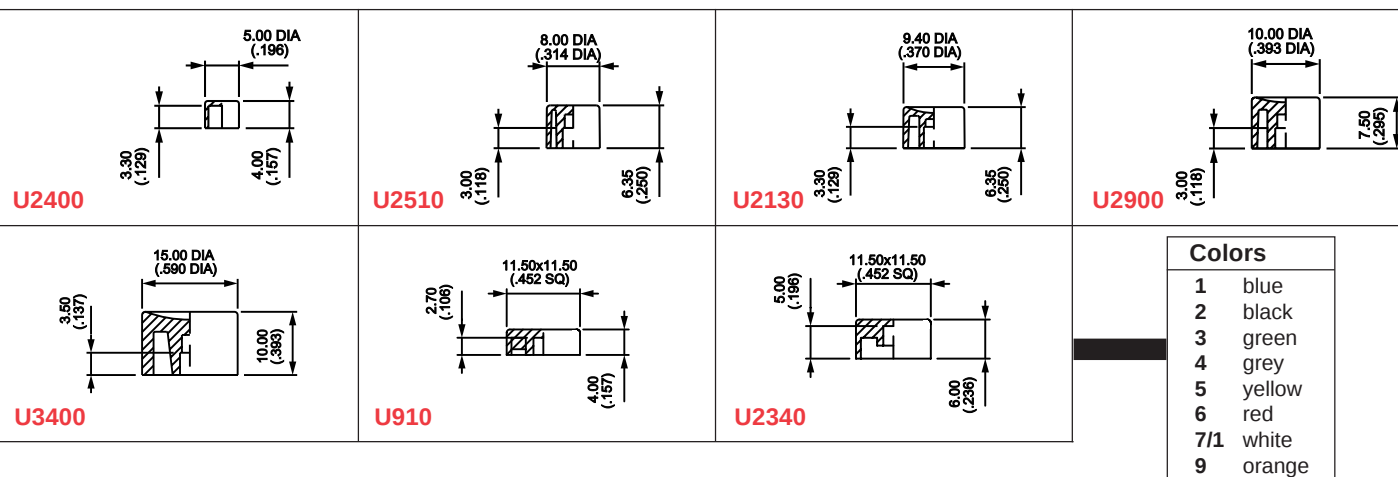


**P0** Straight printed circuit

# SP SERIES - WASHABLE MINIATURE SNAP-ACTION PUSHBUTTON SWITCHES

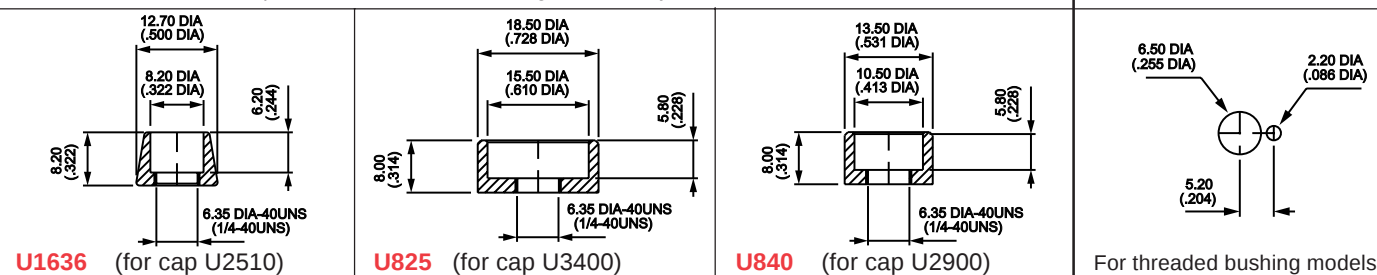
## OPTION DRAWINGS & MISCELLANEOUS

**CAPS** Note: replace last '0' in p/n with color code.



**DRESS NUTS** Chrome plated For threaded bushing models only.

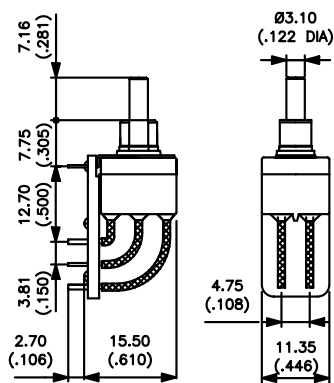
**PANEL CUT-OUT**



## ELECTROSTATIC PUSHBUTTON SWITCHES

### INSULATED

Protects against electrostatic discharges (ESD) up to 12 KV.



**X978** - Consult factory

# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Single pole-double throw & double pole-double throw models with ON-MOM ON action.
- Epoxy terminal sealing standard.
- Panel and p.c. mounting models with compact miniature case size.

## SPECIFICATIONS

|                                           |                                                                                  |
|-------------------------------------------|----------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | Gold plated brass: 100 mA at 30 VDC<br>Gold plated silver: 1A at 120VAC or 30VDC |
| <b>Initial contact resistance:</b>        | 50 milliohms maximum                                                             |
| <b>Insulation resistance:</b>             | 1000 megohms minimum                                                             |
| <b>Dielectric strength:</b>               | 1000 V rms minimum                                                               |
| <b>Electrical life:</b>                   | 60,000 cycles minimum at full load.                                              |
| <b>Operating temperature range:</b>       | -30°C to +65°C                                                                   |
| <b>Total travel:</b>                      | .019" (0.5mm)                                                                    |

## MATERIALS

|                                  |                                                                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts &amp; Terminals:</b> | Gold plated brass or gold plated silver                                                                                                         |
| <b>Actuator:</b>                 | Polyamide, glass filled                                                                                                                         |
| <b>Bushing:</b>                  | Nickel plated brass                                                                                                                             |
| <b>Housing:</b>                  | Stainless steel                                                                                                                                 |
| <b>Case:</b>                     | Diallyl phthalate                                                                                                                               |
| <b>Bracket:</b>                  | Tin plated steel                                                                                                                                |
| <b>Terminal seal:</b>            | Epoxy                                                                                                                                           |
| <b>Hardware:</b>                 | 1/4" threaded bushing models supplied with 2 Hex Nuts .314" (8mm) across flats, 1 Locking Ring & 1 Lockwasher. See hardware section of catalog. |

## ABOUT THIS SERIES

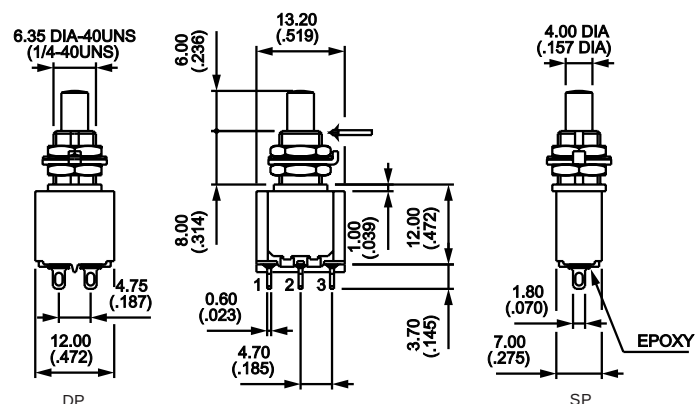
- The material is organized in the following sequence:
- completely specified switch models.
  - 'Build your own switch' order format.
  - Options & miscellaneous

## Solder lug terminals - 1/4" (6.35mm) bushing - gold plated silver contacts



| SINGLE POLE       |  | CIRCUIT    |            |
|-------------------|--|------------|------------|
| MODEL NO.         |  | ON         | MOM        |
| 18535AD           |  | ON         | MOM        |
| DOUBLE POLE       |  | CIRCUIT    |            |
| MODEL NO.         |  | ON         | MOM        |
| 18545AD           |  | ON         | MOM        |
| Handle position:  |  |            |            |
| Terms. connected: |  | 1-3<br>4-6 | 1-2<br>4-5 |

→ Keyway



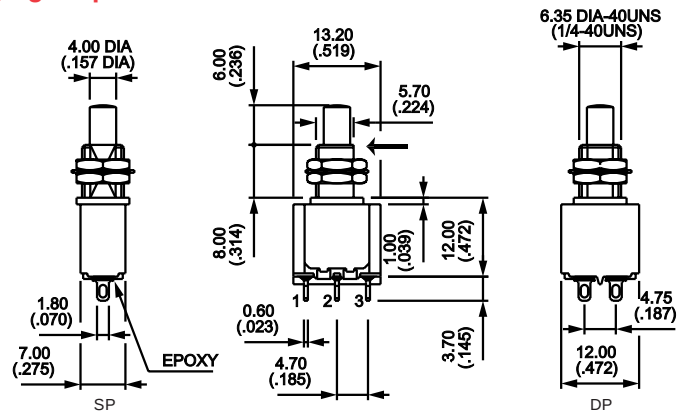
# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

## Solder lug terminals - 1/4" (6.35mm) flatted bushing - gold plated silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18735AD                  | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 18745AD                  | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

→ 'D' flat

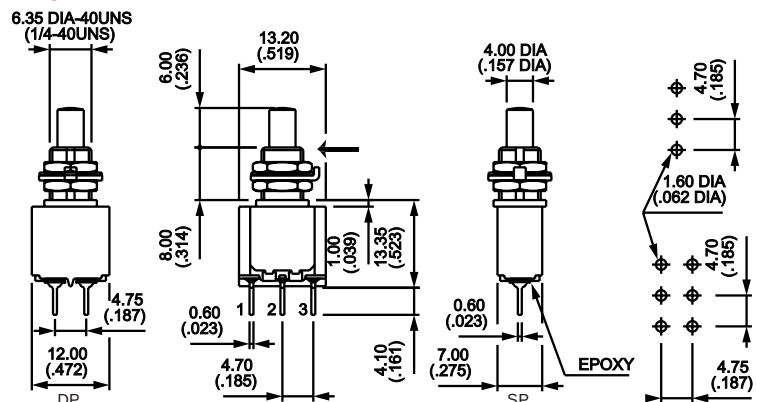


## Straight p.c. terminals - 1/4" (6.35mm) bushing - gold plated silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18235AD                  | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 18245AD                  | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

→ Keyway

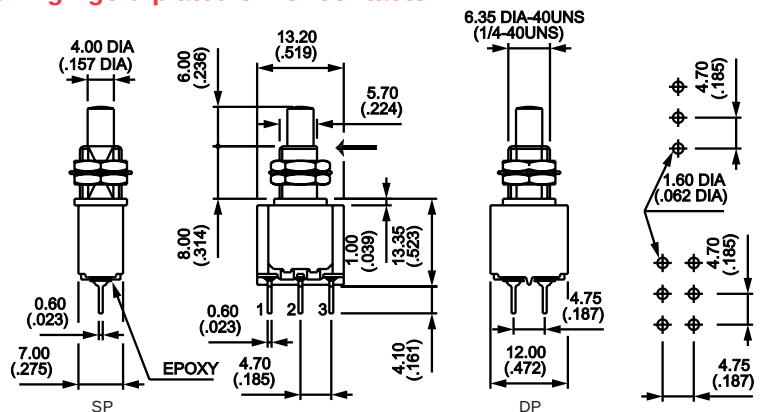


## Straight p.c. terminals - 1/4" (6.35mm) flatted bushing - gold plated silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18935AD                  | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 18945AD                  | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

→ 'D' flat

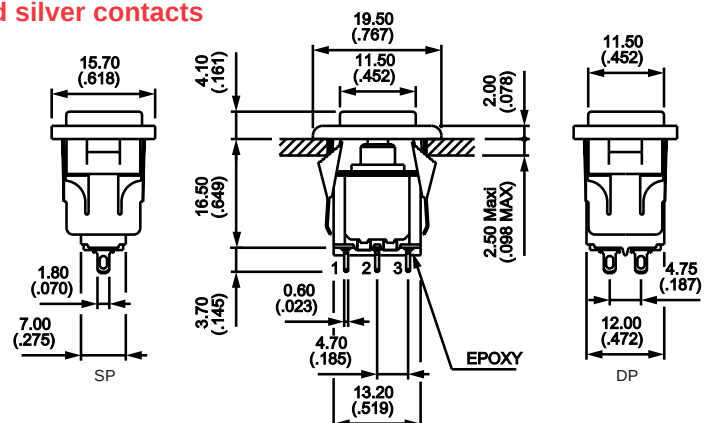


## Solder lug terminals - snap-in mounting - gold plated silver contacts



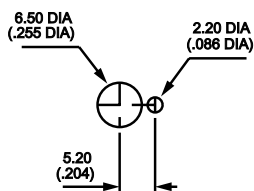
| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18835AD+U912+U1202       | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 18845AD+U912+U1202       | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

Above models have back bezel & cap

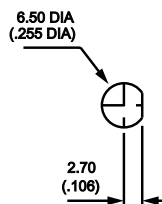


# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

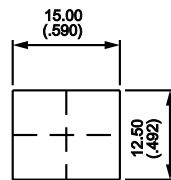
## PANEL CUT-OUTS for models shown above



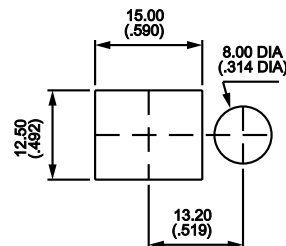
1/4" (6.35mm) bushing



1/4" (6.35mm) flatted bush.



Bezel U1200

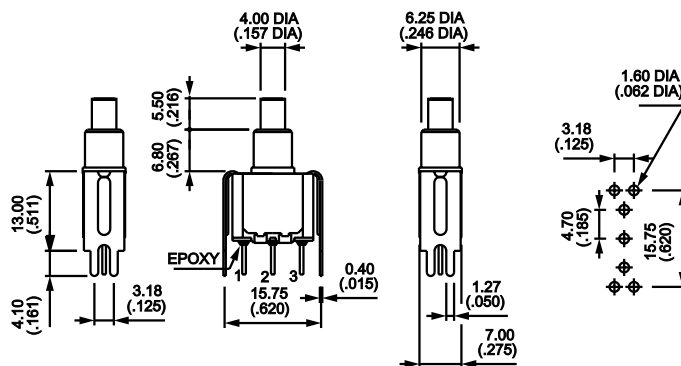


Bezel U1210 w/LED

## Single pole - straight p.c. terminals - bracket mounting - gold plated brass contacts



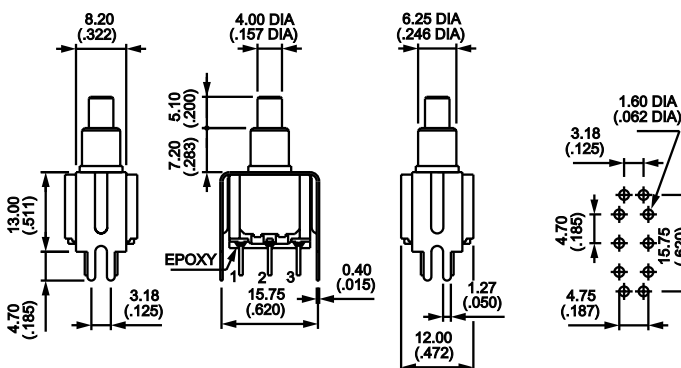
| SINGLE POLE<br>MODEL NO. | CIRCUIT |     |
|--------------------------|---------|-----|
| 18235YCD3                | ON      | MOM |
| Handle position:         |         |     |
| Terms. connected:        | 1-3     | 1-2 |



## Double pole - straight p.c. terminals - bracket mounting - gold plated brass contacts



| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18245YCD3                | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |



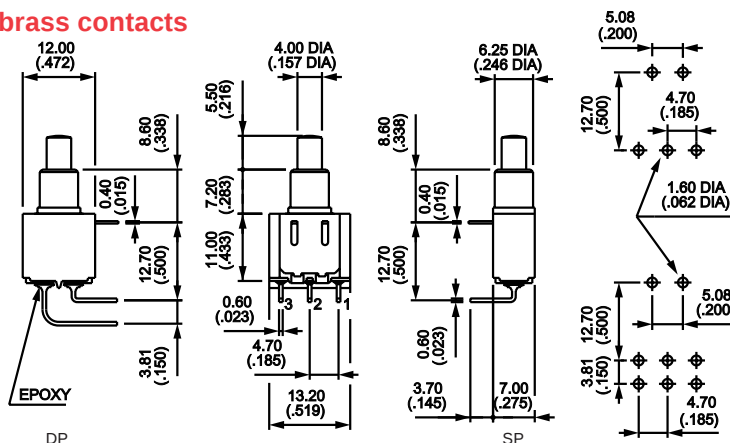
## Horizontal right angle p.c. terminals - gold plated brass contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT |     |
|--------------------------|---------|-----|
| 18235WCD3                | ON      | MOM |
| Handle position:         |         |     |
| Terms. connected:        | 1-3     | 1-2 |

| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 18245WCD3                | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |



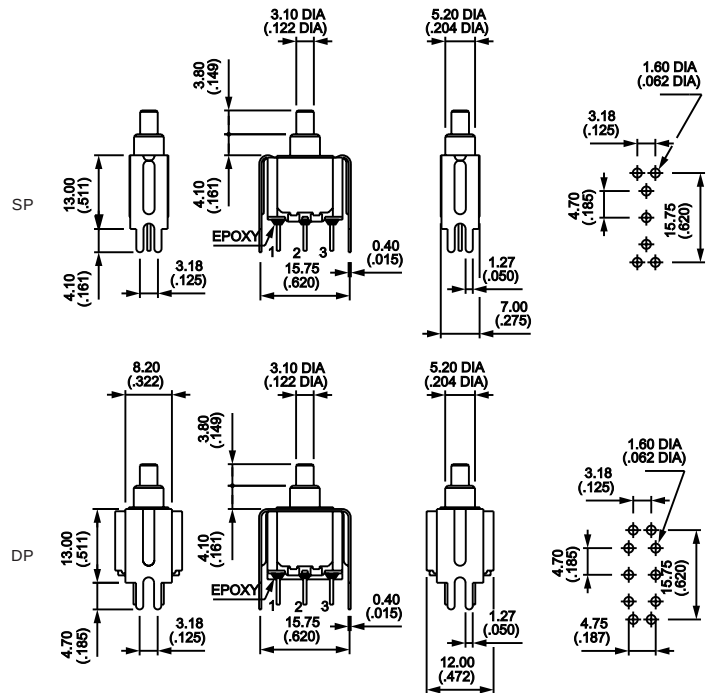
# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

## SPECIAL OPTIONS

### Special option X624 - straight p.c. terminals - short bushing & actuator - gold plated brass contacts



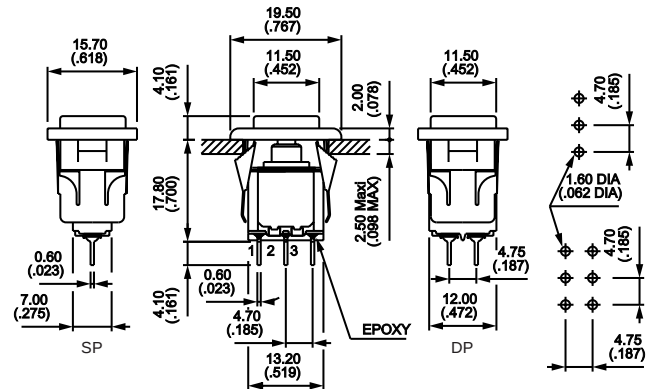
| SINGLE POLE       |  | CIRCUIT                                                                           |                                                                                   |
|-------------------|--|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| MODEL NO.         |  | ON                                                                                | MOM                                                                               |
| 18235YCD2X624     |  | ON                                                                                | MOM                                                                               |
| DOUBLE POLE       |  | CIRCUIT                                                                           |                                                                                   |
| MODEL NO.         |  | ON                                                                                | MOM                                                                               |
| 18245YCD2X624     |  | ON                                                                                | MOM                                                                               |
| Handle position:  |  |                                                                                   |                                                                                   |
|                   |  |  |  |
| Terms. connected: |  | 1-3                                                                               | 1-2                                                                               |
|                   |  | 4-6                                                                               | 4-5                                                                               |



### Special option X662 - straight p.c. terminals - snap-in mounting - gold plated brass contacts



| SINGLE POLE            |  | CIRCUIT                                                                             |                                                                                     |
|------------------------|--|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| MODEL NO.              |  | ON                                                                                  | MOM                                                                                 |
| 18835CDX662+U910+U1200 |  | ON                                                                                  | MOM                                                                                 |
| DOUBLE POLE            |  | CIRCUIT                                                                             |                                                                                     |
| MODEL NO.              |  | ON                                                                                  | MOM                                                                                 |
| 18845CDX662+U910+U1200 |  | ON                                                                                  | MOM                                                                                 |
| Handle position:       |  |                                                                                     |                                                                                     |
|                        |  |  |  |
| Terms. connected:      |  | 1-3                                                                                 | 1-2                                                                                 |
|                        |  | 4-6                                                                                 | 4-5                                                                                 |



## OPTIONS

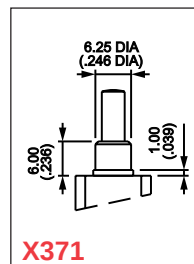
**F** Tin plated terminals (for p.c. terminals only).

**X371** .246" (6.25mm) smooth bushing in place of standard threaded bushing.

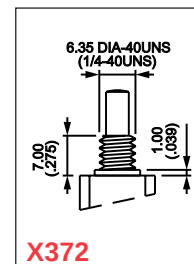
**X372** Short 1/4" (6.35mm) threaded bushing, .274" (7mm) long.

**X386** 1/4" (6.35mm) threaded bushing in place of smooth bushing on models with W, WW & Y options.

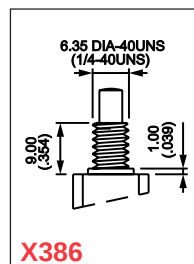
**X438** .246" (6.25mm) smooth bushing without shoulder, .283" (7.2mm) long.



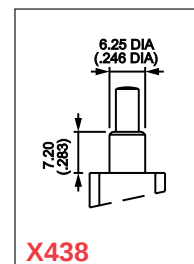
**X371**



**X372**



**X386**



**X438**

# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
(Allowable options are shown under each respective box).  
Note: 'NONE' indicates box may be left empty.

### Model Structure:

| Series | Terminals & bushings                                                                                                                                                                                                                                                                                                                                                                   | Number of poles                | Electrical function | Terminals                                                                                                                  |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1 8    |                                                                                                                                                                                                                                                                                                                                                                                        |                                | 5                   |                                                                                                                            |
|        | 2 Straight p.c. terminals with 1/4" (6.35mm) threaded bushing.<br>Straight p.c. terms. + bracket or right angle p.c. terms. with smooth bushing<br>5 Solder lug terminals with 1/4" (6.35mm) threaded bushing<br>7 Solder lug terminals with 1/4" (6.35mm) flatted bushing<br>8 Solder lug terminals, snap-in mounting<br>9 Straight p.c. terminals with 1/4" (6.35mm) flatted bushing | 3 Single pole<br>4 Double pole | ON - MOM            | (NONE) Solder lug or straight p.c.<br>W Horizontal right angle p.c.<br>W W Vertical right angle p.c.<br>Y Bracket mounting |

Example of completely specified model number: **18245AD**

Caps available separately - see option drawings.

### Options:

| Contact materials                                                                                                                                                                                                                                        | Actuators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Special options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="display: flex; gap: 10px;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <p>A D Silver, gold plated<br/>C D Brass, gold plated</p> | <div style="display: flex; gap: 10px;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <p>(NONE) .157" (4mm) dia. x .236" (6mm) long (standard) with threaded bushing<br/>                     6 .122" (3.1mm) dia. x .230" (5.85mm) with threaded bushing<br/>                     3 .157" (4mm) dia. x .216" (5.5mm) long (standard) with smooth bushing<br/>                     5 .122" (3.1mm) dia. x .248" (6.3mm) long</p> | <div style="display: flex; gap: 10px;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <p>(NONE)<br/>                     F Tin plated terminals- for p.c. terms. only<br/>                     X 6 2 4 Shorter bushing &amp; actuator<br/>                     X 6 6 2 Snap-in mounting &amp; straight p.c. terminals<br/>                     Others listed - see Special Option page</p> |

Although most combinations of options are available, some may result in incompatibilities. Consult factory if there is any question.

### ACTUATOR OPTIONS

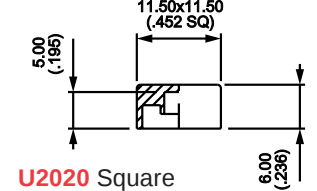
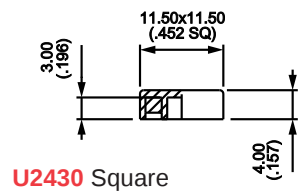
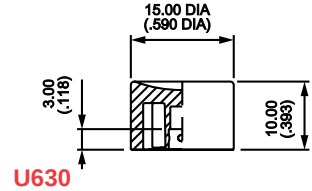
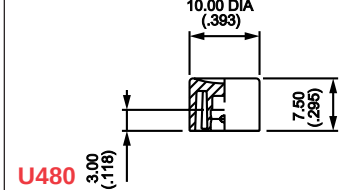
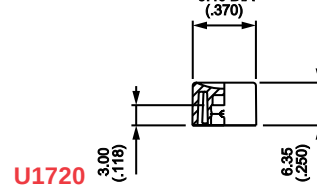
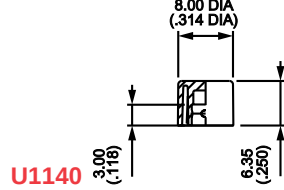
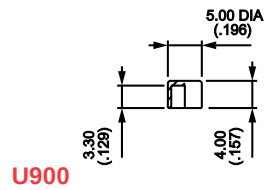
|                                              |                                                      |                                                                                                                                                                                                                |
|----------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(NONE) Standard with threaded bushing</p> | <p>6</p>                                             | <p>3 Standard with smooth bushing</p>                                                                                                                                                                          |
| <p>5</p>                                     | <h4>SWITCH ACTION</h4> <p>Arrow indicates keyway</p> | <h4>TERMINALS</h4> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Solder lug</p> </div> <div style="text-align: center;"> <p>Straight p.c.</p> </div> </div> |

# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

## CAPS

FOR .157" (4mm) DIA. ACTUATORS (13 & 3)

Note: replace last '0' in p/n with color code.

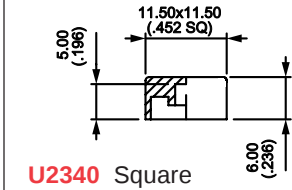
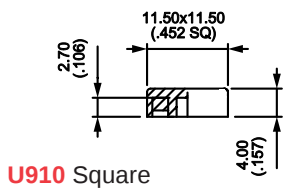
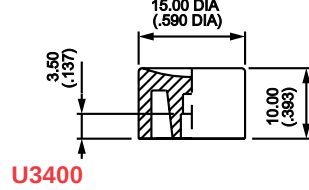
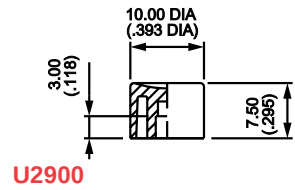
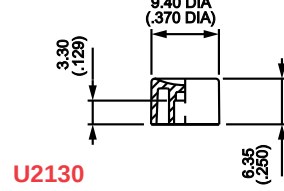
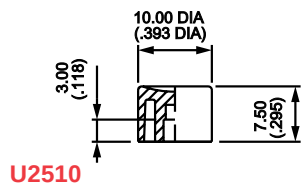
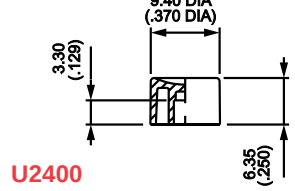


### Colors

- |     |        |
|-----|--------|
| 1   | blue   |
| 2   | black  |
| 3   | green  |
| 4   | grey   |
| 5   | yellow |
| 6   | red    |
| 7   | ivory  |
| 7/1 | white  |
| 9   | orange |

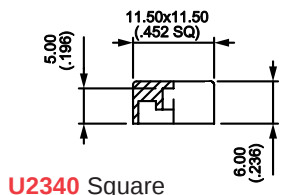
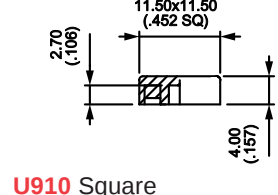
FOR .122" (3.1mm) DIA. ACTUATORS (5 & 6)

Note: replace last '0' in p/n with color code.



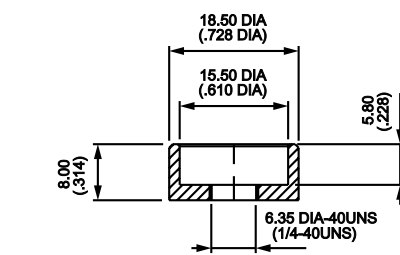
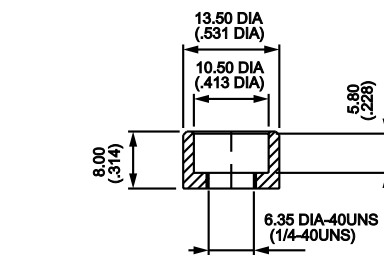
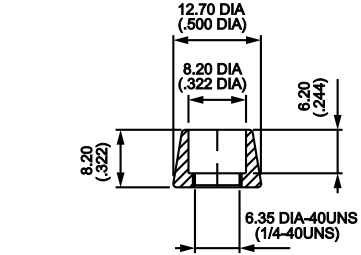
FOR 188.. & 188..X662 MODELS

Note: replace '0' in p/n with color code.



## DRESS NUTS

Chrome plated For models with threaded bushings (182.., 185.., 187.., & 189..) (Order separately)



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

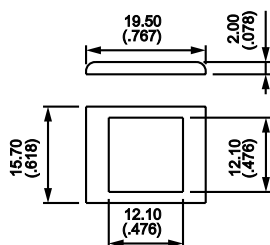
C

# 18000 SERIES - MINIATURE SNAP-ACTION MOMENTARY PUSHBUTTON SWITCHES

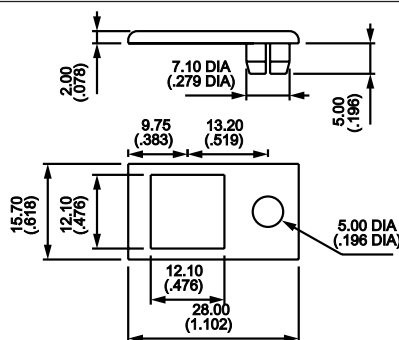
**BEZELS** Note: replace last '0' in p/n with color code

For snap-in models (188.. & 188..X662)

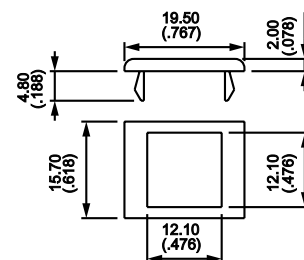
For bracket mtg. models (182..Y & 182..YX624)



**U1200**



**U1210** For LED (not supplied)



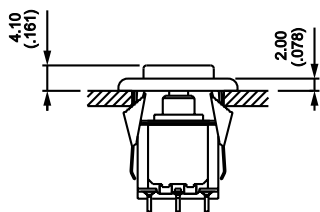
**U3200**

## Colors

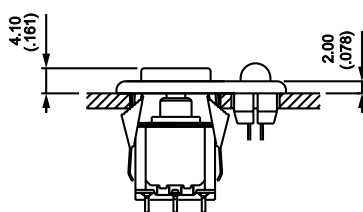
- |     |        |
|-----|--------|
| 1   | blue   |
| 2   | black  |
| 3   | green  |
| 4   | grey   |
| 5   | yellow |
| 6   | red    |
| 7   | ivory  |
| 7/1 | white  |
| 9   | orange |

## STANDARD PANEL MOUNTING FOR BEZELS

Panel thicknesses: .039" (1mm) to .098" (2.5mm)



**188.. + U910 + U1200**



**188.. + U910 + U1210**

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

8000 SERIES - MINI. MOMENTARY OR ALTERNATE ACTION PUSHBUTTON SWITCHES

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

C



FEATURES

- Single pole-double throw & double pole-double throw models.
- ON-MOM and ON-ON alternate actions .
- 1/4-40 and 15/32-32 threaded bushing options.
- Panel and p.c. mounting models with compact miniature case size.

SPECIFICATIONS

|                                    |                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------|
| Contact ratings (resistive loads): | Gold plated brass: 0.4 Volt-Amps max. at 20 V (AC or DC)<br>Silver: 3A 250VAC, 6A 125VAC or 4A 30VDC |
| Initial contact resistance:        | 10 milliohms maximum                                                                                 |
| Insulation resistance:             | 1000 megohms minimum at 500 VDC                                                                      |
| Dielectric strength:               | 2000 V rms min. between terminals and frame. 1000 V rms between terminals.                           |
| Electrical life:                   | 30,000 cycles minimum at full load.                                                                  |
| Operating temperature range:       | -40°C to +85°C                                                                                       |
| Travel:                            | Pre-travel - .086" (2.2mm)    Over-travel - .019" (0.5mm)<br>Total-travel - .106" (2.7mm)            |

MATERIALS

|                       |                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Contacts & Terminals: | Gold plated brass or gold plated silver                                                                                                         |
| Actuator:             | Nickel plated brass                                                                                                                             |
| Bushing:              | Nickel plated brass                                                                                                                             |
| Housing:              | Stainless steel                                                                                                                                 |
| Case:                 | Diallyl phthalate                                                                                                                               |
| Terminal seal:        | Epoxy                                                                                                                                           |
| Hardware:             | 1/4" threaded bushing models supplied with 2 Hex Nuts .314" (8mm) across flats, 1 Locking Ring & 1 Lockwasher. See hardware section of catalog. |

AGENCY LISTINGS



To order switches marked UL, specify in approvals box of Order Format.

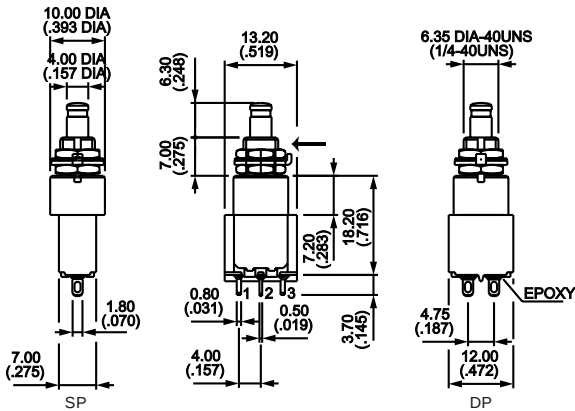
Solder lug terminals - 1/4" (6.35mm) bushing - silver contacts



Note: Cap shown must be ordered separately.

| SINGLE POLE        |  | CIRCUIT    |            |
|--------------------|--|------------|------------|
| MODEL NO.          |  | ON         | MOM        |
| 8632AB             |  | ON         | MOM        |
| 8636AB             |  | ON         | ON         |
| DOUBLE POLE        |  | CIRCUIT    |            |
| MODEL NO.          |  | ON         | MOM        |
| 8642AB             |  | ON         | MOM        |
| 8646AB             |  | ON         | ON         |
| Actuator position: |  |            |            |
| Terms. connected:  |  | 2-3<br>5-6 | 1-2<br>4-5 |

→ Keyway



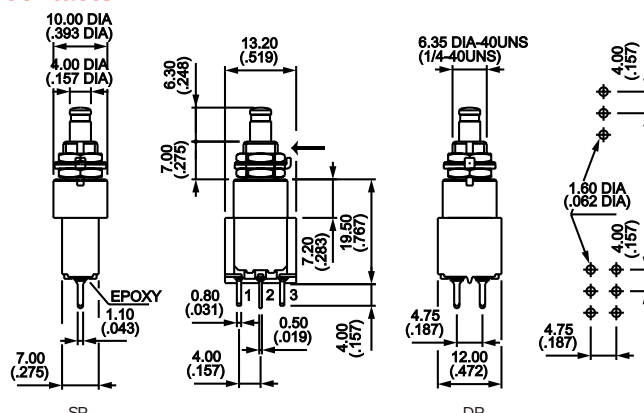
# 8000 SERIES - MINI. MOMENTARY OR ALTERNATE ACTION PUSHBUTTON SWITCHES

## Straight p.c. terminals - 1/4" (6.35mm) bushing - silver contacts



| SINGLE POLE                                                                                                                                                                            |  | CIRCUIT |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|-----|
| MODEL NO.                                                                                                                                                                              |  | ON      | MOM |
| 8432AB                                                                                                                                                                                 |  | ON      | MOM |
| 8436AB                                                                                                                                                                                 |  | ON      | ON  |
| DOUBLE POLE                                                                                                                                                                            |  | CIRCUIT |     |
| MODEL NO.                                                                                                                                                                              |  | ON      | MOM |
| 8442AB                                                                                                                                                                                 |  | ON      | MOM |
| 8446AB                                                                                                                                                                                 |  | ON      | ON  |
| Actuator position:   |  |         |     |
| Terms. connected:                                                                                                                                                                      |  | 2-3     | 1-2 |
|                                                                                                                                                                                        |  | 5-6     | 4-5 |

→ Keyway

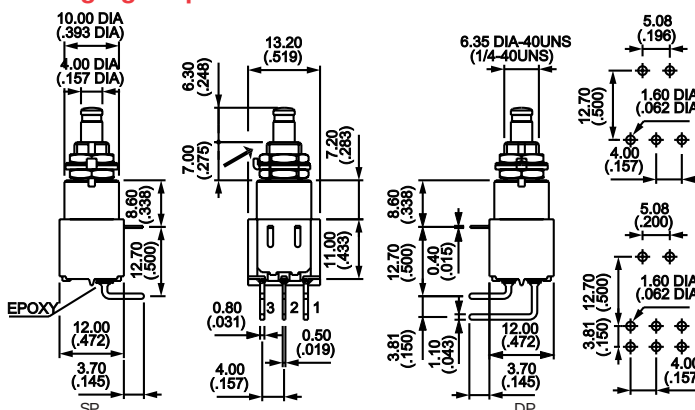


## Horizontal right angle p.c. terminals - 1/4" (6.35mm) bushing - gold plated brass contacts



| SINGLE POLE                                                                                                                                                                              |  | CIRCUIT |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|-----|
| MODEL NO.                                                                                                                                                                                |  | ON      | MOM |
| 8432WCDB                                                                                                                                                                                 |  | ON      | MOM |
| 8436WCDB                                                                                                                                                                                 |  | ON      | ON  |
| DOUBLE POLE                                                                                                                                                                              |  | CIRCUIT |     |
| MODEL NO.                                                                                                                                                                                |  | ON      | MOM |
| 8442WCDB                                                                                                                                                                                 |  | ON      | MOM |
| 8446WCDB                                                                                                                                                                                 |  | ON      | ON  |
| Actuator position:   |  |         |     |
| Terms. connected:                                                                                                                                                                        |  | 2-3     | 1-2 |
|                                                                                                                                                                                          |  | 5-6     | 4-5 |

→ Keyway



**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

### 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
(Allowable options are shown under each respective box).  
Note: 'NONE' indicates box may be left empty.

#### Model Structure:

| Series                         | Terminals                                                          | Number of poles                | Electrical functions    | Terminals                                                |
|--------------------------------|--------------------------------------------------------------------|--------------------------------|-------------------------|----------------------------------------------------------|
| <input type="text" value="8"/> | <input type="text"/>                                               | <input type="text"/>           | <input type="text"/>    | <input type="text"/>                                     |
|                                | 4 Straight p.c. or right angle terminals<br>6 Solder lug terminals | 3 Single pole<br>4 Double pole | 2 ON - MOM<br>6 ON - ON | (NONE) Solder lug or straight p.c.<br>W Right angle p.c. |

#### Options:

| Contact materials                                             | Actuators                                                                                                                                                                  | Sealing                                                                                       | Special options                                                                                    |                      |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------|
| <input type="text"/>                                          | <input type="text"/>                                                                                                                                                       | <input type="text"/>                                                                          | <input type="text"/>                                                                               | <input type="text"/> |
| A Silver<br>A D Silver, gold plated<br>C D Brass, gold plated | For 1/4" (6.35mm) bushings<br>(NONE) Height .248" (6.3mm)<br>9 Height .346" (8.8mm)<br>For 15/32" (11.9mm) bushings<br>(NONE) Height .338" (8.6mm)<br>6 Height .275" (7mm) | (NONE) No sealing<br>B Epoxy sealed terminals<br>K Front panel sealing with 'o'-ring & gasket | (NONE)<br>X 7 1 8 15/32" (11.9mm) bushing<br>X 9 3 4 15/32" (11.9mm) bushing & front panel sealing | (NONE)<br>U L        |

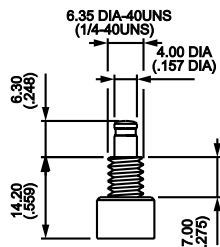
Example of completely specified model number: **8432WCDB**

Caps available separately - see option drawings.

# 8000 SERIES - MINI. MOMENTARY OR ALTERNATE ACTION PUSHBUTTON SWITCHES

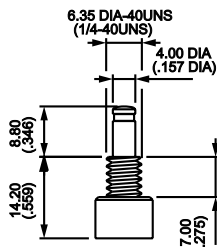
## ACTUATOR OPTIONS

### For 1/4" (6.35mm) bushing

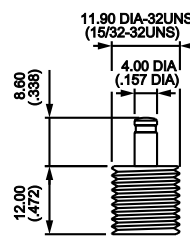


(NONE) Standard

9

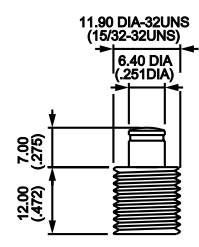


### For 15/32" (11.9mm) bushing



(NONE) Standard

6



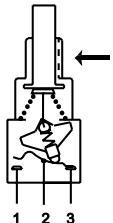
## MISCELLANEOUS

### SWITCH ACTION

Arrow indicates keyway

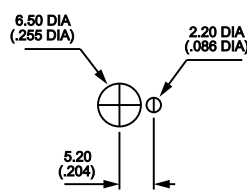


Function 6  
(ON-ON)

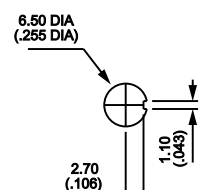


Function 2  
(ON-MOM)

### PANEL CUT-OUTS



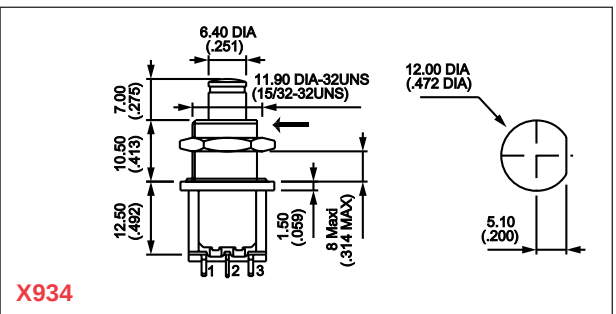
1/4" (6.35mm)  
Standard (With locking ring)



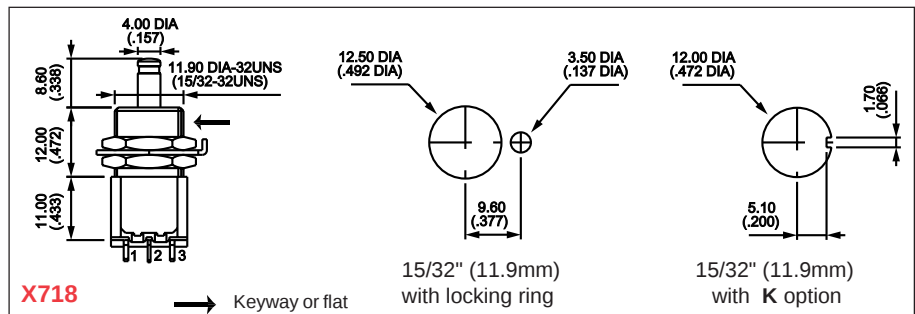
1/4" (6.35mm)  
with K option

## SPECIAL OPTIONS

- F** Tin plated terminals (for p.c. terminals only).
- X601** Silver plated brass contacts. Contact ratings: 0.2A 250VAC, 0.4A 125VAC or 0.5A 30VDC. Electric life: 20,000 cycles min. Minimum quantity: 5,000 pieces.
- X718** Bushing 15/32" (11.9mm). For all basic models (solder lug, straight p.c. or right angle p.c. terminals). Available with actuators **13** & **6**. Sealing option **K** available.
- X934** Flatted 15/32" (11.9mm) bushing and front panel sealing with 2 'o'-rings.



**X934**



**X718**

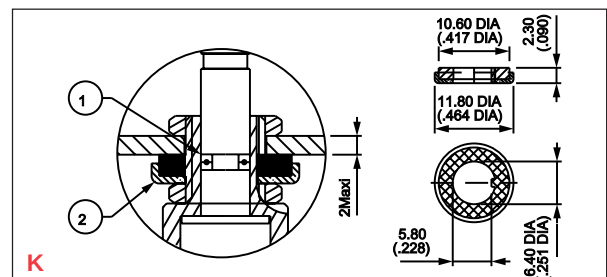
→ Keyway or flat

15/32" (11.9mm)  
with locking ring

15/32" (11.9mm)  
with K option

## SEALING OPTIONS

- (NONE)** No sealing.
- B** Epoxy sealed terminals.
- K** Front panel sealing with 'o'-ring and gasket. Protects against water and dust. Withstands 1 bar pressure when switch is operated.
- KB** Combined sealings (above).

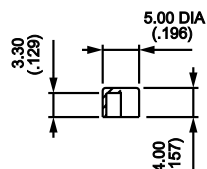


**K**

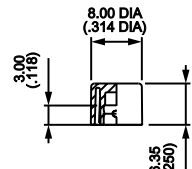
# 8000 SERIES - MINI. MOMENTARY OR ALTERNATE ACTION PUSHBUTTON SWITCHES

## CAPS

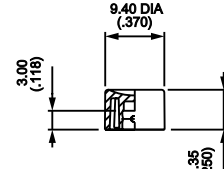
Note: replace last '0' in p/n with color code.



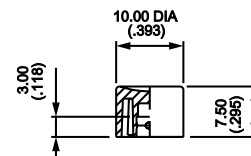
**U900**



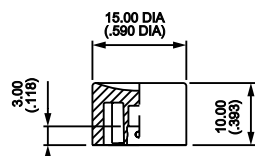
**U1140**



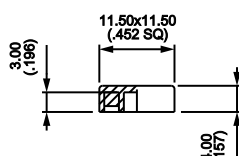
**U1720**



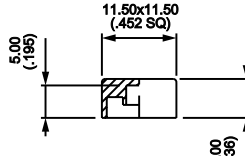
**U480** Standard



**U630**



**U2430** Square

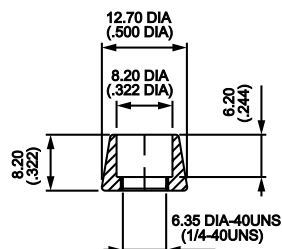


**U2020** Square

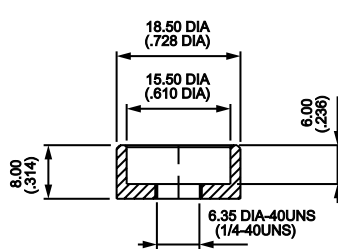
### Colors

- |     |        |
|-----|--------|
| 1   | blue   |
| 2   | black  |
| 3   | green  |
| 4   | grey   |
| 5   | yellow |
| 6   | red    |
| 7/1 | white  |
| 9   | orange |

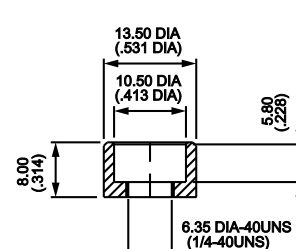
## DRESS NUTS (chrome plated)



**U1636** For cap U1140



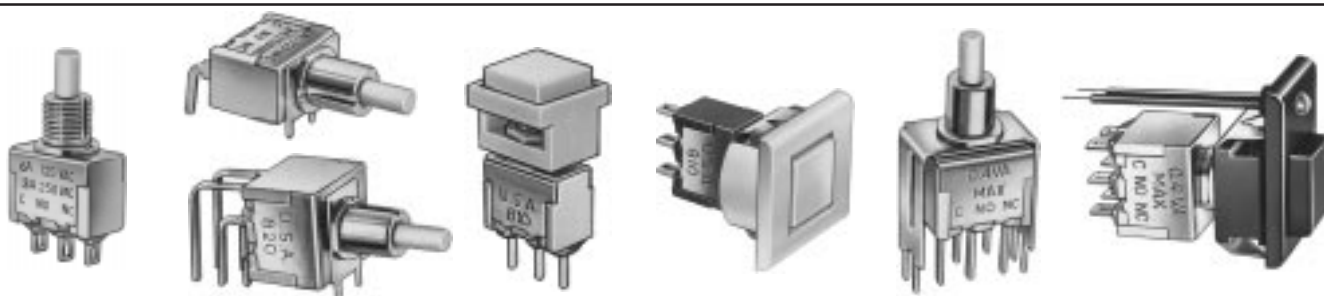
**U825** For cap U630



**U840** For cap U480

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES



### FEATURES

- Dry circuit through power ratings .
- Ultra-rugged construction SPDT & DPDT momentary models with numerous options.
- Panel, panel & p.c. and p.c. mounting models, lighted and unlighted.

### SPECIFICATIONS

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b>                     | (Q) power models - coin silver: 6 Amps at 125 VAC, 3 Amps at 250 VAC or 7 Amps at 30 VDC.<br>(B) dry circuit models - gold over nickel over brass: 0.4 VA max. at 20 V max.<br>UL models - coin silver: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor). UL file no. E66367. CSA models - coin silver: same ratings as UL models. CSA file no. LR54592-1.<br>20 milliohms max. at 3 VDC, 0.1 Amp.<br>Greater than 200,000 megohms between terminals & case ground.<br>Greater than 1500 VAC for 1 minute between terminals & case ground.<br>60,000 cycles min. at full load.<br>-30°C to +85°C<br>.035" (0.9mm) approx.<br>Single pole: 290 ± 75 grams    Double pole: 550 ± 75 grams |
| <b>Also see economy ratings N &amp; T in options section.</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Initial contact resistance:</b>                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Insulation resistance:</b>                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Dielectric strength:</b>                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Electrical life (resistive loads):</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Operating temperature range:</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Total travel:</b>                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Actuation force:</b>                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

### MATERIALS

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts:</b>                | Coin silver for power, UL & CSA models. Gold over nickel over brass for dry circuit models.                                                                                                                                                                              |
| <b>Actuator:</b>                | Glass filled polyester, color white                                                                                                                                                                                                                                      |
| <b>Bushing:</b>                 | Nickel plated brass                                                                                                                                                                                                                                                      |
| <b>Strap:</b>                   | Stainless steel                                                                                                                                                                                                                                                          |
| <b>Case:</b>                    | Melamine phenolic, color red                                                                                                                                                                                                                                             |
| <b>Terminal seal:</b>           | Epoxy (standard)                                                                                                                                                                                                                                                         |
| <b>Support bracket:</b>         | Brass or steel, tin plated                                                                                                                                                                                                                                               |
| <b>Spring mounting bracket:</b> | Stainless steel                                                                                                                                                                                                                                                          |
| <b>Bezel &amp; cap:</b>         | Nylon. Available in black, red & white. Consult factory for other colors.                                                                                                                                                                                                |
| <b>Hardware:</b>                | See 'Miscellaneous' section.                                                                                                                                                                                                                                             |
| <b>LED:</b>                     | Intensity: 2.0 mcd at 10 mA. Forward voltage: 2.0V (3.0V max.). Max. continuous forward current: 15 mA for red, 30 mA for green & 20 mA for yellow. Red is standard. Yellow & green are optional. Specifications are subject to change without notice - consult factory. |

|                           |                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AGENCY RECOGNITION</b> | UL, & CSA. Marking: Switches ordered with '/UL' added at end of model no. are supplied with recognition marked. Switches ordered with '/CSA' added at end of model no. are supplied with recognition marked. |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



### ABOUT THIS SERIES

The material in this series is organized in the following sequence:

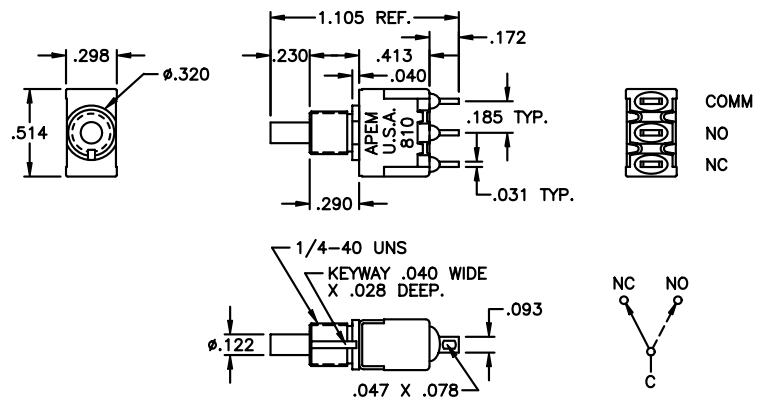
- Completely specified switch models
- 'build your own switch' order format
- Miscellaneous
- Option drawings & information
- Panel cut-outs

# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Solder lug terminals - panel mounting

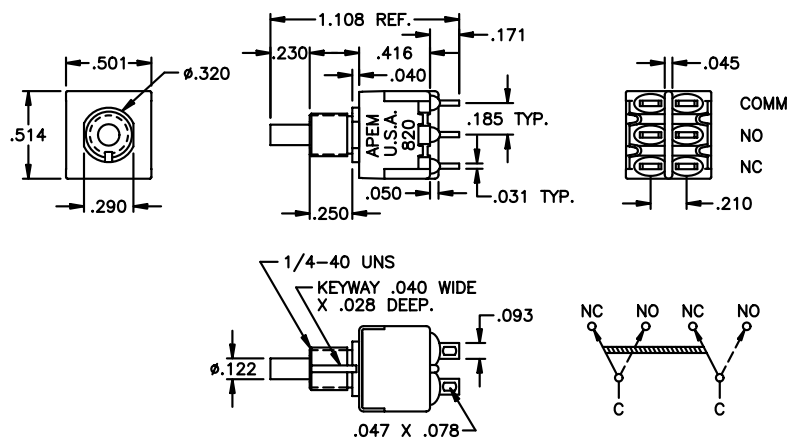
### SINGLE POLE

| POWER CKT.<br>MODEL NO. | UL MODEL NO. |
|-------------------------|--------------|
| 810KMZQ                 | 810KMZQ/UL   |



### DOUBLE POLE

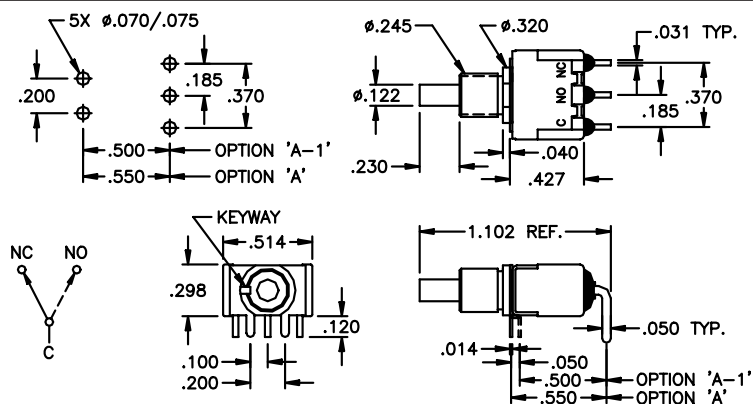
| POWER CKT.<br>MODEL NO. | UL MODEL NO. |
|-------------------------|--------------|
| 820KMZQ                 | 820KMZQ/UL   |



## Horizontal right angle p.c. terminals - p.c. mounting

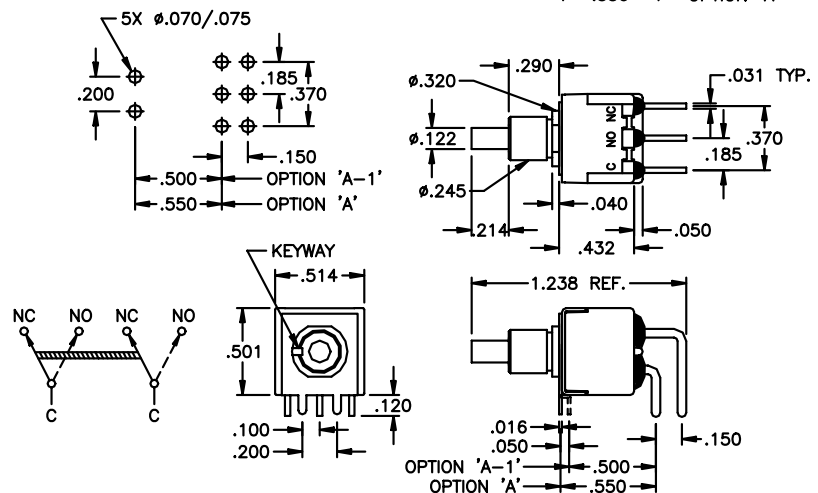
### SINGLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO. |
|-----------------------|--------------|
| 810KSAB               | 810KSAQ/UL   |
| 810KSA-1B             | 810KSA-1Q/UL |



### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO. |
|-----------------------|--------------|
| 820KSAB               | 820KSAQ/UL   |
| 820KSA-1B             | 820KSA-1Q/UL |

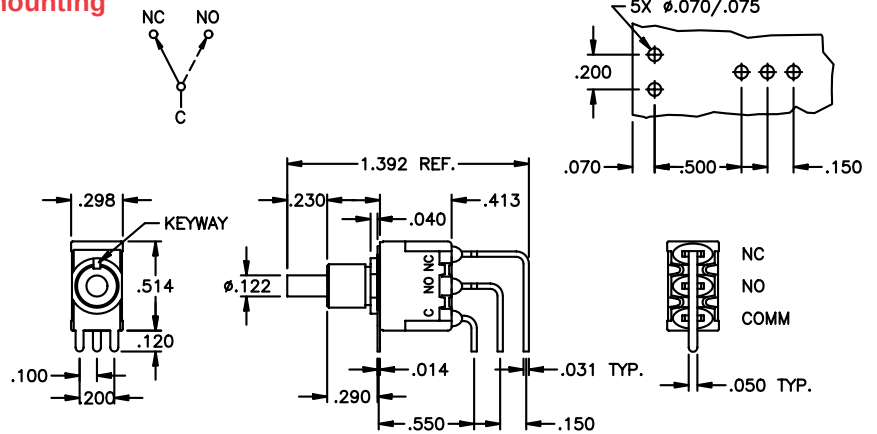


# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Vertical right angle p.c. terminals - p.c. mounting

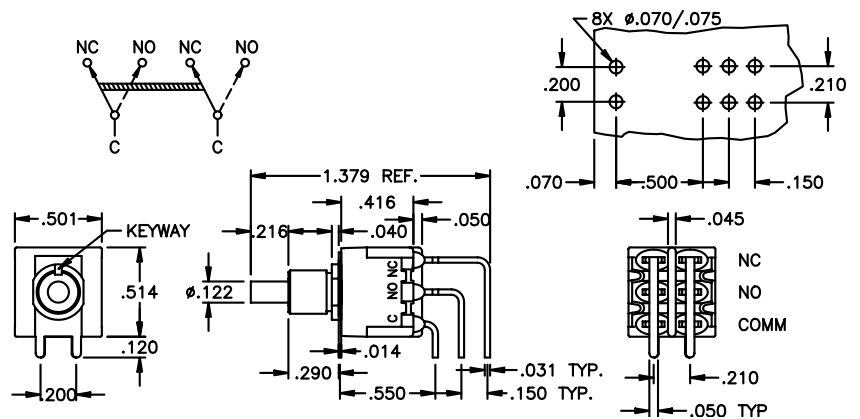
### SINGLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO. |
|-----------------------|--------------|
| 810KSVB               | 810KSVQ/UL   |
| 810KSV-1B             | 810KSV-1Q/UL |
| 810KSV-2B             | 810KSV-2Q/UL |



### DOUBLE POLE

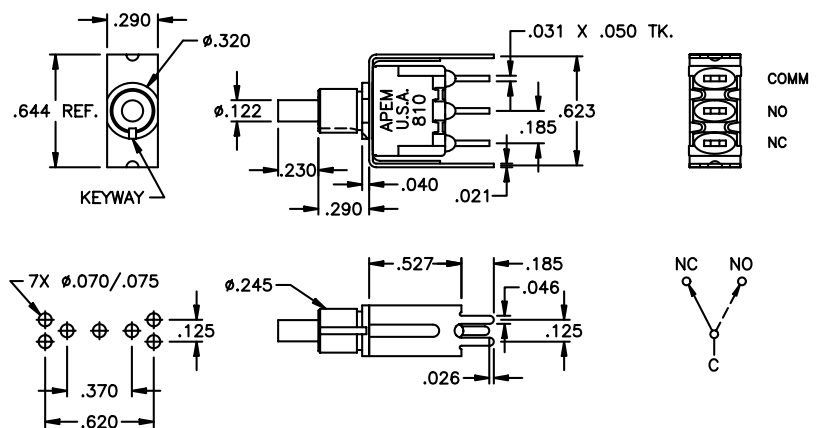
| DRY CKT.<br>MODEL NO. | UL MODEL NO.  |
|-----------------------|---------------|
| 820KSVB               | 820KSVQ/UL    |
| 820KSV-1B             | 820KSV-1Q/UL  |
| 820KSV-2B             | 820KSV-2 Q/UL |



## Straight p.c. terminals with bracket

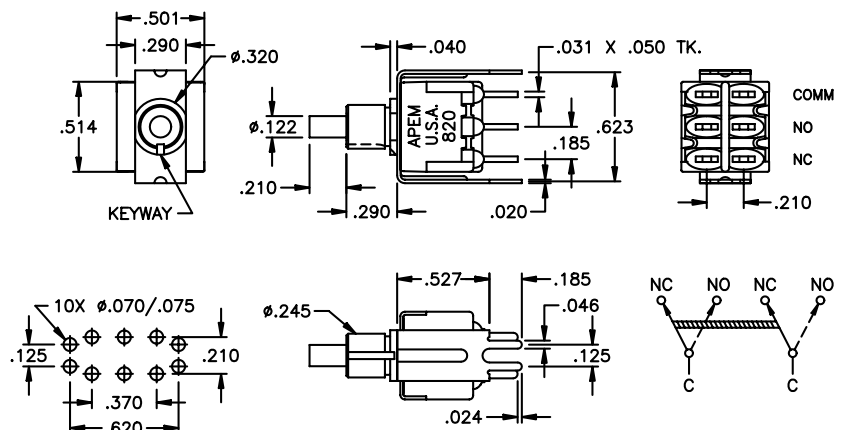
### SINGLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO. |
|-----------------------|--------------|
| 810KSV30B             | 810KSV30Q/UL |
| 810KSV40B             | 810KSV40Q/UL |



### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO. |
|-----------------------|--------------|
| 820KSV30B             | 820KSV30Q/UL |
| 820KSV40B             | 820KSV40Q/UL |



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

C

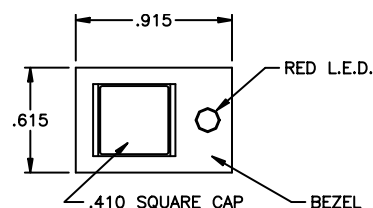
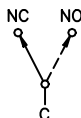
# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Solder lug terminals - snap-in bezel with outboard LED

### SINGLE POLE

| POWER CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-------------------------|-------------------|-----------|
| 810K2M1ZQJ6122          | 810K2M1ZQJ6122/UL | .100      |
| 810K1M1ZQJ6122          | 810K1M1ZQJ6122/UL | .010      |

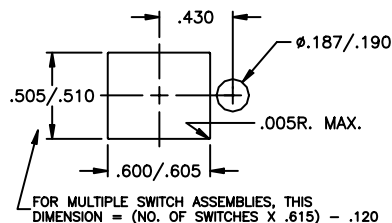
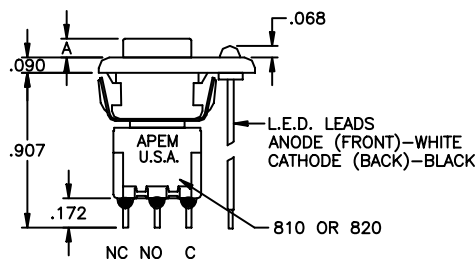
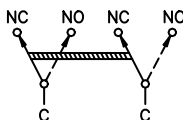
Models listed above have black bezel and cap.



### DOUBLE POLE

| POWER CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-------------------------|-------------------|-----------|
| 820K2M1ZQJ6122          | 820K2M1ZQJ6122/UL | .100      |
| 820K1M1ZQJ6122          | 820K1M1ZQJ6122/UL | .010      |

Models listed above have black bezel and cap.

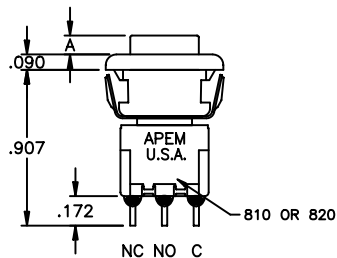
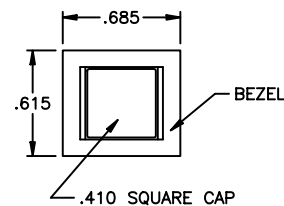
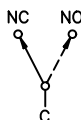


## Solder lug terminals - snap-in bezel

### SINGLE POLE

| POWER CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-------------------------|-------------------|-----------|
| 810K2M1ZQJ8122          | 810K2M1ZQJ8122/UL | .100      |
| 810K1M1ZQJ8122          | 810K1M1ZQJ8122/UL | .010      |

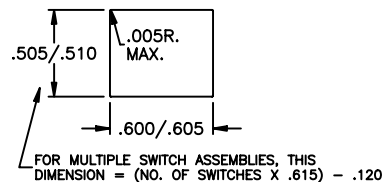
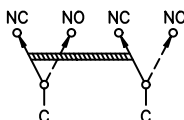
Models listed above have black bezel and cap.



### DOUBLE POLE

| POWER CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-------------------------|-------------------|-----------|
| 820K2M1ZQJ8122          | 820K2M1ZQJ8122/UL | .100      |
| 820K1M1ZQJ8122          | 820K1M1ZQJ8122/UL | .010      |

Models listed above have black bezel and cap.



# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Straight p.c. terminals - p.c. mounting bezel

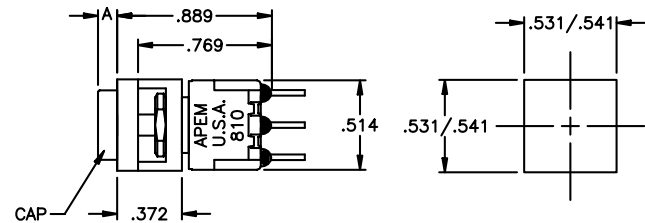
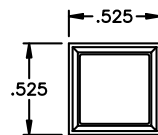
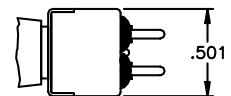
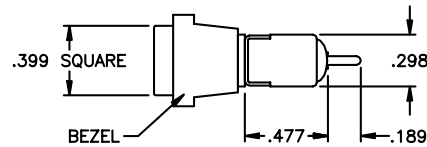
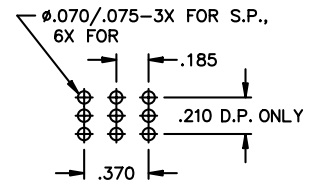
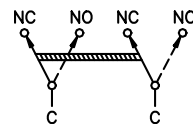
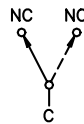
### SINGLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-----------------------|-------------------|-----------|
| 810K2M1CBJ8422        | 810K2M1CQJ8422/UL | .100      |
| 810K1M1CBJ8422        | 810K1M1CQJ8422/UL | .010      |

### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-----------------------|-------------------|-----------|
| 820K2M1CBJ8422        | 820K2M1CQJ8422/UL | .100      |
| 820K1M1CBJ8422        | 820K1M1CQJ8422/UL | .010      |

Models listed above have black bezel and cap.



## Straight p.c. terminals w/bracket - p.c. mounting bezel

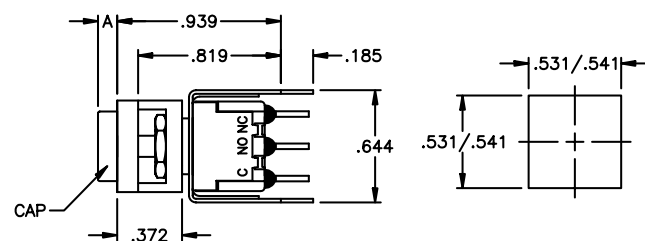
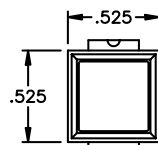
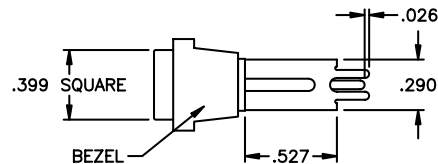
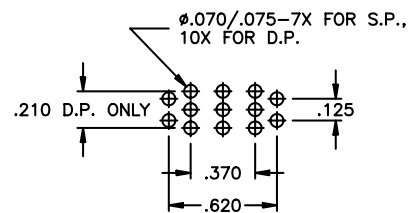
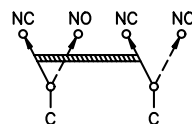
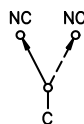
### SINGLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.        | DIM.<br>A |
|-----------------------|---------------------|-----------|
| 810K2M1V30BJ8422      | 810K2M1V30QJ8422/UL | .100      |
| 810K1M1V30BJ8422      | 810K1M1V30QJ8422/UL | .010      |

### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.        | DIM.<br>A |
|-----------------------|---------------------|-----------|
| 820K2M1V30BJ8422      | 820K2M1V30QJ8422/UL | .100      |
| 820K1M1V30BJ8422      | 820K1M1V30QJ8422/UL | .010      |

Models listed above have black bezel and cap.

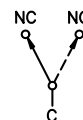
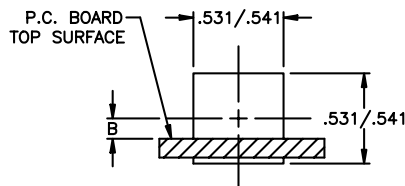


# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Horizontal right angle p.c. terminals - p.c. mounting bezel

### SINGLE POLE

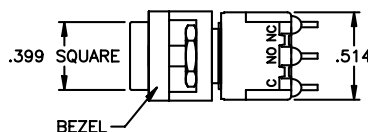
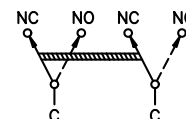
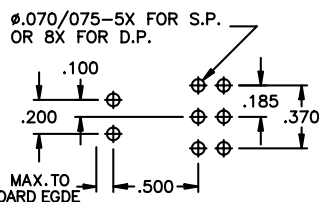
| DRY CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-----------------------|-------------------|-----------|
| 810K2M1ABJ8422        | 810K2M1AQJ8422/UL | .100      |
| 810K1M1ABJ8422        | 810K1M1AQJ8422/UL | .010      |



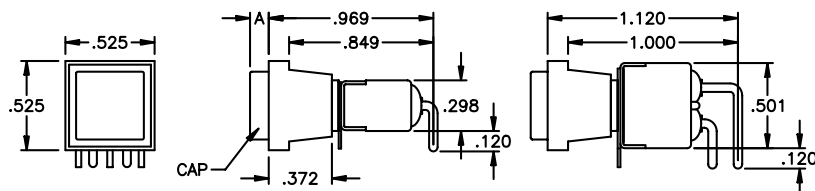
### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.      | DIM.<br>A |
|-----------------------|-------------------|-----------|
| 820K2M1ABJ8422        | 820K2M1AQJ8422/UL | .100      |
| 820K1M1ABJ8422        | 820K1M1AQJ8422/UL | .010      |

Models listed above have black bezel and cap.



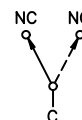
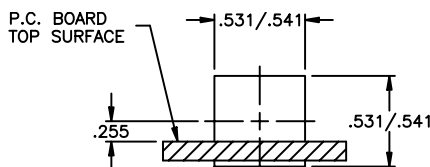
| Poles | Option | Dim. B | Dim. C    |
|-------|--------|--------|-----------|
| SP    | A      | .148   | .045 max. |
| SP    | A-1    | .164   | .095 max. |
| DP    | A      | .250   | .300 max. |
| DP    | A-1    | .266   | .350 max. |



## Vertical right angle p.c. terminals - p.c. mounting bezel

### SINGLE POLE

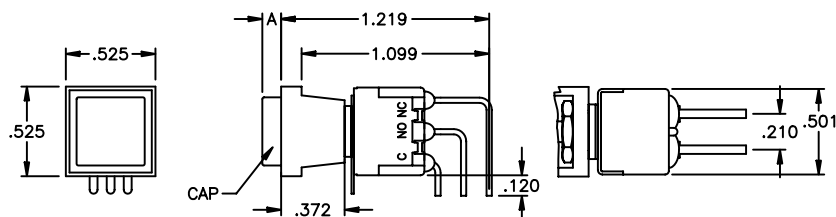
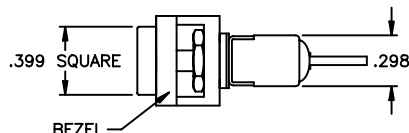
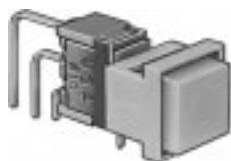
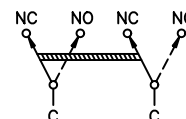
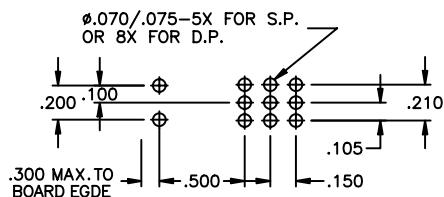
| DRY CKT.<br>MODEL NO. | UL MODEL NO.        | DIM.<br>A |
|-----------------------|---------------------|-----------|
| 810K2M1V-1BJ8422      | 810K2M1V-1QJ8422/UL | .100      |
| 810K1M1V-1BJ8422      | 810K1M1V-1QJ8422/UL | .010      |



### DOUBLE POLE

| DRY CKT.<br>MODEL NO. | UL MODEL NO.        | DIM.<br>A |
|-----------------------|---------------------|-----------|
| 820K2M1V-1BJ8422      | 820K2M1V-1QJ8422/UL | .100      |
| 820K1M1V-1BJ8422      | 820K1M1V-1QJ8422/UL | .010      |

Models listed above have black bezel and cap.



# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## Snap-in bezel for round hole mounting

Self-keying against rotation

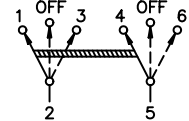
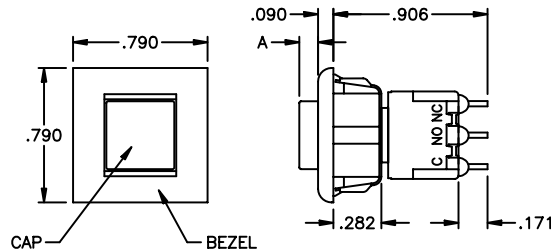
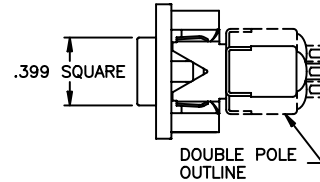
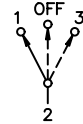
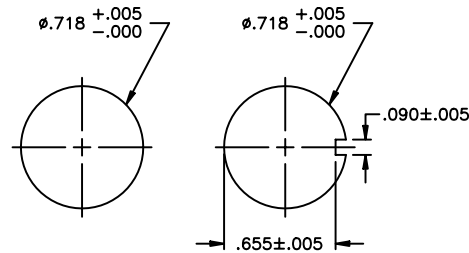
### SINGLE POLE

| POWER CKT. MODEL NO. | UL MODEL NO.      | DIM. A |
|----------------------|-------------------|--------|
| 810K2M1ZQJ9622       | 810K2M1ZQJ9622/UL | .100   |
| 810K1M1ZQJ9622       | 810K1M1ZQJ9622/UL | .010   |

### DOUBLE POLE

| POWER CKT. MODEL NO. | UL MODEL NO.      | DIM. A |
|----------------------|-------------------|--------|
| 820K2M1ZQJ9622       | 820K2M1ZQJ9622/UL | .100   |
| 820K1M1ZQJ9622       | 820K1M1ZQJ9622/UL | .010   |

Models listed above have black bezel and cap.



**Additional ordering information:** Commonly ordered models are shown above and on prior pages with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number. Allowable options are shown below each respective box with brief description - see option dwgs. & info. following.

Note: 'NONE' indicates box may be left empty.

### Model Structure:

| Series                | Actuators               | Bushings                                        | Terminations                                                  | Contact materials                                  |
|-----------------------|-------------------------|-------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------|
| <input type="text"/>  | <input type="text"/>    | <input type="text"/>                            | <input type="text"/>                                          | <input type="text"/>                               |
| Single pole:<br>8 1 0 | K Standard<br>K 1 Short | M Standard 1/4" thd'd.<br>M 1 Short 1/4" thd'd. | Z Solder lug<br>C Printed circuit<br>W Wirewrap               | B Gold<br>Q Coin silver<br>G Gold over coin silver |
| Double pole:<br>8 2 0 | K 2 Medium              | D 1/4" thd'd. w/'D' flat<br>S Non-threaded      | W 1 Lg. wirewrap<br>W 3 Sht. wirewrap<br>X Extra lg. wirewrap | N Economy gold<br>T Economy silver                 |

Notes:  
When bezel is specified and flush cap is desired, specify K1 actuator and M1 bushing.  
When bezel is specified and raised cap is desired, specify K2 actuator and M1 bushing.  
Epoxy terminal seal is standard on 800 Series.

### Options:

| Bezel& cap                                                                                              | Bezel color                           | Cap color                             | Approvals                  |
|---------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|----------------------------|
| <input type="text"/>                                                                                    | <input type="text"/>                  | <input type="text"/>                  | <input type="text"/>       |
| (NONE)<br>J 6 1 Snap-in w/LED<br>J 8 1 Snap-in no LED<br>J 8 4 P.C. style<br>J 9 6 Snap-in (round hole) | (NONE)<br>2 Black<br>6 Red<br>8 White | (NONE)<br>2 Black<br>6 Red<br>8 White | (NONE)<br>/ U L<br>/ C S A |

Although most combinations of options are available, some may result in incompatibilities. Consult factory if there is any question.

Horizontal right angle p.c. terminals:  
A  
A - 1  
Vertical right angle p.c. terminals:  
V  
V - 1  
V - 2  
Straight p.c. terminals w/brkt.:  
V 3 0 or V 3 1  
V 4 0 or V 4 1  
V 7 0  
V 8 0  
V 7 1  
V 8 1

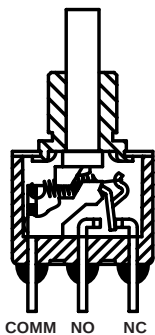
Example of completely specified model number:  
**820K1M1ZQJ8126/UL/CSA**

# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

C

## MISCELLANEOUS

TYPICAL  
SWITCH  
CROSS  
SECTION



### HARDWARE SUPPLIED

(See Hardware section of catalog)

Switches with M option bushings are supplied with (2) A112 Hex Nuts, (1) A115 Lockwasher and (1) A107 Anti-rotate Ring.

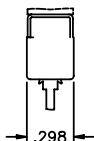
Switches with D option bushings are supplied with (2) A112 Hex Nuts and (1) A115 Lockwasher.

Switches with M1 option bushings are supplied with (1) A112 Hex Nut and (1) A115 Lockwasher.

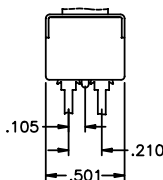
Note: Switches with non-threaded bushings or bezels supplied without hardware.

SWITCH BODY  
SIZES WITH  
TERMINAL  
LOCATION  
DIMENSIONS

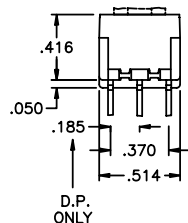
SIDE VIEW  
SINGLE POLE



SIDE VIEW  
DOUBLE POLE



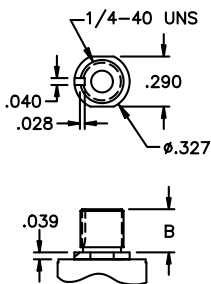
FRONT VIEW  
SINGLE AND  
DOUBLE POLE



## BUSHING OPTIONS

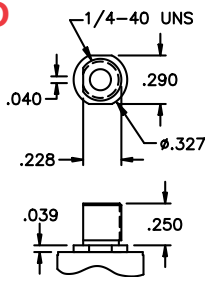
NOTE:  
BUSHING M AND  
ACTUATOR K  
ARE STANDARD.

### M & M1



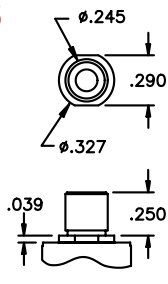
THREADED

### D



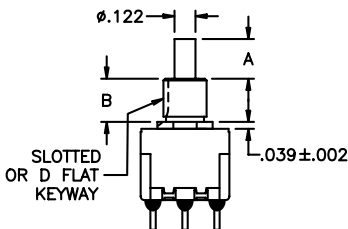
THREADED

### S



NON-THREADED

## ACTUATOR/BUSHING OPTIONS



| BUSHING<br>OPTION | DIM.<br>B | DIMENSION A<br>ACTUATOR OPTION |      |      |
|-------------------|-----------|--------------------------------|------|------|
|                   |           | K                              | K1   | K2   |
| M or D            | .250      | .230                           | .069 | .168 |
| S                 | .250      | .230                           | .069 | .168 |
| M1                | .154      | .322                           | .165 | .264 |

All bushings have 1/4-40 UNS-2A thread except S which is non-threaded.

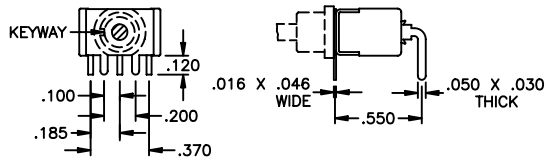
Switch caps for switches without bezels also available - see Hardware section of catalog.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

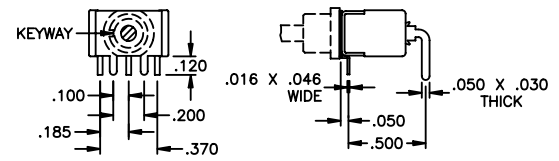
## TERMINATION OPTIONS

**A**



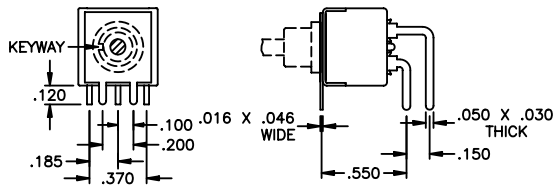
SINGLE POLE HORIZONTAL P.C. MOUNTING

**A-1**



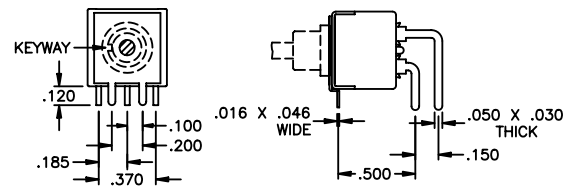
SINGLE POLE HORIZONTAL P.C. MOUNTING

**A**



DOUBLE POLE HORIZONTAL P.C. MOUNTING

**A-1**

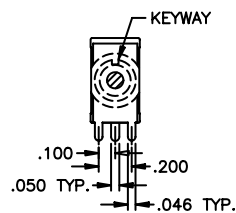


DOUBLE POLE HORIZONTAL P.C. MOUNTING

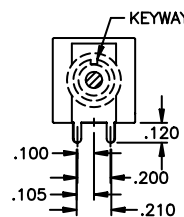
## V, V-1 & V-2

| Option | Dim. A | Dim. B |
|--------|--------|--------|
| V      | .550   | .150   |
| V-1    | .500   | .150   |
| V-2    | .500   | .100   |

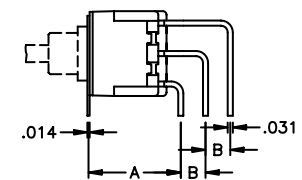
FRONT VIEW  
SINGLE POLE



FRONT VIEW  
DOUBLE POLE



SIDE VIEW - SINGLE & DOUBLE POLE

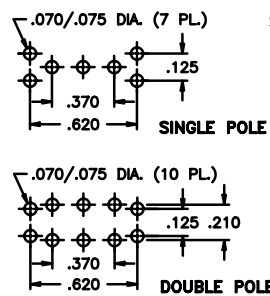


VERTICAL P.C. MOUNTING

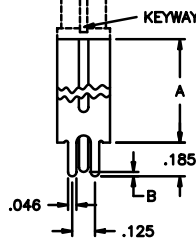
## V30, V40, V70, V80, V31, V41, V71 & V81

PANEL LAYOUT  
V30, V31, V40 & V41

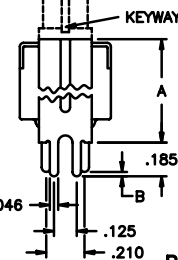
| Option  | Dim. A | Dim. B |
|---------|--------|--------|
| V30-V31 | .527   | .024   |
| V40-V41 | .647   | .048   |



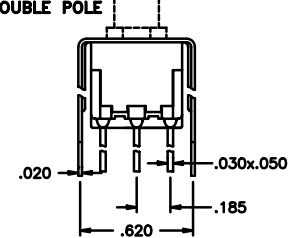
FRONT VIEW  
SINGLE POLE



FRONT VIEW  
DOUBLE POLE



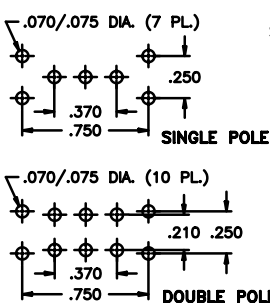
SIDE VIEW -  
SINGLE AND  
DOUBLE POLE



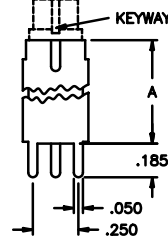
PRINTED CIRCUIT MOUNTING

PANEL LAYOUT  
V70, V71,  
V80 & V81

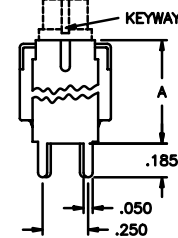
| Option  | Dim. A |
|---------|--------|
| V70-V71 | .630   |
| V80-V81 | .953   |



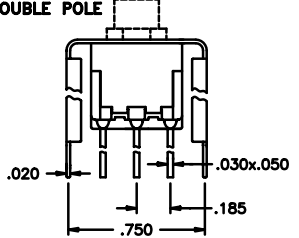
FRONT VIEW  
SINGLE POLE



FRONT VIEW  
DOUBLE POLE

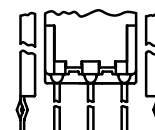
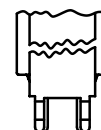


SIDE VIEW -  
SINGLE AND  
DOUBLE POLE



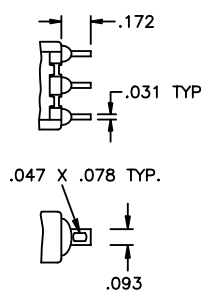
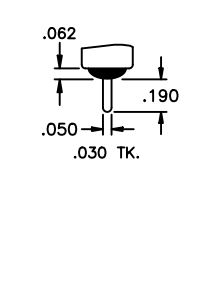
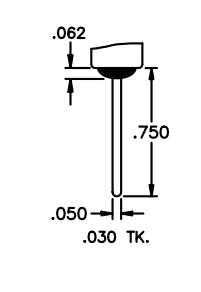
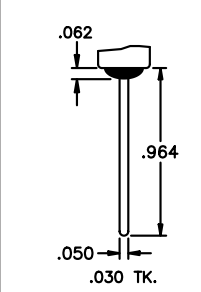
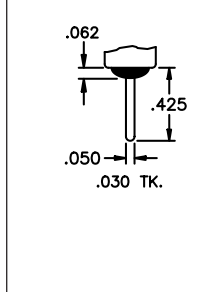
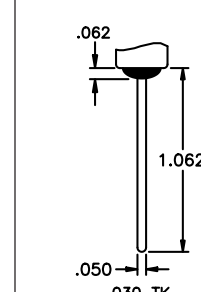
PRINTED CIRCUIT MOUNTING

V31, V41, V71 & V81 ARE THE SAME AS V30, V40, V70 & V80 RESPECTIVELY, EXCEPT WITH CRIMPED LEG DESIGN FOR P.C. BOARD RETENTION, AS SHOWN TO RIGHT.



# 800 SERIES - SNAP-ACTING MINIATURE PUSHBUTTON SWITCHES

## TERMINATION OPTIONS (CONT'D.)

| Z                                                                                                   | C                                                                                                        | W                                                                                                 | W1                                                                                                     | W3                                                                                                        | X                                                                                                             |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
|  <p>SOLDER LUG</p> |  <p>PRINTED CIRCUIT</p> |  <p>WIREWRAP</p> |  <p>LONG WIREWRAP</p> |  <p>SHORT WIREWRAP</p> |  <p>EXTRA LG. WIREWRAP</p> |

## CONTACT MATERIAL OPTIONS

|          |                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B</b> | Dry circuit - gold over nickel over brass.<br>RATING: 0.4 Volt-Amps (VA) max. at 20 V max.<br>ELECTRIC LIFE: 60,000 cycles minimum. MECHANICAL LIFE: 500,000 cycles minimum.                                                                                                                                                                                                                                  |
| <b>Q</b> | Power circuit - coin silver.<br>RATING: 6 Amps at 125 VAC, 3 Amps at 250 VAC or 7 Amps at 30 VDC (resistive loads).<br>ELECTRIC LIFE: 60,000 cycles minimum at full load.                                                                                                                                                                                                                                     |
| <b>G</b> | Dry circuit or power circuit - gold over nickel over coin silver.<br>RATINGS & ELECTRIC LIFE: Same as B & Q above - i.e. - can be used in either dry circuit or power circuit, however once used in power circuit, switch cannot be re-used in dry circuit. This option satisfies those customers who have both dry circuit and power circuit requirements, but prefer to inventory only one switch for both. |
| <b>N</b> | Dry circuit - gold over nickel over brass. Note- less gold than B option.<br>RATING: 0.4 Volt-Amps (VA) max. at 20 V max.<br>ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.                                                                                                                                                                                                                       |
| <b>T</b> | Power circuit - Silver plate over brass.<br>RATING: 1 Amp at 125 VAC or 0.5 Amps at 250 VAC (resistive loads).<br>ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.                                                                                                                                                                                                                                  |

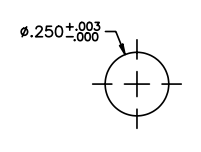
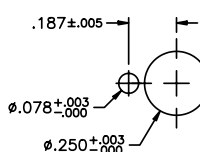
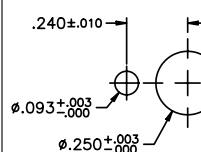
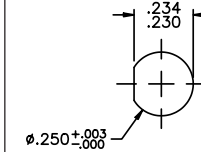
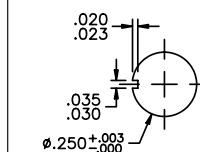
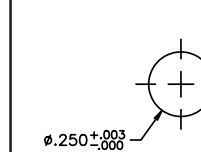
Solder dipped terminals and custom contact plating available - contact factory.

## UL & CSA OPTIONS

|            |                                                                                                                                                                                                                                                                                                                                                                                  |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>UL</b>  | For power circuits - coin silver<br>RATING: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor).<br>Underwriter Laboratories file no. E66367. Note - applicable only to terminations with coin silver contacts (Q or G options).                                                                                                                                           |
| <b>CSA</b> | For power circuits - coin silver<br>RATING: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor). Canadian Standards Association file no. LR54592-1. Note - applicable only to terminations with coin silver contacts (Q or G options) as CSA recognizes switches for power applications only. Note- Double pole switches with solder lug terminals are not CSA recognized. |

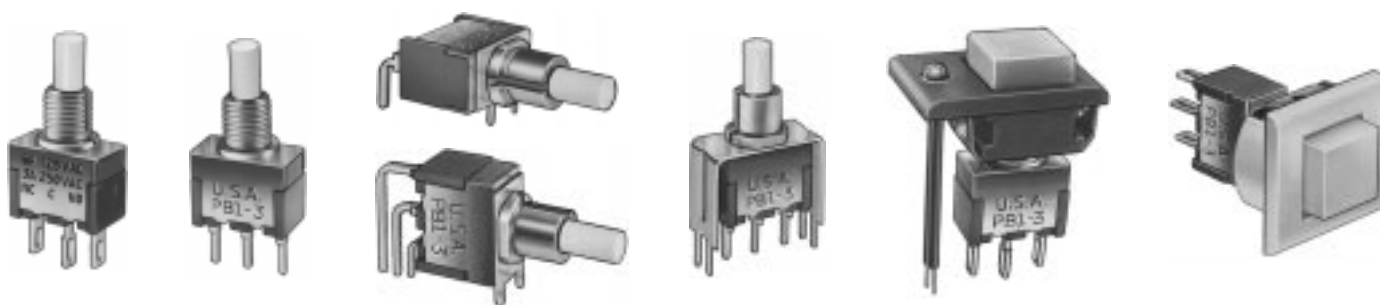
## PANEL CUT-OUTS

Cut-outs that accept all 1/4-40 threaded bushings:

|                                                                                                           |                                                                                                                       |                                                                                                                       |                                                                                                           |                                                                                                                           |                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Without keying</p> |  <p>With A107 anti-rotate ring</p> |  <p>With A158 anti-rotate ring</p> |  <p>With D bushing</p> |  <p>With slotted keyway bushings</p> |  <p>Accepts all 1/4" non-threaded bushings</p> |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Dry circuit through power ratings .
- Rugged construction SPDT momentary models with numerous options.
- Panel, panel & p.c. and p.c. mounting models, lighted and unlighted.

## SPECIFICATIONS

|                                            |                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b>  | (Q) power models - coin silver: 6 Amps at 125 VAC, 3 Amps at 250 VAC or 7 Amps at 30 VDC.<br>(B) dry circuit models - gold over nickel over brass: 0.4 VA max. at 20 V max.<br>UL models - coin silver: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor). UL file no. E66367. CSA models - coin silver: same ratings as UL models. CSA file no. LR54592-1. |
| <b>Initial contact resistance:</b>         | 5 milliohms max. at 3 VDC, 0.1 Amp.                                                                                                                                                                                                                                                                                                                                 |
| <b>Insulation resistance:</b>              | Greater than 200,000 megohms between terminals & case ground.                                                                                                                                                                                                                                                                                                       |
| <b>Dielectric strength:</b>                | Greater than 2000 VAC for 1 minute between terminals & case ground.                                                                                                                                                                                                                                                                                                 |
| <b>Electrical life (resistive loads):</b>  | 100,000 cycles min. at full load.                                                                                                                                                                                                                                                                                                                                   |
| <b>Operating temperature range:</b>        | -30°C to +85°C                                                                                                                                                                                                                                                                                                                                                      |
| <b>Total travel &amp; operating force:</b> | .065" (1.6mm) & 19 oz. (approximate values ).                                                                                                                                                                                                                                                                                                                       |

## MATERIALS

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts:</b>                | Coin silver for power, UL & CSA models. Gold over nickel over brass for dry circuit models.                                                                                                                                                                              |
| <b>Actuator:</b>                | Glass filled polyester, color white                                                                                                                                                                                                                                      |
| <b>Bushing:</b>                 | Nickel plated brass                                                                                                                                                                                                                                                      |
| <b>Strap:</b>                   | Stainless steel                                                                                                                                                                                                                                                          |
| <b>Case:</b>                    | Melamine phenolic, color red                                                                                                                                                                                                                                             |
| <b>Terminal seal:</b>           | Epoxy (optional)                                                                                                                                                                                                                                                         |
| <b>Support bracket:</b>         | Brass or steel, tin plated                                                                                                                                                                                                                                               |
| <b>Spring mounting bracket:</b> | Stainless steel                                                                                                                                                                                                                                                          |
| <b>Bezel &amp; cap:</b>         | Nylon. Available in black, red or white. Consult factory for other colors.                                                                                                                                                                                               |
| <b>Hardware:</b>                | See 'Miscellaneous' section.                                                                                                                                                                                                                                             |
| <b>LED:</b>                     | Intensity: 2.0 mcd at 10 mA. Forward voltage: 2.0V (3.0V max.). Max. continuous forward current: 15 mA for red, 30 mA for green & 20 mA for yellow. Red is standard. Yellow & green are optional. Specifications are subject to change without notice - consult factory. |

## AGENCY RECOGNITION



UL, & CSA. Marking: Switches ordered with 'UL' added at end of model no. are supplied with recognition marked. Switches ordered with 'CSA' added at end of model no. are supplied with recognition marked.

## ABOUT THIS SERIES

The material in this series is organized in the following sequence:

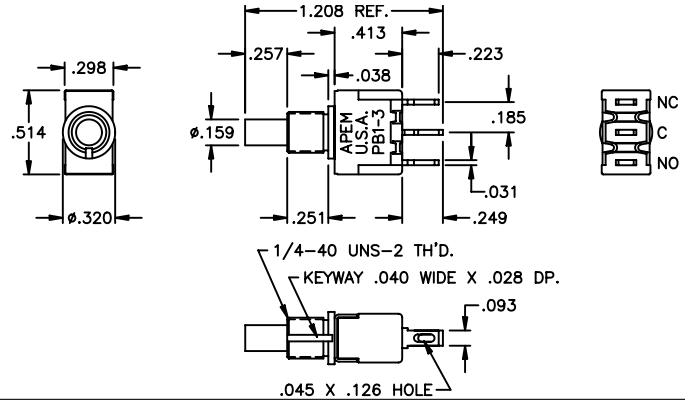
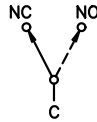
- Completely specified switch models
- 'build your own switch' order format
- Miscellaneous
- Option drawings & information
- Panel cut-outs & miscellaneous

# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Solder lug terminals - panel mounting



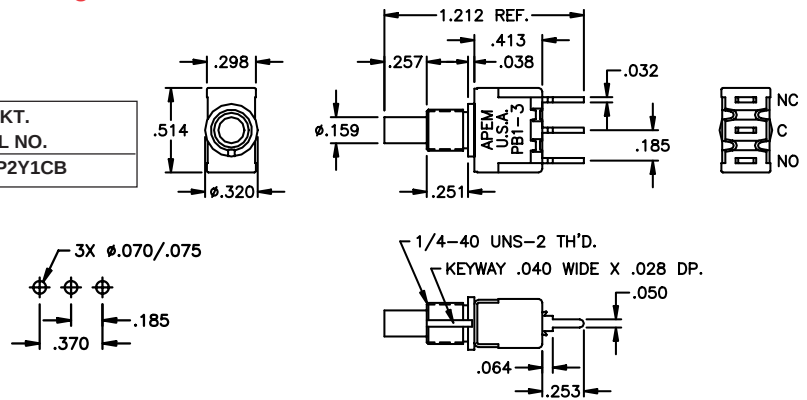
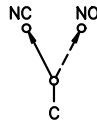
|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1ZQ             | PB1-3P2Y1ZB           |



## P.C. or wirewrap terminals - panel or p.c. mounting



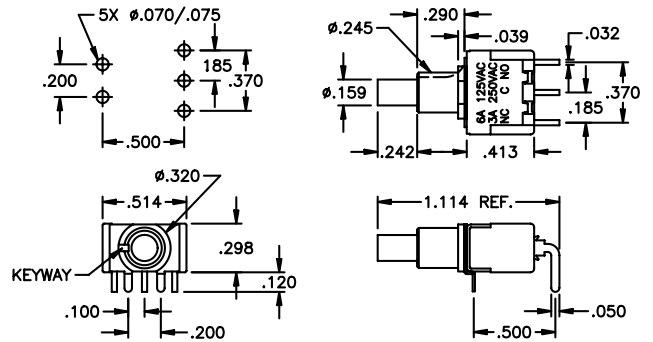
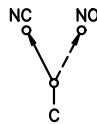
|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1CQ             | PB1-3P2Y1CB           |



## Horizontal right angle p.c. terminals - p.c. mounting



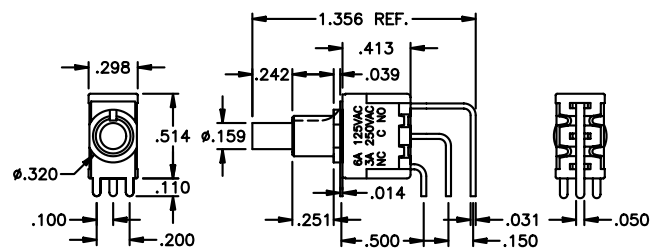
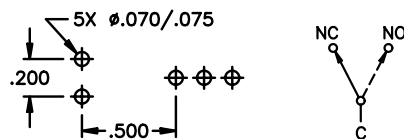
|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y2A-1Q           | PB1-3P2Y2A-1B         |



## Vertical right angle p.c. terminals - p.c. mounting



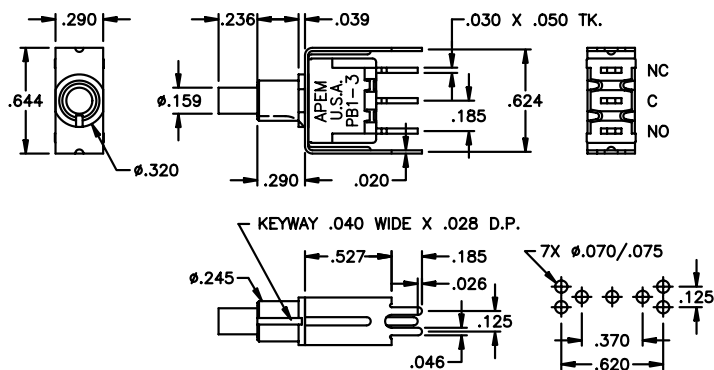
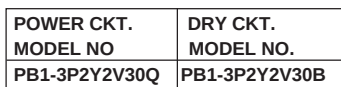
|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y2V-1Q           | PB1-3P2Y2V-1B         |



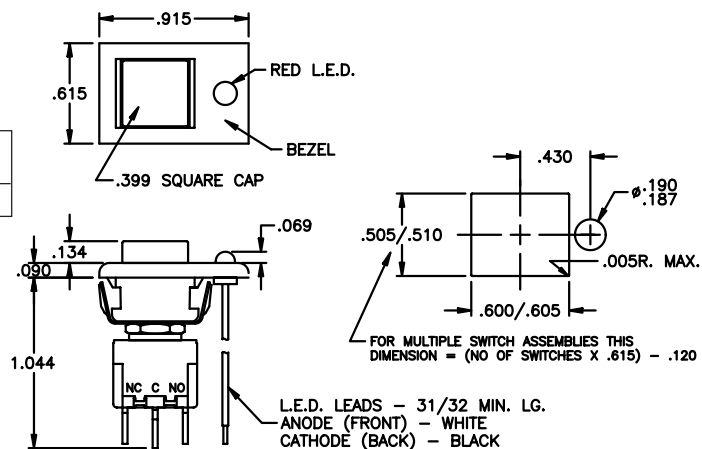
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

## C

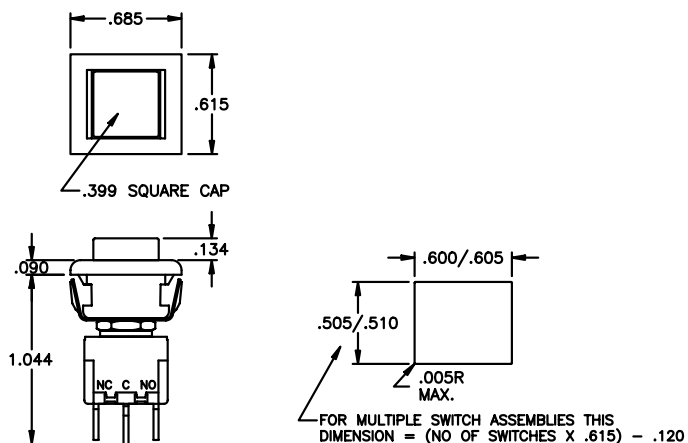
## SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1ZQJ6168        | PB1-3P2Y1ZBJ6168      |

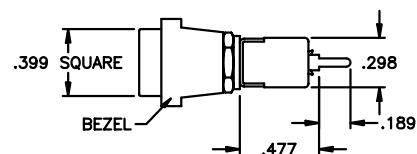
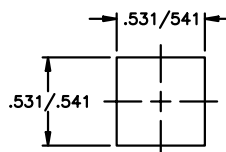
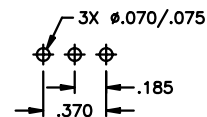
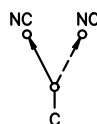


|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1ZQJ8182        | PB1-3P2Y1ZBJ8182      |

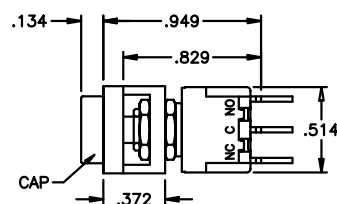
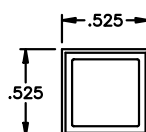


# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

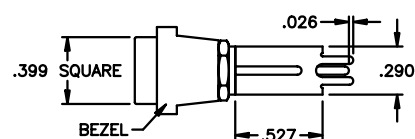
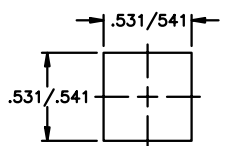
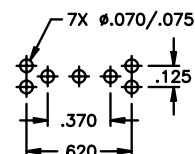
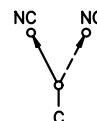
## Straight p.c. terminals - p.c. mounting bezel



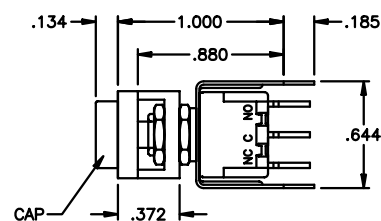
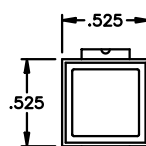
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
|-------------------------|-----------------------|
| PB1-3P2Y1CQJ8488        | PB1-3P2Y1CBJ8488      |



## Straight p.c. terminals with bracket - p.c. mounting bezel



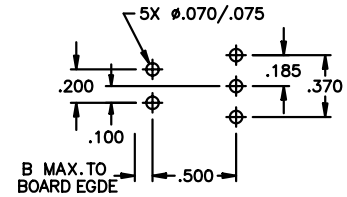
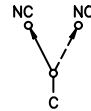
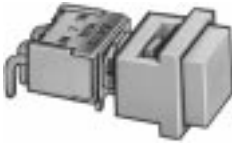
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
|-------------------------|-----------------------|
| PB1-3P2Y1V30QJ8488      | PB1-3P2Y1V30BJ8488    |



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

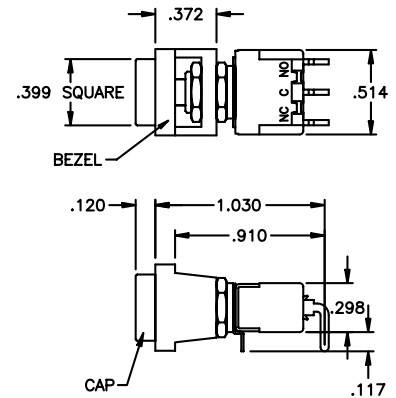
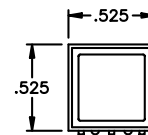
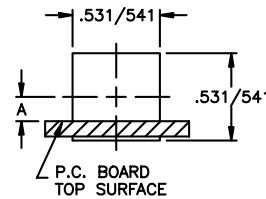
# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Horizontal right angle p.c. terminals - p.c. mounting bezel

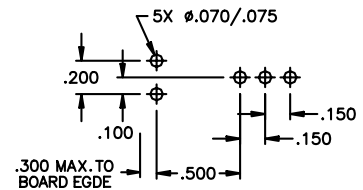
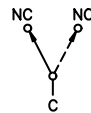
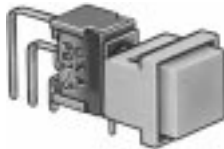


|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1A-1QJ8488      | PB1-3P2Y1A-1BJ8488    |

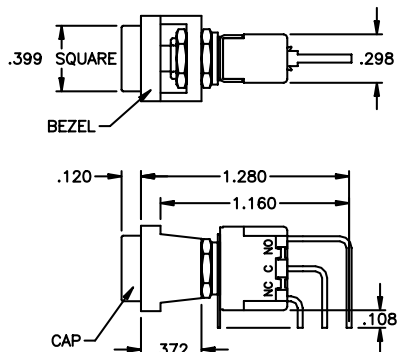
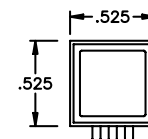
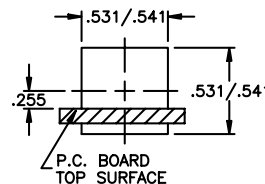
| Option | Dim. A | Dim. B    |
|--------|--------|-----------|
| A      | .148   | .045 max. |
| A-1    | .164   | .095 max. |



## Vertical right angle p.c. terminals - p.c. mounting bezel



|                         |                       |
|-------------------------|-----------------------|
| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
| PB1-3P2Y1V-1QJ8488      | PB1-3P2Y1V-1BJ8488    |



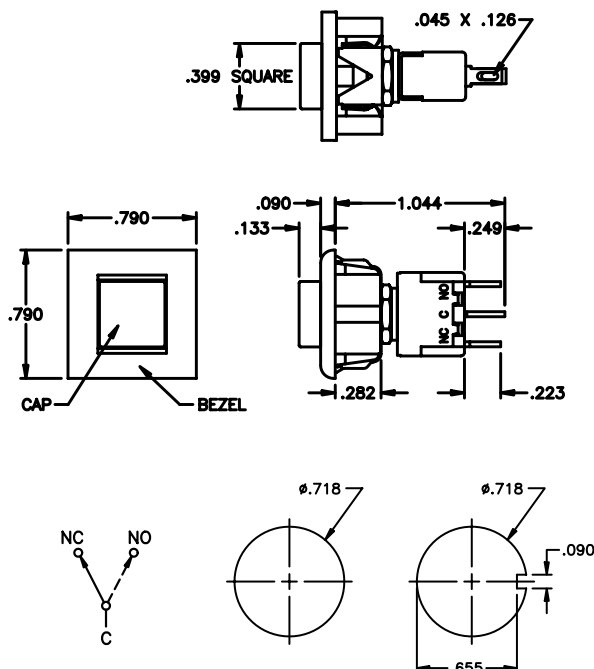
# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## Solder lug terminals - snap-in bezel for round hole mounting

Self-keying against rotation



| POWER CKT.<br>MODEL NO. | DRY CKT.<br>MODEL NO. |
|-------------------------|-----------------------|
| PB1-3P2Y1ZQJ9688        | PB1-3P2Y1ZB9688       |



**Additional ordering information:** Commonly ordered models are shown above and on prior pages with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.

Allowable options are shown below each respective box with brief description - see option dwgs. & info. following.

Note: 'NONE' indicates box may be left empty.

### Model Structure:

| Series    | Actuators                         | Bushings                                                                                             | Terminations                                                                                                                                                                                                                                                                                                                                          | Contact materials                                                                                 |
|-----------|-----------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| P B 1 - 3 | P Long<br>P 2 Short<br>(standard) | Y 1/4" thd'd.<br>Y 1 Short 1/4" thd'd.<br>(standard)<br>D 1/4" thd'd. w/'D' flat<br>Y 2 Non-threaded | Z Solder lug<br>C Printed circuit<br>W Wirewrap<br>W 1 Lg. wirewrap<br>W 3 Sht. wirewrap<br>X Extra lg. wirewrap<br>Horiz. right angle p.c.<br>terminals:<br>A<br>A - 1<br>Vertical right angle<br>p.c. terminals:<br>V<br>V - 1<br>V - 2<br>Straight p.c. terminals w/brkt.:<br>V 3 0 or V 4 1<br>V 4 0 or V 4 1<br>V 7 0<br>V 8 0<br>V 7 1<br>V 8 1 | B Gold<br>Q Coin silver<br>G Gold over<br>coin silver<br>N Economy<br>gold<br>T Economy<br>silver |

Note:  
When bezel is specified,  
specify P2 actuator and  
Y1 bushing.

### Options:

| Bezel & cap                                                                                                | Bezel color                           | cap color                             | Approvals                  |
|------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|----------------------------|
| (NONE)<br>J 6 1 Snap-in w/LED<br>J 8 1 Snap-in no LED<br>J 8 4 P.C. style<br>J 9 6 Snap-in (round<br>hole) | (NONE)<br>2 Black<br>6 Red<br>8 White | (NONE)<br>2 Black<br>6 Red<br>8 White | (NONE)<br>/ U L<br>/ C S A |

Although most combinations of options are available, some may result in incompatibilities. Consult factory if there is any question.

Example of completely specified  
model number:  
**PB1-3P2Y1ZQJ9622/UL/CSA**

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## MISCELLANEOUS

### HARDWARE SUPPLIED

(See Hardware section of catalog)

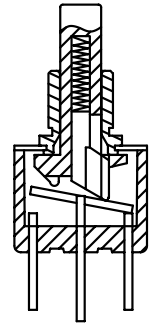
Switches with Y option bushings are supplied with (2) A112 Hex Nuts, (1) A115 Lockwasher and (1) A107 Anti-rotate Ring.

Switches with D option bushings are supplied with (2) A112 Hex Nuts and (1) A115 Lockwasher.

Switches with Y1 option bushings are supplied with (1) A112 Hex Nut and (1) A115 Lockwasher.

Note: Switches with non-threaded bushings or bezels supplied without hardware.

TYPICAL  
SWITCH  
CROSS  
SECTION

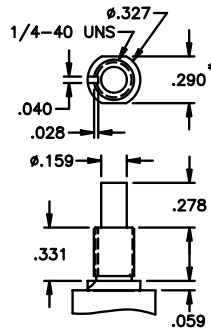


## ACTUATOR/BUSHING OPTIONS

Drawings reflect allowable actuator/bushing combinations.

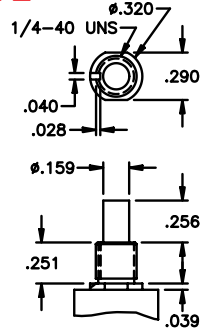
Note for drawings P2Y1 & P2Y2:  
Asterisk indicates .290 flats are supplied with options A, V, V30, V40, V70, V71, V80 & V81.  
For other options, .320 Dia. with no flats may be supplied

PY



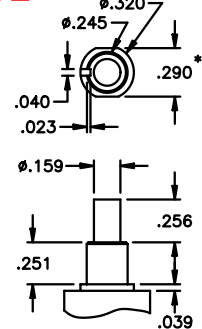
THREADED

P2Y1



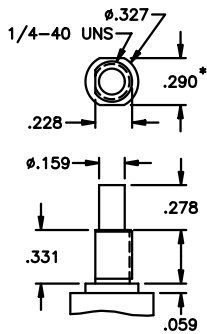
THREADED

P2Y2



NON-THREADED

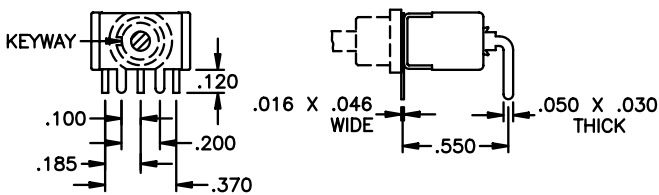
PD



THREADED

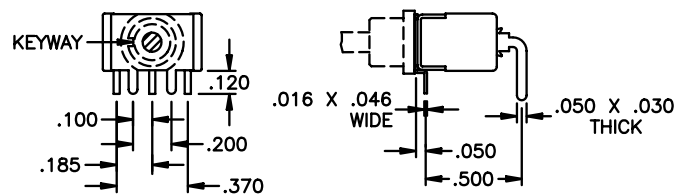
## TERMINATION OPTIONS

A



HORIZONTAL P.C. MOUNTING

A-1



HORIZONTAL P.C. MOUNTING

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

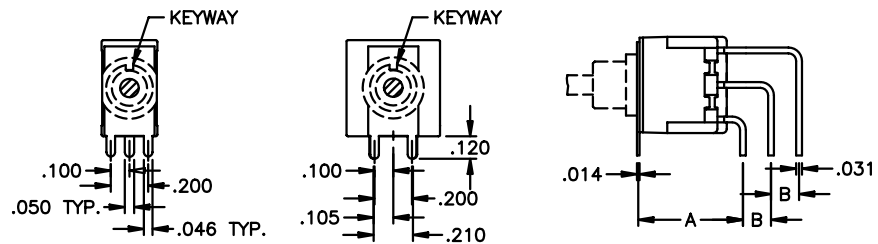
C

# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## TERMINATION OPTIONS (CONT'D.)

### V, V-1 & V-2

| Option | Dim. A | Dim. B |
|--------|--------|--------|
| V      | .550   | .150   |
| V-1    | .500   | .150   |
| V-2    | .500   | .100   |

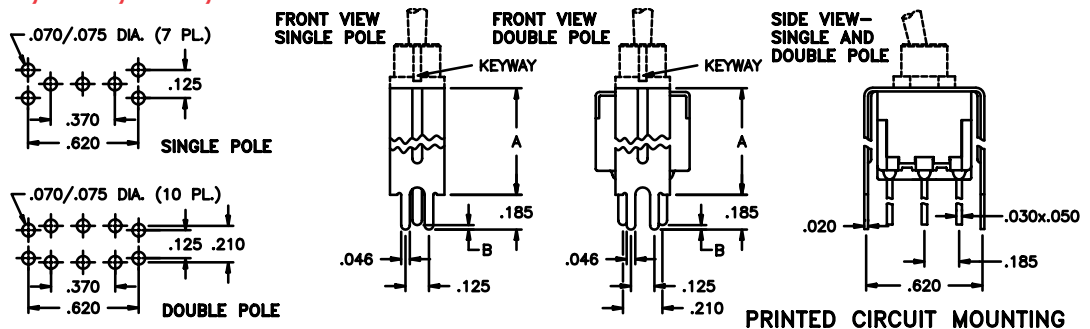


VERTICAL P.C. MOUNTING

### V30, V40, V70, V80, V31, V41, V71 & V81

PANEL LAYOUT  
V30, V31, V40 & V41

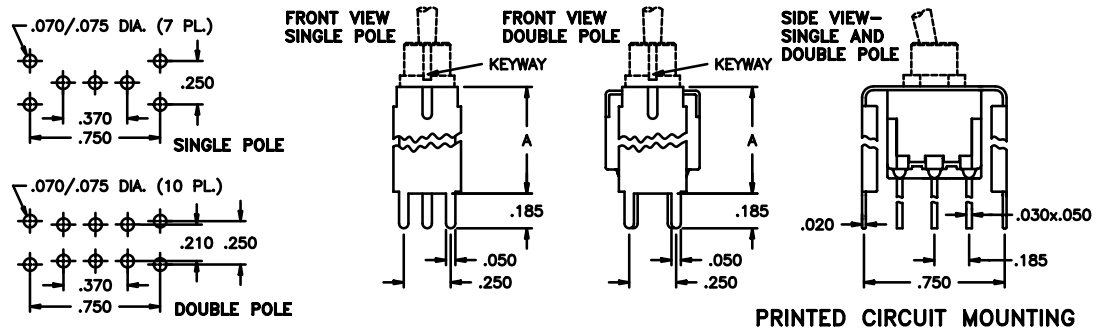
| Option  | Dim. A | Dim. B |
|---------|--------|--------|
| V30-V31 | .527   | .024   |
| V40-V41 | .647   | .048   |



PRINTED CIRCUIT MOUNTING

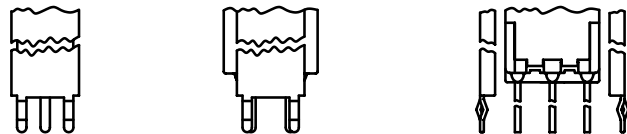
PANEL LAYOUT  
V70, V71,  
V80 & V81

| Option  | Dim. A |
|---------|--------|
| V70-V71 | .630   |
| V80-V81 | .953   |

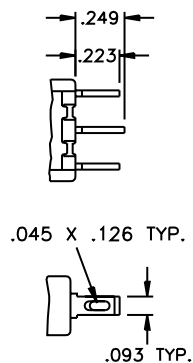


PRINTED CIRCUIT MOUNTING

V31, V41, V71 & V81 ARE THE SAME AS V30, V40, V70 & V80 RESPECTIVELY, EXCEPT WITH CRIMPED LEG DESIGN FOR P.C. BOARD RETENTION, AS SHOWN TO RIGHT.

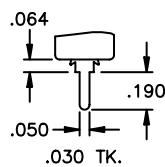


### Z



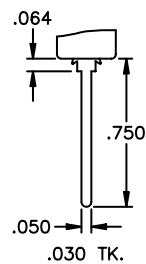
SOLDER LUG

### C



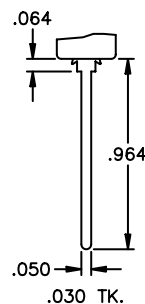
PRINTED CIRCUIT

### W



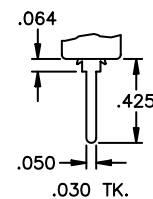
WIREWRAP

### W1



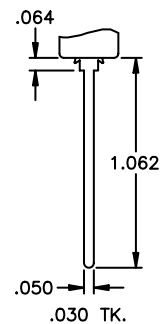
LONG WIREWRAP

### W3



SHORT WIREWRAP

### X



EXTRA LG. WIREWRAP

# PB SERIES - MINIATURE MOMENTARY PUSHBUTTON SWITCHES

## CONTACT MATERIAL OPTIONS

|          |                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B</b> | Dry circuit - gold over nickel over brass.<br>RATING: 0.4 Volt-Amps (VA) max. at 20 V max.<br>ELECTRIC LIFE: 60,000 cycles minimum. MECHANICAL LIFE: 500,000 cycles minimum.                                                                                                                                                                                                                                  |
| <b>Q</b> | Power circuit - coin silver.<br>RATING: 6 Amps at 125 VAC, 3 Amps at 250 VAC or 7 Amps at 30 VDC (resistive loads).<br>ELECTRIC LIFE: 60,000 cycles minimum at full load.                                                                                                                                                                                                                                     |
| <b>G</b> | Dry circuit or power circuit - gold over nickel over coin silver.<br>RATINGS & ELECTRIC LIFE: Same as B & Q above - i.e. - can be used in either dry circuit or power circuit, however once used in power circuit, switch cannot be re-used in dry circuit. This option satisfies those customers who have both dry circuit and power circuit requirements, but prefer to inventory only one switch for both. |
| <b>N</b> | Dry circuit - gold over nickel over brass. Note- less gold than B option.<br>RATING: 0.4 Volt-Amps (VA) max. at 20 V max.<br>ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.                                                                                                                                                                                                                       |
| <b>T</b> | Power circuit - Silver plate over brass.<br>RATING: 1 Amp at 125 VAC or 0.5 Amps at 250 VAC (resistive loads).<br>ELECTRIC LIFE: 10,000 cycles min. at 13 cycles per minute.                                                                                                                                                                                                                                  |

Solder dipped terminals and custom contact plating available - contact factory.

## UL & CSA OPTIONS

|            |                                                                                                                                                                                                                                                                                                        |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>UL</b>  | For power circuits - coin silver<br>RATING: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor).<br>Underwriter Laboratories file no. E66367. Note - applicable only to terminations with coin silver contacts (Q or G options).                                                                 |
| <b>CSA</b> | For power circuits - coin silver<br>RATING: 6 Amps at 125 VAC or 3 Amps at 250 VAC (75% power factor).<br>Canadian Standards Association file no. LR54592-1. Note - applicable only to terminations with coin silver contacts (Q or G options) as CSA recognizes switches for power applications only. |

## EPOXY SEALING OPTION

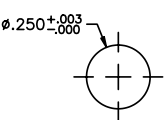
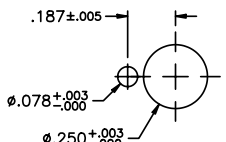
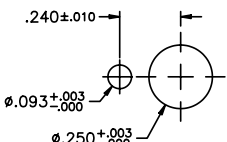
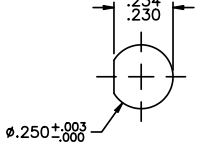
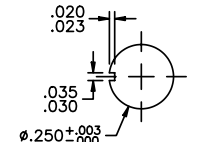
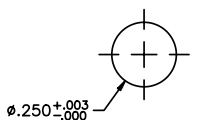
|          |                                                                                                         |
|----------|---------------------------------------------------------------------------------------------------------|
| <b>E</b> | Space between terminals and case hole is completely epoxy sealed to prevent flux and contaminant entry. |
|----------|---------------------------------------------------------------------------------------------------------|

## REVERSE ACTION OPTION

|           |                                                                                             |
|-----------|---------------------------------------------------------------------------------------------|
| <b>/R</b> | To reverse the <b>NO</b> and <b>NC</b> terminals, add <b>/R</b> to the switch model number. |
|-----------|---------------------------------------------------------------------------------------------|

## PANEL CUT-OUTS

Cut-outs that accept all 1/4-40 threaded bushings:

|                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |
| Without keying                                                                      | With A107 anti-rotate ring                                                          | With A158 anti-rotate ring                                                          | With D bushing                                                                       | With slotted keyway bushings                                                          | Accepts all 1/4" non-threaded bushings                                                |

## MISCELLANEOUS

**QUICK-CONNECT RECEPTACLES** that are compatible with solder lug or p.c. terminals are commercially available. Consult factory.

**FRONT PANEL SEAL:** Silicone rubber boots for front panel sealing of the switch against high pressure water or other contaminants are available. See Waterproof Switch Sealing Boots section in catalog.

**SWITCH CAPS** for switches without bezels also available - see Hardware section of catalog

## 13000 SERIES - PROFESSIONAL PUSHBUTTON SWITCHES



### FEATURES

- Quick break momentary action.
- SPDT & DPDT models with 1/4" threaded bushing (also see optional 15/32" bushing).
- Models for panel and p.c. mounting.
- Bright chrome or matte black finish on bushing, actuator & hardware.

### SPECIFICATIONS

|                                           |                                                                                                                                                                                          |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | Silver & gold plated silver; 2 Amps at 250 VAC, 4 Amps at 125 VAC or 4 Amps at 30 VDC. (300 mA 30 VDC max. to prevent damage to gold plating.)<br>Gold plated brass; 100 mA at 30 V max. |
| <b>Initial contact resistance:</b>        | 10 milliohms maximum                                                                                                                                                                     |
| <b>Insulation resistance:</b>             | 1000 megohms min. at 500 VDC                                                                                                                                                             |
| <b>Dielectric strength:</b>               | 1000 V rms min. - between terminals<br>2000 V rms min. - between poles and terminals and frame                                                                                           |
| <b>Electrical life:</b>                   | Silver: 50,000 cycles min. Gold plated silver: 20,000 cycles min.<br>Gold plated brass: 50,000 cycles min.                                                                               |
| <b>Low level or mechanical life:</b>      | 150,000 cycles min.                                                                                                                                                                      |
| <b>Total Travel:</b>                      | .078" (2mm)                                                                                                                                                                              |
| <b>Operating temperature range:</b>       | -40°C to +85°C                                                                                                                                                                           |

### MATERIALS

|                       |                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts :</b>     | Silver, gold plated silver or gold plated brass                                                                                                 |
| <b>Actuator:</b>      | Chrome plated brass                                                                                                                             |
| <b>Bushing:</b>       | Nickel plated brass                                                                                                                             |
| <b>Housing:</b>       | Nickel plated brass                                                                                                                             |
| <b>Case:</b>          | Diallyl phthalate (DAP)                                                                                                                         |
| <b>Terminal seal:</b> | Epoxy                                                                                                                                           |
| <b>Hardware:</b>      | 1/4" threaded bushing models supplied with 2 Hex Nuts .314" (8mm) across flats, 1 Locking Ring & 1 Lockwasher. See hardware section of catalog. |

### AGENCY RECOGNITION

CECC, LN2, GAM T1, QPL (Europe), MUAHAG

Availability: Consult factory for details of recognized models.

Marking: To order switches marked CECC, complete the appropriate box of the ordering format. Other listings do not appear on the switches.

### ABOUT THIS SERIES

The material in this series is organized in the following sequence:

- a. Completely specified switch models
- b. 'build your own switch' order format
- c. Option drawings

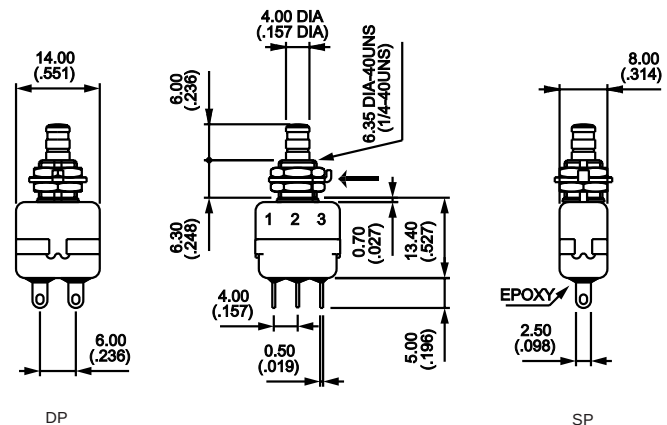
# 13000 SERIES - PROFESSIONAL PUSHBUTTON SWITCHES

## Solder lug terminals - silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 13435A                   | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 13445A                   | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

→ Keyway

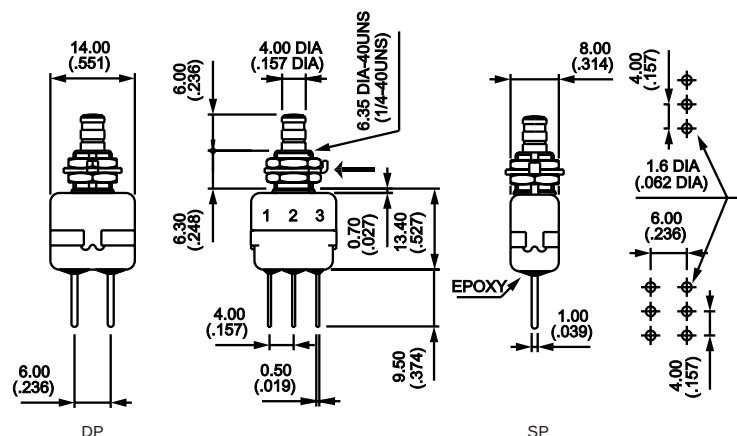


## Straight p.c. terminals - silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |            |
|--------------------------|------------|------------|
| 13235A                   | ON         | MOM        |
| DOUBLE POLE<br>MODEL NO. | CIRCUIT    |            |
| 13245A                   | ON         | MOM        |
| Handle position:         |            |            |
| Terms. connected:        | 1-3<br>4-6 | 1-2<br>4-5 |

→ Keyway

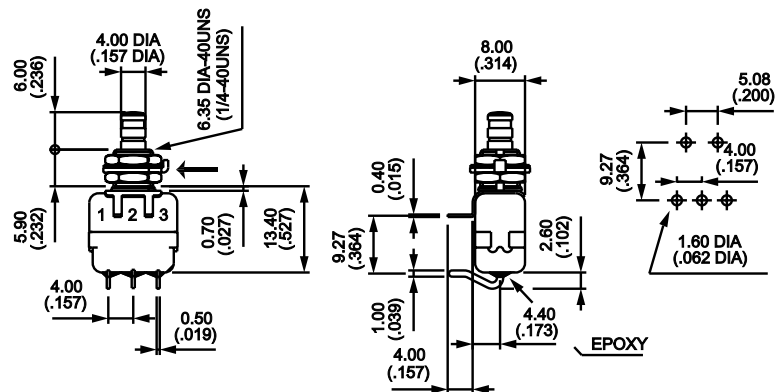


## Horizontal right angle p.c. terminals - silver contacts



| SINGLE POLE<br>MODEL NO. | CIRCUIT    |     |
|--------------------------|------------|-----|
| 13435WA                  | ON         | MOM |
| Handle position:         |            |     |
| Terms. connected:        | 1-3<br>1-2 |     |

→ Keyway



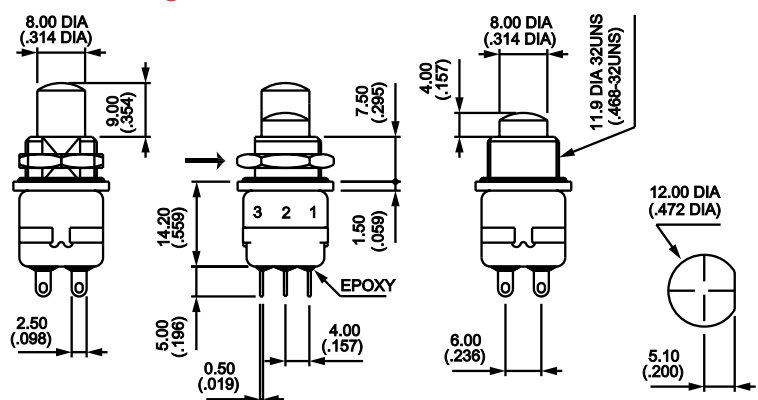
## X768 - Sealed double pole with 15/32" (11.9mm) flatted bushing



|                                  |            |            |
|----------------------------------|------------|------------|
| With short actuator<br>MODEL NO. | CIRCUIT    |            |
| 13445A4X768                      | ON         | MOM        |
| With long actuator<br>MODEL NO.  | CIRCUIT    |            |
| 13445A9X768                      | ON         | MOM        |
| Handle position:                 |            |            |
| Terms. connected:                | 1-3<br>4-6 | 1-2<br>4-5 |

Contact and finish options available.

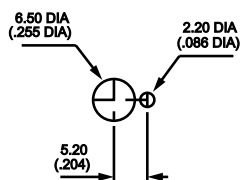
→ Flat



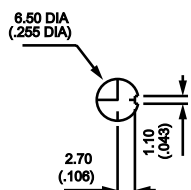
# 13000 SERIES - PROFESSIONAL PUSHBUTTON SWITCHES

## PANEL CUT-OUTS

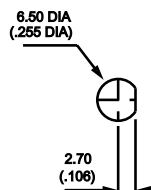
## TERMINALS



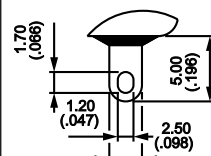
Standard



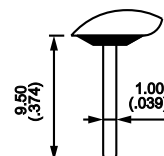
with K sealing option



with X640 sealing option  
(see Special Options)



Solder Lug



Straight p.c.

**Additional ordering information:** Commonly ordered models are shown on prior pages with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.  
Allowable options are shown below each respective box.  
Note 'NONE' indicates box may be left empty.

### Model Structure:

| Series | Terminals & bushings                                                                                                                                      | Number of poles                | Electrical functions | Terminals                                                            | Contact materials                                                         |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1 3    |                                                                                                                                                           |                                |                      |                                                                      |                                                                           |
|        | 2 Straight p.c. terminals, 1/4" (6.35mm) bushing<br>4 Solder lugs, 1/4" (6.35mm) or 15/32" (11.9mm) bushing. Right angle terminals, 1/4" (6.35mm) bushing | 3 Single pole<br>4 Double pole | 5 ON - MOM           | (NONE) Solder lugs or straight p.c.<br>W Horizontal right angle p.c. | A Silver<br>A D 2 Gold plated silver (2 microns)<br>C D Gold plated brass |

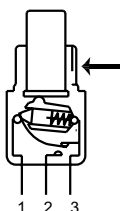
### Options:

| Actuators                                                                                                                                          | Finish                                                                               | Sealing                                                                             | Special options                                                                                                           | Approvals/listings                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                    |                                                                                      |                                                                                     |                                                                                                                           |                                                                                                                                |
| (NONE) Standard for 1/4" bushing<br>4 .157" (4mm) long for 15/32" (11.9mm) bushing (X768)<br>9 .354" (9mm) long for 15/32" (11.9mm) bushing (X758) | (NONE) Bright chrome finish<br>G Matte black finish on bushing, actuator & hardware. | (NONE) Epoxy sealed terminals std'd.<br>K Front panel sealing with o-ring & gasket. | (NONE)<br>F Tin plated terminals (p.c. only)<br>X 7 6 8 15/32" (11.9mm) bushing + front panel sealing (Double pole only). | (NONE)<br>C E C C<br>(consult factory for details of approved models).<br><br>Caps available separately - see option drawings. |

Example of completely specified model number:  
**13235AGKFCECC**

## SWITCH ACTION

Arrow indicates keyway

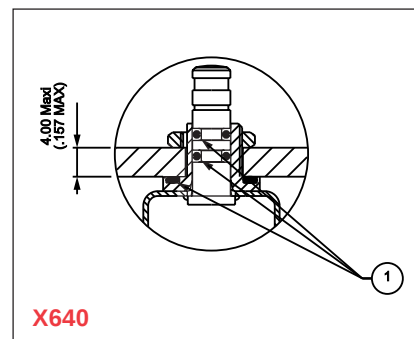
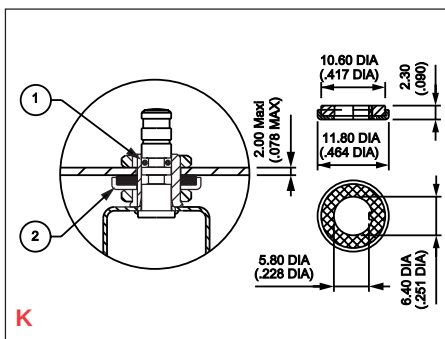


SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 13000 SERIES - PROFESSIONAL PUSHBUTTON SWITCHES

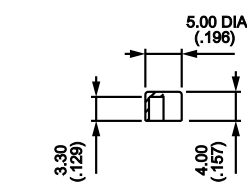
## SPECIAL & SEALING OPTIONS

- F** Tin plated terminals (for p.c. terminals only).
- K** Front panel sealing with 'o'-ring (1) & sealing gasket (2). Protects switch against water & dust. Panel seal withstands 1 bar pressure even when switch is operated.
- X640** Front panel sealing with 3 'o'-rings (1) & flatted bushing. Protects switch against water & dust. Panel seal withstands 1 bar pressure even when switch is operated. (Available with 1/4" (6.35mm) bushing only).

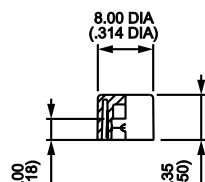


## CAPS

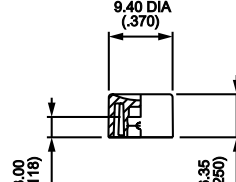
Note: replace last '0' in p/n with color code.



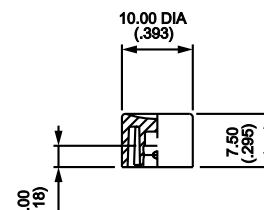
**U900**



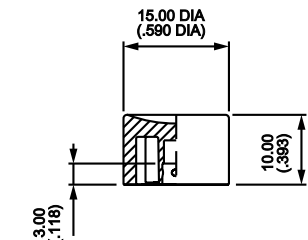
**U1140**



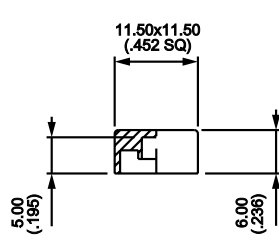
**U1720**



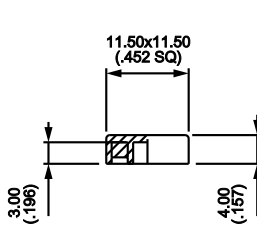
**U480 Standard**



**U630**



**U2020 Square**



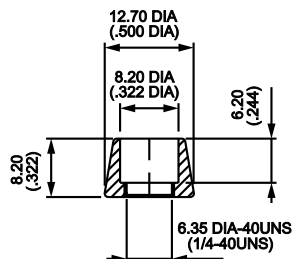
**U2430 Square**

### Colors

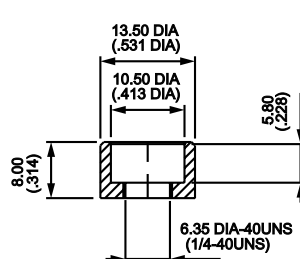
- |     |        |
|-----|--------|
| 1   | blue   |
| 2   | black  |
| 3   | green  |
| 4   | grey   |
| 5   | yellow |
| 6   | red    |
| 7   | ivory  |
| 7/1 | white  |
| 9   | orange |

## DRESS NUTS

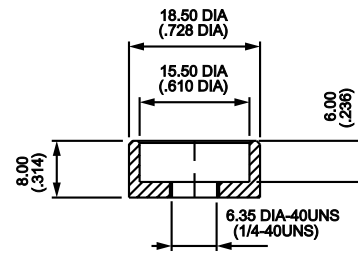
Chrome plated For models with 1/4" (6.35mm) threaded bushings only.



**U1636** For cap U1140



**U840** For cap U480



**U825** For cap U630

## 13000X778 SERIES - HIGH PERFORMANCE PUSHBUTTON SWITCHES



### FEATURES

- Designed for high reliability environments.
- Double shell case for high mechanical strength & high electrical insulation.
- Quick break momentary action DPDT models with 15/32" (11.9mm) threaded bushing.
- Panel sealed to IP67 and fully sealed switch body.
- Highly reliable for low level or power applications.
- Matte black finish on body, bushing, actuator and hardware.

### SPECIFICATIONS

|                                           |                                                                                                                                                                                                |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | Silver & gold plated silver; 2 Amps at 250 VAC, 4 Amps at 125 VAC or 4 Amps at 28 VDC. (300 mA 30 VDC max. to prevent damage to gold plating.)<br>Minimum load - 10 mA at 50 mV, 10µA at 5 VDC |
| <b>Initial contact resistance:</b>        | 10 milliohms maximum                                                                                                                                                                           |
| <b>Insulation resistance:</b>             | 1000 megohms min. at 500 VDC                                                                                                                                                                   |
| <b>Dielectric strength:</b>               | 1000 V rms min. - between terminals<br>2000 V rms min. - between poles and between terminals and frame                                                                                         |
| <b>Electrical life:</b>                   | At 2A 250VAC or 4A 28VDC - 10,000 cycles.<br>At low level (50mV at 10mA) - 20,000 cycles                                                                                                       |
| <b>Total Travel:</b>                      | .078" (2mm)                                                                                                                                                                                    |
| <b>Operating temperature range:</b>       | -40°C to +85°C                                                                                                                                                                                 |
| <b>Environmental:</b>                     | Shock: 50g - 11ms (IEC 68-2-27). Vibration: 10-500 Hz - 10g (IEC68-2-6)<br>Salt spray: 96 hrs. (IEC68-2-11). Humidity: 56 days, 93% R.H., 40°C (IEC68-2-3)                                     |

### MATERIALS

|                   |                                                                                   |
|-------------------|-----------------------------------------------------------------------------------|
| <b>Contacts :</b> | Silver inlay - gold plated over nickel barrier                                    |
| <b>Actuator:</b>  | Black chrome plated brass                                                         |
| <b>Bushing:</b>   | Black chrome plated brass                                                         |
| <b>Case:</b>      | Diallyl phthalate (DAP) with PBT external shell, epoxy sealed                     |
| <b>Hardware:</b>  | Supplied with 1 Hex Nut with black finish p/n U41. See drawing at end of section. |

### AGENCY RECOGNITION

CECC, GAM, QPL (Europe), MUAHAG & DAT (French defense military). Marking: Many models have full CECC recognition and are marked CECC. Consult factory for list of recognized models.

### ABOUT THIS SERIES

The material in this series is organized in the following sequence:

- a. Completely specified switch models
- b. 'build your own switch' order format
- c. Miscellaneous

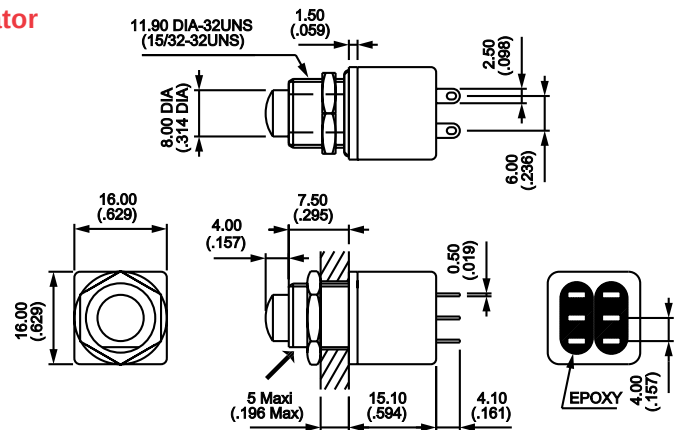
# 13000X778 SERIES - HIGH PERFORMANCE PUSHBUTTON SWITCHES

## Double pole - solder lug terminals - .157" (4mm) actuator



| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| 134454X778       | ON      | MOM |
| Handle position: |         |     |

→ Flat

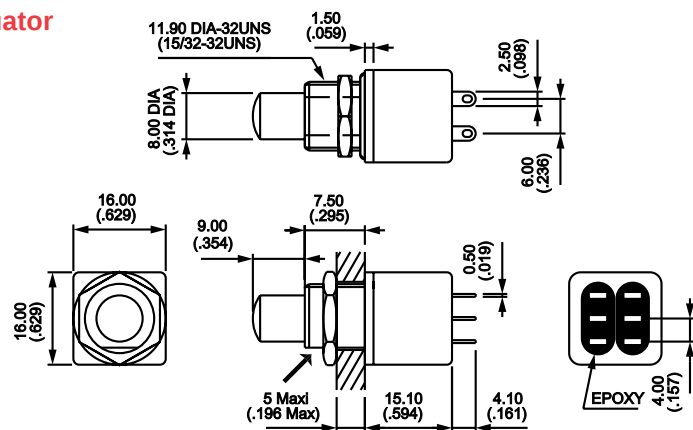


## Double pole - solder lug terminals - .354" (9mm) actuator



| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| 134459X778       | ON      | MOM |
| Handle position: |         |     |

→ Flat

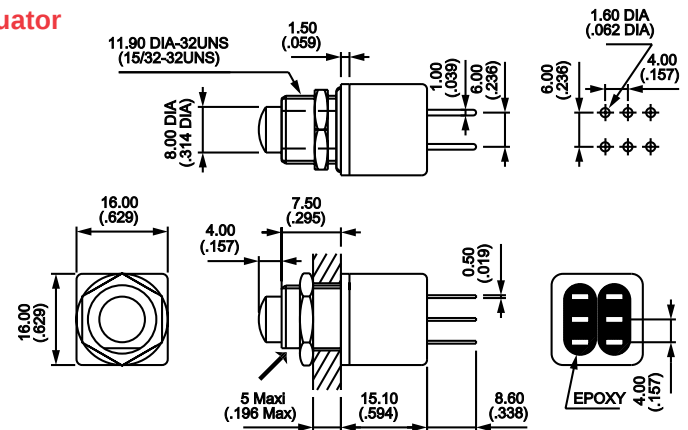


## Double pole - straight p.c. terminals - .157" (4mm) actuator



| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| 132454X778       | ON      | MOM |
| Handle position: |         |     |

→ Flat

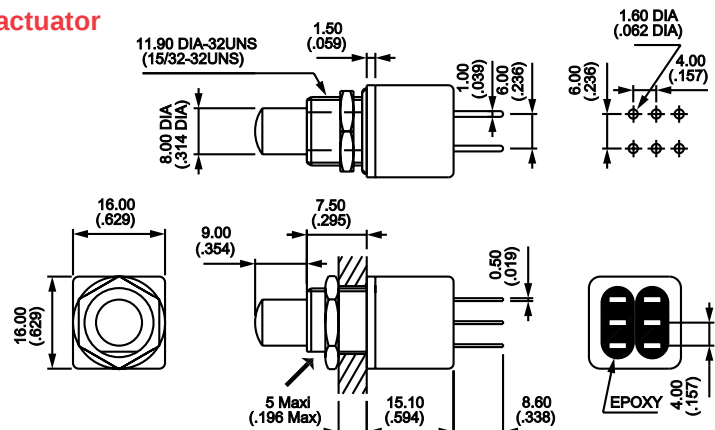


## Double pole - straight p.c. terminals - .354" (9mm) actuator



| MODEL NO.        | CIRCUIT |     |
|------------------|---------|-----|
| 132459X778       | ON      | MOM |
| Handle position: |         |     |

→ Flat



# 13000X778 SERIES - HIGH PERFORMANCE PUSHBUTTON SWITCHES

**Additional ordering information:** Commonly ordered models are shown on prior pages with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for **Model Structure**, then add **Options** selections for complete model number.

Allowable options are shown below each respective box.

Note 'NONE' indicates box may be left empty.

### Model Structure:

| Series | Terminals & bushing                                                                                                      | Number of poles | Electrical function | Actuator                                 | Special options                                  |
|--------|--------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------|------------------------------------------|--------------------------------------------------|
| 1 3    |                                                                                                                          |                 |                     |                                          | X 7 7 8                                          |
|        | 2 Straight p.c. terminals, 15/32" (11.9mm) threaded bushing<br>4 Solder lug terminals, 15/32" (11.9mm) threaded bushing. | 4 Double pole   | 5 ON - MOM          | 4 .157" (4mm) long<br>9 .354" (9mm) long | High performance fully sealed matte black switch |

### Options:

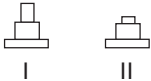
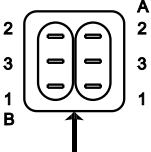
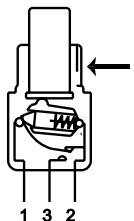
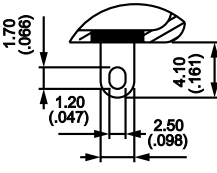
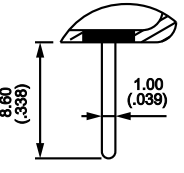
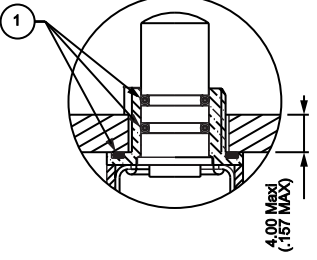
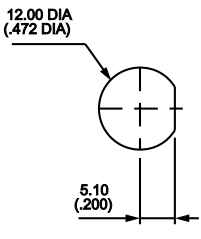
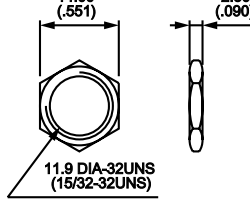
Approvals/listings

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

(NONE)

C E C C (consult factory for details of approved models).

Example of completely specified model number:  
**132454X778CECC**

| POSITIONS AND CONNECTIONS                                                                                                                                                                                                                                                              |                                                                                                                                                | SWITCH ACTION                                                                                                                     | TERMINALS                                                                                                                   |                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <p>Button position</p>  <p>Connections</p> <p>ON      MOM</p> <p>A 1-2    A 1-3</p> <p>B 1-2    B 1-3</p>                                                                                           | <p>Terminal identification</p> <p>Arrow indicates flat</p>  | <p>Arrow indicates flat</p>                    |  <p>Solder lug</p>                     |  <p>Straight p.c.</p> |
| SEALING                                                                                                                                                                                                                                                                                |                                                                                                                                                | PANEL CUT-OUT                                                                                                                     | HARDWARE                                                                                                                    |                                                                                                            |
| <p><b>Standard on all models:</b></p> <p>3 'o'-rings (1) seal front panel and withstand 1 bar pressure, even when switch is operated.</p> <p>Epoxy sealed terminals.</p> <p>Splash-proof case.</p>  |                                                                                                                                                |  <p>Panel thickness:<br/>.196" (5mm) max.</p> |  <p><b>U41</b> matte black Hex Nut</p> |                                                                                                            |

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 1200 SERIES - MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Single pole panel mounting models.
- NC & NO electrical functions with double break.
- Solder lug, screw, screw with clamp and right angle screw with clamp terminals.
- 4 optional actuator colors.

## SPECIFICATIONS

|                                           |                                                                         |                                   |
|-------------------------------------------|-------------------------------------------------------------------------|-----------------------------------|
| <b>Contact ratings (resistive loads):</b> | 4 Amps at 250 VAC, 8 Amps at 125 VAC or 4 Amps at 24 VDC                |                                   |
| <b>Initial contact resistance:</b>        | 10 milliohms max. at 1A 2VDC                                            |                                   |
| <b>Insulation resistance:</b>             | 1000 megohms minimum at 500 VDC                                         |                                   |
| <b>Dielectric strength:</b>               | 2000 V rms min. between terminals. 3000 V rms between terminals & frame |                                   |
| <b>Electrical life:</b>                   | 10,000 cycles at full load                                              |                                   |
| <b>Operating temperature range:</b>       | -20°C to +55°C                                                          |                                   |
| <b>Total travel:</b>                      | NO: .177" (4.5mm) ± .011" (0.3mm)                                       | NC: .137" (3.5mm) ± .011" (0.3mm) |

## MATERIALS

|                  |                                                                                             |
|------------------|---------------------------------------------------------------------------------------------|
| <b>Contacts:</b> | Silver                                                                                      |
| <b>Actuator:</b> | Polyamide                                                                                   |
| <b>Case:</b>     | Polyamide                                                                                   |
| <b>Bushing:</b>  | Nickel plated brass                                                                         |
| <b>Hardware:</b> | Supplied with 1 Hex Nut p/n U166 & 1 Knurled Nut p/n U411. See hardware section of catalog. |

## AGENCY RECOGNITION



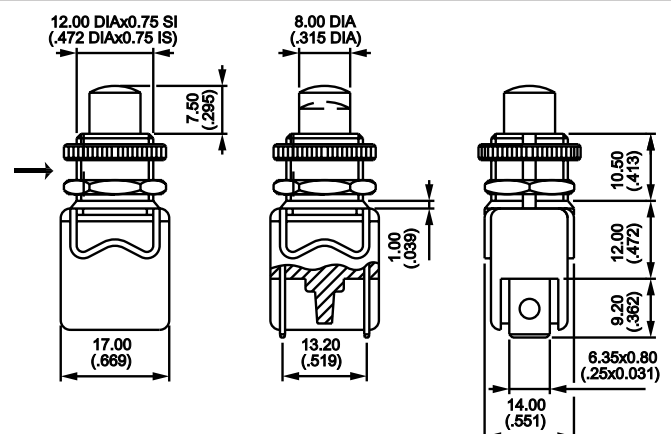
Model no's. with 'UU' are UL & CSA recognized.  
Models 1233X209 & 1233X209L are VDE recognized.  
Marking: Switches are supplied with recognitions marked.

## Solder lug/quick-connect terminals



|          |  |                 |
|----------|--|-----------------|
| 1212A2   |  | Normally Closed |
| 1213A2UU |  | Normally Open   |

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.



# 1200 SERIES - MOMENTARY PUSHBUTTON SWITCHES

## Screw terminals



1222A2



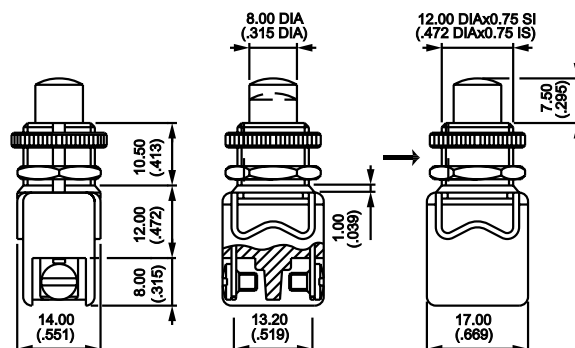
Normally Closed

1223A2UU



Normally Open

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.



## Straight screw terminals and clamp



1202A2



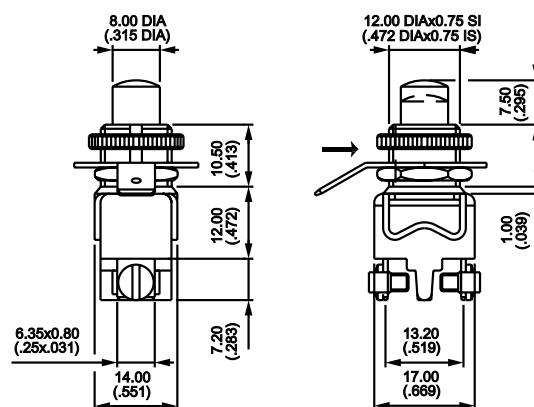
Normally Closed

1203A2UU



Normally Open

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.



## Right angle screw terminals and clamp

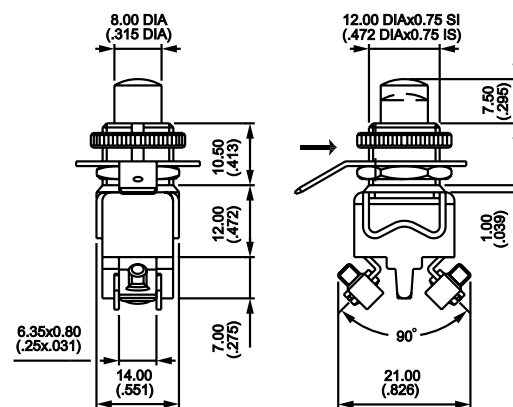


12037A2UU



Normally Open

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.



## X209 - UL, CSA, VDE, SEMCO & NF-USE approved - solder lug/quick connect terminals

( Note- U187 ground connector ring required if panel is not metallic or not connected to ground. Order separately).

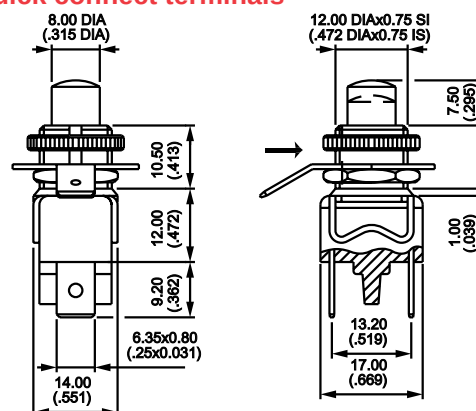


1233A2X209UU



Normally Open

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# 1200 SERIES - MOMENTARY PUSHBUTTON SWITCHES

## X209 - UL, CSA, VDE, SEMCO & NF-USE approved - solder lug/quick connect terminals

( Note- U187 ground connector ring required if panel is not metallic or not connected to ground. Order separately).

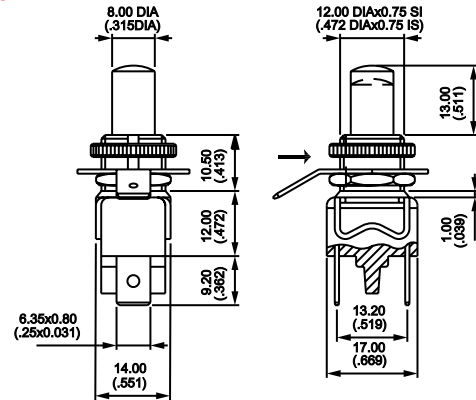


1233A2X209LUU



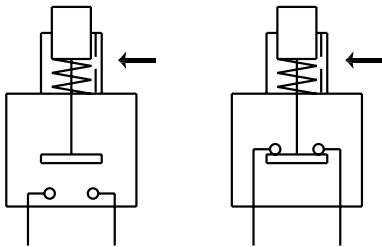
Normally Open

The '2' following the 'A' in model no. indicates black actuator. Substitute '6' for red or '7/1' for white, if desired.

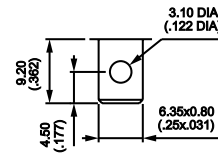


### SWITCH ACTION

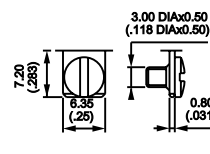
Arrow indicates keyway



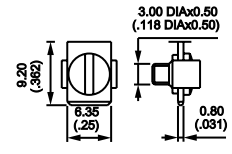
### TERMINALS



Solder lug/ quick-connect



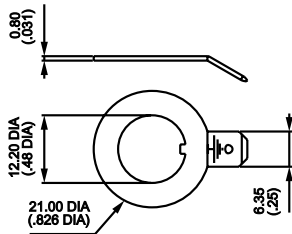
Screw



Screw and clamp

**PANEL CUT-OUT: .480" (12.2mm) dia.**

### GROUND CONNECTOR RING U187



# 1200M & 1200MR SERIES - MOMENTARY PUSHBUTTON SWITCHES



## FEATURES

- Single pole panel mounting models.
- NC & NO electrical functions with double break.
- Solder lug, screw and screw with clamp terminals.
- Chrome plated domed or flat metal actuators .

## SPECIFICATIONS

|                                    |                                                                          |
|------------------------------------|--------------------------------------------------------------------------|
| Contact ratings (resistive loads): | 4 Amps at 250 VAC, 8 Amps at 125 VAC or 4 Amps at 24 VDC                 |
| Initial contact resistance:        | 10 milliohms max. at 1A 2VDC                                             |
| Insulation resistance:             | 1000 megohms minimum at 500 VDC                                          |
| Dielectric strength:               | 2000 V rms min. between terminals. 3000 V rms between terminals & frame  |
| Electrical life:                   | 10,000 cycles at full load                                               |
| Operating temperature range:       | -20°C to +55°C                                                           |
| Total travel:                      | NO: .177" (4.5mm) ± .011" (0.3mm)      NC: .137" (3.5mm) ± .011" (0.3mm) |

## MATERIALS

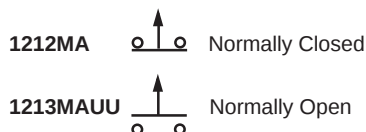
|           |                                                                                              |
|-----------|----------------------------------------------------------------------------------------------|
| Contacts: | Silver                                                                                       |
| Actuator: | Chrome plated brass on polyamide base                                                        |
| Case:     | Polyamide                                                                                    |
| Bushing:  | Nickel plated brass                                                                          |
| Hardware: | Supplied with 1 Hex Nut p/n U166 & 1 Panel Dress Nut U1868. See hardware section of catalog. |

## AGENCY RECOGNITION



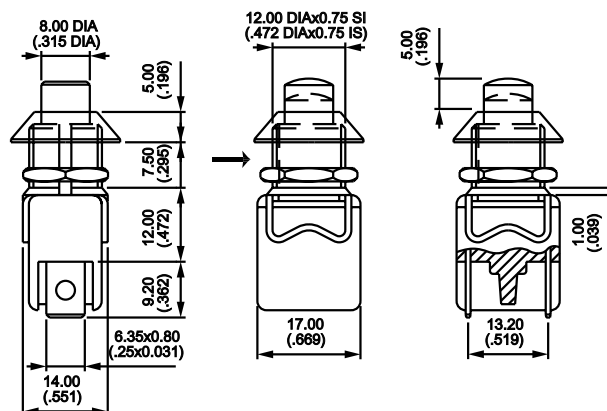
Model no's. with 'UU' are UL & CSA recognized.  
Marking: Switches are supplied with recognized marks.

## Solder lug/quick-connect terminals



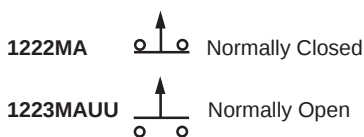
The 'M' in model no. indicates flat actuator.  
Substitute 'MR' for domed actuator, if desired.

→ Keyway

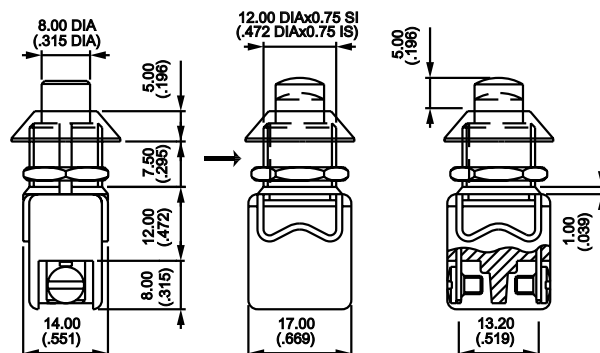


# 1200M & 1200MR SERIES - MOMENTARY PUSHBUTTON SWITCHES

## Screw terminals

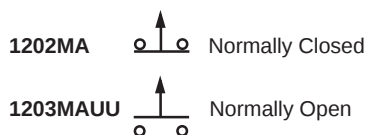


The 'M' in model no. indicates flat actuator.  
Substitute 'MR' for domed actuator, if desired.

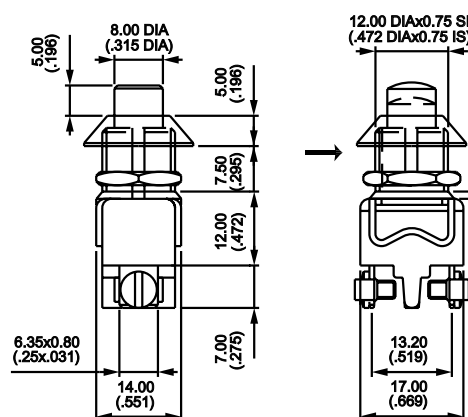


→ Keyway

## Straight screw terminals and clamp



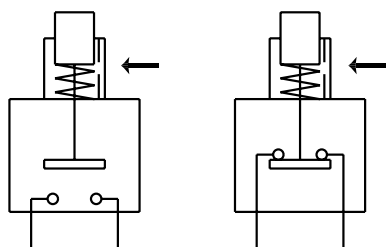
The 'M' in model no. indicates flat actuator.  
Substitute 'MR' for domed actuator, if desired.



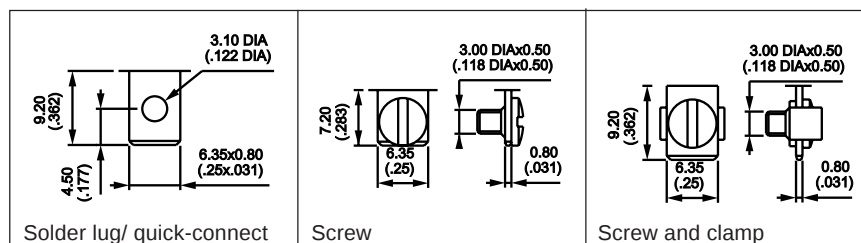
→ Keyway

## SWITCH ACTION

Arrow indicates keyway

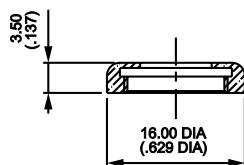


## TERMINALS



**PANEL CUT-OUT: .480" (12.2mm) dia.**

## SPECIAL CAP NUT



**U1874** Chrome plated cap nut, flat & plain  
May be ordered in place of panel dress nut.  
Order separately.

## 4700 & 4800 SERIES - ALTERNATE ACTION PUSHBUTTON SWITCHES



### FEATURES

- Single and double pole panel mounting models.
- ON-OFF and ON-ON electrical functions.
- Solder lug, straight p.c. and quick-connect terminals.
- 7 optional actuator colors with matching knurled mounting nut.

### SPECIFICATIONS

|                                           |                                                                         |
|-------------------------------------------|-------------------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | 3 Amps at 250 VAC or 6 Amps at 125 VAC                                  |
| <b>Initial contact resistance:</b>        | 10 milliohms max. at 1A 2VDC                                            |
| <b>Insulation resistance:</b>             | 1000 megohms minimum at 500 VDC                                         |
| <b>Dielectric strength:</b>               | 2000 V rms min. between terminals. 3000 V rms between terminals & frame |
| <b>Electrical life:</b>                   | 10,000 cycles at full load                                              |
| <b>Operating temperature range:</b>       | -20°C to +65°C                                                          |
| <b>Total travel:</b>                      | .177" (4.5mm) ± .019" (0.5mm)                                           |

### MATERIALS

|                  |                                                                                                                                                          |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts:</b> | Silver                                                                                                                                                   |
| <b>Actuator:</b> | Polyamide                                                                                                                                                |
| <b>Case:</b>     | Melamine-phenolic                                                                                                                                        |
| <b>Bushing:</b>  | Nickel plated brass                                                                                                                                      |
| <b>Hardware:</b> | Supplied with 1 Hex Nut p/n U166 and 1 insulating Knurled Nut p/n U520.<br>Knurled Nut supplied same color as actuator. See hardware section of catalog. |

### AGENCY RECOGNITION



Models 4731AUU, 4736AUU, 4741AUU & 4746AUU are UL, CSA and VDE recognized.  
Models 4831A, 4836A, 4841A & 4846A are VDE recognized.  
Marking: Switches are supplied with recognitions marked.

### ORDER FORMAT

Fill in boxes below, for complete model number. Note: 'NONE' indicates box may be left empty.

**Model Number**                      **Actuator & knurled nut color**

Select model  
number from  
those shown  
on next page.

|   |       |        |
|---|-------|--------|
| 0 | 1     | blue   |
| 0 | 2     | black  |
| 0 | 3     | green  |
| 0 | 5     | yellow |
| 0 | 6     | red    |
| 0 | 7 / 1 | white  |
| 0 | 9     | orange |

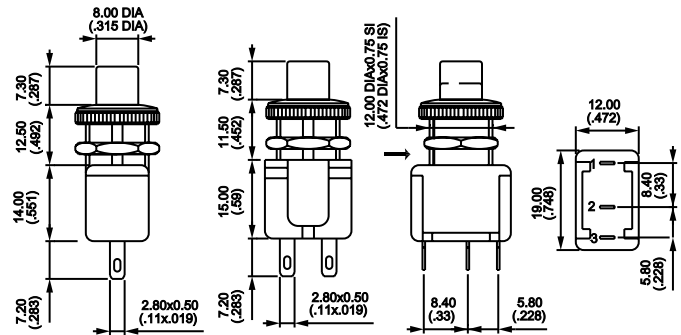
# 4700 & 4800 SERIES - ALTERNATE ACTION PUSHBUTTON SWITCHES

## Solder lug/quick-connect terminals



| SINGLE POLE MODEL NO. | DOUBLE POLE MODEL NO. | CIRCUIT  |
|-----------------------|-----------------------|----------|
| 4731AUU               | 4741AUU               | ON - OFF |
| 4736AUU               | 4746AUU               | ON - ON  |

Note: add color to model number - see Order Format, prior page.



→ Keyway

SP

DP

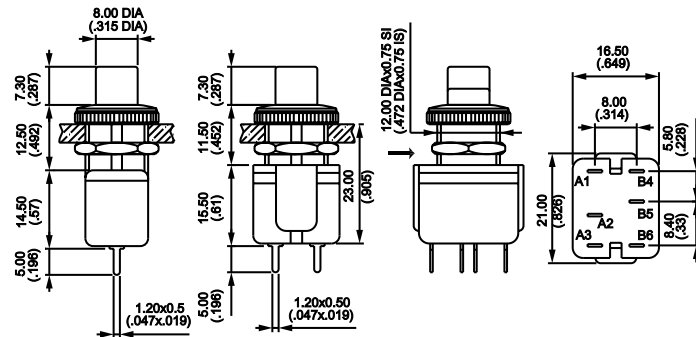
SP

## Straight p.c. terminals



| SINGLE POLE MODEL NO. | DOUBLE POLE MODEL NO. | CIRCUIT  |
|-----------------------|-----------------------|----------|
| 4831A                 | 4841A                 | ON - OFF |
| 4836A                 | 4846A                 | ON - ON  |

Note: add color to model number - see Order Format, prior page.



→ Keyway

SP

DP

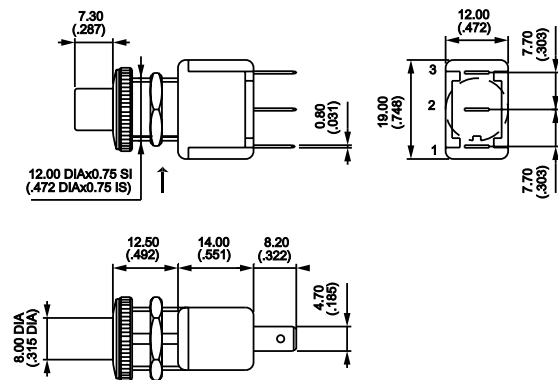
DP

## Quick-connect terminals - .185" x .031" (4.7mm x 0.8mm)



| SINGLE POLE MODEL NO. | CIRCUIT  |
|-----------------------|----------|
| 47318A                | ON - OFF |
| 47368A                | ON - ON  |

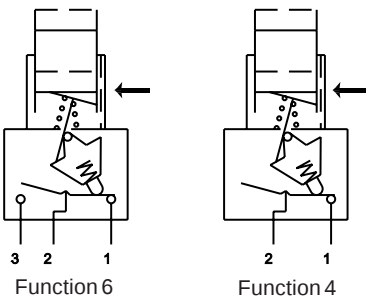
Note: add color to model number - see Order Format, prior page.



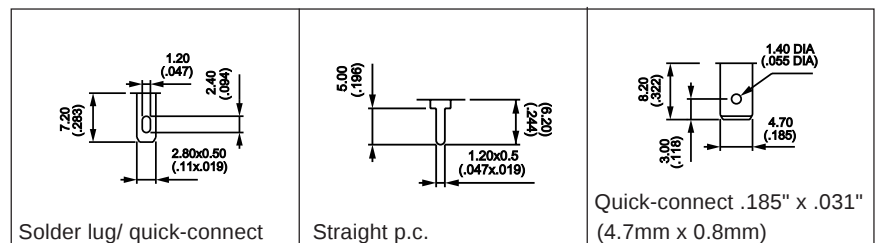
→ Keyway

## SWITCH ACTION

Arrow indicates keyway



## TERMINALS



PANEL CUT-OUT: .480" (12.2mm) dia.

# New! MD SERIES PUSHBUTTON SWITCHES

## FEATURES

- Momentary or maintained actions.
- 1, 2 & 4 pole 2 throw models.
- Printed circuit & panel mounting models.
- Self-cleaning bifurcated contacts.

## SPECIFICATIONS

|                                           |                                                             |
|-------------------------------------------|-------------------------------------------------------------|
| <b>Contact ratings (resistive loads):</b> | 200 mA at 30 VDC                                            |
| <b>Initial contact resistance:</b>        | 20 milliohms maximum                                        |
| <b>Insulation resistance:</b>             | 100 megohms minimum at 500 VDC                              |
| <b>Dielectric strength:</b>               | Type 5: 500 VAC for 1 minute. Type 8: 250 VAC for 1 minute. |
| <b>Electrical life:</b>                   | 10,000 cycles minimum                                       |
| <b>Operating temperature range:</b>       | -20°C to +85°C                                              |
| <b>Operating force:</b>                   | Type 5: 300g ± 150g Type 8: 330g ± 150g                     |

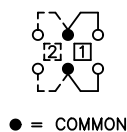
## MATERIALS

|                         |                               |
|-------------------------|-------------------------------|
| <b>Terminals:</b>       | Silver plated brass           |
| <b>Actuator:</b>        | Polyacetal                    |
| <b>Frame:</b>           | Steel with tin plating        |
| <b>Base:</b>            | Phenolic laminated sheet      |
| <b>Sliding contact:</b> | Silver plated phosphor bronze |

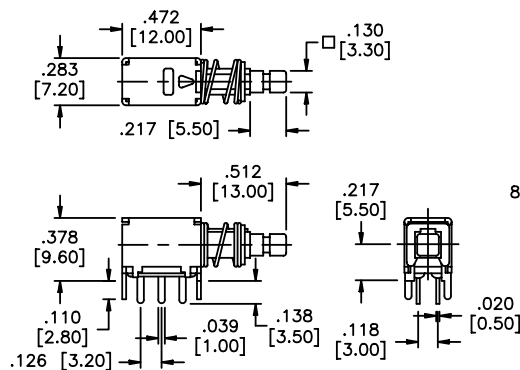
**MDPS522PN (MOMENTARY)**  
**MDPA522PN (MAINTAINED)**



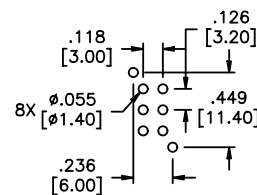
2P2T P.C. MOUNTING



SCHEMATIC



MECHANICAL OUTLINE



P.C. BOARD LAYOUT

# New! MD SERIES PUSHBUTTON SWITCHES

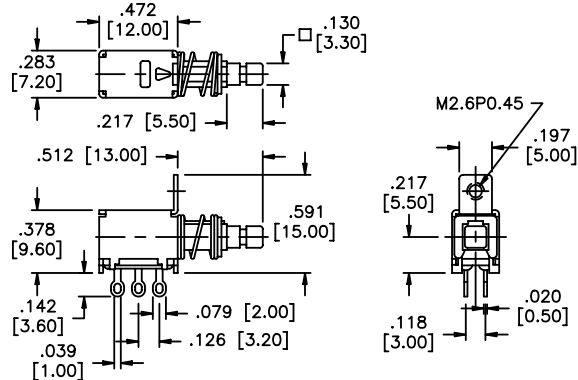
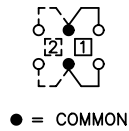
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

C

**MDPS522WN** (MOMENTARY)  
**MDPA522WN** (MAINTAINED)



2P2T PANEL MOUNTING



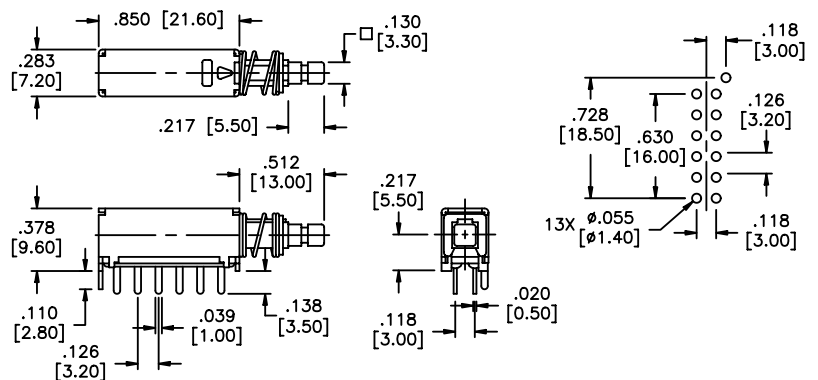
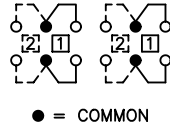
SCHEMATIC

MECHANICAL OUTLINE

**MDPS542PN** (MOMENTARY)  
**MDPA542PN** (MAINTAINED)



4P2T P.C. MOUNTING

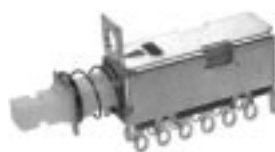


SCHEMATIC

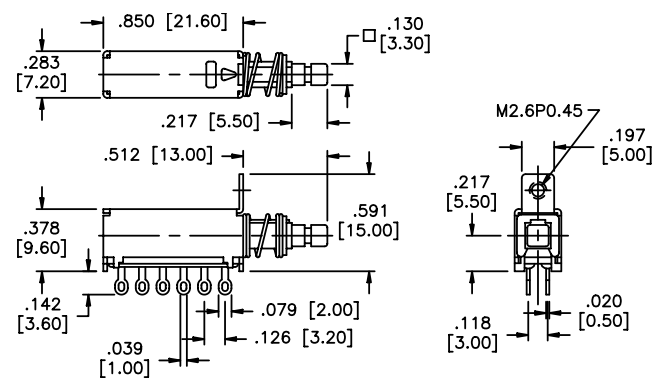
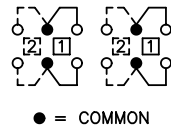
MECHANICAL OUTLINE

P.C. BOARD LAYOUT

**MDPS542WN** (MOMENTARY)  
**MDPA542WN** (MAINTAINED)



4P2T PANEL MOUNTING



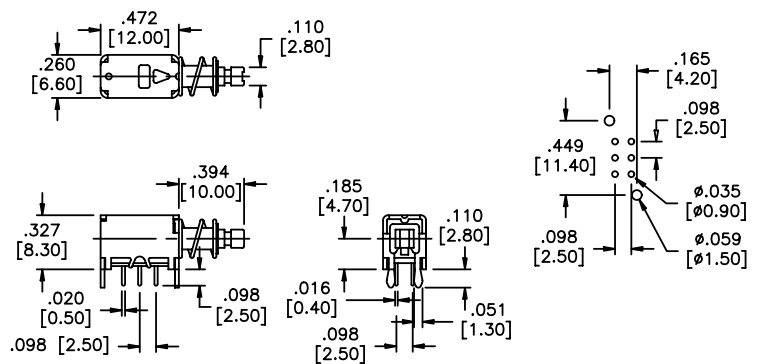
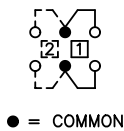
SCHEMATIC

MECHANICAL OUTLINE

**MDPS822PN** (MOMENTARY)  
**MDPA822PN** (MAINTAINED)



2P2T P.C. MOUNTING



SCHEMATIC

MECHANICAL OUTLINE

P.C. BOARD LAYOUT

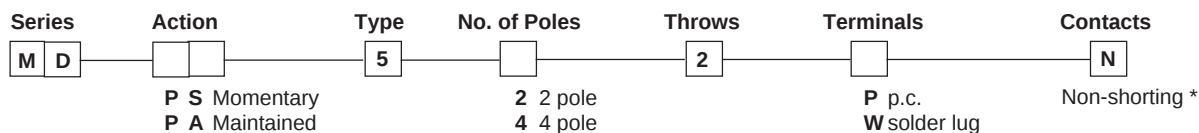
# New! MD SERIES PUSHBUTTON SWITCHES

**Additional ordering information:** Commonly ordered models are shown above with complete model numbers and specifications. Below is an order format that enables you to 'build your own switch' and specify the correct switch model number by simply selecting from all available options shown and filling in the boxes.

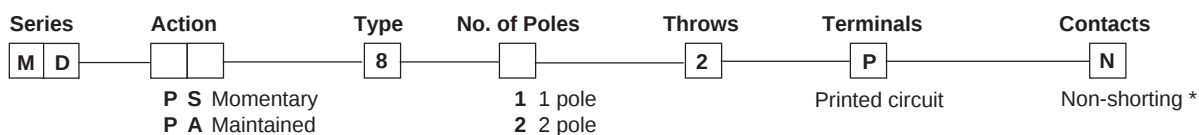
## 'BUILD YOUR OWN SWITCH' ORDER FORMAT

Fill in boxes with selections shown for complete model number.  
(Allowable options are shown under each respective box).

### TYPE 5:



### TYPE 8:

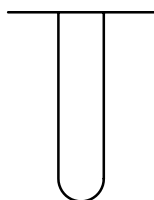


\*Shorting available-consult factory.

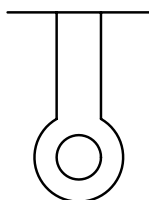
Example of completely specified model number: **MDPS542WN**

### TERMINAL CONFIGURATIONS

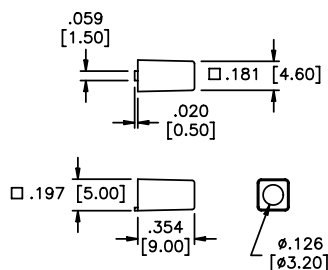
### COLOR KNOBS FOR TYPE 8 MODELS



PRINTED CIRCUIT



SOLDER LUG



| MODEL NO. | COLOR |
|-----------|-------|
| C152      | Black |
| C154      | Gray  |
| C156      | Red   |

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

# MD1 SERIES PUSHBUTTON SWITCHES

## FEATURES

- Power ratings include TV-5 & TV-8 (TV-5 rating shown)
- Double pole single throw alternate action.
- TV-5 & TV-8 ratings are UL, CSA, VDE & SEMKO recognized. TV-8 ratings are also NEMKO, DEMCO, SETI and SEV recognized.
- Panel mounting with threaded mounting holes.

## MATERIALS

Base: Phenolic, UL94V-O  
 Frame: Zinc plated steel  
 Actuator: 30% glass fiber PBT, color gray  
 Terminals: Silver plated copper alloy  
 Contacts: Silver copper alloy

## GENERAL SPECIFICATIONS

### ELECTRICALS

Contact ratings: UL: 7.5 amps @ 125/250 VAC, TV5&8 CSA:10 amps @ 125/250 VAC,TV5&8 VDE, SEMCO, NEMCO, SETI, DEMCO & SEV: 8A/128A @ 250 VAC  $\mu$ T85  
 Insulation resistance: 100 megohms min. (500 VDC)  
 Dielectric withstanding voltage: 1000 VAC for 1 minute  
 Contact resistance: 20 milliohms max.  
 Electrical life: 25,000 cycles min.  
 Mechanical life: 30,000 cycles min.

### MECHANICALS, THERMALS

Actuation force: 500 grams  $\pm$ 200 grams Travel: .098" (2.5mm)  
 Operating temperature range: -10 °C to +85 °C

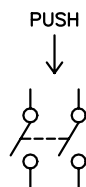
### SOLDERING

Solder heat resistance: 230°C max. for 3  $\pm$ 0.5 seconds

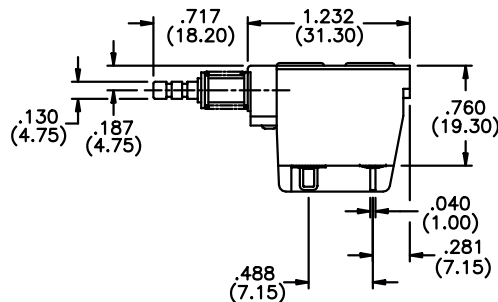
#### MD12T5



SOLDER LUG TERMS.



SCHEMATIC

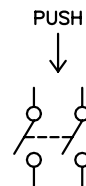


MECHANICAL OUTLINE

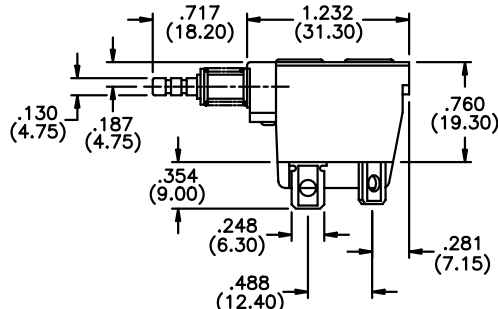
#### MD12L5



QUICK CONNECT TERMS.



SCHEMATIC



MECHANICAL OUTLINE

# MD2 SERIES PUSHBUTTON SWITCHES

## FEATURES

- Power ratings include TV-5
- Single pole single throw alternate action.
- UL, CSA, VDE and SEMKO recognized.
- Panel mounting with threaded mounting holes and p.c. mounting with restraining bracket.

## MATERIALS

Base: Phenolic, UL94V-O  
 Frame: Zinc plated steel (panel mtg. models)  
 Tin plated steel (p.c. mtg. models)  
 Actuator: PBT, nylon 66, UL94V-2 min.  
 Terminals: Silver plated copper alloy  
 Contacts: Silver copper alloy

## GENERAL SPECIFICATIONS

### ELECTRICALS

|                                  |                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------|
| Contact ratings:                 | UL & CSA: 15 amps @ 125 VAC, 10 amps @ 250 VAC, TV-5<br>VDE & SEMCO: 5A/80A @ 250 VAC $\mu$ T85 |
| Insulation resistance:           | 100 megohms min. (500 VDC)                                                                      |
| Dielectric withstanding voltage: | 1000 VAC for 1 minute                                                                           |
| Contact resistance:              | 20 milliohms max.                                                                               |
| Electrical life:                 | 10,000 cycles min.                                                                              |
| Mechanical life:                 | 30,000 cycles min.                                                                              |

### MECHANICALS, THERMALS

|                              |                           |
|------------------------------|---------------------------|
| Actuation force:             | 400 grams $\pm$ 200 grams |
| Operating temperature range: | -10 °C to +85 °C          |

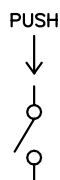
### SOLDERING

|                         |                                    |
|-------------------------|------------------------------------|
| Solder heat resistance: | 230°C max. for 3 $\pm$ 0.5 seconds |
|-------------------------|------------------------------------|

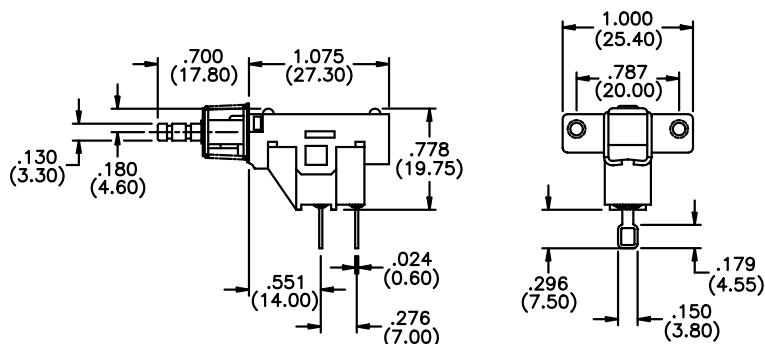
### MD2BM4T1



PANEL MOUNTING WITH  
SOLDER LUG TERMS.



SCHEMATIC

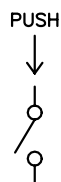


MECHANICAL OUTLINE

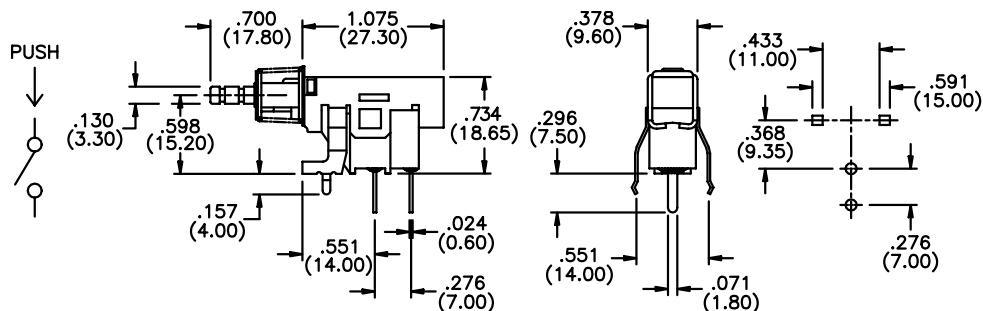
### MD2CP4T3



P.C. MOUNTING



SCHEMATIC



MECHANICAL OUTLINE

P.C. BOARD LAYOUT

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

# AV SERIES PUSHBUTTON SWITCHES

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Designed to meet stringent security requirements, all AV Series models are rugged, durable and cosmetically attractive.

All models feature:

- Long life.
- Anti-jamming construction.
- Minimum clearance between actuator and bushing, to prevent willful damage by means of insertion of foreign parts or matter.
- Protection against crushing of contacts and switch mechanism.



In addition, all standard models are sealed to Specification IP54. IP54 specifies that the switch enclosure must be dust-protected (no harmful penetration) as well as resistant to splashing water. Optional sealing to IP65 is also available on all models, and is provided with a front panel sealing gasket as well. IP65 specifies that the switch enclosure must be dust-tight (no penetration) as well as resistant to jets of water from any direction.

The AV Series consists of 3 categories of pushbutton switches designated **Anti-Vandal**, **Security** and **Snap-Action Security**. The distinctive features are:

**Anti-Vandal** - Highest impact resistance provided by a mechanical stop and added ruggedness provided by a stainless steel actuator and bushing. The 19mm models meet IP..7 which specifies the switch must withstand a hammer blow to the actuator with a striking energy of 6 joules, while the 22mm models meet IP..9 which specifies the switch must similarly withstand 20 joules of energy. In both of these cases, no resulting damage is permissible per the specification. (Continued).

# AV SERIES PUSHBUTTON SWITCHES

**Security** - High impact resistance and ruggedness with a large variety of options, including actuator shapes, electrical functions, connections, finish and marking options.

**Snap-Action Security** - High impact resistance and ruggedness. All of these models feature tactile response and optional illumination and marking.

AV Series switches are shown on the following pages in order of the above categories. For ease in selecting the correct model for your application, the following table lists key parameters by switch category in order of ascending ratings.

| CATEGORY                    | RATING(S)<br>(RESISTIVE)                              | ELECTRICAL .<br>CONFIGURATION          | SIZE<br>(mm) | ADD'L. SPECS.<br>SEE ALSO | PAGE       |
|-----------------------------|-------------------------------------------------------|----------------------------------------|--------------|---------------------------|------------|
| <b>ANTI-VANDAL</b>          | 2 A 48 VDC<br>2 A 48 VDC                              | SPST NO Momentary<br>SPST NO Momentary | 19<br>22     | -<br>-                    | C87<br>C88 |
| <b>SECURITY</b>             | 1 A 30 V                                              | SPST NO & NC Mom                       | 19           | 9000 Series               | C89        |
|                             | 2 A 48 VDC                                            | SPST NO Momentary                      | 19           | -                         | C90        |
|                             | 2 A 48 VDC                                            | SPST NO Momentary                      | 22           | -                         | C91        |
| <b>New!</b>                 | 3 A 120 VAC or 28 VDC,<br>1.5 A 250 VAC & Dry Circuit | SPST NO Momentary                      | 19           | 300 Series                | C92        |
|                             | 3 A 125 VAC, 2 A 250 VAC,<br>2.5 A 24 VDC             | SPST NC Momentary                      | 22           | 1200 Series               | C93        |
|                             | 6 A 125 VAC, 3 A 250 VAC,<br>3 A 24 VDC               | DPDT ON-ON Alternate                   | 22           | 4700 Series               | C94        |
| <b>New!</b>                 | 6 A 125 VAC, 3 A 250 VAC,<br>7 A 30 VDC & Dry Circuit | SPDT NO & NC Mom.                      | 19           | PB Series                 | C95        |
| <b>SNAP-ACTION SECURITY</b> | 50 mA 24 VDC                                          | SPST NO Momentary                      | 19           | -                         | C96        |
|                             | 50 mA 24 VDC                                          | SPST NO Mom. (lighted)                 | 19           | -                         | C97        |
| <b>New!</b>                 | 3A 120 VAC or 28 VDC.<br>1.5 A 250 VAC & Dry Circuit  | SPST ON-OFF Alternate                  | 19           | 400 Series                | C98        |
| <b>New!</b>                 | 6 A 125 VAC, 3 A 250 VAC,<br>7 A 30 VDC & Dry Circuit | SPDT & DPDT,<br>NO & NC Mom.           | 19           | 800 Series                | C99        |

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

# AV SERIES ANTI-VANDAL PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** 2 A at 48 VDC max. (resistive load)  
**Initial contact resistance:** 10 milliohms max. at 1 A, 2 V  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 3000 V rms min. between terminals and frame and between terminals  
**Electrical life:** 10,000 cycles min. at full load  
**Mechanical life:** 1,000,000 cycles min.  
**Operating temperature range:** -20°C to +55°C  
**Solder heat resistance:** 300°C max. for 5 seconds  
**Washing not recommended**

## FEATURES

- .755" (19 mm) dia. and .866" (22 mm) dia. models.
- Single pole NO momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts & terminals:** Silver plated brass  
**Bushing & Actuator:** Stainless steel  
**Case:** PBT    **Hex. Mounting Nut:** Nickel plated brass

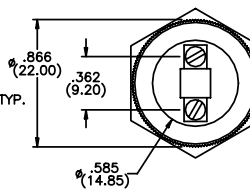
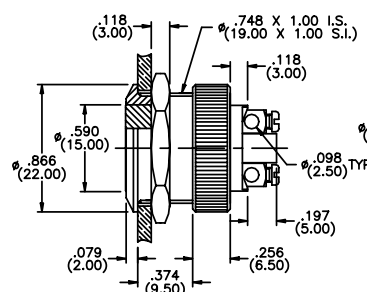
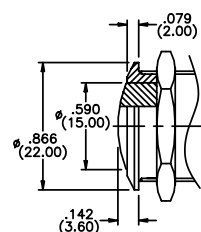
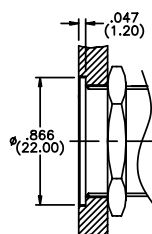
**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below.  
 Example of complete model no. -  
**AV191003C940N**

| Series | Bush./Act. Config. | Body Style | Function | Cont.Matl. | Term.Type | Bush./Act. Matl. | Sealing     |
|--------|--------------------|------------|----------|------------|-----------|------------------|-------------|
| AV     |                    | 100        | 3        | C          | 9         | 40               |             |
|        | 09<br>19<br>9D     |            |          |            |           |                  | N<br>R<br>T |

## 19mm

## Bushing/Actuator configurations

## Screw terminals



**9D** flat Act. w/flush mount Bush.    **19** curved Act. & Bush.

**09** flat Act. & curved Bush.

Rear view all models

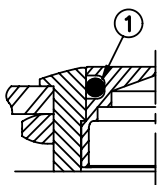


AV091003C940N  
(Model shown)

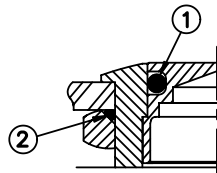


Schematic

**N** - no sealing (std'd)



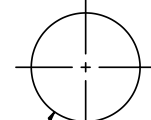
**R** ① Internal seal meets IP65



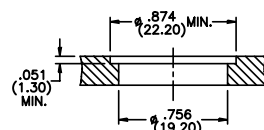
**T** ① Internal seal & ② front panel seals meet IP65

Sealing

For **09** & **19** Bush/Act



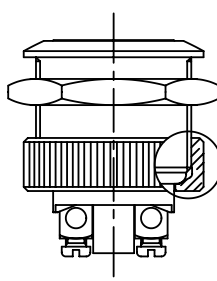
For **9D** Bush/Act



Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).

Mounting Holes

**R** and **T** sealing options also feature increased impact resistance provided by knurled nut as shown below.



# AV SERIES ANTI-VANDAL PUSHBUTTON SWITCHES

**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below. Example of complete model no. -

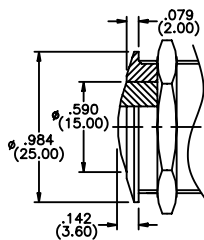
| Series | Bush./Act. Config.   | Body Style | Function | Cont.Matl. | Term.Type | Bush./Act. Matl. | Sealing     |
|--------|----------------------|------------|----------|------------|-----------|------------------|-------------|
| AV     |                      | 100        | 3        | C          | 9         | 40               |             |
|        | 02<br>03<br>M2<br>M3 |            |          |            |           |                  | N<br>R<br>T |

AV021003C940N

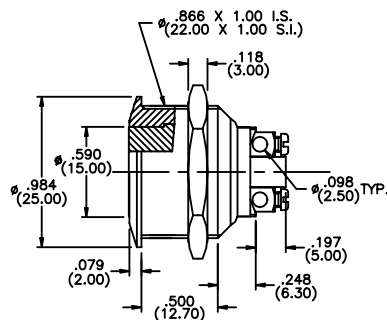
22mm

Bushing/Actuator configurations

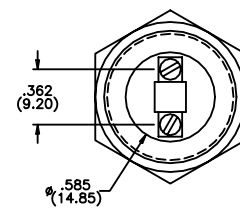
Screw terminals



02 curved Act. & Bush.



03 flat Act. & curved Bush.

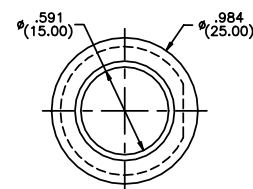


Rear view all models

M2 curved Actuator & curved Bushing with 'D' flat on Bushing

or

M3 flat Actuator & curved Bushing with 'D' flat on Bushing

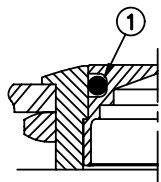


AV021003C940N  
(Model shown)

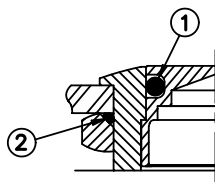


Schematic

N - no sealing (std'd)



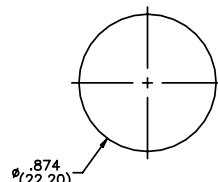
R ① Internal seal meets IP65



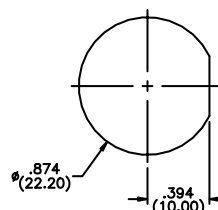
T ① Internal seal & ② front panel seals meet IP65

Sealing

For 02 & 03 Bush/Act



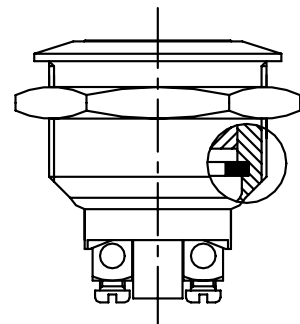
For M2 & M3 Bush/Act



Min. dimensions for matrix mounting: 1.181" (30mm) x 1.181" (30mm).

Mounting Holes

R and T sealing options also feature increased impact resistance provided by an internal ring as shown below.



# AV SERIES SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** 1 A at 30 V max. (resistive load)  
10  $\mu$ A at 5 V min.  
Note: current above 100 mA damages the gold plating.  
**Initial contact resistance:** 10 milliohms max. at 1 A, 2 V  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 2000 V rms min. between terms. & frame. 1000 V rms min. between terminals  
**Electrical life:** 250,000 cycles min. at full load  
**Mechanical life:** 1,000,000 cycles min.  
**Operating temperature range:** -20°C to +55°C  
**Solder heat resistance:** 300°C max. for 5 seconds  
**Washing not recommended**

## FEATURES

- .755" (19 mm) dia. models.
- Combined single pole NO & NC momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** Gold plated silver  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** PBT **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below.  
Example of complete model no. -  
**AV199035D200**

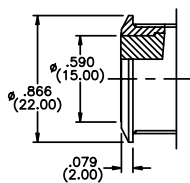
| Series | Bush./Act. Config. | Body Style | Function | Cont.Matl. | Term.Type | Bush./Act. Matl. | Sealing         |
|--------|--------------------|------------|----------|------------|-----------|------------------|-----------------|
| AV     | 09<br>19           | 903        | 5        | D          | 2         | 00               | Blank<br>E<br>K |

Other Bushing/Actuator materials available - flat thermoplastic Actuators available - Actuator marking available - consult factory.

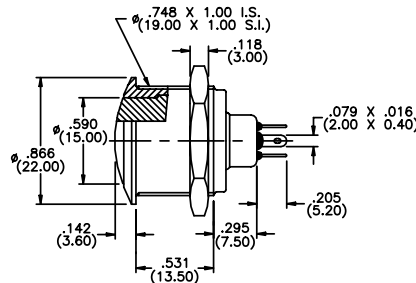
## 19mm

### Bushing/Actuator configurations

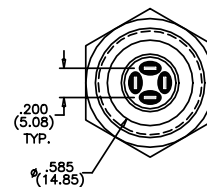
### Solder lug terminals



09 flat Act. & curved Bush.



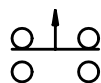
19 curved Act. & Bush.



Rear view all models

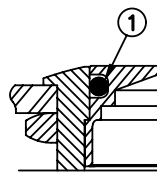


AV199035D200  
(Model shown)

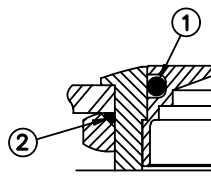


Schematic

**Blank** - no sealing (std'd)



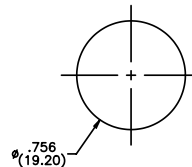
**E** ① Internal seal meets IP65



**K** ① Internal seal & ② front panel seals meet IP65

Sealing

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



Mounting Hole

# AV SERIES SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** 2 A at 48 VDC max. (resistive load)  
**Initial contact resistance:** 10 milliohms max. at 1 A, 2 V  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 3000 V rms min. between terms. & frame and between terminals  
**Electrical life:** 10,000 cycles min. at full load  
**Mechanical life:** 1,000,000 cycles min.  
**Operating temperature range:** -20°C to +55°C  
**Solder heat resistance:** 300°C max. for 5 seconds  
**Washing not recommended**

## FEATURES

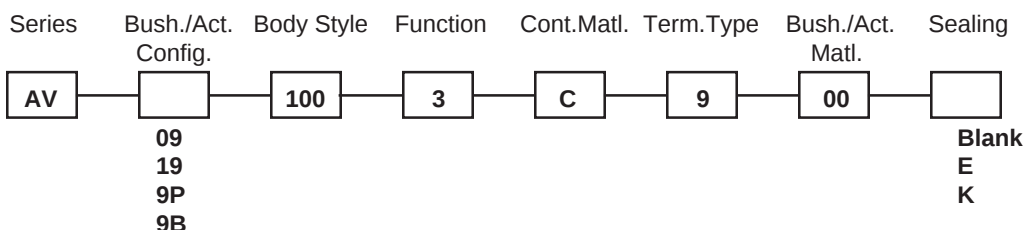
- .755" (19 mm) dia. and .866" (22 mm) dia. models.
- Single pole NO momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts & terminals:** Silver plated brass  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** PBT    **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below.

Example of complete model no. -  
**AV191003C900**

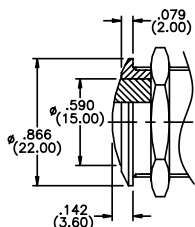


Other Bushing/Actuator materials available - flat thermoplastic Actuators available - Actuator marking available - consult factory.

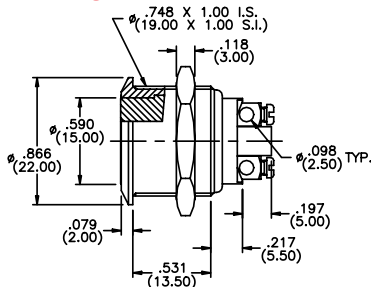
## 19mm

### Bushing/Actuator configurations

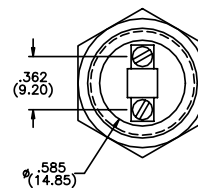
### Screw terminals



**19** curved Act. & Bush.



**09** flat Act. & curved Bush.



Rear view all models

**9B** curved Act. & Bush.  
 with knurled nut for  
 closer matrix mtg.

**9P** flat Act. & curved  
 Bush. with knurled nut  
 for closer matrix mtg.

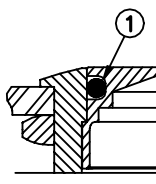
Min. dimensions for matrix mtg. for  
 options **9B** & **9P**: .984" (25mm) x  
 .984" (25mm). Order wrench p/n  
 U1929 for knurled nut.



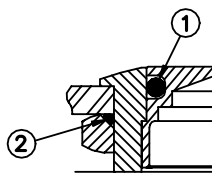
**AV191003C900**  
 (Model shown)

### Blank - no sealing (std'd)

**E** ① Internal seal meets IP65



**K** ① Internal seal & ② front panel seals meet IP65

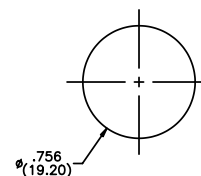


**Sealing**



**Schematic**

Min. dimensions for matrix mount-  
 ing: .984" (25mm) x .984" (25mm).



**Mounting Hole**

# AV SERIES SECURITY PUSHBUTTON SWITCHES

**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below.  
Example of complete model no. -

**AV021003C900**

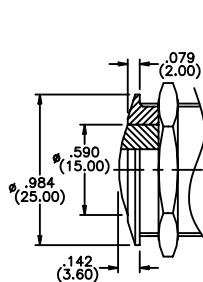
| Series | Bush./Act. Config.   | Body Style | Function | Cont.Matl. | Term.Type | Bush./Act. Matl. | Sealing         |
|--------|----------------------|------------|----------|------------|-----------|------------------|-----------------|
| AV     | 02<br>03<br>M2<br>M3 | 100        | 3        | C          | 9         | 00               | Blank<br>E<br>K |

Other Bushing/Actuator materials available - flat thermoplastic Actuators available - Actuator marking available - consult factory.

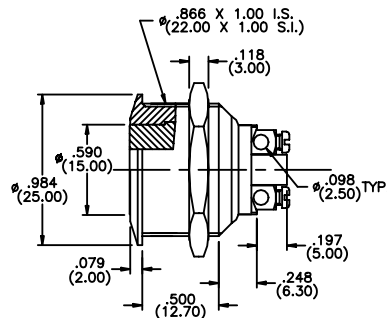
**22mm**

**Bushing/Actuator configurations**

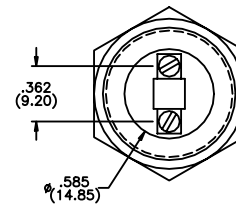
**Screw terminals**



**02** curved Act. & Bush.



**03** flat Act. & curved Bush.

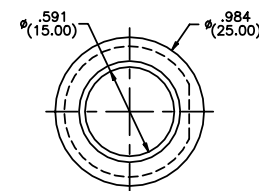


Rear view all models

**M2** curved Actuator & curved Bushing with 'D' flat on Bushing

or

**M3** flat Actuator & curved Bushing with 'D' flat on Bushing

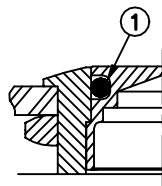


**AV021003C900**  
(Model shown)

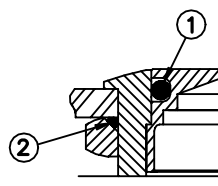


**Schematic**

**Blank** - no sealing (std'd)



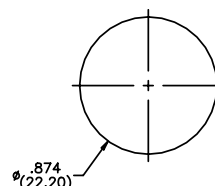
**E** ① Internal seal meets IP65



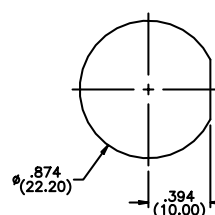
**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

For **02** & **03** Bush/Act



For **M2** & **M3** Bush/Act



Min. dimensions for matrix mounting: 1.181" (30mm) x 1.181" (30mm).

**Mounting Holes**

**New!**

# AV SERIES SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** Max. resistive loads: **Q** - 3 A 120 VAC (and life) or 28 VDC, 1.5 A 250 VAC - 10,000 cycles min. Also 1 A 120 VAC or 28 VDC, 0.5 A 250 VAC - 250,000 cycles min. **B** - 0.4 Volt-Amps max at 20 V max. - 250,000 cycles min.

**Initial contact resistance:** 10 mΩ max. at 3 V, 0.1 A

**Insulation resistance:** 10,000 megohms min.

**Dielectric strength:** 1000 V rms min.

**Operating temperature range:** -30°C to +85°C

**For additional specifications:** See 300 Series switches

## FEATURES

- .755" (19 mm) dia. models.
- Single pole NO momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** **Q** - Coin silver for power & UL models. **B** - Gold over nickel over brass for dry circuit models.

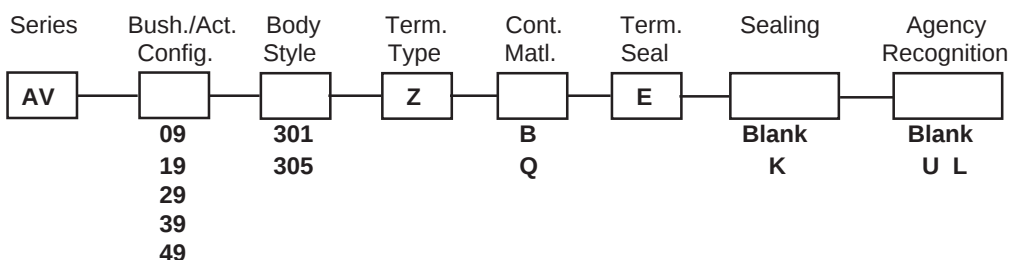
**Bushing & Actuator:** Nickel plated brass (std'd)

**Case:** Diallyl Phthalate **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in boxes with selected options shown below.

Example of complete model no. -

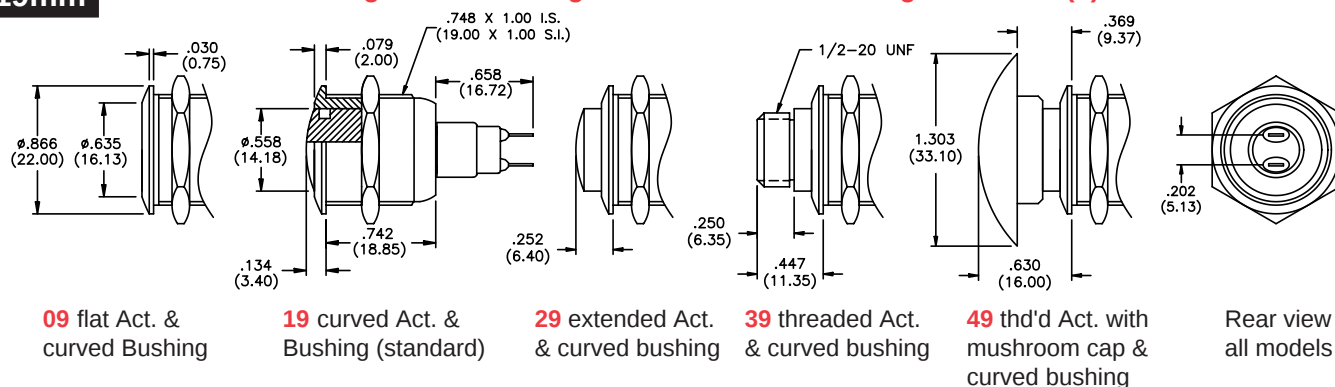
**AV19301ZQEK/UL**



## 19mm

### Bushing/Actuator configuration

### Solder lug terminals - (Z)

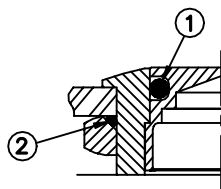


**AV19301ZQE/UL**  
(Model shown)



**Schematic**

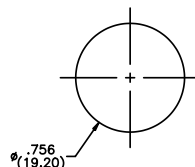
**Blank** - no sealing (std'd)



**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



**Mounting Hole**

Notes to Order Format:

**301** models have .020" (0.5mm) overtravel and .110" (2.79mm) total travel.

**305** models have .080" (2.03mm) overtravel and .110" (2.79mm) total travel.

**UL** option available only with Q option. UL rating: 1 A 125 VAC or 0.5 A 250 VAC (75% power factor). UL file E66367.

**E** option is epoxy terminal seal - standard.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

# AV SERIES SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** Max. resistive loads: , 3 A 125 VAC,  
2 A 250 VAC & 2.5 A 24 VDC  
**Initial contact resistance:** 10 milliohms max. at 1 A, 2 V  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 2000 V rms min. between terms. &  
frame. 2000 V rms min. between terminals  
**Electrical life:** 10,000 cycles at 0.3 A 24 V  
**Mechanical life:** 1,000,000 cycles min.  
**Operating temperature range:** -20°C to +55°C  
**Solder heat resistance:** 300°C max. for 5 seconds  
**Washing not recommended**

## FEATURES

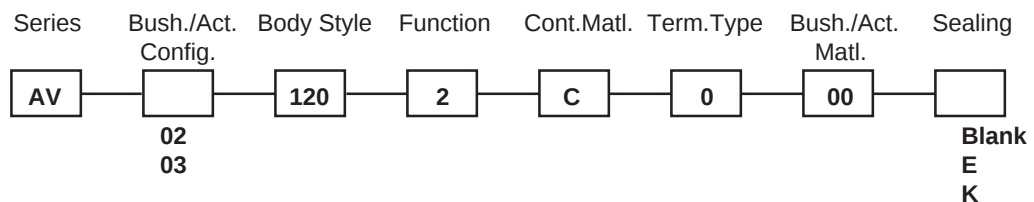
- .866" (22 mm) dia. models.
- Single pole NC momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts & terminals:** Silver plated brass  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** PBT **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in 2 empty boxes with selected options shown below.

Example of complete model no. -  
**AV021202C000**

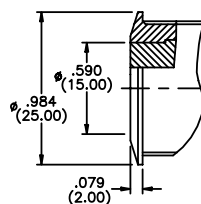


Other Bushing/Actuator materials available - flat thermoplastic Actuators available - Actuator marking available - consult factory.

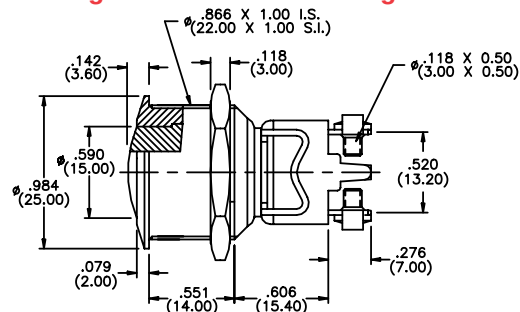
**22mm**

**Bushing/Actuator configurations**

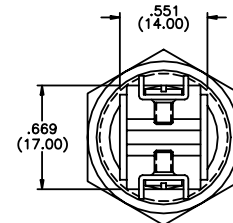
**Straight screw terminals w/clamp**



**03** flat Act. & curved Bush.



**02** curved Act.& Bush.



Rear view all models

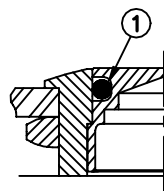


**AV021202C000**  
(Model shown)

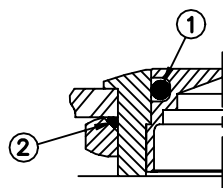


**Schematic**

**Blank** - no sealing (std'd)



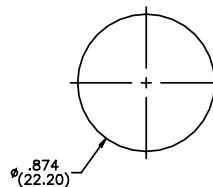
**E** ① Internal seal meets IP65



**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

Min. dimensions for matrix mounting: 1.181" (30mm) x 1.181" (30mm).



**Mounting Hole**

Note: Models on this page are VDE recognized and marked.

# AV SERIES SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** Max.resistive loads: 6 A 125 VAC, 3 A 250 VAC, & 3 A 24 VAC or VDC  
**Initial contact resistance:** 10 milliohms max. at 1 A, 2 V  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 3000 V rms min. between terms. & frame  
**Electrical life:** 10,000 cycles at full load, 50,000 cycles min. at 1 A 24 VAC of VDC  
**Mechanical life:** 50,000 cycles min.  
**Operating temperature range:** -20°C to +55°C  
**Solder heat resistance:** 300°C max. for 5 seconds

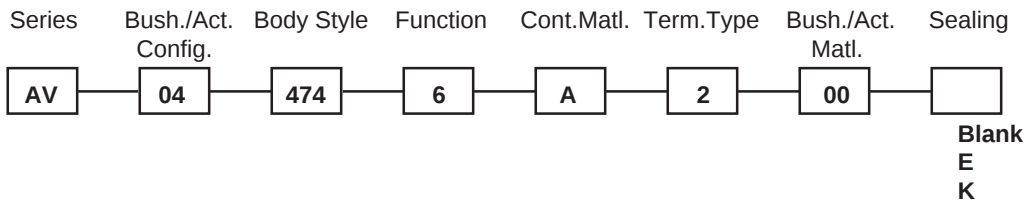
## FEATURES

- .866" (22 mm) dia. models.
- Double pole alternate action (ON - ON).
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** Silver  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** PBT **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in empty box with selected options shown below.  
 Example of complete model no. -  
**AV044746A200**

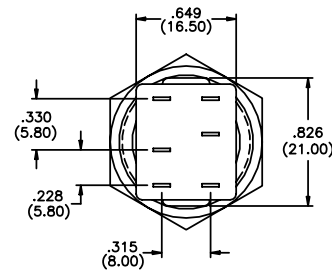
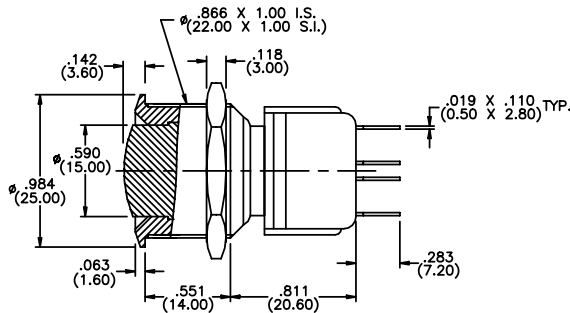


Other Bushing/Actuator materials available - flat thermoplastic Actuators available - Actuator marking available - consult factory.

## 22mm

### Bushing/Actuator configurations

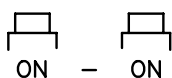
### Solder lug/quick connect terminals



04 curved Act. & Bush.

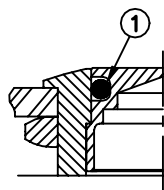


AV044746A200  
(Model shown)

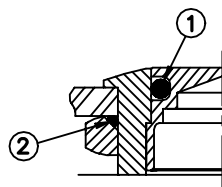


Schematic

Blank - no sealing (std'd)



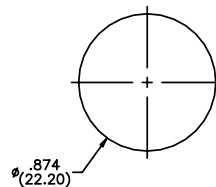
E ① Internal seal meets IP65



K ① Internal seal & ② front panel seals meet IP65

Sealing

Min. dimensions for matrix mounting: 1.181" (30mm) x 1.181" (30mm).



Mounting Hole

**New!**

# AV SERIES SECURITY PUSHBUTTON SWITCHES

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

**C**

## SPECIFICATIONS

**Contact ratings:** Max. resistive loads: **Q** - 6 A 125 VAC, 3 A 250 VAC or 7 A 30 VDC.  
**B** - 0.4 Volt-Amps max at 20 V max.  
**Initial contact resistance:** 5 mΩ max. at 3 VDC, 0.1 A  
**Insulation resistance:** 200,000 megohms minimum between terminals & case ground.  
**Dielectric strength:** 2000 VAC min. between terminals and case ground.  
**Electrical life:** 100,000 cycles min.  
**Operating temperature range:** -30°C to +85°C  
**For additional specifications:** See PB Series switches

## FEATURES

- .755" (19 mm) dia. models.
- Single pole double throw NO & NC momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** **Q** - Coin silver for power & UL models. **B** - Gold over nickel over brass for dry circuit models.  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** Diallyl Phthalate    **Hex. Mounting Nut:** Nickel plated brass

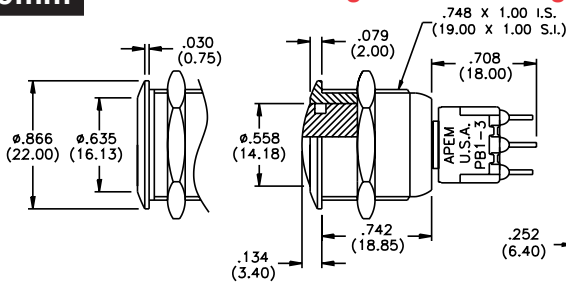
**ORDER FORMAT:** For complete model no., fill in boxes with selected options shown below. Example of complete model no. -  
**AV19PB1-3P2Y1ZQE/UL**

| Series | Bush./Act. Config.               | Body Style | Term. Type | Cont. Matl. | Term. Seal | Sealing    | Agency Recognition |
|--------|----------------------------------|------------|------------|-------------|------------|------------|--------------------|
| AV     | 19<br>09<br>19<br>29<br>39<br>49 | PB1-3P2Y1  | Z          | B<br>Q      | E          | Blank<br>K | Blank<br>UL        |

## 19mm

### Bushing/Actuator configuration

### Solder lug terminals - (Z)



**09** flat Act. & curved Bushing

**19** curved Act. & Bushing (standard)

**29** extended Act. & curved bushing

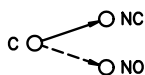
**39** threaded Act. & curved bushing

**49** thd'd Act. with mushroom cap & curved bushing

Rear view all models

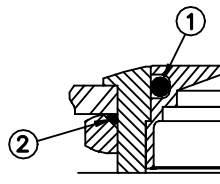


**AV19PB1-3P2Y1ZQE**  
(Model shown)



**Schematic**

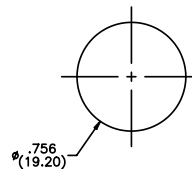
**Blank** - no sealing (std'd)



**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



**Mounting Hole**

Notes to Order Format:

**UL** option available only with Q option. UL rating: 6 A 125 VAC or 3 A 250 VAC (75% power factor). UL file E66367.

**E** option is epoxy terminal seal - standard.

# AV SERIES

## SNAP-ACTION SECURITY PUSHBUTTON SWITCHES

### SPECIFICATIONS

**Contact ratings:** Max.resistive load: 50mA at 24 VDC  
**Initial contact resistance:** 100 milliohms max.  
**Insulation resistance:** 1000 megohms min. at 500 VDC  
**Dielectric strength:** 500 V rms min. between terms.  
 2000 V rms between terms & bushing  
**Electrical life:** 1,000,000 cycles at full load  
**Operating force:** 25 oz.  $\pm$  7 oz.  
**Travel:** .027" (0.7mm)  $\pm$  .003" (0.1mm)  
**Panel thickness:** .039" (1mm) to .433" (11mm)  
**Operating temperature range:** -30°C to +70°C  
**Solder heat resistance:** 270 °C max. for 3 seconds

### FEATURES

- .755" (19 mm) dia. models.
- Single pole NO momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

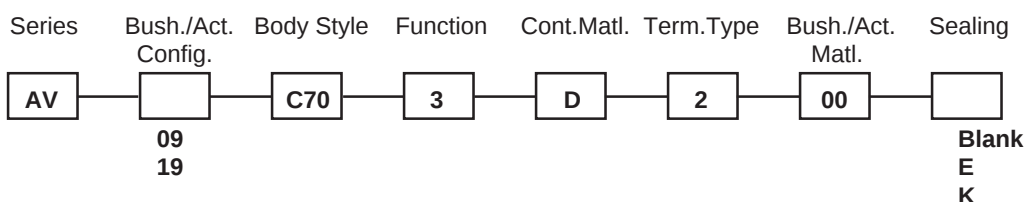
### MATERIALS

**Contacts:** Gold plated dome    **Terminals:** Gold plated brass  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** PBT    **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in empty boxes with selected options shown below. Example of complete model no. -

**AV19C703D200**

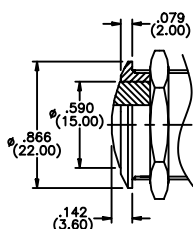
Other Bushing/Actuator materials available - consult factory.



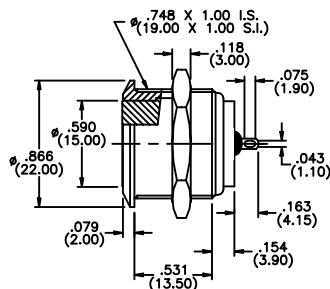
### 19mm

### Bushing/Actuator configurations

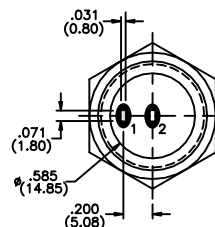
### Solder lug terminals



19 curved Act. & Bush.



09 flat Act.& curved Bush.



Rear view all models

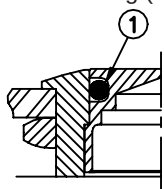


AV09C703D200  
(Model shown)

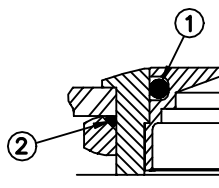


Schematic

**Blank** - no sealing (std'd)



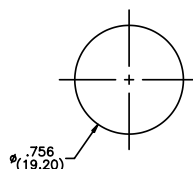
**E** ① Internal seal meets IP65



**K** ① Internal seal & ② front panel seals meet IP65

Sealing

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



Mounting Hole

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

**New!**

# AV SERIES SNAP-ACTION SECURITY PUSHBUTTON SWITCHES

## SPECIFICATIONS

**Contact ratings:** Max. resistive loads: **Q** - 3 A 120 VAC (and life) or 28 VDC, 1.5 A 250 VAC - 10,000 cycles min. Also 1 A 120 VAC or 28 VDC, 0.5 A 250 VAC - 250,000 cycles min. **B** - 0.4 Volt-Amps max at 20 V max. - 250,000 cycles min.

**Initial contact resistance:** 10 mΩ max. at 3 V, 0.1 A

**Insulation resistance:** 10,000 megohms min.

**Dielectric strength:** 1000 V rms min.

**Operating temperature range:** -30°C to +85°C

**For additional specifications:** See 400 Series switches

## FEATURES

- .755" (19 mm) dia. models.
- Single pole ON-OFF alternate & momentary actions.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** **Q** - Coin silver for power & UL models. **B** - Gold over nickel over brass for dry circuit models.

**Bushing & Actuator:** Nickel plated brass (std'd)

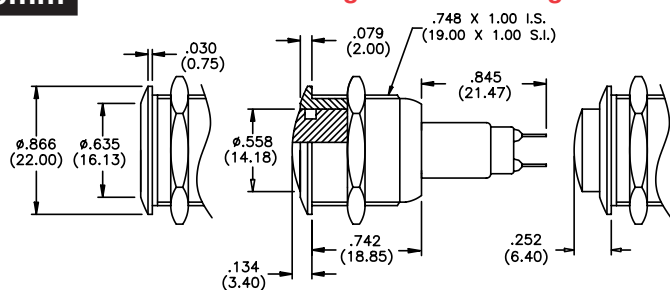
**Case:** Diallyl Phthalate **Hex. Mounting Nut:** Nickel plated brass

**ORDER FORMAT:** For complete model no., fill in boxes with selected options shown below.  
Example of complete model no. -  
**AV19401ZQE/UL**

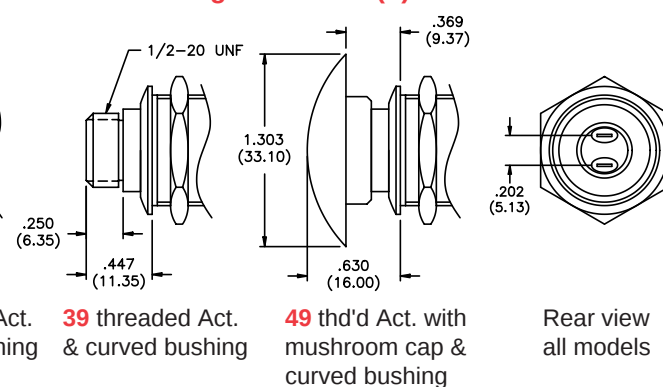
| Series | Bush./Act. Config.         | Body Style | Term. Type | Cont. Matl. | Term. Seal | Sealing    | Agency Recognition |
|--------|----------------------------|------------|------------|-------------|------------|------------|--------------------|
| AV     | 09<br>19<br>29<br>39<br>49 | 401<br>402 | Z          | B<br>Q      | E          | Blank<br>K | Blank<br>UL        |

## 19mm

### Bushing/Actuator configuration



### Solder lug terminals - (Z)

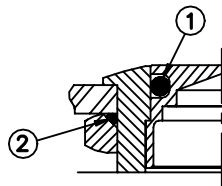


**AV19401ZQE/UL  
(Model shown)**



**Schematic**

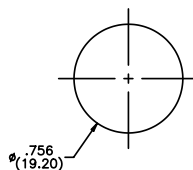
### Blank - no sealing (std'd)



**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



**Mounting Hole**

### Notes to Order Format:

**401** is alternate action.  
**402** is momentary action.

**401** models have .026" (0.7mm) to contact closure, .106" (2.7mm) travel to activate switch and .137" (3.5mm) total travel.

**UL** option available only with Q option. UL rating: 1 A 125 VAC or 0.5 A 250 VAC (75% power factor). UL file E66367.

**E** option is epoxy terminal seal - standard.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

**New!**

# AV SERIES SNAP-ACTION SECURITY PUSHBUTTON SWITCHES

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

**C**

## SPECIFICATIONS

**Contact ratings:** Max. resistive loads: **Q** - 6 A 125 VAC, 3 A 250 VAC or 7 A 30 VDC.  
**B** - 0.4 Volt-Amps max at 20 V max.  
**Initial contact resistance:** 20 mΩ max. at 3 VDC, 0.1 A  
**Insulation resistance:** 200,000 megohms minimum between terminals & case ground.  
**Dielectric strength:** 1500 VAC min. between terminals and case ground.  
**Electrical life:** 60,000 cycles min.  
**Operating temperature range:** -30°C to +85°C  
**For additional specifications:** See 800 Series switches

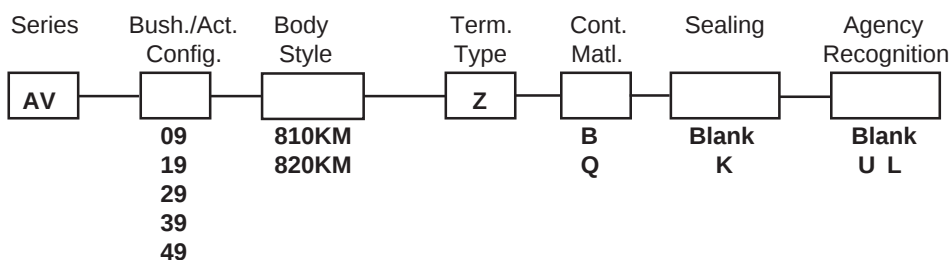
## FEATURES

- .755" (19 mm) dia. models.
- SPDT and DPDT with NO & NC momentary action.
- Standard - sealing protection per IP547 or IP549.
- Optional - sealing protection per IP657 or IP659.
- Extremely rugged and durable.

## MATERIALS

**Contacts:** **Q** - Coin silver for power & UL models. **B** - Gold over nickel over brass for dry circuit models.  
**Bushing & Actuator:** Nickel plated brass (std'd)  
**Case:** Diallyl Phthalate    **Hex. Mounting Nut:** Nickel plated brass

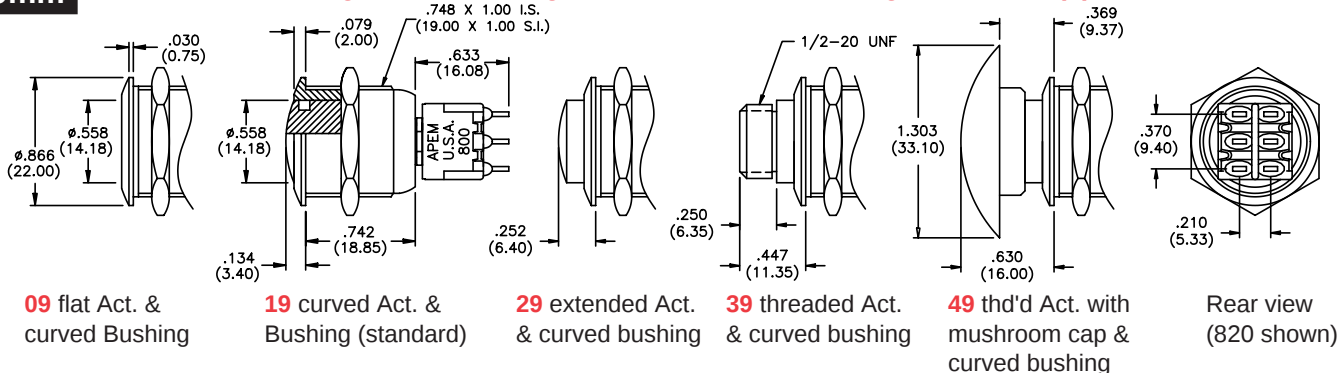
**ORDER FORMAT:** For complete model no., fill in boxes with selected options shown below.  
 Example of complete model no. -  
**AV19810KMZQK/UL**



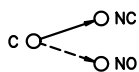
## 19mm

### Bushing/Actuator configuration

### Solder lug terminals - (Z)

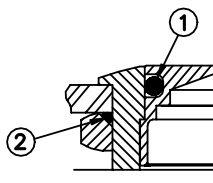


**AV19820KMZQ/UL**  
(Model shown)



**Schematic**

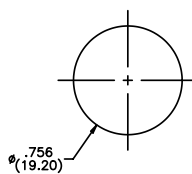
**Blank** - no sealing (std'd)



**K** ① Internal seal & ② front panel seals meet IP65

**Sealing**

Min. dimensions for matrix mounting: .984" (25mm) x .984" (25mm).



**Mounting Hole**

### Notes to Order Format:

810KM is SPDT

820KM is DPDT

**UL** option available only with Q option. UL rating: 6 A 125 VAC or 3 A 250 VAC (75% power factor). UL file E66367.

Epoxy terminal seal is standard on all models.